Ozone Health Risk Assessment

for Selected Urban Areas

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PREFACE TO JULY 2007 EDITION

This July 2007 edition contains revised lung function risk estimates based on revised exposure estimates resulting from technical corrections to the exposure model made subsequent to the January 2007 editions of the Staff Paper and accompanying Technical Support Document (TSD). As noted in chapters 4 and 5 of the July 2007 edition of the Staff Paper, a small error was detected in the exposure model in January 2007 that resulted in small increases in the exposure estimates. This error has been corrected and the model runs have been redone, generally resulting in small increases in the exposure estimates. The revised lung function risk estimates, based on the corrected exposure estimates, are generally slightly higher than the original estimates presented in the January 2007 edition of the Staff Paper and accompanying TSD. The corrected lung function risk estimates for all children and for asthmatic children are presented in this edition of the TSD in Chapter 3 and associated appendices as well as in the July 2007 edition of the Staff Paper. Due to time constraints, however, the lung function risk estimates for active children, presented in Appendix C of the TSD, were not revised. Also due to time constraints, the date on the footer was not updated to July 2007. Sections 1, 2, and 4 of this edition of the TSD and the results in the Appendices for health endpoints other than lung function remain unchanged with the exception of some minor corrections and updates to several references.

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1 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) is presently conducting a review of the national ambient air quality standards (NAAQS) for ozone (O_3). Sections 108 and 109 of the Clean Air Act (Act) govern the establishment and periodic review of the NAAQS. These standards are established for pollutants that may reasonably be anticipated to endanger public health and welfare, and whose presence in the ambient air results from numerous or diverse mobile or stationary sources. The NAAQS are to be based on air quality criteria, which are to accurately reflect the latest scientific knowledge useful in indicating the kind and extent of identifiable effects on public health or welfare that may be expected from the presence of the pollutant in ambient air. The EPA Administrator is to promulgate and periodically review, at five-year intervals, "primary" (health-based) and "secondary" (welfare-based) NAAQS for such pollutants.[1] Based on periodic reviews of the air quality criteria and standards, the Administrator is to make revisions in the criteria and standards, and promulgate any new standards, as may be appropriate. The Act also requires that an independent scientific review committee advise the Administrator as part of this NAAQS review process, a function performed by the Clean Air Scientific Advisory Committee (CASAC).

EPA's overall plan and schedule for this O_3 NAAQS review is presented in a *Plan for Review of the National Ambient Air Quality Standards for Ozone* (EPA, 2005a), which is available at: http://www.epa.gov/ttn/naaqs/standards/ozone/s_o3_cr_pd.html . That plan discusses the preparation of two key documents in the NAAQS review process: an Air Quality Criteria Document (hereafter cited as CD) and a Staff Paper. The CD provides a critical assessment of the latest available scientific information upon which the NAAQS are to be based, and the Staff Paper evaluates the policy implications of the information contained in the CD and discusses standard-setting options for the Administrator to consider. In conjunction with preparation of the Staff Paper, staff in EPA's Office of Air Quality Planning and Standards (OAQPS) conducts various policy-relevant assessments, including in this review a quantitative exposure analysis and a human health risk assessment. Both the exposure analysis and the risk assessment require a quantitative analysis of O_3 air quality. The methods and results of this analysis are described in Chapters 2 and 4 of the Staff Paper (EPA, 2007a) (hereafter "Staff Paper") and in Fitz-Simons et al. (2005) and Rizzo (2005, 2006). The methods and results of the modeling of personal exposures are discussed in Chapter 4 of the Staff Paper and in an accompanying technical support document (EPA, 2007b). The methods and results of the human health risk assessment are described in this document.

[1] Section 109(b)(1) [42 U.S.C. 7409] of the Act defines a primary standard as one "the attainment and maintenance of which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health."

As part of the last O_3 NAAQS review, EPA conducted exposure analyses for the general population; children, who spend more time outdoors; and outdoor workers. Exposure estimates were generated for 9 urban areas for existing (referred to as "as is") air quality and for just meeting the existing 1-hour standard and several alternative 8-hour standards. Several reports (Johnson et al., 1996a,b,c; Johnson, 1997) that describe these analyses can be found at: http://www.epa.gov/ttn/naaqs/standards/ozone/s_o3_pr_td.html. EPA also conducted a health risk assessment that produced risk estimates for the number and percent of children experiencing lung function and respiratory symptoms associated with the exposures estimated for these same 9 urban areas. This portion of the risk assessment was based on exposure-response relationships developed from analysis of data from several controlled human exposure studies. The risk assessment for the last review also included risk estimates for excess respiratory-related hospital admissions related to O_3 concentrations for New York City based on a concentration-response relationship reported in an epidemiology study. Risk estimates for lung function decrements, respiratory symptoms, and hospital admissions were developed for "as is" air quality and for just meeting the existing 1-hour standard and several alternative 8-hour standards. Reports describing the health risk assessment (Whitfield et al., 1996; Whitfield, 1997) can be found at: http://www.epa.gov/ttn/naaqs/standards/ozone/s_o3_pr_td.html.

The health risk assessment described in this report builds upon the methodology and lessons learned from the exposure and risk work conducted for the last review. This report is also based on the information and evaluation contained in the final O_3 CD (EPA, 2006a) (hereafter O_3 CD). The general approach used in the current risk assessment was described in the draft Health Assessment Plan (EPA, 2005b), that was released to the CASAC and general public in April 2005 for review and comment and was the subject of a consultation with the CASAC O_3 Panel on May 5, 2005. The approach used in the current risk assessment reflects consideration of the comments offered by CASAC members and the public on the draft Health Assessment Plan; comments offered on the first drafts of the Staff Paper and Risk Assessment TSD at and subsequent to a consultation with CASAC on December 8, 2005; CASAC comments provided to the EPA in letters dated February 16, 2006 (Henderson, 2006a) and June 5, 2006 (Henderson, 2006b); and comments offered on the second draft Staff Paper and draft Risk Assessment TSD at and subsequent to a consultation with CASAC on August 24 and 25, 2006, including CASAC comments provided to EPA in a letter dated October 24, 2006 (Henderson, 2006c).

The O_3 health risk assessment described in this document estimates the health effects associated with short-term exposures to O_3 under recent ("as is") air quality levels and upon just meeting the current and several alternative O_3 primary NAAQS in selected sample urban areas. These assessments cover a variety of health effects for which there is adequate information to develop quantitative risk estimates. However, there are several health endpoints for which there currently is insufficient information to develop quantitative risk estimates. These additional health endpoints are discussed qualitatively in the Staff Paper. The risk assessment is intended as a tool that, together with other information on these health endpoints and other health effects evaluated in the O_3 CD and

Staff Paper, can aid the Administrator in judging whether the current primary standard protects public health with an adequate margin of safety, or whether revisions to the standard are appropriate.

The basic structure of the risk assessment reflects the two different types of studies on which the health risk assessment for O_3 is based: controlled human exposure studies, and epidemiological studies. This basic structure, as well as some preliminary considerations, is described in Section 2. Section 3 describes the methods and results of that portion of the risk assessment based on controlled human exposure studies. Section 4 describes the methods and results of that portion of the risk assessment based on epidemiological studies.

2 PRELIMINARY CONSIDERATIONS

The health risk assessment described in this report estimated various health effects associated with O_3 exposures for recent ("as is") O_3 levels, based on 2002, 2003, and 2004 air quality data, as well as the reduced risks for one O_3 season associated with just meeting the current 8-hour daily maximum O_3 NAAQS and several alternative 8-hour daily maximum standards. Risk estimates were developed for 12 urban areas located throughout the U.S. In this section we address preliminary considerations. Section 2.1 briefly discusses the broad empirical basis for a relationship between O_3 exposures and adverse health effects. Section 2.2 describes the basic structure of the risk assessment. Finally, Section 2.3 addresses air quality considerations that affect both major portions of the risk assessment described in Section 2.2.

2.1 The Broad Empirical Basis for a Relationship Between O_3 and Adverse Health Effects

The health endpoints examined in the risk assessment include: lung function decrements, respiratory-related hospital admissions, and mortality. In addition, estimates of respiratory symptoms in asthmatic children were developed for one urban area. The empirical basis for a relationship between O_3 exposures and adverse human health effects extends well beyond these specific health effects, however, and is by now considered quite solid.

In its October 24, 2006 letter to the EPA administrator (Henderson, 2006c), the CASAC affirmed this solid empirical basis, quoting and concurring with EPA's own assessment, as stated in the second draft Staff Paper (EPA, 2006b):

> "… While being mindful of important remaining uncertainties, staff concludes that the newly available information generally reinforces our judgments about causal relationships between O_3 exposure and respiratory effects observed in the last review and broadens the evidence of O_3-related associations to include additional respiratory-related endpoints, newly identified cardiovascular-related health endpoints, and mortality. Newly available evidence also has identified increased susceptibility in people with asthma. While recognizing that important uncertainties and research questions remain, we also conclude that progress has been made since the last review in advancing our understanding of potential mechanisms by which ambient O_3, alone and in combination with other pollutants, is causally linked to a range of respiratory- and cardiovascular-related health endpoints." (Pages 6-6 and 6-7)

The CASAC pointed to "several new single-city studies and large multi-city studies designed specifically to examine the effects of ozone and other pollutants on both morbidity and mortality" that have "provided more evidence for adverse health effects at concentrations lower than the current standard." (Henderson, 2006c, p. 3). The CASAC also pointed to the results from controlled human exposure studies, noting that "these findings were observed in healthy volunteers" and that, although similar studies in sensitive groups such as asthmatics have not yet been conducted, "people with asthma, and particularly children, have been found to be more sensitive and to experience larger decrements in lung function in response to ozone exposures than would healthy volunteers" (Henderson, 2006c, p. 4).

The CASAC also noted that, in addition to the lung function decrements seen in controlled human exposure studies, "adverse health effects due to low-concentration exposure to ambient ozone (that is, below the current primary 8-hour NAAQS) … include: an increase in school absenteeism; increases in respiratory hospital emergency department visits among asthmatics and patients with other respiratory diseases; an increase in hospitalizations for respiratory illnesses; an increase in symptoms associated with adverse health effects, including chest tightness and medication usage; and an increase in mortality (non-accidental, cardiorespiratory deaths) reported at exposure levels well below the current standard. *The CASAC considers each of these findings to be an important indicator of adverse health effects*" (Henderson, 2006c, p. 4).

2.2 Basic Structure of the Risk Assessment

At this time, two general types of human studies are particularly relevant for deriving quantitative relationships between O_3 levels and human health effects: controlled human exposure studies and epidemiological studies. Controlled human exposure studies involve volunteer subjects who are exposed while engaged in different exercise regimens to specified levels of O_3 under controlled conditions for specified amounts of time. The responses measured in such studies have included measures of lung function, such as forced expiratory volume in one second (FEV_1), respiratory symptoms, airway hyperresponsiveness, and inflammation. As noted above, prior EPA risk assessments for O_3 have included risk estimates for lung function decrements and respiratory symptoms based on analysis of individual data from controlled human exposure studies. For the current health risk assessment, we used exposure-response relationships based on analysis of individual data that describe the relationship between a measure of personal exposure to O_3 and the measure(s) of lung function recorded in several studies. The measure of personal exposure to ambient O_3 is typically some function of hourly exposures – e.g., 1-hour maximum or 8-hour maximum. Therefore, a risk assessment based on exposure-response relationships derived from controlled human exposure study data requires estimates of personal exposure to O_3, typically on a 1-hour or multi-hour basis. Because data on personal hourly O_3 exposures are not available, estimates of personal exposures to varying ambient concentrations were derived through exposure modeling, as described in the exposure analysis technical support document (EPA, 2007b).

In contrast to the exposure-response relationships derived from controlled human exposure studies, epidemiological studies provide estimated concentration-response (C-R) relationships based on data collected in real world settings. Ambient O_3 concentration is typically measured as the average of monitor-specific measurements. Population health responses for O_3 have included lung function decrements, respiratory symptoms in moderate to severe asthmatic children, asthma emergency department visits, respiratory-related hospital admissions and premature mortality. As described more fully below, a risk assessment based on epidemiological studies requires baseline incidence rates and population data for the risk assessment locations.

The characteristics that are relevant to carrying out a risk assessment based on controlled human exposure studies versus one based on epidemiology studies can be summarized as follows:

- A risk assessment based on controlled human exposure studies uses exposure-response functions, and therefore requires as input (modeled) personal exposures to O_3. A risk assessment based on epidemiology studies uses C-R functions, and therefore requires as input (monitored) ambient O_3 concentrations.

- Epidemiological studies are carried out in specific real world locations (e.g., specific urban areas). A risk assessment focused on locations in which the epidemiologic studies providing the C-R functions were carried out will minimize uncertainties. Controlled human exposure studies, carried out in laboratory settings, are generally not specific to any particular real world location. A controlled human exposure studies-based risk assessment can therefore appropriately be carried out for any location for which there are adequate air quality data on which to base the modeling of personal exposures.

- The adequate modeling of hourly personal exposures associated with ambient concentrations requires more complete ambient monitoring data than are necessary to estimate average ambient concentrations used to calculate risks based on C-R relationships. Therefore, there may be some locations in which an epidemiological studies-based risk assessment could appropriately be carried out but a controlled human exposure studies-based risk assessment would introduce significant additional uncertainty.

- To derive estimates of risk from C-R relationships estimated in epidemiological studies, it is usually necessary to have estimates of the baseline incidences of the health effects involved. Such baseline incidence estimates are not needed in a controlled human exposure studies-based risk assessment.

The methods and results for the two parts of the risk assessment – the part based on controlled human exposure studies and the part based on epidemiological studies – are discussed in Sections 3 and 4 below. Both parts of the risk assessment were implemented within a new probabilistic version of TRIM.Risk, the component of EPA's Total Risk Integrated Methodology (TRIM) model that estimates human health risks.

2.3 Air Quality Considerations

Both the portion of the risk assessment based on controlled human exposure studies and the portion based on epidemiological studies include risk estimates for a recent year of air quality (“as is” air quality) and for air quality adjusted so that it simulates just meeting the current or alternative 8-hr O_3 standards based on a recent three-year period (2002-2004). This period was selected to represent the most recent air quality for which complete data were available when the risk assessment was conducted.

In order to estimate health risks associated with just meeting the current and alternative 8-hr O_3 standards, it is necessary to estimate the distribution of hourly O_3 concentrations that would occur under any given standard. Since compliance with the current O_3 standard is based on a 3-year average, air quality data from 2002 to 2004 were used to determine the amount of reduction in O_3 concentrations required to meet the current standard. Estimated design values were used to determine the adjustment necessary to just meet the current 8-hr daily maximum standard. The amount of control was then applied to each year of data (2002, 2003, and 2004) to estimate risks for a single O_3 season or single warm O_3 season, depending on the health effect, in each of these individual years.

As described in section 4.5.6 of the Staff Paper and in more detail in Rizzo (2005, 2006), after considering several approaches, including proportional rollback and Weibull adjustment procedures, EPA concluded that the Quadratic air quality adjustment procedure generally best represented the pattern of reductions across the O_3 air quality distribution observed over the last decade. The Quadratic air quality adjustment procedure was applied in each of the 12 urban areas to the filled in 2002, 2003, and 2004 O_3 monitoring data, based on the 3-year period (2002-2004) O_3 design values, to generate new time series of hourly O_3 concentrations for 2002, 2003, and 2004 that simulate air quality levels that just meet the current 8-hr O_3 standard and each of the alternative 8-hr O_3 standards considered in the risk assessment over this three year period.

Because compliance with the current standard is based on the 3-year average of the 4th daily maximum 8-hr values, the air quality distribution in each of the 3 years can and generally does vary. As a result, the risk estimates associated with air quality just meeting the current standard also will vary depending on the year chosen for the analysis. The risk assessment includes risk estimates involving adjustment of 2002, 2003, and 2004 air quality data to illustrate the magnitude of this year-to-year variability in the estimates. The year 2002 generally had meteorology that was very conducive to producing O_3 over the eastern half of the U.S., and this resulted in the highest O_3 levels over the 2002-2004 time period in the vast majority of the 12 urban study areas. In contrast, 2004 was a year associated with an unusually cool and rainy summer in the eastern half of the U.S. and this contributed to the fact that the lowest O_3 levels over this same three-year period were observed in this year in most of the urban areas included in the risk assessment. The lower O_3 levels observed in 2004 were also due, in part, to reductions in emissions of nitrogen oxides (NO_x) associated with implementation of additional regional controls on large power plants in the eastern half of the U.S. The risk results for 2002 and 2004 thus provide generally lower-end and upper-end estimates of the annual risks that can occur over a three-year period when alternative standards are just met in most of the urban areas examined.

Daily maximum 1-hr and 8-hr O_3 levels in 2003 generally fell somewhere between 2002 and 2004 levels in most of the 12 urban areas. Differences in meteorology were less evident in Texas and California, and these areas also were not impacted by the recent additional regional controls imposed on large power plants. It is therefore not surprising that the daily maximum 8-hr levels observed in Houston in 2003 and 2004 were somewhat higher than those observed in 2002 and that 8-hr levels were higher in Los Angeles in 2003.

The risk estimates developed for both the recent air quality scenario and scenarios in which O_3 concentrations just meet the current or alternative 8-hr standards represent risks associated with O_3 levels in excess of estimated background concentrations. The results of the global tropospheric O_3 model GEOS-CHEM have been used to estimate average background O_3 levels for different geographic regions across the U.S. These GEOS-CHEM simulations include a background simulation in which North American anthropogenic emissions of nitrogen oxides, non-methane volatile organic compounds, and carbon monoxide are set to zero, as described in Fiore et al. (2003). EPA estimated monthly background concentrations for each of the 12 urban areas based on the GEOS-CHEM simulations, including daily diurnal profiles that were fixed for each day of each month during the O_3 season (see Appendix 2-A of the Staff Paper for plots of these estimated background values).

3 ASSESSMENT OF RISK BASED ON CONTROLLED HUMAN EXPOSURE STUDIES

3.1 Methods

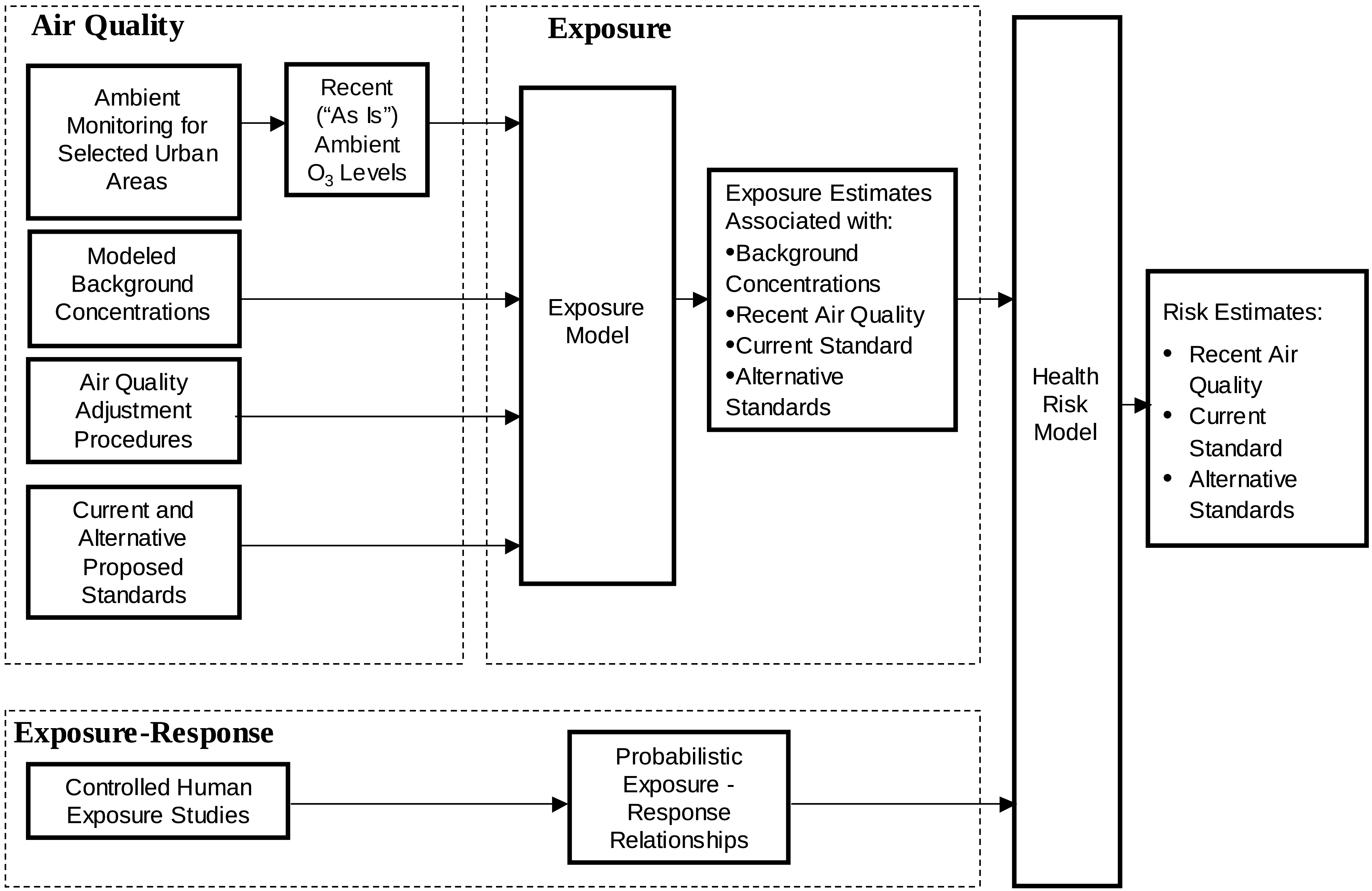
The major components of the part of the health risk assessment based on data from controlled human exposure studies are illustrated in Figure 3-1. The air quality and exposure analysis components that are integral to this part of the risk assessment are discussed in Chapters 2 and 4, respectively, of the Staff Paper. As described in the O_3 CD, there are numerous controlled human exposure studies reporting lung function decrements (as measured by changes in FEV_1), other measures of lung function, airway responsiveness, respiratory symptoms, and various markers of inflammation. Most of these studies have involved voluntary exposures with healthy adults, although a few studies have been conducted with mild and moderate asthmatics and one study reported lung function decrements for children 8-11 years old (McDonnell et al., 1985a) at a single exposure level.

3.1.1 Selection of health endpoints

In the last review, the health risk assessment estimated both lung function decrements ($\geq$10, $\geq$15, and $\geq$20% changes in FEV_1) and respiratory symptoms in children 6-18 years old associated with 1-hour exposures at moderate and heavy exertion and 8-hour exposures at moderate exertion. At that time EPA staff and the CASAC O_3 Panel judged that it was reasonable to estimate the exposure-response relationships for children 6-18 years old based on data from adult subjects (18-35 years old). As discussed in the 1996 O_3 Staff Paper (EPA, 1996a) and 1996 O_3 CD (EPA, 1996b), findings from other chamber studies (McDonnell et al., 1985a) for children 8-11 years old for a single exposure level and summer camp field studies involving children exposed to ambient O_3 in at least six different locations in the United States and Canada found lung function changes in healthy children similar to those observed in healthy adults exposed to O_3 under controlled chamber conditions. We are using the same approach in this assessment.

In the prior risk assessment, EPA estimated risk for lung function decrements associated with 1-hour heavy exertion, 1-hour moderate exertion, and 8-hour moderate exertion exposures. Since the 8-hour moderate exertion exposure scenario clearly resulted in the greatest health risks in terms of lung function decrements, EPA staff has chosen to include only the 8-hour moderate exertion exposures in the current risk assessment for this health endpoint. As discussed in Chapter 4 of the Staff Paper, levels of physical activity were categorized by a daily Physical Activity Index (PAI). Children were characterized as active if their median daily PAI over the period modeled was 1.75 or higher, a level characterized by exercise physiologists as being “moderately active” or “active.”

Figure 3-1. Components of Ozone Health Risk Assessment Based on Controlled Human Exposure Studies



Although respiratory symptoms in healthy children were estimated in the last review, EPA staff has decided not to estimate respiratory symptoms in healthy children given the lack of symptoms found in field studies examining responses in healthy children published since the prior review. The O_3 CD concludes that "collectively, these studies indicate that there is no consistent evidence of an association between O_3 and respiratory symptoms among healthy children" (p. 7-55). While a number of controlled human exposure studies have been published since the last review reporting various other acute effects, including airway responsiveness and increases in inflammatory indicators, none of these studies were conducted at multiple concentration levels within the range of greatest interest (i.e., below 0.12 ppm). Thus, EPA staff has decided to limit this portion of the risk assessment to lung function decrements in children and to again base the exposure-response relationships on data obtained for 18-35 year old subjects.

3.1.2 Development of exposure-response functions

We used a Bayesian Markov Chain Monte Carlo approach to estimate probabilistic exposure-response relationships for lung function decrements associated with 8-hour moderate exertion exposures, using the WinBUGS software (Spiegelhalter et al. (1996)). (For an explanation of these methods, see Gelman et al. (1995) or Gilks et al. (1996). The combined data set from the Folinsbee et al. (1988), Horstman et al. (1990), and McDonnell et al. (1991) studies provide three data points – lung function decrements associated with each of three O_3 concentrations (0.08, 0.10, and 0.12 ppm) – for each of the three measures of lung function decrement listed above ($\geq$10, $\geq$15, and $\geq$20% changes in FEV_1). In addition, we now have three studies by Adams (Adams 2002, 2003, and 2006) that provide data for O_3 concentrations of 0.04 and 0.06 ppm as well as additional data for 0.08 and 0.12 ppm. In total, then, we have data for five O_3 concentrations – 0.04, 0.06, 0.08, 0.10, and 0.12 ppm. All of these studies were conducted for 6.6 hours under moderate exertion.

Before being used to estimate exposure-response relationships for 8-hour exposures, the data from these controlled human exposure studies were corrected for the effect of exercise in clean air to remove any systematic bias that might be present in the data attributable to an exercise effect. Generally, this correction for exercise in clean air is small relative to the total effects measures in the O_3-exposed cases. The resulting study-specific results, based on the corrected data, are shown in Table 3-1.

Our Bayesian estimation approach incorporated both model (epistemic) uncertainty and (aleatory) uncertainty about the values of the parameters in the models considered. In particular, for each of the three measures of lung function decrement we assumed a 90 percent probability that the exposure-response function has the following 3-parameter logistic form:[2,3]

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[2] As noted in Whitfield et al., 1996, the response data point in the combined dataset from the Folinsbee, Horstman, and McDonnell studies associated with 0.12 ppm for the response measure FEV1 ≥ 15% appeared to be inconsistent with the other data points (see Whitfield et al., 1996, Table 10, footnote c). Because of this, we estimated the probability of a response of FEV1 ≥ 15% at an O_3 concentration of 0.12 ppm by interpolating between the FEV1 ≥ 10% and FEV1 ≥ 20% response rates at that O_3 concentration.

[3] The 3-parameter logistic function is a special case of the 4-parameter logistic, in which the function is forced to go through the origin, so that the probability of response to 0.00 ppm is 0.

Table 3-1. Study-Specific Ozone Exposure-Response Data for Lung Function Decrements

Study and O_3 Level	Protocol	Change in $FEV_1 \geq 10\%$		Change in $FEV_1 \geq 15\%$		Change in $FEV_1 \geq 20\%$	
		Number Exposed	Number Responding	Number Exposed	Number Responding	Number Exposed	Number Responding
0.04 ppm O_3							
Adams (2006)	Triangular	30	0	30	0	30	0
Adams (2002)	Square-wave, face mask	30	2	30	0	30	0
0.06 ppm O_3							
Adams (2006)	Square-wave	30	2	30	0	30	0
	Triangular	30	2	30	2	30	0
0.08 ppm O_3							
Adams (2006)	Square-wave	30	7	30	2	30	1
	Triangular	30	9	30	3	30	1
Adams (2003)	Square-wave, chamber	30	6	30	2	30	1
	Square-wave, face mask	30	9	30	3	30	1
	Variable levels (0.08 ppm avg), chamber	30	6	30	1	30	1
	Variable levels (0.08 ppm avg), face mask	30	5	30	3	30	0
Adams (2002)	Square-wave, face mask	30	6	30	5	30	2
F-H-M*	Square-wave	60	18	60	11	60	5
0.1 ppm O_3							
F-H-M	Square-wave	32	13	32	9	32	5
0.12 ppm O_3							
Adams (2002)	Square-wave, chamber	30	17	30	12	30	10
	Square-wave, face mask	30	21	30	13	30	7
F-H-M	Square-wave	30	15	30**	15**	30	6

*Data from Folinsbee et al. (1988), Horstman et al. (1990), and McDonnell et al. (1991) are combined.

**In general, the percentages of responders followed the same pattern at each of the three ozone concentrations in the Folinsbee, Horstman, and McDonnell studies – the percentage with FEV_1 decrements ≥ 15% at a given ozone concentration was about midway between the percentages with FEV_1 decrements ≥ 10% and ≥ 20% at that ozone concentration. The sole exception was the percentage with FEV_1 decrements ≥ 15% at an ozone concentration of 0.12 ppm, which was the same as the percentage with FEV_1 decrements ≥ 10% at 0.12 ppm (50%). This data point was therefore sufficiently inconsistent with the other data that it was considered an outlier and was not included in the analysis.

$$y(x;\alpha,\beta,\gamma)=\frac{\alpha * e^{\gamma}(1-e^{\beta x})}{(1+e^{\gamma})(1+e^{\beta x+\gamma})}, \quad (3\text{-}1)$$

where *x* denotes the O_3 concentration (in ppm) to which the individual is exposed, y denotes the corresponding response (decrement in $FEV_1 \geq 10\%$, $\geq 15\%$ or $\geq 20\%$), and *α*, *β*, and *γ* are the three parameters whose values are estimated.

We assumed a 10 percent probability that the exposure-response function has the following linear (hockeystick) form:

$$y(x;\alpha,\beta)=\begin{cases}\alpha+\beta x, & for\ \alpha+\beta x>0\\ 0, & for\ \alpha+\beta x<0\end{cases} \quad . \quad (3\text{-}2)$$

We assumed that the number of responses, *S*, out of *N* subjects exposed to a given concentration, *x*, has a binomial distribution with response probability given by model (3-1) with 90 percent probability and response probability given by model (3-2) with 10 percent probability. The choice of a 90 percent logistic/10 percent linear split as the base case for the current risk assessment was made by EPA staff (EPA, 2007a) based on the following considerations: 1) the prior 1997 risk assessment had used a linear form consistent with the advice from the CASAC O_3 Panel at the time that a linear model reasonably fit the available data at 0.08, 0.10, and 0.12 ppm; 2) with the addition of data at 0.06 and 0.04 ppm, a logistic model provides a very good fit to the data; and 3) as the current CASAC O_3 Panel has noted, there is only very limited data at the two lowest exposure levels and, therefore, a linear model cannot entirely be ruled out. Section 3.3.2 presents the results of sensitivity analyses that explore the impact of different assumptions about the functional form of the exposure-response function.

In some of the controlled human exposure studies, subjects were exposed to a given O_3 concentration more than once – for example, using a square-wave exposure pattern in one protocol and a triangular exposure pattern in another protocol. However, because there were insufficient data to estimate subject-specific response probabilities, we assumed a single response probability (for a given definition of response) for all individuals and treated the repeated exposures for a single subject as independent exposures in the binomial distribution.

For each of the two functional forms (logistic and linear), we derived a Bayesian posterior distribution using this binomial likelihood function in combination with prior distributions for each of the unknown parameters. We assumed lognormal priors with maximum likelihood estimates of the means and variances for the parameters of the logistic function, and normal priors, similarly with maximum likelihood estimates for the means and variances, for the parameters of the linear function. For each of the two functional forms considered, we used 1000 iterations as the "burn-in" period followed by 9,000 iterations for the estimation. Each iteration corresponds to a set of values for the parameters of the (logistic or linear) exposure-response function. We then combined the 9,000 sets of values from the logistic model runs with the last 1,000 sets of values from the linear model runs to get a single combined distribution of 10,000 sets of values reflecting the 90 percent/10 percent assumptions stated above.

For any O_3 concentration, *x*, we could then derive the n^{th} percentile response value, for any n, by evaluating the exposure-response function at *x* using each of the10,000 sets of parameter values (9,000 of which were for a logistic model and 1,000 of which were for a linear model). The resulting median (50^{th} percentile) exposure-response functions for changes in FEV_1 $\geq$ 10%, $\geq$ 15% and $\geq$ 20% are shown together in Figure 3-2. The 2.5^{th} percentile, median, and 97.5^{th} percentile curves, along with the response data to which they were fit, are shown separately for each of the three response definitions in Figures 3-3a, b, and c, respectively.

3.1.3 Approach to calculating risk estimates

We have generated several risk measures for this portion of the risk assessment. In addition to the estimates of the number of school age children and active children experiencing 1 or more occurrences of a lung function decrement $\geq$ 10%, $\geq$ 15% and $\geq$ 20% in an O_3 season, risk estimates have been developed for the total number of occurrences of these lung function decrements in school age children and active school age children. The mean number of occurrences per child has been calculated to provide an indicator of the average number of times that a responder would experience the specified effect during an O_3 season.

A headcount risk estimate for a given lung function decrement (e.g., $\geq$20% change in FEV_1) is an estimate of the expected number of people who will experience that lung function decrement. To obtain risk estimates associated with ozone concentrations in excess of policy relevant background (PRB) concentrations, we have (1) estimated expected risk, given the personal exposures associated with "as is" ambient O_3 concentrations, (2) estimated expected risk, given the personal exposures associated with estimated background ambient O_3 concentrations, and (3) subtracted the latter from the former. The headcount risk is then calculated by multiplying the resulting expected risk by the number of people in the relevant population. Because response rates are calculated for 21 fractiles, estimated headcount risks are similarly fractile-specific.

Figure 3-2. Bayesian-Estimated (90% Logistic and 10% Linear) Median Exposure-Response Functions: Change in FEV_1 $\geq$ 10%, 15%, and 20%

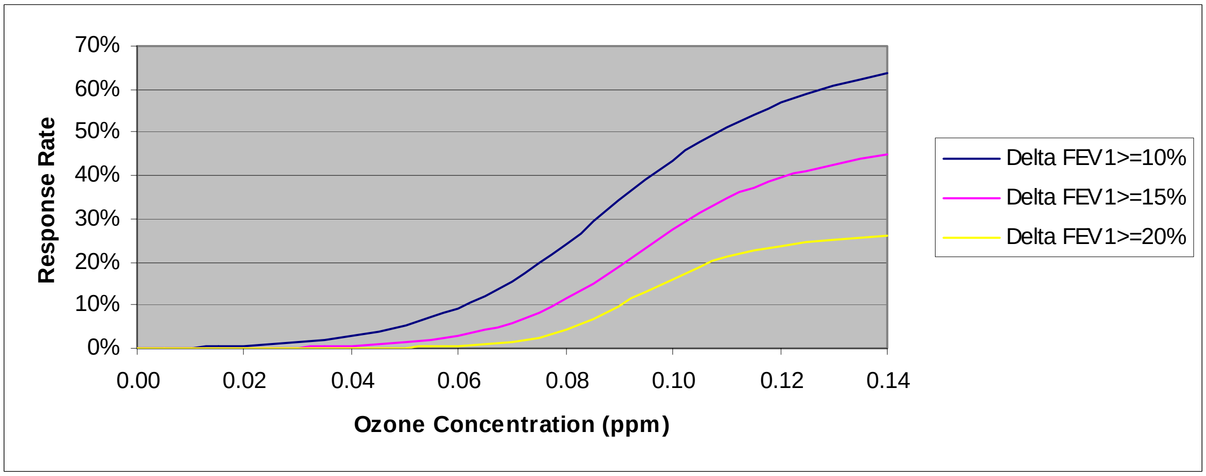
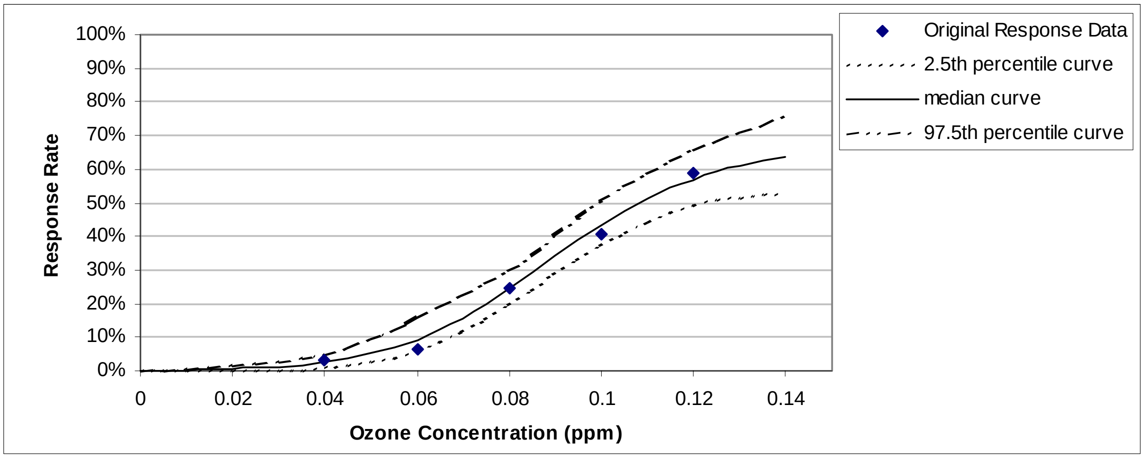
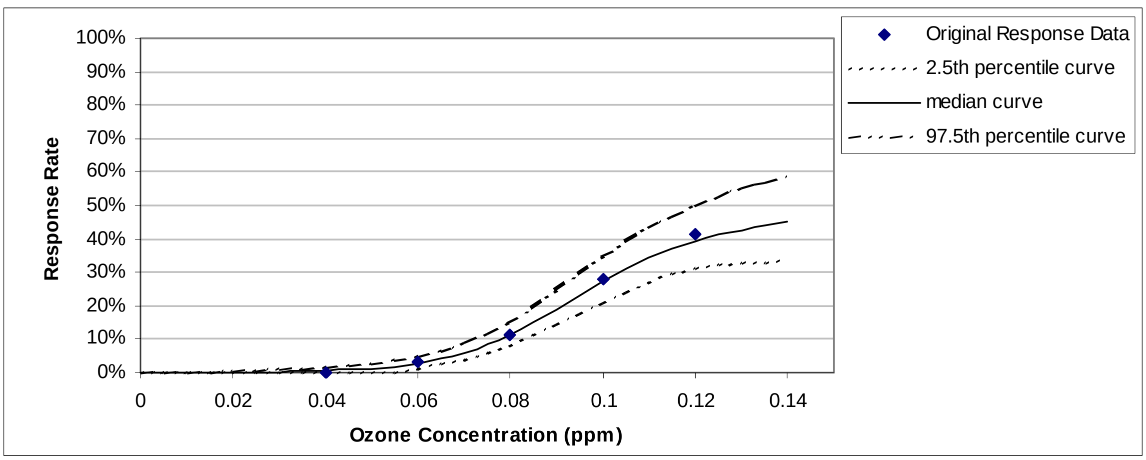


Figure 3-3. a, b, c. Probabilistic Exposure-Response Relationships for FEV_1 Decrement > 10%, > 15%, and > 20% for 8-Hour Exposures Under Moderate Exertion*

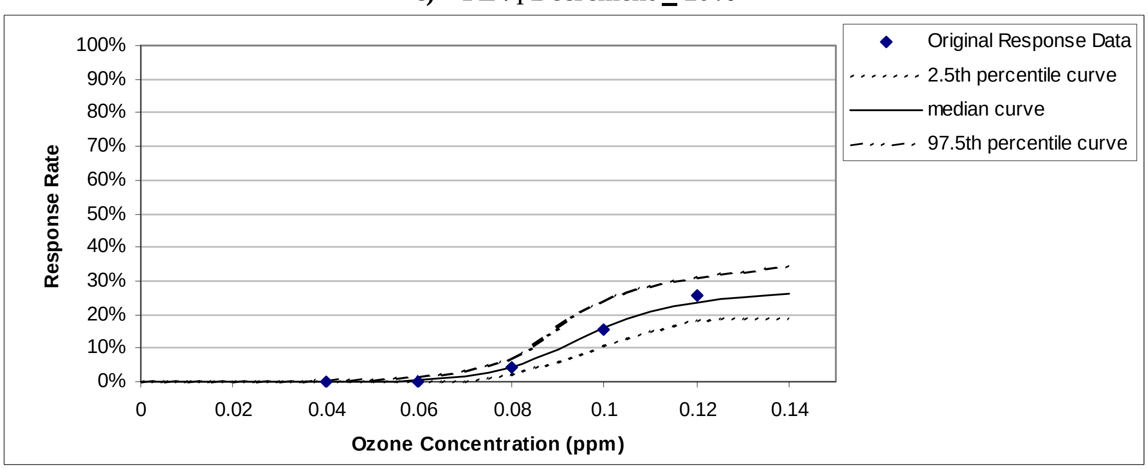
a) FEV_1 Decrement > 10%



b) FEV_1 Decrement > 15%



c) FEV_1 Decrement > 20%



* Derived from Folinsbee et al., 1988; Horstman et al. 1990; McDonnell et al., 1991; Adams 2002, 2003, 2006). Each curve is 90% logistic and 10% linear (see text above).

The risk (i.e., expected fractional response rate) for the k^{th} fractile, R_k is:

$$R_k = \sum_{j=1}^{N} P_j \; x \; (RR_k \mid e_j) \quad - \quad \sum_{i=1}^{N_b} P_i^b \; x \; (RR_k \mid e_i^b) \qquad \text{(Equation 3-1)}$$

where:

e_j = (the midpoint of) the jth category of personal exposure to ozone, given "as is" ambient O_3 concentrations;

e_i^b = (the midpoint of) the ith category of personal exposure to ozone, given background ambient O_3 concentrations;

P_j = the fraction of the population having personal exposures to O_3 concentration of e_j ppm, given "as is" ambient O_3 concentrations;

P_i^b = the fraction of the population having personal exposures to O_3 concentration of e_i^b ppm, given background ambient O_3 concentrations;

$RR_k \mid e_j$ = k-fractile response rate at O_3 concentration e_j;

$RR_k \mid e_i^b$ = k-fractile response rate at O_3 concentration e_i^b; and

N = number of intervals (categories) of O_3 personal exposure concentration, given "as is" ambient O_3 concentrations; and

N_b = number of intervals of O_3 personal exposure concentration, given background ambient O_3 concentrations.

For example, if the median expected response rate given "as is" ambient concentrations is 0.065 (i.e., the median expected fraction of the population responding is 6.5%) and the median expected response rate given background ambient concentrations is 0.001 (i.e., the median expected fraction of the population responding is 0.1%), then the median expected response rate associated with "as is" ambient concentrations above PRB concentrations is 0.065 – 0.001 = 0.064. If there are 300,000 people in the relevant population, then the headcount risk is 0.064 x 300,000 = 19,200.

An artifact of the method used is that the population numbers associated with PRB concentrations were not identical to those associated with "as is" concentrations (or concentrations rolled back to simulate just meeting current or alternative standards) in the same location. Before calculating risk estimates associated with ozone concentrations in excess of PRB concentrations, we therefore first normalized the number of responders (or the number of occurrences of response) given personal exposures associated with "as is" ambient O_3

concentrations (or concentrations rolled back to simulate just meeting a standard) by multiplying by the ratio of the population associated with PRB concentrations to the population associated with "as is" concentrations (or concentrations rolled back to simulate just meeting current or alternative standards in the same location). For example, the number of person-days for all children in St. Louis associated with PRB concentrations was 39,500,000; the number of person-days for all children in St. Louis associated with "as is" concentrations was 42,310,000. The ratio of the former to the latter is 0.9336. The number of person-days with a decrease in FEV_1 $\geq$10% given personal exposures associated with "as is" ambient O_3 concentrations was 391,011. After normalizing to the background population of person-days, this becomes 365,042. The number of person-days with a decrease in FEV_1 $\geq$10% given personal exposures associated with PRB O_3 concentrations was 50,183. The number of occurrences of a decrease in FEV_1 $\geq$10% associated with "as is" ambient O_3 concentrations over PRB concentrations was therefore calculated to be 365,042 - 50,183 = 314,859, or about 315,000.

3.1.4 Selection of urban areas

EPA staff chose to develop lung function decrement risk estimates for school age children and active school age children living in 12 urban areas in the U.S. Since the exposure-response functions for lung function decrements based on the controlled human exposure studies were based on controlled laboratory conditions, the location of these studies played no role in selecting urban locations for the risk assessment. Instead, several criteria and considerations guided the selection of urban areas for the risk assessment, including the following:

- The overall set of urban locations should represent a range of geographic areas, urban population demographics, and climatology, and be focused on areas that do not meet the current 8-hour O_3 NAAQS.
- The largest areas with major O_3 nonattainment problems should be included.
- There must be sufficient air quality data for the three-year period (2002 - 2004).

Several additional criteria, which apply to the epidemiology-based portion of the risk assessment, are discussed below in Section 4.1.4. Because the same 12 urban areas were used in both the controlled human studies- and the epidemiological studies-based portions of the risk assessment, these additional criteria were used to further narrow the choice of urban areas for which lung function decrement risk estimates were developed.

For the purposes of estimating population exposure and the risk of lung function decrements associated with these population exposure estimates, the 12 urban areas were defined based on consolidated statistical areas (CSAs). In contrast, for the risk estimates for premature mortality and excess hospital admissions based on C-R relationships estimated in epidemiological studies, the urban areas were defined to be generally consistent with the geographic boundaries used in those studies. While risk estimates in the epidemiology-based portion of the O_3 risk assessment are based on the months of April through September, risk estimates in the controlled human studies-based portion are based on the actual location-specific O_3 seasons. The CSAs and their O_3 seasons are shown in Table 3-2. Throughout the rest of this report, the urban area in bold is used as a short-hand name representing the entire CSA for the lung function part of the risk assessment. The populations of all, active, and asthmatic school age children in these areas are shown in Table 3-3.

3.1.5 Addressing variability and uncertainty

Any estimation of risk and reduced risks associated with just meeting the current O_3 standards should address both the variability and uncertainty that generally underlie such an analysis. *Uncertainty* refers to the lack of knowledge regarding the actual values of model input variables (parameter uncertainty) and of physical systems or relationships (model uncertainty – e.g., the shapes of exposure-response and concentration-response functions). The goal of the analyst is to reduce uncertainty to the maximum extent possible. Uncertainty can be reduced by improved measurement and improved model formulation. In a health risk assessment, however, significant uncertainty often remains.

Table 3-2. Urban Areas Used in the Controlled Human Studies-Portion of the O_3 Risk Assessment and Their O_3 Seasons

Urban Area (CSA)	**O_3 Season**
Atlanta-Sandy Springs-Gainesville, GA-AL	March 1 to Oct. 31
Boston-Worcester-Manchester, MA-NH	April 1 to Sept. 30
Chicago-Naperville-Michigan City, IL-IN-WI	April 1 to Sept. 30
Cleveland-Akron-Elyria, OH	April 1 to Oct. 31
Detroit-Warren-Flint, MI	April 1 to Sept. 30
Houston-Baytown-Huntsville, TX	Jan. 1 to Dec. 30
Los Angeles-Long Beach-Riverside, CA	Jan. 1 to Dec. 30
New York-Newark-Bridgeport, NY-NJ-CT-PA	April 1 to Sept. 30
Philadelphia-Camden-Vineland, PA-NJ-DE-MD	April 1 to Oct. 31
Sacramento--Arden-Arcade--Truckee, CA-NV	Jan. 1 to Dec. 30
St. Louis-St. Charles-Farmington, MO-IL	April 1 to Oct. 31
Washington-Baltimore-N. Virginia, **DC**-MD-VA-WV	April 1 to Oct. 31

Table 3-3. Population Coverage of Modeled Areas

Urban Area (CSA)	Modeled population (thousands)	All school age children (thousands)	Active school age children (thousands)	Asthmatic school age children (thousands)
Atlanta	4,548	942	519	100
Boston	5,714	1,098	529	200
Chicago	9,311	1,946	933	300
Cleveland	2,945	582	295	100
Detroit	5,357	1,110	553	200
Houston	4,815	1,076	598	100
Los Angeles	16,349	3,594	1,951	500
New York	21,357	4,084	2,009	600
Philadelphia	5,832	1,179	609	200
Sacramento	1,930	418	226	100
St. Louis	2,754	572	309	100
Washington, DC	7,572	1,473	759	200

The degree of uncertainty can be characterized, sometimes quantitatively. For example, the statistical uncertainty surrounding the estimated O_3 coefficients in the exposure-response functions is reflected in confidence or credible intervals provided for the risk estimates.

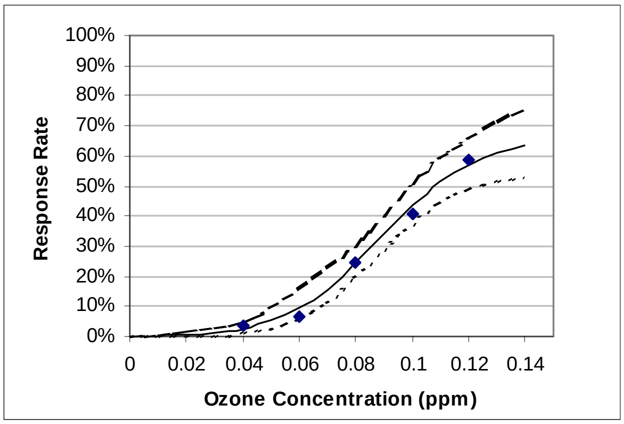
As described in Section 3.1.3 above, we used a Bayesian Markov Chain Monte Carlo approach to estimate exposure-response functions as well as to characterize uncertainty attributable to sampling error based on sample size considerations. Using this approach, we could derive the n^{th} percentile response value, for any *n*, for any O_3 concentration, *x*, as described above (see Section 3.1.3). Because our exposure estimates were generated at the midpoints of 0.01 ppm intervals (i.e., for 0.005 ppm, 0.015 ppm, etc.), we derived 2.5^{th} percentile, 50^{th} percentile (median), and 97.5^{th} percentile response estimates for O_3 concentrations at these midpoint values. The 2.5^{th} percentile and 97.5^{th} percentile response estimates comprise the lower and upper bounds of the credible interval around each point estimate (median estimate) of response. The median curve, and the upper and lower bounds of the credible intervals are shown above, separately for each of the three response definitions, in Figures 3-3a, b, and c, respectively.

As noted above, the exposure-response functions shown in Figures 3-3a, b, and c above are based on the assumption that the relationship between exposure and response has a logistic form with 90 percent probability and a linear (hockeystick) form with 10 percent probability. If we had assumed different probabilities for the two alternative functional forms, the resulting exposure-response curves, and the response probabilities associated with exposure to any given O_3 concentration, would have been different. Alternative median exposure-response functions, with 95% credible intervals, based on an 80 percent logistic/20 percent linear split and a 50 percent logistic/50 percent linear split are shown in Figures 3-4 and 3-5, respectively. The median exposure-response functions for all three alternative forms are shown for decrements in $FEV_1 \geq 10\%$ and $\geq 15\%$ in Figures 3-6a and b, respectively.

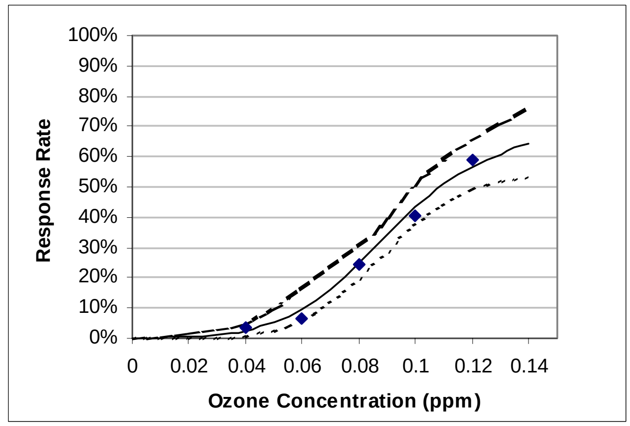
We carried out sensitivity analyses to explore the impact of alternative input values for two sources of uncertainty that we did not characterize quantitatively. The first set of sensitivity analyses explore the impact of alternative assumptions about PRB levels in each of three of the locations included in the risk assessment – Atlanta, Los Angeles, and New York. The second set of sensitivity analyses explores the impact of different assumptions about the functional form of the exposure-response function. The results from both sets of sensitivity analyses are presented in Section 3.3 below.

Figure 3-4. Probabilistic Exposure-Response Relationships for FEV_1 Decrement ≥ 10%, ≥ 15%, and ≥ 20% for 8-Hour Exposures Under Moderate Exertion: Comparison of 90% Logistic/10% Linear (Hockeystick) Split and 80% Logistic/20% Linear (Hockeystick) Split in Assumed Relationship Between Exposure and Response*

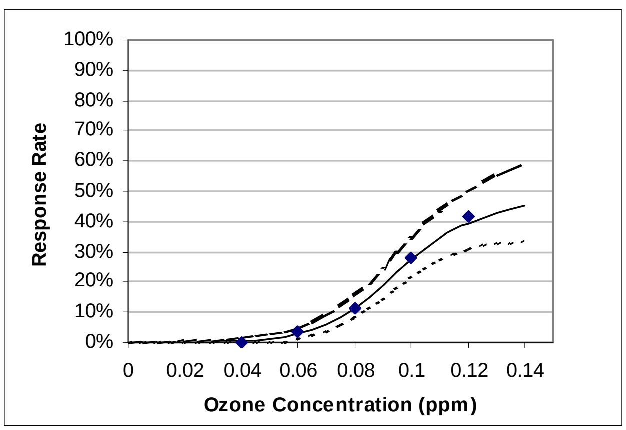
FEV_1 Decrement ≥ 10%: 90% Logistic/10% Linear



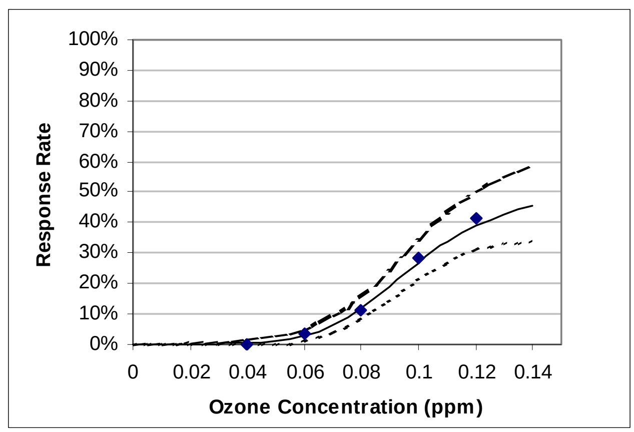
FEV_1 Decrement ≥ 10%: 80% Logistic/20% Linear



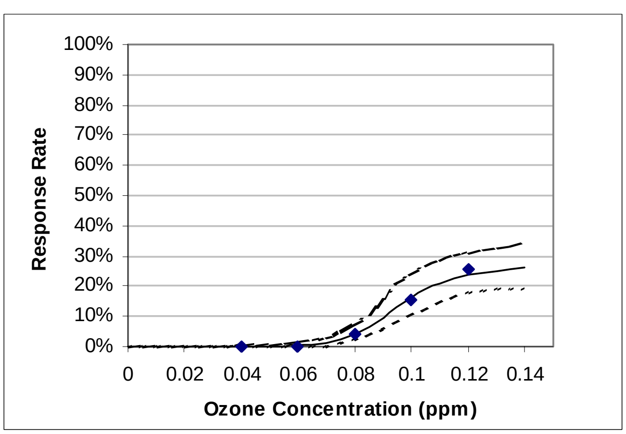
FEV_1 Decrement ≥ 15%: 90% Logistic/10% Linear



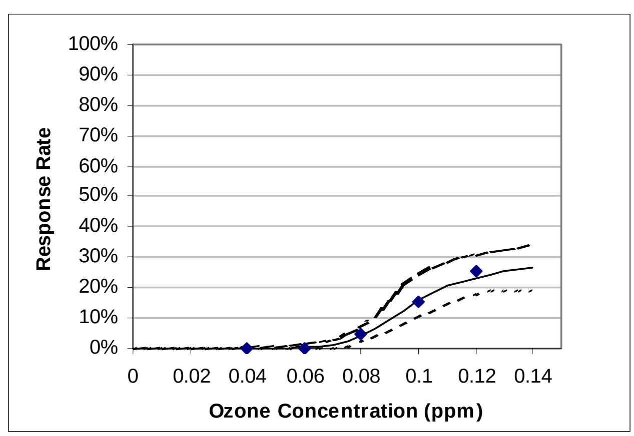
FEV_1 Decrement ≥ 15%: 80% Logistic/20% Linear



FEV_1 Decrement ≥ 20%: 90% Logistic/10% Linear



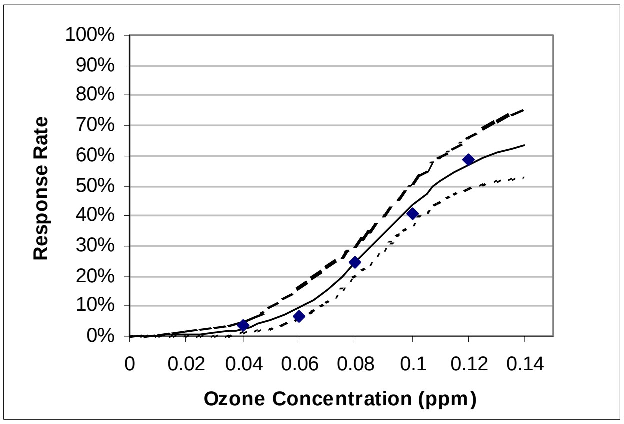
FEV_1 Decrement ≥ 20%: 80% Logistic/20% Linear



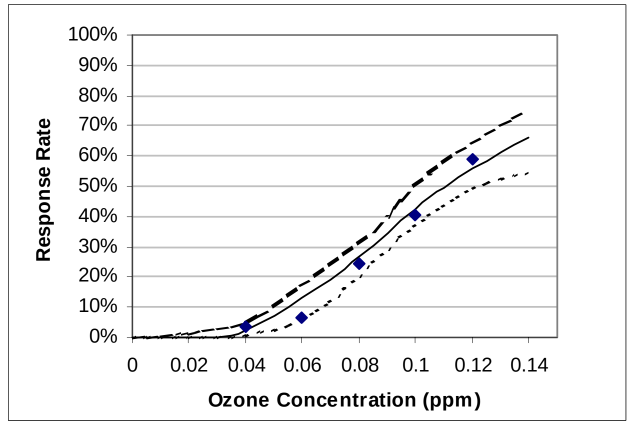
* Derived from Folinsbee et al., 1988; Horstman et al. 1990; McDonnell et al., 1991; Adams 2002, 2003, 2006.

Figure 3-5. Probabilistic Exposure-Response Relationships for FEV_1 Decrement ≥ 10%, ≥ 15%, and ≥ 20% for 8-Hour Exposures Under Moderate Exertion: Comparison of 90% Logistic/10% Linear (Hockeystick) Split and 50% Logistic/50% Linear (Hockeystick) Split in Assumed Relationship Between Exposure and Response*

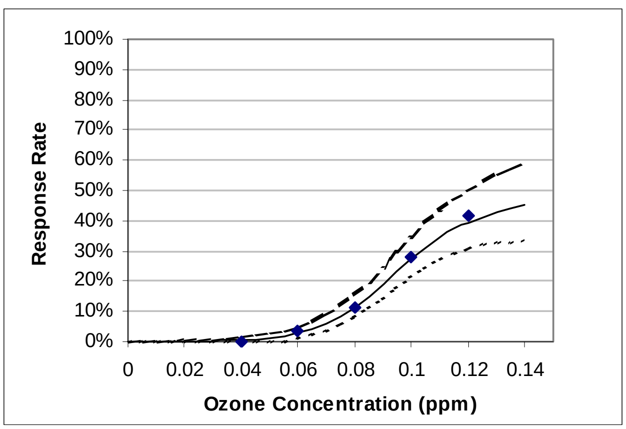
FEV_1 Decrement ≥ 10%: 90% Logistic/10% Linear



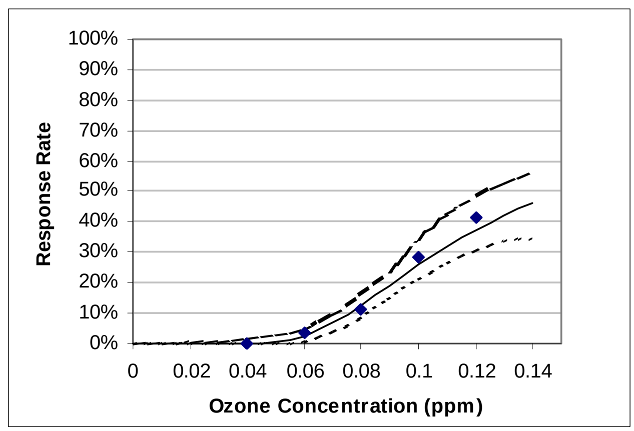
FEV_1 Decrement ≥ 10%: 50% Logistic/50% Linear



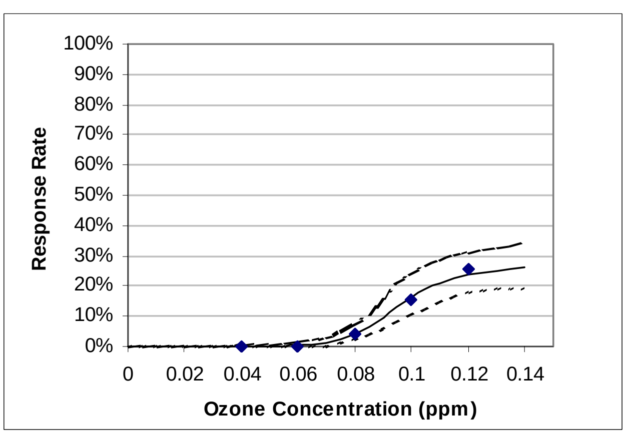
FEV_1 Decrement ≥ 15%: 90% Logistic/10% Linear



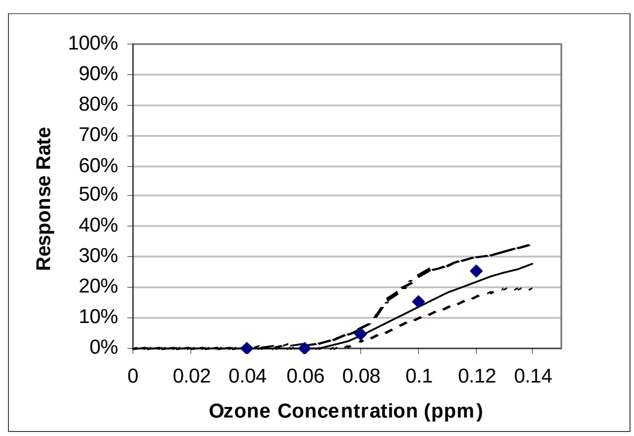
FEV_1 Decrement ≥ 15%: 50% Logistic/50% Linear



FEV_1 Decrement ≥ 20%: 90% Logistic/10% Linear



FEV_1 Decrement ≥ 20%: 50% Logistic/50% Linear



* Derived from Folinsbee et al., 1988; Horstman et al. 1990; McDonnell et al., 1991; Adams 2002, 2003, 2006).

Figure 3-6. Median Exposure-Response Functions Using Three Different Combinations of Logistic and Linear (Hockeystick) Models

Figure 3-6a. FEV_1 Decrements ≥ 10%

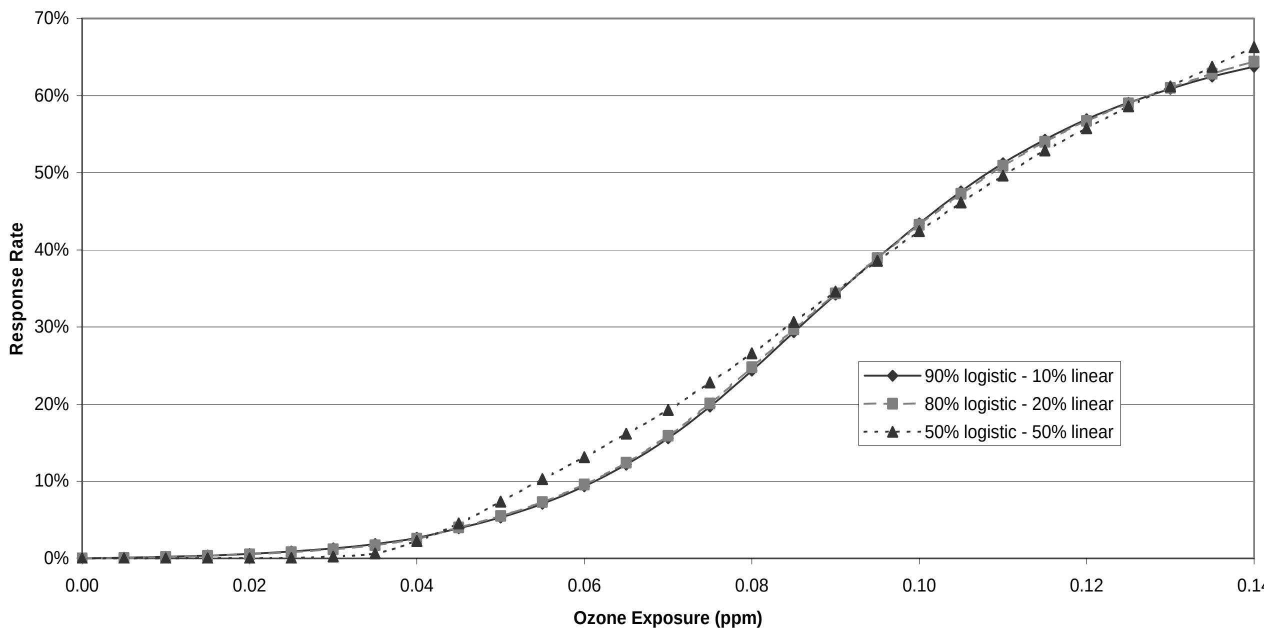
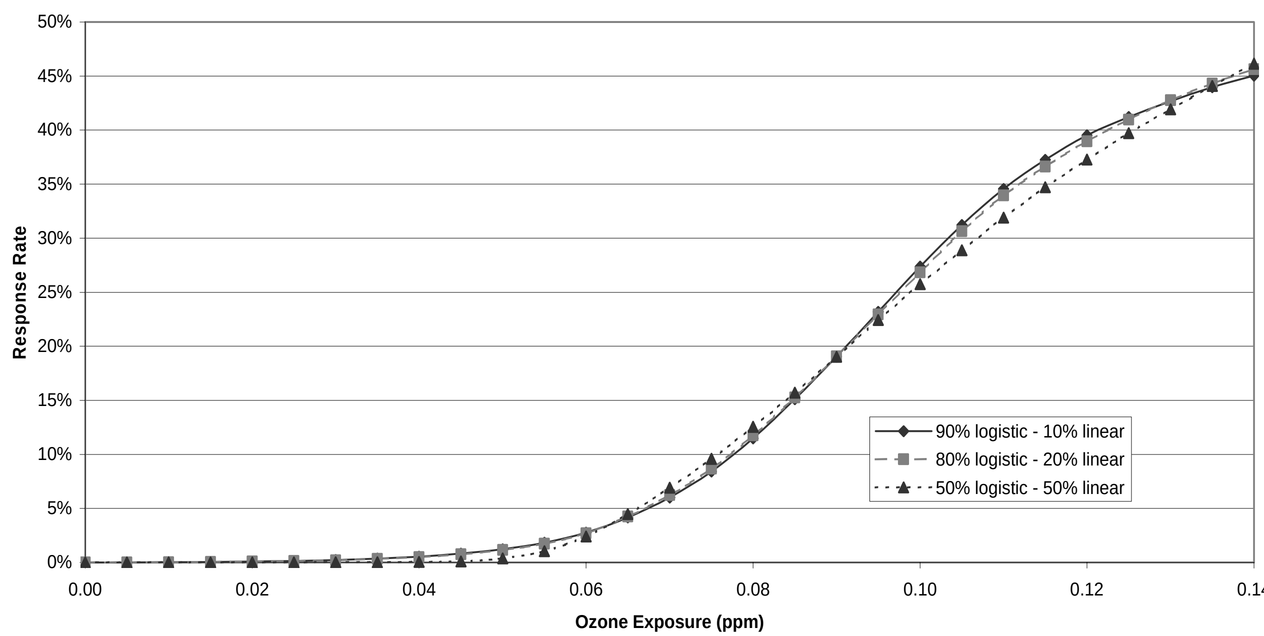


Figure 3-6b. FEV_1 Decrements ≥ 15%



In addition to uncertainties arising from sampling variability, other uncertainties associated with the use of the exposure-response relationships for lung function responses are briefly summarized below. Additional uncertainties with respect to the exposure inputs to the risk assessment are described in Chapter 4 of the Staff Paper and in the Exposure Assessment TSD (EPA 2006c). The main additional uncertainties with respect to the approach used to estimate exposure-response relationships include:

- Length of exposure. The 8-hour moderate exertion risk estimates are based on a combined data set from six controlled human exposure studies conducted using 6.6-hr exposures. The use of these data to estimate responses associated with an 8-hour exposure seem reasonable, however, because lung function response appears to level off after exposure for 6 hours. It is unlikely that the exposure-response relationships would have been appreciably different had the studies been conducted over an 8-hour period.

- Extrapolation of exposure-response relationships. It was necessary to estimate responses at O_3 levels below the lowest exposure levels used in the controlled human studies (i.e., 0.04 ppm). In both the prior review and the current assessment, the response has been extrapolated down to background levels.

- Reproducibility of O_3-induced responses. The risk assessment assumed that the O_3-induced responses for individuals are reproducible. This assumption is supported by the evaluation in the O_3 CD (see section AX6.4), which cites studies by McDonnell et al. (1985b) and Hazucha et al. (2003) as showing significant reproducibility of response.

- Age and lung function response. As in the prior review, exposure-response relationships based on controlled human exposure studies involving 18-35 year old subjects were used in the risk assessment to estimate responses for school age children (ages 5-18). This approach is supported by the findings of McDonnell et al. (1985a) who reported that children 8-11 years old experienced FEV_1 responses similar to those observed in adults 18-35 years old when both groups were exposed to concentrations of 0.12 ppm at an EVR of 35 $L/min/m^2$. In addition, a number of summer camp studies of school age children exposed in outdoor environments in the Northeast also showed O_3-induced lung function changes similar in magnitude to, and in some cases somewhat larger than, those observed in controlled human exposure studies.

- Exposure history. The risk assessment assumed that the O_3-induced response on any given day is independent of previous O_3 exposures. As discussed in Chapter 3 of the Staff Paper and in the O_3 CD, O_3-induced responses can be enhanced or attenuated as a result of recent prior exposures. The possible impact of exposure history on the risk estimates is an additional source of uncertainty that is not quantified in this assessment. In addition, the Adams studies were conducted in southern California, where ozone levels are generally higher than those in Chapel Hill, NC, where the Folinsbee, Horstman, and McDonnell studies were conducted. However, the Adams studies were conducted when ozone levels were below the level of the current standard.

- Exposure-response relationship for all, active, and asthmatic school age children. The risk assessment used the same exposure-response relationship, developed from data on "healthy" subjects, for all, active, and asthmatic school age children. Based on evidence from epidemiological studies, it is likely that moderate to severe asthmatic children would experience greater lung function decrements than other children without these conditions. This would tend to lead to the lung function decrements presented in this assessment for asthmatic children being underestimated. One consideration working in the opposite direction is that the activity patterns used in the exposure analysis to estimate exposures for asthmatic children were not specific to asthmatic individuals. To the extent that asthmatic children, especially those with moderate to severe asthma, are less active or spend less time outdoors than other children of the same age, the estimates of their 8-hr exposures to O_3 under moderate exertion may be overstated. This factor would tend to lead to overestimates of risks for lung function decrements in the asthmatic school age population.

- Interaction between O_3 and other pollutants. Because the controlled human exposure studies used in the risk assessment involved only O_3 exposures, it was assumed that estimates of O_3-induced health responses would not be affected by the presence of other pollutants (e.g., $SO_{2,}$ $PM_{2..5}$, etc). Some evidence exists that other pollutants may enhance the respiratory effects associated with exposure to O_3, but the evidence is not consistent across studies.

Variability refers to the heterogeneity in a population or parameter. Even if there is no uncertainty surrounding inputs to the analysis, there may still be variability. For example, there may be variability among exposure-response functions describing the relationship between O_3 and lung function across urban areas. Similarly, there may be variability among C-R functions describing the relationship between O_3 and mortality across urban areas. This variability does not imply uncertainty about the exposure-response or C-R function in any of the urban areas, but only that these functions are different in the different locations, reflecting differences in the populations and/or other factors that may affect the relationship between O_3 and the associated health endpoint. In general, it is possible to have uncertainty but no variability (if, for instance, there is a single parameter whose value is uncertain) or variability but little or no uncertainty (for example, people's heights vary considerably but can be accurately measured with little uncertainty).

The current controlled human exposure studies portion of the risk assessment incorporates some of the variability in key inputs to the analysis by using location-specific inputs for the exposure analysis (e.g., location-specific population data, air exchange rates, air quality and temperature data). Although spatial variability in these key inputs across all U.S. locations has not been fully characterized, variability across the selected locations is imbedded in the analysis by using, to the extent possible, inputs specific to each urban area. Temporal variability is more difficult to address, because the risk assessment focuses on some unspecified time in the future. To minimize the degree to which values of inputs to the analysis may be different from the values of those inputs at that unspecified time, we have used relatively recent inputs – in particular, year 2002, 2003, and 2004 air quality data for the urban locations, and the most recent available population data (from the 2000 Census). However, future changes in inputs have not been predicted (e.g., future population levels).

3.2 Results

Section 3.2.1 presents the results of the assessment of lung function decrement associated with exposure to “as is” O_3 concentrations (representing levels measured in 2004, 2003, and 2002 for all of the assessment locations) over PRB levels, based on controlled human exposure studies. The corresponding results when O_3 concentrations just meet the current and alternative 8-hour daily maximum standards are presented in Section 3.2.2. Section 3.2.2.1 focuses on the current standard and a set of seven alternative standards, based on adjusting 2004 and 2002 air quality data. Section 3.2.2.2 focuses on the current standard and a (different) set of five alternative standards, based on adjusting 2002, 2003, and 2004 air quality data for a subset of five locations. Results for “as is” O_3 concentrations for each of the three years are also included in the tables of results in Section 3.2.2.2. While all three lung function response measures were developed and included in the risk assessment, based on CASAC advice and EPA staff recommendations, the focus of the results discussed in this section is primarily on decrements in $FEV_1 \geq 15\%$ for all and active school age children and on decrements in $FEV_1 \geq 10\%$ for asthmatic school age children as an indicator of adverse lung function effects.

All estimated numbers (of children and of occurrences) were rounded to the nearest 1000, and all percentages were rounded to one decimal place. These rounding conventions are not intended to imply confidence in that level of precision, but rather to avoid the confusion that can result when a greater amount of rounding is used.

3.2.1 Assessment of lung function decrement associated with exposure to “as is” O_3 concentrations in excess of policy relevant background levels

3.2.1.1 Results for all school age children

The estimated number and percent of occurrences of lung function decrement associated with exposure to “as is” O_3 concentrations over PRB concentrations among all school age children (ages 5 – 18) engaged in moderate exercise for at least one 8-hour period during the O_3 season in 2004 is given in Table 3-4; the corresponding table for 2002 is Table 3-5. The numbers and percents of these children estimated to experience at least one lung function decrement associated with exposure to “as is” O_3 concentrations over PRB concentrations is given in Tables 3-6 and 3-7, for 2004 and 2002, respectively. The corresponding results for active children are given in Appendix C. Results for all three measures of lung function decrement being considered in this analysis – decrements in $FEV_1 \geq 10\%$, $\geq 15\%$, and $\geq 20\%$ -- are shown in each table.

The estimated number and percent of occurrences of lung function decrement, defined as decrements in FEV_1 of $\geq 15\%$, associated with exposure to “as is” O_3 concentrations over PRB concentrations among all school age children (ages 5 – 18) engaged in moderate exercise for at least one 8-hour period during the O_3 season is given in Table 3-8 for 2002, 2003, and 2004 O_3 concentrations. The number and percent of these children estimated to experience at least one decrement in $FEV_1 \geq 15\%$ associated with exposure to “as is” O_3 concentrations over PRB concentrations is given, for 2002, 2003, and 2004 O_3 concentrations, in Table 3-9.

Table 3-4. Estimated Number and Percent of Occurrences of Lung Function Response Associated with Exposure to "As Is" O_3 Concentrations Over Background O_3 Concentrations Among All Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: 2004 O_3 Concentrations*

Location	Response = Decrease in FEV_1 Greater Than or Equal to:					
	10%		15%		20%	
	Number (1000s)	Percent	Number (1000s)	Percent	Number (1000s)	Percent
Atlanta	800 (281 - 1430)	1% (0.3% - 1.7%)	191 (29 - 456)	0.2% (0% - 0.6%)	27 (4 - 117)	0% (0% - 0.1%)
Boston	547 (165 - 1002)	0.8% (0.2% - 1.4%)	125 (16 - 315)	0.2% (0% - 0.5%)	16 (2 - 77)	0% (0% - 0.1%)
Chicago	795 (188 - 1485)	0.6% (0.2% - 1.2%)	167 (6 - 460)	0.1% (0% - 0.4%)	17 (0 - 106)	0% (0% - 0.1%)
Cleveland	312 (89 - 575)	0.7% (0.2% - 1.3%)	69 (6 - 179)	0.2% (0% - 0.4%)	8 (0 - 43)	0% (0% - 0.1%)
Detroit	512 (136 - 953)	0.7% (0.2% - 1.4%)	111 (8 - 296)	0.2% (0% - 0.4%)	12 (0 - 69)	0% (0% - 0.1%)
Houston	827 (387 - 1361)	0.6% (0.3% - 1%)	230 (63 - 465)	0.2% (0% - 0.3%)	45 (12 - 140)	0% (0% - 0.1%)
Los Angeles	5432 (2471 - 9181)	1.1% (0.5% - 1.9%)	1470 (393 - 3073)	0.3% (0.1% - 0.6%)	273 (62 - 892)	0.1% (0% - 0.2%)
New York	2418 (795 - 4360)	0.9% (0.3% - 1.6%)	563 (77 - 1383)	0.2% (0% - 0.5%)	76 (8 - 347)	0% (0% - 0.1%)
Philadelphia	901 (338 - 1588)	1% (0.4% - 1.8%)	218 (35 - 509)	0.3% (0% - 0.6%)	31 (3 - 132)	0% (0% - 0.2%)
Sacramento	366 (135 - 647)	0.7% (0.3% - 1.3%)	86 (11 - 206)	0.2% (0% - 0.4%)	11 (1 - 52)	0% (0% - 0.1%)
St. Louis	317 (92 - 579)	0.7% (0.2% - 1.3%)	69 (4 - 181)	0.2% (0% - 0.4%)	8 (0 - 43)	0% (0% - 0.1%)
Washington, DC	1091 (404 - 1928)	1% (0.4% - 1.7%)	268 (50 - 622)	0.2% (0% - 0.6%)	41 (7 - 165)	0% (0% - 0.1%)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient. Numbers are rounded to the nearest 1000. Percents are rounded to the nearest tenth.

Table 3-5. Estimated Number and Percent of Occurrences of Lung Function Response Associated with Exposure to "As Is" O_3 Concentrations Over Background O_3 Concentrations Among All Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: 2002 O_3 Concentrations*

Location	Response = Decrease in FEV_1 Greater Than or Equal to:					
	10%		15%		20%	
	Number (1000s)	Percent	Number (1000s)	Percent	Number (1000s)	Percent
Atlanta	1043 (489 - 1754)	1.3% (0.6% - 2.1%)	290 (88 - 593)	0.4% (0.1% - 0.7%)	57 (14 - 176)	0.1% (0% - 0.2%)
Boston	1046 (502 - 1737)	1.5% (0.7% - 2.5%)	311 (115 - 611)	0.4% (0.2% - 0.9%)	74 (27 - 197)	0.1% (0% - 0.3%)
Chicago	1777 (862 - 2954)	1.4% (0.7% - 2.4%)	511 (171 - 1015)	0.4% (0.1% - 0.8%)	106 (29 - 310)	0.1% (0% - 0.3%)
Cleveland	814 (441 - 1304)	1.9% (1% - 3%)	259 (110 - 473)	0.6% (0.3% - 1.1%)	65 (24 - 161)	0.2% (0.1% - 0.4%)
Detroit	1135 (569 - 1875)	1.6% (0.8% - 2.7%)	333 (119 - 649)	0.5% (0.2% - 0.9%)	71 (20 - 201)	0.1% (0% - 0.3%)
Houston	742 (349 - 1215)	0.5% (0.3% - 0.9%)	209 (62 - 419)	0.2% (0% - 0.3%)	42 (12 - 128)	0% (0% - 0.1%)
Los Angeles	4625 (2054 - 7815)	1% (0.4% - 1.6%)	1265 (355 - 2642)	0.3% (0.1% - 0.6%)	249 (69 - 781)	0.1% (0% - 0.2%)
New York	4995 (2588 - 8140)	1.9% (1% - 3.1%)	1522 (585 - 2885)	0.6% (0.2% - 1.1%)	361 (123 - 945)	0.1% (0% - 0.4%)
Philadelphia	1788 (984 - 2848)	2.1% (1.1% - 3.3%)	570 (239 - 1037)	0.7% (0.3% - 1.2%)	146 (54 - 358)	0.2% (0.1% - 0.4%)
Sacramento	538 (245 - 912)	1.1% (0.5% - 1.8%)	145 (39 - 305)	0.3% (0.1% - 0.6%)	27 (6 - 88)	0.1% (0% - 0.2%)
St. Louis	623 (311 - 1023)	1.5% (0.7% - 2.4%)	183 (65 - 356)	0.4% (0.2% - 0.8%)	40 (12 - 112)	0.1% (0% - 0.3%)
Washington, DC	1882 (959 - 3085)	1.7% (0.9% - 2.8%)	565 (209 - 1086)	0.5% (0.2% - 1%)	132 (45 - 352)	0.1% (0% - 0.3%)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient. Numbers are rounded to the nearest 1000. Percents are rounded to the nearest tenth.

Table 3-6. Number and Percent of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response Associated with Exposure to "As Is" O_3 Concentrations Over Background O_3 Concentrations, for Location-Specific O_3 Seasons: 2004 O_3 Concentrations*

Location	Response = Decrease in FEV_1 Greater Than or Equal to:					
	10%		15%		20%	
	Number (1000s)	Percent	Number (1000s)	Percent	Number (1000s)	Percent
Atlanta	89 (66 - 128)	9.4% (7.1% - 13.6%)	34 (19 - 51)	3.6% (2% - 5.4%)	10 (3 - 20)	1% (0.4% - 2.1%)
Boston	76 (53 - 114)	6.9% (4.9% - 10.4%)	26 (12 - 42)	2.4% (1.1% - 3.8%)	6 (2 - 15)	0.6% (0.1% - 1.4%)
Chicago	93 (59 - 150)	4.8% (3% - 7.7%)	27 (6 - 49)	1.4% (0.3% - 2.5%)	4 (0 - 15)	0.2% (0% - 0.8%)
Cleveland	37 (25 - 57)	6.2% (4.2% - 9.6%)	12 (5 - 20)	2% (0.8% - 3.3%)	2 (0 - 7)	0.4% (0.1% - 1.1%)
Detroit	65 (43 - 102)	5.8% (3.9% - 9.2%)	20 (7 - 35)	1.8% (0.6% - 3.1%)	4 (0 - 11)	0.3% (0% - 1%)
Houston	129 (102 - 173)	11.9% (9.4% - 15.9%)	57 (37 - 79)	5.2% (3.4% - 7.3%)	20 (10 - 37)	1.9% (0.9% - 3.4%)
Los Angeles	483 (402 - 631)	13.2% (11% - 17.2%)	220 (149 - 298)	6% (4.1% - 8.1%)	81 (39 - 143)	2.2% (1.1% - 3.9%)
New York	316 (227 - 469)	7.6% (5.5% - 11.3%)	112 (55 - 176)	2.7% (1.3% - 4.2%)	28 (8 - 64)	0.7% (0.2% - 1.6%)
Philadelphia	105 (77 - 153)	8.8% (6.5% - 12.9%)	38 (21 - 59)	3.2% (1.8% - 4.9%)	10 (3 - 22)	0.8% (0.2% - 1.8%)
Sacramento	31 (25 - 45)	7.5% (6% - 11%)	11 (6 - 17)	2.7% (1.4% - 4.1%)	3 (1 - 6)	0.7% (0.1% - 1.5%)
St. Louis	34 (23 - 54)	5.8% (3.9% - 9.3%)	10 (3 - 18)	1.8% (0.6% - 3.1%)	2 (0 - 6)	0.3% (0% - 1%)
Washington, DC	144 (109 - 204)	9.7% (7.3% - 13.8%)	57 (33 - 84)	3.8% (2.2% - 5.6%)	17 (6 - 34)	1.1% (0.4% - 2.3%)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient. Numbers are rounded to the nearest 1000. Percents are rounded to the nearest tenth.

Table 3-7. Number and Percent of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response Associated with Exposure to "As Is" O_3 Concentrations Over Background O_3 Concentrations, for Location-Specific O_3 Seasons: 2002 O_3 Concentrations*

Location	Response = Decrease in FEV_1 Greater Than or Equal to:					
	10%		15%		20%	
	Number (1000s)	Percent	Number (1000s)	Percent	Number (1000s)	Percent
Atlanta	132 (105 - 173)	14% (11.2% - 18.3%)	59 (40 - 81)	6.3% (4.2% - 8.6%)	21 (10 - 38)	2.3% (1.1% - 4.1%)
Boston	172 (140 - 219)	15.7% (12.7% - 19.9%)	84 (58 - 112)	7.6% (5.3% - 10.3%)	35 (20 - 59)	3.2% (1.8% - 5.4%)
Chicago	275 (220 - 359)	14.1% (11.3% - 18.4%)	123 (83 - 169)	6.3% (4.2% - 8.7%)	44 (21 - 79)	2.3% (1.1% - 4%)
Cleveland	112 (93 - 138)	18.9% (15.6% - 23.2%)	56 (40 - 74)	9.4% (6.7% - 12.4%)	24 (13 - 40)	4% (2.2% - 6.7%)
Detroit	167 (135 - 215)	15.1% (12.1% - 19.4%)	76 (51 - 103)	6.8% (4.6% - 9.3%)	27 (13 - 48)	2.5% (1.2% - 4.4%)
Houston	131 (104 - 175)	12% (9.5% - 16%)	58 (38 - 80)	5.3% (3.5% - 7.4%)	21 (10 - 38)	1.9% (0.9% - 3.5%)
Los Angeles	472 (394 - 612)	12.9% (10.7% - 16.7%)	220 (150 - 297)	6% (4.1% - 8.1%)	86 (44 - 149)	2.3% (1.2% - 4.1%)
New York	712 (582 - 895)	17.2% (14% - 21.6%)	346 (244 - 462)	8.3% (5.9% - 11.2%)	144 (79 - 242)	3.5% (1.9% - 5.8%)
Philadelphia	231 (192 - 283)	19.5% (16.2% - 23.9%)	118 (85 - 155)	9.9% (7.2% - 13.1%)	53 (31 - 87)	4.4% (2.6% - 7.3%)
Sacramento	53 (44 - 69)	12.8% (10.7% - 16.6%)	24 (16 - 32)	5.8% (3.9% - 7.9%)	9 (4 - 15)	2.1% (1% - 3.8%)
St. Louis	89 (72 - 113)	15.3% (12.4% - 19.5%)	41 (28 - 56)	7.1% (4.8% - 9.6%)	16 (8 - 27)	2.7% (1.4% - 4.7%)
Washington, DC	255 (209 - 321)	17.2% (14.1% - 21.6%)	125 (88 - 167)	8.4% (5.9% - 11.2%)	52 (29 - 88)	3.5% (2% - 5.9%)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient. Numbers are rounded to the nearest 1000. Percents are rounded to the nearest tenth.

Table 3-8. Estimated Number and Percent of Occurrences of Lung Function Response (Decrease in FEV_1>=15%) Associated with Exposure to "As Is" O_3 Concentrations Over Background O_3 Concentrations Among All Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: 2002, 2003, and 2004*

Location	2002 Data		2003 Data		2004 Data	
	Number (1000s)	Percent	Number (1000s)	Percent	Number (1000s)	Percent
Atlanta	290 (88 - 593)	0.4% (0.1% - 0.7%)	186 (32 - 431)	0.2% (0% - 0.5%)	191 (29 - 456)	0.2% (0% - 0.6%)
Boston	311 (115 - 611)	0.4% (0.2% - 0.9%)	149 (24 - 364)	0.2% (0% - 0.5%)	125 (16 - 315)	0.2% (0% - 0.5%)
Chicago	511 (171 - 1015)	0.4% (0.1% - 0.8%)	265 (36 - 640)	0.2% (0% - 0.5%)	167 (6 - 460)	0.1% (0% - 0.4%)
Cleveland	259 (110 - 473)	0.6% (0.3% - 1.1%)	116 (27 - 262)	0.3% (0.1% - 0.6%)	69 (6 - 179)	0.2% (0% - 0.4%)
Detroit	333 (119 - 649)	0.5% (0.2% - 0.9%)	226 (65 - 481)	0.3% (0.1% - 0.7%)	111 (8 - 296)	0.2% (0% - 0.4%)
Houston	209 (62 - 419)	0.2% (0% - 0.3%)	291 (96 - 567)	0.2% (0.1% - 0.4%)	230 (63 - 465)	0.2% (0% - 0.3%)
Los Angeles	1265 (355 - 2642)	0.3% (0.1% - 0.6%)	1700 (610 - 3277)	0.4% (0.1% - 0.7%)	1470 (393 - 3073)	0.3% (0.1% - 0.6%)
New York	1522 (585 - 2885)	0.6% (0.2% - 1.1%)	834 (237 - 1769)	0.3% (0.1% - 0.7%)	563 (77 - 1383)	0.2% (0% - 0.5%)
Philadelphia	570 (239 - 1037)	0.7% (0.3% - 1.2%)	281 (77 - 594)	0.3% (0.1% - 0.7%)	218 (35 - 509)	0.3% (0% - 0.6%)
Sacramento	145 (39 - 305)	0.3% (0.1% - 0.6%)	121 (26 - 265)	0.2% (0.1% - 0.5%)	86 (11 - 206)	0.2% (0% - 0.4%)
St. Louis	183 (65 - 356)	0.4% (0.2% - 0.8%)	120 (26 - 266)	0.3% (0.1% - 0.6%)	69 (4 - 181)	0.2% (0% - 0.4%)
Washington, DC	565 (209 - 1086)	0.5% (0.2% - 1%)	253 (60 - 568)	0.2% (0.1% - 0.5%)	268 (50 - 622)	0.2% (0% - 0.6%)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient. Numbers are rounded to the nearest 1000. Percents are rounded to the nearest tenth.

Table 3-9. Number and Percent of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Decrease in FEV_1>=15%) Associated with Exposure to "As Is" O_3 Concentrations Over Background O_3 Concentrations, for Location-Specific O_3 Seasons: 2002, 2003, and 2004*

Location	2002 Data		2003 Data		2004 Data	
	Number (1000s)	Percent	Number (1000s)	Percent	Number (1000s)	Percent
Atlanta	59 (40 - 81)	6.3% (4.2% - 8.6%)	34 (20 - 51)	3.6% (2.1% - 5.4%)	34 (19 - 51)	3.6% (2% - 5.4%)
Boston	84 (58 - 112)	7.6% (5.3% - 10.3%)	33 (17 - 51)	3% (1.6% - 4.6%)	26 (12 - 42)	2.4% (1.1% - 3.8%)
Chicago	123 (83 - 169)	6.3% (4.2% - 8.7%)	52 (25 - 81)	2.6% (1.3% - 4.2%)	27 (6 - 49)	1.4% (0.3% - 2.5%)
Cleveland	56 (40 - 74)	9.4% (6.7% - 12.4%)	28 (18 - 40)	4.7% (3% - 6.7%)	12 (5 - 20)	2% (0.8% - 3.3%)
Detroit	76 (51 - 103)	6.8% (4.6% - 9.3%)	62 (40 - 86)	5.5% (3.6% - 7.7%)	20 (7 - 35)	1.8% (0.6% - 3.1%)
Houston	58 (38 - 80)	5.3% (3.5% - 7.4%)	72 (49 - 98)	6.6% (4.5% - 9%)	57 (37 - 79)	5.2% (3.4% - 7.3%)
Los Angeles	220 (150 - 297)	6% (4.1% - 8.1%)	309 (221 - 406)	8.4% (6% - 11.1%)	220 (149 - 298)	6% (4.1% - 8.1%)
New York	346 (244 - 462)	8.3% (5.9% - 11.2%)	223 (145 - 312)	5.4% (3.5% - 7.5%)	112 (55 - 176)	2.7% (1.3% - 4.2%)
Philadelphia	118 (85 - 155)	9.9% (7.2% - 13.1%)	68 (45 - 94)	5.7% (3.8% - 8%)	38 (21 - 59)	3.2% (1.8% - 4.9%)
Sacramento	24 (16 - 32)	5.8% (3.9% - 7.9%)	19 (12 - 26)	4.5% (2.9% - 6.3%)	11 (6 - 17)	2.7% (1.4% - 4.1%)
St. Louis	41 (28 - 56)	7.1% (4.8% - 9.6%)	26 (16 - 37)	4.4% (2.7% - 6.3%)	10 (3 - 18)	1.8% (0.6% - 3.1%)
Washington, DC	125 (88 - 167)	8.4% (5.9% - 11.2%)	69 (44 - 99)	4.7% (2.9% - 6.6%)	57 (33 - 84)	3.8% (2.2% - 5.6%)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient. Numbers are rounded to the nearest 1000. Percents are rounded to the nearest tenth.

The estimated occurrence of lung function decrement among all school age children exercising moderately while exposed to "as is" O_3 concentrations (Tables 3-4 and 3-5) varied across the locations in each year for each of the three lung function response measures (decrements in $FEV_1 \geq 10\%$, $\geq 15\%$, and $\geq 20\%$). For all three lung function response measures, there was a greater occurrence of lung function decrement in 2002 than in 2004 in all locations except Los Angeles and Houston. In 2004, Los Angeles had the greatest percentage of child-days with occurrences of lung function response for all three response definitions (decrements in $FEV_1 \geq 10\%$, $\geq 15\%$, and $\geq 20\%$). Not surprisingly, absolute numbers of occurrences of lung function decrement were also largest in Los Angeles. They were smallest in Cleveland and St. Louis for all three definitions of lung function response (at about 312,000 and 317,000, respectively, for decrements in $FEV_1 \geq 10\%$; about 69,000 for decrements in $FEV_1 \geq 15\%$; and about 8,000 for decrements in $FEV_1 \geq 20\%$). In 2002, New York had the greatest absolute numbers of occurrences of lung function response for all three definitions of response (at about 5.0 million for decrements in $FEV_1 \geq 10\%$, 1.5 million for decrements in $FEV_1 \geq 15\%$, and about 361,000 for decrements in $FEV_1 \geq 20\%$). For all three lung function response measures Sacramento had the smallest numbers of occurrence (at about 538,000; 145,000; and 27,000 occurrences for the three lung function response definitions, respectively). However, Philadelphia had the greatest percentages of child-days with occurrences of lung function response defined as decrements in $FEV_1 \geq 10\%$ and $\geq 15\%$, at 2.1% and 0.7%, respectively. The percentages of child-days with occurrences of decrements in $FEV_1 \geq 20\%$ rounded to 0.1% in most locations.

The patterns were similar for occurrences of lung function decrement among active school age children (Tables C-1 and C-2). Once again, for all three lung function response measures, there was a greater occurrence of lung function decrement in 2002 than in 2004 in all locations except Los Angeles and Houston. In 2004, the percentage of child-days (for active children) on which decrements of $FEV_1 \geq 10\%$ were estimated to occur ranged from 0.6% in Houston to 1.3% in Los Angeles. The corresponding percentages for decrements of $FEV_1 \geq 15\%$ rounded to 0.2% in most locations (except Chicago, where it was 0.1%, and Los Angeles and Philadelphia, where it was 0.3%). For decrements of $FEV_1 \geq 20\%$, the percentages rounded to 0.0% in all locations except Los Angeles, where it rounded to 0.1%. The absolute numbers of occurrences were greatest in Los Angeles for all three lung function response measures. In 2002, the percentage of child-days (for active children) on which decrements of $FEV_1 \geq 10\%$ were estimated to occur ranged from 0.6% in Houston to 2.1% in Philadelphia; the corresponding percentages for decrements of $FEV_1 \geq 15\%$ ranged from 0.2% in Houston to 0.7% in Philadelphia; and for decrements of $FEV_1 \geq 20\%$, the percentages rounded to 0.1% in most locations.

When we considered the number of children experiencing at least one lung function response during the O_3 season (Tables 3-6 and C-3 for 2004, and Tables 3-7 and C-4 for 2002), the patterns were similar to those observed when occurrence of lung function responses was estimated. In 2004, among all school age children and among active school age children, the percentages experiencing at least one lung function response were largest in Los Angeles and smallest in Chicago – for each of the three lung function response measures. For example, 6.0% of all school age children and 6.4% of active school age children in Los Angeles experienced at least one decrement in $FEV_1 \geq 15\%$ during the O_3 season. The corresponding percentages for Chicago were 1.4% and 1.4% for all school age and active school age children, respectively. In 2002, among all school age children and among active school age children, the percentages experiencing at least one lung function response were largest in Philadelphia and smallest in Houston – for each of the three lung function response measures. For example, 9.9% of all school age children and 10.3% of active school age children in Philadelphia experienced at least one decrement in $FEV_1 \geq 15\%$ during the ozone season. The corresponding percentages for Houston for all school age and active school age children were 5.3% and 5.3%, respectively.

The patterns of numbers of occurrences of lung function response defined as decrements in $FEV_1 \geq 15\%$ across all three years (2002, 2003, and 2004) shown in Table 3-8 are similar in most locations. In all locations except Houston and Los Angeles, the number of occurrences is greatest in 2002, and the number of occurrences in 2003 either falls between those of 2004 and 2002 or is slightly lower than in 2004. In Houston and Los Angeles the numbers of occurrences are lowest in 2002 and highest in 2003. The patterns for the numbers of children with at least one decrement in $FEV_1 \geq 15\%$, shown in Table 3-9, are similar. In all locations except Houston and Los Angeles, the number of children with at least one occurrence decreases from 2002 to 2003 to 2004 (in Atlanta, the number is the same in 2003 and 2004). In Houston and Los Angeles the numbers of occurrences are highest in 2003 and the same or almost the same in 2002 and 2004.

3.2.1.2 Results for asthmatic school age children

The estimated number and percent of occurrences of lung function response, defined as a change in $FEV_1 \geq 10\%$, associated with exposure to "as is" O_3 concentrations above PRB concentrations among asthmatic school age children (ages 5 – 18) engaged in moderate exercise for at least one 8-hour period during the O_3 season, is given in Table 3-10, for 2002, 2003, and 2004 O_3 concentrations. The number and percent of these children estimated to experience at least one decrement in FEV_1 of $\geq$10% associated with exposure to "as is" O_3 concentrations over PRB concentrations is given, for 2002, 2003, and 2004 O_3 concentrations, in Table 3-11.

The numbers of occurrences of lung function response, defined as decrements in $FEV_1 \geq 10\%$, among asthmatic children follow the same patterns across the three years (2002, 2003, and 2004) as for all children (see Table 3-8). In all locations except Houston and Los Angeles, the number of occurrences is greatest in 2002, and the number of occurrences in 2003 either falls between those of 2004 and 2002 or is slightly lower than in 2004. In Houston and Los Angeles the numbers of occurrences are lowest in 2002 and highest in 2003. Similarly, the numbers of asthmatic children with at least one lung function response, defined as a change in $FEV_1 \geq 10\%$, follow the same patterns across the three years as for all children, for changes in $FEV_1 \geq 15\%$ (see Table 3-9). In all locations except Houston and Los Angeles, the number of asthmatic children with at least one occurrence decreases from 2002 to 2003 to 2004 (in Atlanta, the number is the same in 2003 and 2004). In Houston and Los Angeles the numbers of occurrences are highest in 2003 and the same or almost the same in 2002 and 2004.

Table 3-10. Estimated Number and Percent of Occurrences of Lung Function Response (Decrease in FEV1>=10%) Associated with Exposure to "As Is" O_3 Concentrations Over Background O_3 Concentrations Among Asthmatic Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: 2002, 2003, and 2004*

Location	2002 Data		2003 Data		2004 Data	
	Number (1000s)	Percent	Number (1000s)	Percent	Number (1000s)	Percent
Atlanta	145 (68 - 244)	1.3% (0.6% - 2.2%)	106 (40 - 187)	1% (0.4% - 1.7%)	109 (38 - 196)	1% (0.3% - 1.8%)
Boston	186 (90 - 308)	1.5% (0.7% - 2.5%)	111 (37 - 201)	0.9% (0.3% - 1.7%)	96 (29 - 176)	0.8% (0.2% - 1.5%)
Chicago	257 (125 - 427)	1.5% (0.7% - 2.4%)	163 (56 - 291)	0.9% (0.3% - 1.6%)	114 (27 - 214)	0.7% (0.2% - 1.2%)
Cleveland	115 (62 - 184)	1.9% (1% - 3.1%)	64 (24 - 112)	1.1% (0.4% - 1.9%)	44 (13 - 82)	0.7% (0.2% - 1.4%)
Detroit	159 (79 - 262)	1.6% (0.8% - 2.7%)	118 (50 - 202)	1.2% (0.5% - 2.1%)	73 (20 - 135)	0.8% (0.2% - 1.4%)
Houston	96 (45 - 158)	0.5% (0.3% - 0.9%)	131 (64 - 213)	0.7% (0.4% - 1.2%)	110 (51 - 181)	0.6% (0.3% - 1%)
Los Angeles	561 (255 - 942)	1% (0.5% - 1.7%)	690 (352 - 1119)	1.2% (0.6% - 2%)	660 (308 - 1108)	1.2% (0.6% - 2%)
New York	834 (435 - 1356)	1.9% (1% - 3.1%)	506 (215 - 868)	1.2% (0.5% - 2%)	399 (131 - 720)	0.9% (0.3% - 1.7%)
Philadelphia	325 (180 - 516)	2.1% (1.2% - 3.4%)	188 (82 - 320)	1.2% (0.5% - 2.1%)	165 (63 - 289)	1.1% (0.4% - 1.9%)
Sacramento	69 (32 - 116)	1.1% (0.5% - 1.9%)	60 (26 - 103)	1% (0.4% - 1.6%)	45 (16 - 80)	0.7% (0.3% - 1.3%)
St. Louis	86 (43 - 141)	1.5% (0.7% - 2.4%)	64 (26 - 112)	1.1% (0.5% - 1.9%)	44 (13 - 80)	0.8% (0.2% - 1.4%)
Washington, DC	261 (133 - 428)	1.7% (0.9% - 2.8%)	137 (52 - 240)	0.9% (0.3% - 1.6%)	153 (57 - 270)	1% (0.4% - 1.8%)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient. Numbers are rounded to the nearest 1000. Percents are rounded to the nearest tenth.

Table 3-11. Number and Percent of Asthmatic Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Decrease in FEV1>=10%) Associated with Exposure to "As Is" O_3 Concentrations Over Background O_3 Concentrations, for Location-Specific O_3 Seasons: 2002, 2003, and 2004*

Location	2002 Data		2003 Data		2004 Data	
	Number (1000s)	Percent	Number (1000s)	Percent	Number (1000s)	Percent
Atlanta	18 (14 - 23)	15.2% (12.2% - 19.8%)	12 (9 - 17)	10.1% (7.6% - 14.5%)	12 (9 - 17)	9.9% (7.4% - 14.2%)
Boston	30 (24 - 38)	16.4% (13.3% - 20.7%)	15 (11 - 22)	8.4% (6.1% - 12.2%)	13 (9 - 20)	7.2% (5.1% - 10.8%)
Chicago	40 (32 - 53)	14.5% (11.6% - 18.9%)	21 (15 - 32)	7.6% (5.5% - 11.5%)	14 (9 - 22)	4.9% (3.1% - 7.8%)
Cleveland	17 (14 - 20)	18.7% (15.4% - 23.1%)	9 (7 - 13)	10.6% (8.1% - 14.5%)	5 (4 - 8)	6.2% (4.2% - 9.6%)
Detroit	24 (19 - 31)	14.9% (11.9% - 19.2%)	20 (16 - 27)	12.3% (9.6% - 16.4%)	10 (6 - 15)	5.9% (4% - 9.3%)
Houston	17 (13 - 23)	12.5% (9.9% - 16.7%)	20 (17 - 26)	15.1% (12.3% - 19.5%)	17 (14 - 23)	12.6% (10% - 16.8%)
Los Angeles	61 (51 - 79)	13.3% (11.1% - 17.2%)	77 (65 - 95)	16.8% (14.3% - 20.9%)	62 (52 - 81)	13.6% (11.4% - 17.7%)
New York	118 (97 - 147)	18.3% (15.1% - 22.9%)	81 (64 - 109)	12.7% (10% - 17%)	51 (37 - 76)	8% (5.8% - 11.8%)
Philadelphia	40 (33 - 49)	20.8% (17.3% - 25.3%)	27 (21 - 35)	13.8% (11% - 18.2%)	18 (14 - 27)	9.5% (7.1% - 13.8%)
Sacramento	7 (6 - 9)	13% (10.9% - 16.9%)	6 (5 - 8)	11% (9.2% - 14.9%)	4 (3 - 6)	7.5% (5.9% - 11%)
St. Louis	12 (10 - 16)	15% (12.1% - 19.3%)	9 (7 - 12)	10.6% (8.1% - 14.8%)	5 (3 - 8)	5.9% (3.9% - 9.4%)
Washington, DC	34 (28 - 42)	18.2% (15% - 22.7%)	21 (16 - 28)	11.2% (8.6% - 15.2%)	19 (15 - 27)	10.5% (7.9% - 14.7%)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient. Numbers are rounded to the nearest 1000. Percents are rounded to the nearest tenth.

3.2.2 Assessment of lung function decrement associated with exposure to O_3 concentrations that just meet the current and alternative daily maximum 8-hour standards

In this section, we present results for two sets of 8-hr average O_3 standards. An 8-hr average standard, denoted m/n, is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 – 0.084 ppm, 4th daily maximum 8-hr average. The 3rd, 4th, and 5th daily maximum standards, denoted m/n, for n = 3, 4, and 5, require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

3.2.2.1 Results for all locations for the current standard and the original set of seven alternative standards, based on 2002 and 2004 air quality data

The estimated number of occurrences of lung function response associated with exposure to O_3 concentrations that just meet the current and alternative daily maximum 8-hour standards among all school age children (ages 5 – 18) engaged in moderate exercise for at least one 8-hour period during the O_3 season, is given in Table 3-12, for estimates based on 2004 O_3 concentrations, and Table 3-13, for estimates based on 2002 O_3 concentrations. The corresponding estimated percents of occurrences are given in Tables 3-14 and 3-15, for estimates based on 2004 and 2002 O_3 concentrations, respectively. The numbers of these children estimated to experience at least one lung function response associated with exposure to O_3 concentrations that just meet the current and alternative standards are given in Tables 3-16 and 3-17, for estimates based on 2004 and 2002 O_3 concentrations, respectively. The corresponding estimated percents of children are given in Tables 3-18 and 3-19. The corresponding results for active school age children are given in Tables C-5 through C-12 in Appendix C. Results for all three measures of lung function response being considered in this analysis – decrements in FEV_1 of $\geq$10%, $\geq$15%, and $\geq$20% -- are shown in each table.

The percent reductions in numbers of occurrences and in numbers of school age children experiencing at least one occurrence of lung function response when O_3 concentrations are reduced from those just meeting the current standard to those that would just meet each alternative standard are summarized for all school age children in Figures 3-7 through 3-10 below. Percent reductions are calculated as the number (e.g., of occurrences) at the current standard minus the number at the alternative standard divided by the number at the current standard, so that a decrease in number results in a positive percent. Each figure also shows the percent reduction when O_3 concentrations are changed from those just meeting the current standard to "as is" concentrations in the relevant year of air quality (e.g., when O_3 concentrations just meeting the current and alternative standards were based on adjusting 2004 O_3 concentrations, 2004 "as is" O_3 concentrations were used). Because these "as is" O_3 concentrations are higher than the O_3 concentrations just meeting the current standard, these percent reductions are negative. Figure 3-7 shows the percent reductions in the aggregate numbers (across all locations) of occurrences of lung function response, for each of the three definitions of response, based on 2004 data (Figure 3-7a) and 2002 data (Figure 3-7b). Figure 3-

8 shows the percent reductions of occurrences of decrement in $FEV_1 \geq 15\%$, separately for each location, based on 2004 data (Figure 3-8a) and 2002 data (Figure 3-8b). Figure 3-9 shows the percent reductions in the aggregate numbers (across all locations) of all children experiencing at least one occurrence of lung function response, for each of the three definitions of response, based on 2004 data (Figure 3-9a) and 2002 data (Figure 3-9b). Finally, Figure 3-10 shows the percent reductions of numbers of all children experiencing at least one occurrence of decrement in $FEV_1 \geq 15\%$, separately for each location, based on 2004 data (Figure 3-10a) and 2002 data (Figure 3-10b). The corresponding figures for active school age children (ages 5-18) are given in Appendix C.

Table 3-12. Estimated Number of Occurrences of Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards Among All Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: Based on Adjusting 2004 O_3 Concentrations*

Location	Number of Occurrences (in 1000s) of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	598 (166 - 1102)	587 (160 - 1084)	532 (131 - 994)	472 (102 - 892)	444 (89 - 844)	439 (87 - 836)	390 (66 - 752)	318 (40 - 626)
Boston	408 (94 - 773)	368 (75 - 704)	363 (72 - 696)	347 (65 - 670)	302 (46 - 591)	279 (38 - 550)	266 (33 - 527)	216 (17 - 437)
Chicago	555 (86 - 1071)	517 (72 - 1004)	487 (62 - 952)	437 (46 - 862)	395 (34 - 787)	370 (28 - 741)	337 (20 - 680)	261 (7 - 537)
Cleveland	212 (41 - 407)	195 (33 - 377)	189 (31 - 365)	162 (21 - 318)	155 (19 - 306)	145 (15 - 288)	136 (13 - 271)	109 (6 - 221)
Detroit	386 (77 - 739)	353 (62 - 681)	343 (58 - 665)	331 (53 - 644)	285 (36 - 563)	263 (29 - 523)	249 (25 - 498)	200 (12 - 408)
Houston	457 (170 - 775)	411 (145 - 698)	393 (136 - 669)	319 (100 - 541)	305 (93 - 518)	273 (80 - 462)	245 (70 - 412)	137 (38 - 209)
Los Angeles	1802 (381 - 3361)	1721 (349 - 3220)	1566 (292 - 2947)	1156 (173 - 2198)	1106 (161 - 2106)	1012 (140 - 1929)	793 (94 - 1514)	375 (31 - 694)
New York	1452 (280 - 2771)	1374 (244 - 2639)	1293 (210 - 2498)	1054 (118 - 2081)	1081 (128 - 2129)	1035 (112 - 2046)	953 (87 - 1901)	747 (38 - 1523)
Philadelphia	602 (162 - 1107)	556 (138 - 1031)	535 (127 - 995)	456 (89 - 861)	443 (83 - 839)	415 (71 - 790)	387 (59 - 743)	314 (33 - 613)
Sacramento	198 (48 - 367)	186 (43 - 345)	171 (37 - 320)	143 (26 - 270)	135 (23 - 256)	128 (21 - 243)	112 (16 - 216)	79 (8 - 155)
St. Louis	257 (63 - 478)	237 (53 - 443)	225 (48 - 423)	191 (33 - 363)	182 (30 - 348)	169 (25 - 325)	156 (21 - 302)	121 (10 - 240)
Washington, DC	750 (205 - 1386)	671 (163 - 1256)	665 (160 - 1246)	587 (122 - 1114)	551 (106 - 1052)	501 (84 - 966)	484 (77 - 936)	390 (43 - 771)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	131 (10 - 344)	128 (9 - 338)	113 (6 - 308)	98 (3 - 275)	91 (2 - 260)	90 (2 - 257)	78 (1 - 230)	62 (0 - 191)
Boston	86 (5 - 238)	76 (3 - 216)	74 (2 - 213)	70 (2 - 205)	59 (1 - 180)	54 (0 - 167)	51 (0 - 160)	40 (0 - 131)
Chicago	110 (1 - 328)	102 (0 - 307)	95 (0 - 291)	84 (0 - 262)	75 (0 - 239)	70 (0 - 224)	63 (0 - 205)	48 (0 - 161)
Cleveland	43 (1 - 125)	39 (0 - 115)	37 (0 - 112)	31 (0 - 97)	30 (0 - 93)	28 (0 - 87)	26 (0 - 82)	20 (0 - 66)
Detroit	79 (2 - 227)	71 (1 - 208)	68 (1 - 203)	66 (1 - 196)	55 (0 - 171)	50 (0 - 158)	47 (0 - 150)	37 (0 - 122)
Houston	110 (13 - 253)	97 (9 - 227)	92 (7 - 217)	73 (4 - 176)	69 (3 - 168)	61 (2 - 151)	55 (1 - 135)	32 (0 - 73)
Los Angeles	371 (6 - 1044)	353 (5 - 999)	317 (3 - 913)	230 (1 - 680)	220 (1 - 651)	201 (0 - 597)	156 (0 - 469)	75 (0 - 220)

Location	Number of Occurrences (in 1000s) of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
New York	296 (7 - 851)	277 (5 - 809)	258 (3 - 765)	203 (0 - 633)	209 (0 - 648)	199 (0 - 622)	181 (0 - 576)	139 (0 - 458)
Philadelphia	130 (6 - 345)	118 (4 - 320)	112 (3 - 308)	93 (1 - 266)	90 (1 - 259)	83 (0 - 243)	77 (0 - 228)	61 (0 - 188)
Sacramento	41 (1 - 114)	38 (0 - 107)	35 (0 - 99)	29 (0 - 83)	27 (0 - 79)	25 (0 - 75)	22 (0 - 66)	15 (0 - 48)
St. Louis	54 (1 - 148)	49 (1 - 137)	46 (0 - 131)	38 (0 - 112)	36 (0 - 107)	33 (0 - 100)	30 (0 - 93)	23 (0 - 73)
Washington, DC	164 (12 - 432)	142 (7 - 389)	141 (6 - 386)	121 (3 - 343)	112 (2 - 323)	100 (1 - 296)	96 (1 - 286)	75 (0 - 234)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	15 (1 - 82)	15 (1 - 80)	12 (0 - 71)	9 (0 - 62)	9 (0 - 58)	8 (0 - 57)	7 (0 - 50)	5 (0 - 40)
Boston	9 (0 - 54)	7 (0 - 48)	7 (0 - 47)	7 (0 - 45)	5 (0 - 39)	4 (0 - 35)	4 (0 - 34)	3 (0 - 27)
Chicago	9 (0 - 71)	8 (0 - 66)	8 (0 - 62)	7 (0 - 55)	6 (0 - 50)	5 (0 - 46)	5 (0 - 42)	3 (0 - 32)
Cleveland	4 (0 - 28)	3 (0 - 25)	3 (0 - 24)	3 (0 - 20)	2 (0 - 20)	2 (0 - 18)	2 (0 - 17)	1 (0 - 13)
Detroit	7 (0 - 50)	6 (0 - 46)	6 (0 - 44)	6 (0 - 42)	4 (0 - 36)	4 (0 - 33)	4 (0 - 31)	3 (0 - 25)
Houston	15 (1 - 66)	12 (1 - 59)	11 (0 - 56)	8 (0 - 44)	8 (0 - 42)	7 (0 - 37)	6 (0 - 34)	3 (0 - 19)
Los Angeles	35 (0 - 236)	33 (0 - 225)	28 (0 - 203)	19 (0 - 148)	18 (0 - 142)	17 (0 - 129)	13 (0 - 101)	6 (0 - 48)
New York	27 (0 - 189)	25 (0 - 178)	22 (0 - 166)	16 (0 - 133)	17 (0 - 137)	16 (0 - 130)	14 (0 - 119)	10 (0 - 93)
Philadelphia	14 (0 - 81)	12 (0 - 74)	11 (0 - 71)	8 (0 - 59)	8 (0 - 57)	7 (0 - 53)	6 (0 - 50)	5 (0 - 40)
Sacramento	4 (0 - 26)	4 (0 - 24)	3 (0 - 22)	2 (0 - 18)	2 (0 - 17)	2 (0 - 16)	2 (0 - 14)	1 (0 - 10)
St. Louis	5 (0 - 34)	5 (0 - 31)	4 (0 - 29)	3 (0 - 25)	3 (0 - 23)	3 (0 - 22)	2 (0 - 20)	2 (0 - 15)
Washington, DC	19 (1 - 102)	15 (0 - 90)	14 (0 - 89)	11 (0 - 77)	10 (0 - 72)	9 (0 - 64)	8 (0 - 62)	6 (0 - 49)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-13. Estimated Number of Occurrences of Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards Among All Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: Based on Adjusting 2002 O_3 Concentrations*

Location	Number of Occurrences (in 1000s) of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	782 (312 - 1365)	770 (304 - 1348)	693 (254 - 1230)	621 (210 - 1115)	580 (185 - 1050)	577 (184 - 1045)	510 (145 - 935)	415 (95 - 777)
Boston	795 (326 - 1379)	718 (273 - 1267)	711 (268 - 1256)	679 (247 - 1208)	594 (193 - 1079)	550 (166 - 1008)	527 (152 - 972)	433 (99 - 820)
Chicago	1286 (521 - 2239)	1202 (465 - 2111)	1140 (424 - 2018)	1038 (360 - 1858)	946 (303 - 1711)	895 (273 - 1629)	827 (233 - 1517)	670 (149 - 1255)
Cleveland	564 (254 - 962)	513 (217 - 889)	502 (209 - 872)	433 (162 - 770)	417 (151 - 744)	383 (129 - 692)	367 (119 - 666)	300 (79 - 557)
Detroit	864 (374 - 1490)	782 (317 - 1369)	764 (304 - 1342)	743 (291 - 1311)	633 (218 - 1140)	578 (184 - 1052)	553 (169 - 1012)	450 (110 - 841)
Houston	404 (153 - 679)	362 (131 - 610)	346 (124 - 583)	278 (91 - 467)	264 (85 - 443)	239 (74 - 398)	209 (64 - 343)	106 (35 - 150)
Los Angeles	1504 (336 - 2792)	1447 (314 - 2692)	1266 (255 - 2364)	863 (149 - 1613)	851 (146 - 1590)	796 (134 - 1486)	575 (90 - 1058)	206 (35 - 323)
New York	3053 (1184 - 5374)	2879 (1070 - 5107)	2730 (971 - 4878)	2237 (663 - 4097)	2304 (700 - 4205)	2189 (633 - 4019)	2044 (548 - 3783)	1654 (350 - 3125)
Philadelphia	1232 (565 - 2082)	1132 (493 - 1939)	1100 (470 - 1891)	958 (371 - 1680)	925 (349 - 1631)	860 (306 - 1529)	818 (279 - 1464)	677 (192 - 1237)
Sacramento	315 (106 - 566)	296 (95 - 534)	279 (86 - 506)	238 (65 - 439)	229 (60 - 423)	216 (54 - 402)	199 (46 - 371)	156 (29 - 296)
St. Louis	515 (235 - 869)	476 (208 - 814)	455 (193 - 782)	396 (154 - 695)	374 (139 - 661)	350 (124 - 623)	326 (109 - 586)	264 (73 - 484)
Washington, DC	1327 (560 - 2293)	1190 (465 - 2090)	1183 (460 - 2078)	1055 (377 - 1884)	994 (338 - 1788)	908 (285 - 1651)	882 (269 - 1610)	728 (182 - 1358)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	196 (39 - 442)	192 (37 - 435)	166 (25 - 392)	143 (16 - 352)	131 (12 - 330)	130 (12 - 328)	111 (6 - 291)	86 (1 - 240)
Boston	210 (56 - 458)	181 (40 - 412)	179 (39 - 408)	167 (34 - 389)	139 (20 - 341)	124 (14 - 316)	117 (12 - 304)	91 (4 - 252)
Chicago	325 (68 - 727)	297 (54 - 679)	276 (45 - 644)	243 (31 - 588)	215 (21 - 537)	200 (16 - 510)	180 (11 - 472)	139 (2 - 388)
Cleveland	153 (43 - 320)	133 (32 - 290)	129 (30 - 284)	105 (18 - 245)	99 (15 - 236)	88 (11 - 217)	83 (9 - 208)	64 (2 - 172)
Detroit	226 (56 - 488)	197 (41 - 441)	190 (38 - 431)	183 (34 - 420)	147 (18 - 359)	130 (12 - 328)	123 (9 - 315)	94 (2 - 259)
Houston	99 (13 - 223)	87 (9 - 199)	82 (8 - 191)	64 (4 - 153)	61 (3 - 145)	55 (2 - 131)	48 (1 - 114)	26 (0 - 54)
Los Angeles	315 (9 - 869)	302 (8 - 837)	261 (5 - 735)	175 (1 - 502)	173 (1 - 496)	161 (1 - 463)	117 (0 - 333)	46 (0 - 112)

Location	Number of Occurrences (in 1000s) of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4* **	**0.084/3**	**0.080/4**	**0.074/5**	**0.074/4**	**0.074/3**	**0.070/4**	**0.064/4**
New York	753 (140 - 1727)	695 (113 - 1630)	646 (91 - 1547)	494 (35 - 1277)	513 (40 - 1314)	480 (31 - 1252)	439 (20 - 1174)	339 (4 - 962)
Philadelphia	335 (92 - 696)	297 (71 - 638)	284 (64 - 619)	234 (39 - 539)	223 (34 - 521)	202 (25 - 485)	189 (20 - 462)	147 (7 - 386)
Sacramento	72 (8 - 179)	67 (6 - 168)	62 (5 - 159)	51 (2 - 137)	49 (2 - 132)	46 (1 - 125)	41 (1 - 115)	31 (0 - 91)
St. Louis	141 (40 - 292)	126 (32 - 269)	118 (28 - 257)	98 (18 - 224)	91 (15 - 211)	83 (11 - 198)	75 (9 - 185)	57 (2 - 150)
Washington, DC	345 (82 - 752)	296 (57 - 674)	293 (55 - 670)	250 (36 - 599)	231 (28 - 564)	205 (19 - 517)	197 (16 - 503)	154 (4 - 420)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	30 (4 - 118)	29 (4 - 116)	23 (2 - 101)	18 (1 - 88)	16 (1 - 81)	16 (1 - 80)	12 (0 - 69)	8 (0 - 55)
Boston	39 (10 - 130)	30 (6 - 111)	29 (6 - 110)	26 (4 - 103)	19 (2 - 85)	15 (1 - 77)	14 (1 - 73)	9 (0 - 57)
Chicago	51 (7 - 195)	44 (5 - 179)	38 (3 - 166)	31 (1 - 148)	26 (1 - 132)	23 (0 - 123)	20 (0 - 112)	13 (0 - 88)
Cleveland	27 (5 - 91)	22 (3 - 79)	20 (3 - 77)	15 (1 - 63)	13 (1 - 60)	11 (0 - 54)	10 (0 - 51)	7 (0 - 40)
Detroit	37 (5 - 134)	30 (3 - 117)	28 (2 - 114)	26 (2 - 110)	18 (0 - 89)	15 (0 - 80)	14 (0 - 76)	9 (0 - 59)
Houston	14 (1 - 60)	11 (1 - 52)	10 (1 - 50)	7 (0 - 39)	7 (0 - 37)	6 (0 - 33)	5 (0 - 29)	3 (0 - 15)
Los Angeles	31 (0 - 199)	29 (0 - 191)	24 (0 - 166)	15 (0 - 112)	15 (0 - 110)	14 (0 - 103)	10 (0 - 75)	4 (0 - 28)
New York	112 (13 - 455)	98 (9 - 421)	86 (6 - 392)	56 (1 - 306)	59 (1 - 317)	53 (1 - 298)	46 (0 - 275)	32 (0 - 216)
Philadelphia	61 (13 - 201)	50 (8 - 177)	46 (7 - 170)	33 (3 - 141)	31 (2 - 134)	26 (1 - 123)	23 (1 - 115)	16 (0 - 92)
Sacramento	9 (1 - 44)	8 (0 - 41)	7 (0 - 38)	5 (0 - 32)	5 (0 - 31)	5 (0 - 29)	4 (0 - 26)	3 (0 - 20)
St. Louis	26 (6 - 84)	22 (4 - 75)	19 (3 - 71)	14 (1 - 59)	13 (1 - 55)	11 (1 - 50)	9 (0 - 46)	6 (0 - 36)
Washington, DC	58 (11 - 208)	45 (6 - 179)	44 (6 - 177)	34 (3 - 152)	30 (2 - 141)	24 (1 - 126)	23 (1 - 122)	15 (0 - 97)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-14. Estimated Percent of Occurrences of Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards Among All Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: Based on Adjusting 2004 O_3 Concentrations*

Location	Percent of Occurrences of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	0.7% (0.2% - 1.3%)	0.7% (0.2% - 1.3%)	0.6% (0.2% - 1.2%)	0.6% (0.1% - 1.1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.4% (0% - 0.8%)
Boston	0.6% (0.1% - 1.1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.4% (0.1% - 0.9%)	0.4% (0.1% - 0.8%)	0.4% (0% - 0.8%)	0.3% (0% - 0.6%)
Chicago	0.5% (0.1% - 0.9%)	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.8%)	0.4% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.4%)
Cleveland	0.5% (0.1% - 0.9%)	0.4% (0.1% - 0.9%)	0.4% (0.1% - 0.8%)	0.4% (0% - 0.7%)	0.4% (0% - 0.7%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.5%)
Detroit	0.6% (0.1% - 1.1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.5% (0.1% - 0.9%)	0.4% (0.1% - 0.8%)	0.4% (0% - 0.7%)	0.4% (0% - 0.7%)	0.3% (0% - 0.6%)
Houston	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)
Los Angeles	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.1% (0% - 0.1%)
New York	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.4% (0% - 0.7%)	0.3% (0% - 0.6%)
Philadelphia	0.7% (0.2% - 1.3%)	0.6% (0.2% - 1.2%)	0.6% (0.1% - 1.1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.4% (0.1% - 0.9%)	0.4% (0% - 0.7%)
Sacramento	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)
St. Louis	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1%)	0.5% (0.1% - 1%)	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.8%)	0.4% (0% - 0.7%)	0.3% (0% - 0.6%)
Washington, DC	0.7% (0.2% - 1.3%)	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1.1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.4% (0.1% - 0.8%)	0.4% (0% - 0.7%)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Boston	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Chicago	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)
Cleveland	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0% (0% - 0.2%)
Detroit	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Houston	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Los Angeles	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)

Location	Percent of Occurrences of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
New York	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Philadelphia	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Sacramento	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
St. Louis	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Washington, DC	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)
Boston	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)
Chicago	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
Cleveland	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
Detroit	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
Houston	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
Los Angeles	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
New York	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
Philadelphia	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)
Sacramento	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
St. Louis	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)
Washington, DC	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)

*Percents are median (0.5 fractile) percents of occurrences. Percents in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-15. Estimated Percent of Occurrences of Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards Among All Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: Based on Adjusting 2002 O_3 Concentrations*

Location	Percent of Occurrences of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	1% (0.4% - 1.7%)	0.9% (0.4% - 1.6%)	0.8% (0.3% - 1.5%)	0.8% (0.3% - 1.4%)	0.7% (0.2% - 1.3%)	0.7% (0.2% - 1.3%)	0.6% (0.2% - 1.1%)	0.5% (0.1% - 0.9%)
Boston	1.1% (0.5% - 2%)	1% (0.4% - 1.8%)	1% (0.4% - 1.8%)	1% (0.4% - 1.7%)	0.9% (0.3% - 1.5%)	0.8% (0.2% - 1.4%)	0.8% (0.2% - 1.4%)	0.6% (0.1% - 1.2%)
Chicago	1% (0.4% - 1.8%)	1% (0.4% - 1.7%)	0.9% (0.3% - 1.6%)	0.8% (0.3% - 1.5%)	0.8% (0.2% - 1.4%)	0.7% (0.2% - 1.3%)	0.7% (0.2% - 1.2%)	0.5% (0.1% - 1%)
Cleveland	1.3% (0.6% - 2.2%)	1.2% (0.5% - 2%)	1.2% (0.5% - 2%)	1% (0.4% - 1.8%)	1% (0.3% - 1.7%)	0.9% (0.3% - 1.6%)	0.8% (0.3% - 1.5%)	0.7% (0.2% - 1.3%)
Detroit	1.2% (0.5% - 2.1%)	1.1% (0.5% - 2%)	1.1% (0.4% - 1.9%)	1.1% (0.4% - 1.9%)	0.9% (0.3% - 1.6%)	0.8% (0.3% - 1.5%)	0.8% (0.2% - 1.5%)	0.6% (0.2% - 1.2%)
Houston	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.1%)
Los Angeles	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)
New York	1.1% (0.4% - 2%)	1.1% (0.4% - 1.9%)	1% (0.4% - 1.8%)	0.8% (0.2% - 1.5%)	0.9% (0.3% - 1.6%)	0.8% (0.2% - 1.5%)	0.8% (0.2% - 1.4%)	0.6% (0.1% - 1.2%)
Philadelphia	1.4% (0.6% - 2.4%)	1.3% (0.6% - 2.2%)	1.3% (0.5% - 2.2%)	1.1% (0.4% - 1.9%)	1.1% (0.4% - 1.9%)	1% (0.4% - 1.8%)	0.9% (0.3% - 1.7%)	0.8% (0.2% - 1.4%)
Sacramento	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1%)	0.5% (0.1% - 0.9%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)
St. Louis	1.2% (0.5% - 2%)	1.1% (0.5% - 1.9%)	1.1% (0.5% - 1.8%)	0.9% (0.4% - 1.6%)	0.9% (0.3% - 1.5%)	0.8% (0.3% - 1.5%)	0.8% (0.3% - 1.4%)	0.6% (0.2% - 1.1%)
Washington, DC	1.2% (0.5% - 2.1%)	1.1% (0.4% - 1.9%)	1.1% (0.4% - 1.9%)	1% (0.3% - 1.7%)	0.9% (0.3% - 1.6%)	0.8% (0.3% - 1.5%)	0.8% (0.2% - 1.5%)	0.7% (0.2% - 1.2%)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)
Boston	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.1% (0% - 0.4%)
Chicago	0.3% (0.1% - 0.6%)	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)
Cleveland	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.7%)	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.1% (0% - 0.4%)
Detroit	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.1% (0% - 0.4%)
Houston	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)
Los Angeles	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)

Location	Percent of Occurrences of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
New York	0.3% (0.1% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.1% (0% - 0.4%)
Philadelphia	0.4% (0.1% - 0.8%)	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)
Sacramento	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
St. Louis	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.1% (0% - 0.4%)
Washington, DC	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.1% (0% - 0.4%)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Boston	0.1% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Chicago	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Cleveland	0.1% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Detroit	0.1% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Houston	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
Los Angeles	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
New York	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Philadelphia	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Sacramento	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)
St. Louis	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Washington, DC	0.1% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)

*Percents are median (0.5 fractile) percents of occurrences. Percents in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-16. Number of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons: Based on Adjusting 2004 O_3 Concentrations*

Location	Number of All Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	62 (43 - 96)	61 (42 - 94)	53 (35 - 83)	45 (29 - 72)	42 (26 - 67)	41 (26 - 66)	35 (21 - 56)	26 (14 - 42)
Boston	52 (33 - 82)	45 (28 - 72)	44 (27 - 71)	41 (25 - 67)	34 (19 - 55)	31 (17 - 50)	29 (15 - 46)	21 (9 - 34)
Chicago	60 (34 - 98)	56 (31 - 90)	52 (28 - 83)	45 (23 - 72)	40 (19 - 64)	37 (17 - 59)	33 (13 - 53)	23 (6 - 39)
Cleveland	23 (14 - 37)	20 (12 - 33)	19 (11 - 32)	16 (8 - 26)	15 (8 - 24)	14 (7 - 22)	13 (6 - 20)	9 (4 - 15)
Detroit	46 (28 - 74)	40 (24 - 66)	39 (23 - 63)	37 (21 - 60)	30 (16 - 49)	27 (14 - 44)	25 (13 - 41)	19 (8 - 30)
Houston	69 (49 - 105)	61 (42 - 95)	58 (40 - 91)	48 (31 - 76)	45 (29 - 72)	41 (26 - 65)	38 (23 - 60)	27 (15 - 43)
Los Angeles	121 (87 - 190)	113 (81 - 178)	100 (71 - 156)	74 (52 - 114)	71 (49 - 109)	66 (45 - 101)	54 (36 - 82)	27 (16 - 42)
New York	161 (97 - 261)	149 (88 - 242)	137 (79 - 222)	102 (52 - 164)	106 (55 - 172)	100 (50 - 161)	89 (42 - 144)	66 (24 - 108)
Philadelphia	63 (41 - 101)	57 (36 - 92)	54 (34 - 87)	44 (26 - 72)	42 (25 - 69)	39 (22 - 63)	35 (20 - 57)	27 (13 - 42)
Sacramento	15 (11 - 23)	13 (10 - 21)	12 (9 - 19)	9 (7 - 15)	9 (6 - 13)	8 (6 - 12)	7 (5 - 11)	5 (3 - 7)
St. Louis	27 (17 - 43)	24 (15 - 40)	23 (14 - 37)	19 (11 - 31)	18 (10 - 29)	16 (9 - 26)	15 (8 - 23)	11 (5 - 18)
Washington, DC	89 (60 - 138)	76 (49 - 120)	75 (48 - 119)	63 (39 - 102)	58 (35 - 94)	50 (29 - 82)	48 (27 - 78)	36 (18 - 57)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	20 (8 - 34)	20 (8 - 33)	16 (5 - 28)	13 (3 - 24)	12 (2 - 22)	11 (2 - 21)	9 (1 - 18)	6 (0 - 14)
Boston	15 (4 - 27)	13 (3 - 24)	12 (2 - 23)	11 (2 - 22)	9 (1 - 18)	7 (0 - 16)	7 (0 - 15)	5 (0 - 11)
Chicago	15 (1 - 31)	14 (0 - 29)	12 (0 - 27)	10 (0 - 24)	9 (0 - 21)	8 (0 - 20)	7 (0 - 18)	5 (0 - 13)
Cleveland	6 (1 - 12)	5 (0 - 11)	5 (0 - 10)	4 (0 - 8)	4 (0 - 8)	3 (0 - 7)	3 (0 - 7)	2 (0 - 5)
Detroit	12 (2 - 24)	11 (1 - 21)	10 (1 - 20)	9 (1 - 19)	7 (0 - 16)	6 (0 - 14)	6 (0 - 13)	4 (0 - 10)
Houston	23 (10 - 37)	19 (7 - 33)	18 (6 - 31)	14 (3 - 25)	13 (3 - 24)	11 (2 - 21)	10 (1 - 19)	7 (0 - 14)
Los Angeles	34 (5 - 62)	31 (4 - 58)	26 (3 - 50)	18 (1 - 37)	17 (1 - 36)	16 (0 - 33)	13 (0 - 27)	6 (0 - 14)

Location	Number of All Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4* **	**0.084/3**	**0.080/4**	**0.074/5**	**0.074/4**	**0.074/3**	**0.070/4**	**0.064/4**
New York	43 (6 - 84)	39 (4 - 78)	35 (3 - 72)	24 (0 - 53)	25 (0 - 56)	23 (0 - 52)	20 (0 - 47)	14 (0 - 35)
Philadelphia	19 (5 - 33)	16 (3 - 30)	15 (3 - 28)	11 (1 - 23)	11 (1 - 22)	10 (0 - 20)	9 (0 - 18)	6 (0 - 14)
Sacramento	4 (1 - 7)	4 (0 - 7)	3 (0 - 6)	2 (0 - 5)	2 (0 - 4)	2 (0 - 4)	2 (0 - 3)	1 (0 - 2)
St. Louis	7 (1 - 14)	7 (1 - 13)	6 (0 - 12)	5 (0 - 10)	4 (0 - 9)	4 (0 - 8)	3 (0 - 8)	2 (0 - 6)
Washington, DC	28 (10 - 48)	22 (6 - 40)	22 (6 - 40)	17 (3 - 33)	16 (2 - 30)	13 (1 - 26)	12 (1 - 25)	8 (0 - 19)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	4 (1 - 12)	4 (1 - 11)	3 (0 - 9)	2 (0 - 7)	2 (0 - 7)	2 (0 - 7)	1 (0 - 5)	1 (0 - 4)
Boston	3 (0 - 9)	2 (0 - 7)	2 (0 - 7)	2 (0 - 6)	1 (0 - 5)	1 (0 - 4)	1 (0 - 4)	1 (0 - 3)
Chicago	2 (0 - 9)	2 (0 - 8)	2 (0 - 7)	1 (0 - 6)	1 (0 - 5)	1 (0 - 5)	1 (0 - 4)	0 (0 - 3)
Cleveland	1 (0 - 3)	1 (0 - 3)	1 (0 - 3)	0 (0 - 2)	0 (0 - 2)	0 (0 - 2)	0 (0 - 2)	0 (0 - 1)
Detroit	2 (0 - 7)	2 (0 - 6)	1 (0 - 6)	1 (0 - 5)	1 (0 - 4)	1 (0 - 4)	1 (0 - 4)	0 (0 - 3)
Houston	5 (1 - 13)	4 (1 - 11)	4 (0 - 10)	2 (0 - 8)	2 (0 - 7)	2 (0 - 6)	1 (0 - 6)	1 (0 - 4)
Los Angeles	5 (0 - 19)	5 (0 - 18)	4 (0 - 15)	2 (0 - 11)	2 (0 - 10)	2 (0 - 9)	2 (0 - 8)	1 (0 - 4)
New York	7 (0 - 25)	6 (0 - 23)	5 (0 - 20)	3 (0 - 14)	3 (0 - 15)	3 (0 - 14)	2 (0 - 12)	1 (0 - 9)
Philadelphia	3 (0 - 10)	3 (0 - 9)	2 (0 - 9)	2 (0 - 7)	2 (0 - 6)	1 (0 - 6)	1 (0 - 5)	1 (0 - 4)
Sacramento	1 (0 - 2)	1 (0 - 2)	0 (0 - 2)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)
St. Louis	1 (0 - 4)	1 (0 - 4)	1 (0 - 4)	1 (0 - 3)	1 (0 - 3)	0 (0 - 2)	0 (0 - 2)	0 (0 - 2)
Washington, DC	6 (1 - 16)	4 (0 - 13)	4 (0 - 12)	3 (0 - 10)	2 (0 - 9)	2 (0 - 8)	2 (0 - 7)	1 (0 - 5)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-17. Number of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons: Based on Adjusting 2002 O_3 Concentrations*

Location	Number of All Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	94 (71 - 133)	92 (69 - 131)	79 (58 - 117)	69 (49 - 105)	63 (44 - 98)	63 (44 - 97)	53 (35 - 84)	40 (25 - 66)
Boston	123 (95 - 167)	106 (80 - 150)	105 (79 - 148)	98 (73 - 141)	81 (58 - 121)	72 (50 - 110)	68 (46 - 104)	50 (31 - 80)
Chicago	186 (140 - 268)	172 (127 - 252)	160 (116 - 238)	141 (99 - 216)	124 (85 - 195)	116 (78 - 183)	104 (68 - 167)	77 (47 - 127)
Cleveland	73 (57 - 99)	64 (49 - 90)	63 (48 - 88)	51 (37 - 77)	49 (35 - 74)	43 (30 - 67)	41 (28 - 64)	31 (20 - 50)
Detroit	121 (92 - 169)	106 (79 - 154)	103 (76 - 151)	99 (73 - 147)	80 (56 - 124)	71 (49 - 113)	67 (45 - 107)	50 (31 - 82)
Houston	70 (50 - 106)	62 (43 - 96)	60 (41 - 92)	48 (31 - 76)	46 (30 - 73)	42 (27 - 67)	38 (24 - 61)	28 (16 - 44)
Los Angeles	120 (87 - 187)	115 (83 - 180)	99 (71 - 155)	70 (49 - 109)	70 (49 - 108)	66 (46 - 102)	52 (36 - 80)	28 (18 - 43)
New York	382 (283 - 555)	355 (259 - 524)	328 (236 - 494)	248 (166 - 392)	258 (175 - 406)	240 (160 - 382)	218 (141 - 350)	165 (99 - 270)
Philadelphia	149 (117 - 201)	134 (103 - 185)	129 (99 - 179)	106 (78 - 156)	101 (74 - 150)	92 (65 - 139)	85 (60 - 131)	65 (42 - 104)
Sacramento	27 (21 - 40)	25 (19 - 37)	23 (18 - 35)	18 (14 - 29)	17 (13 - 27)	16 (12 - 25)	14 (10 - 22)	10 (7 - 16)
St. Louis	72 (56 - 96)	65 (50 - 89)	61 (47 - 86)	52 (38 - 75)	48 (35 - 71)	44 (31 - 66)	40 (28 - 62)	30 (19 - 48)
Washington, DC	168 (129 - 231)	145 (109 - 207)	143 (108 - 205)	122 (89 - 182)	113 (80 - 171)	100 (69 - 155)	96 (65 - 150)	72 (46 - 117)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	36 (21 - 54)	35 (20 - 52)	29 (15 - 44)	23 (11 - 38)	21 (8 - 34)	20 (8 - 34)	16 (5 - 28)	11 (1 - 21)
Boston	52 (33 - 74)	42 (25 - 62)	42 (24 - 61)	38 (21 - 57)	29 (14 - 45)	24 (11 - 39)	22 (9 - 37)	14 (3 - 26)
Chicago	71 (41 - 106)	63 (35 - 96)	57 (29 - 88)	47 (22 - 76)	40 (15 - 66)	36 (12 - 62)	31 (9 - 55)	20 (2 - 40)
Cleveland	30 (19 - 43)	25 (15 - 37)	24 (15 - 36)	18 (10 - 28)	17 (9 - 27)	14 (6 - 23)	13 (5 - 22)	9 (2 - 16)
Detroit	47 (29 - 69)	40 (23 - 60)	38 (21 - 58)	36 (20 - 55)	27 (12 - 43)	22 (9 - 38)	21 (7 - 35)	14 (1 - 26)
Houston	24 (11 - 38)	20 (8 - 34)	19 (7 - 32)	14 (3 - 25)	13 (3 - 24)	12 (2 - 22)	10 (1 - 20)	7 (0 - 14)
Los Angeles	35 (7 - 62)	33 (6 - 59)	27 (4 - 51)	18 (1 - 35)	18 (1 - 35)	17 (1 - 33)	13 (0 - 26)	7 (0 - 14)

Location	Number of All Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4* **	**0.084/3**	**0.080/4**	**0.074/5**	**0.074/4**	**0.074/3**	**0.070/4**	**0.064/4**
New York	142 (79 - 216)	128 (68 - 197)	114 (57 - 181)	76 (26 - 132)	81 (29 - 138)	73 (23 - 127)	64 (16 - 115)	43 (3 - 86)
Philadelphia	63 (41 - 89)	54 (34 - 78)	51 (31 - 75)	39 (21 - 59)	36 (19 - 56)	31 (15 - 50)	28 (13 - 46)	19 (5 - 34)
Sacramento	10 (5 - 15)	8 (4 - 13)	8 (3 - 12)	6 (2 - 10)	5 (1 - 9)	5 (1 - 8)	4 (1 - 7)	3 (0 - 5)
St. Louis	30 (20 - 43)	26 (16 - 38)	24 (15 - 35)	19 (11 - 29)	17 (9 - 26)	15 (7 - 24)	13 (6 - 22)	9 (2 - 16)
Washington, DC	68 (42 - 98)	55 (32 - 82)	55 (31 - 82)	44 (22 - 68)	39 (18 - 62)	32 (13 - 54)	30 (12 - 51)	20 (4 - 38)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	10 (3 - 21)	10 (3 - 20)	7 (2 - 16)	5 (1 - 13)	4 (1 - 11)	4 (1 - 11)	3 (0 - 9)	2 (0 - 6)
Boston	18 (8 - 33)	13 (5 - 26)	13 (5 - 25)	11 (4 - 23)	7 (2 - 16)	5 (1 - 14)	5 (1 - 12)	2 (0 - 8)
Chicago	19 (6 - 40)	16 (4 - 35)	13 (3 - 31)	10 (1 - 26)	8 (1 - 22)	7 (0 - 20)	5 (0 - 17)	3 (0 - 12)
Cleveland	9 (4 - 18)	7 (2 - 14)	7 (2 - 14)	4 (1 - 10)	4 (1 - 9)	3 (0 - 8)	3 (0 - 7)	1 (0 - 5)
Detroit	13 (4 - 27)	10 (2 - 22)	9 (2 - 21)	9 (2 - 20)	5 (0 - 14)	4 (0 - 12)	4 (0 - 11)	2 (0 - 8)
Houston	6 (1 - 14)	4 (1 - 11)	4 (1 - 11)	2 (0 - 8)	2 (0 - 7)	2 (0 - 7)	2 (0 - 6)	1 (0 - 4)
Los Angeles	6 (0 - 20)	6 (0 - 19)	4 (0 - 16)	3 (0 - 10)	3 (0 - 10)	2 (0 - 10)	2 (0 - 8)	1 (0 - 4)
New York	37 (11 - 81)	31 (8 - 72)	26 (5 - 64)	14 (1 - 43)	16 (1 - 45)	13 (1 - 41)	11 (0 - 36)	6 (0 - 25)
Philadelphia	21 (9 - 39)	16 (6 - 32)	15 (5 - 30)	10 (2 - 22)	9 (2 - 20)	7 (1 - 17)	6 (1 - 16)	3 (0 - 11)
Sacramento	2 (0 - 5)	2 (0 - 5)	2 (0 - 4)	1 (0 - 3)	1 (0 - 3)	1 (0 - 3)	1 (0 - 2)	0 (0 - 2)
St. Louis	10 (4 - 19)	8 (3 - 15)	7 (2 - 14)	5 (1 - 11)	4 (1 - 9)	3 (0 - 8)	3 (0 - 7)	1 (0 - 5)
Washington, DC	21 (8 - 41)	15 (5 - 32)	15 (5 - 31)	10 (2 - 24)	9 (1 - 21)	7 (1 - 18)	6 (1 - 17)	3 (0 - 12)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-18. Percent of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons: Based on Adjusting 2004 O_3 Concentrations*

Location	Percent of All Children Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	6.6% (4.6% - 10.1%)	6.4% (4.4% - 9.9%)	5.6% (3.7% - 8.8%)	4.8% (3.1% - 7.7%)	4.4% (2.8% - 7.1%)	4.4% (2.7% - 7%)	3.7% (2.2% - 5.9%)	2.8% (1.5% - 4.5%)
Boston	4.7% (3% - 7.5%)	4.1% (2.5% - 6.6%)	4% (2.5% - 6.5%)	3.8% (2.3% - 6.1%)	3.1% (1.7% - 5%)	2.8% (1.5% - 4.5%)	2.6% (1.4% - 4.2%)	1.9% (0.9% - 3.1%)
Chicago	3.1% (1.7% - 5%)	2.9% (1.6% - 4.6%)	2.6% (1.4% - 4.3%)	2.3% (1.2% - 3.7%)	2% (1% - 3.3%)	1.9% (0.8% - 3%)	1.7% (0.7% - 2.7%)	1.2% (0.3% - 2%)
Cleveland	3.8% (2.3% - 6.2%)	3.4% (2% - 5.6%)	3.3% (1.9% - 5.3%)	2.7% (1.4% - 4.3%)	2.5% (1.3% - 4.1%)	2.3% (1.2% - 3.7%)	2.1% (1% - 3.4%)	1.6% (0.6% - 2.6%)
Detroit	4.1% (2.5% - 6.7%)	3.6% (2.1% - 5.9%)	3.5% (2% - 5.7%)	3.3% (1.9% - 5.4%)	2.7% (1.5% - 4.4%)	2.5% (1.3% - 4%)	2.3% (1.1% - 3.7%)	1.7% (0.7% - 2.7%)
Houston	6.3% (4.5% - 9.6%)	5.6% (3.9% - 8.7%)	5.3% (3.6% - 8.3%)	4.4% (2.9% - 6.9%)	4.2% (2.7% - 6.6%)	3.8% (2.4% - 6%)	3.4% (2.1% - 5.5%)	2.5% (1.4% - 4%)
Los Angeles	3.3% (2.4% - 5.2%)	3.1% (2.2% - 4.9%)	2.7% (1.9% - 4.3%)	2% (1.4% - 3.1%)	1.9% (1.3% - 3%)	1.8% (1.2% - 2.8%)	1.5% (1% - 2.2%)	0.7% (0.4% - 1.1%)
New York	3.9% (2.3% - 6.3%)	3.6% (2.1% - 5.8%)	3.3% (1.9% - 5.4%)	2.5% (1.2% - 4%)	2.6% (1.3% - 4.1%)	2.4% (1.2% - 3.9%)	2.2% (1% - 3.5%)	1.6% (0.6% - 2.6%)
Philadelphia	5.3% (3.5% - 8.5%)	4.8% (3% - 7.7%)	4.5% (2.8% - 7.4%)	3.7% (2.2% - 6.1%)	3.6% (2.1% - 5.8%)	3.3% (1.9% - 5.3%)	3% (1.7% - 4.8%)	2.2% (1.1% - 3.6%)
Sacramento	3.6% (2.7% - 5.6%)	3.3% (2.4% - 5.2%)	2.9% (2.2% - 4.6%)	2.3% (1.7% - 3.5%)	2.1% (1.6% - 3.3%)	2% (1.5% - 3%)	1.7% (1.3% - 2.6%)	1.1% (0.8% - 1.6%)
St. Louis	4.6% (2.9% - 7.5%)	4.2% (2.6% - 6.8%)	3.9% (2.4% - 6.4%)	3.2% (1.9% - 5.3%)	3.1% (1.7% - 5%)	2.8% (1.5% - 4.5%)	2.5% (1.3% - 4%)	1.9% (0.9% - 3.1%)
Washington, DC	6% (4% - 9.3%)	5.1% (3.3% - 8.1%)	5% (3.3% - 8%)	4.2% (2.6% - 6.9%)	3.9% (2.4% - 6.3%)	3.4% (2% - 5.5%)	3.2% (1.8% - 5.2%)	2.4% (1.2% - 3.9%)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	2.2% (0.9% - 3.6%)	2.1% (0.8% - 3.5%)	1.7% (0.5% - 3%)	1.4% (0.3% - 2.5%)	1.2% (0.2% - 2.3%)	1.2% (0.2% - 2.3%)	0.9% (0.1% - 1.9%)	0.7% (0% - 1.5%)
Boston	1.4% (0.4% - 2.5%)	1.1% (0.2% - 2.2%)	1.1% (0.2% - 2.1%)	1% (0.2% - 2%)	0.8% (0.1% - 1.6%)	0.7% (0% - 1.5%)	0.6% (0% - 1.4%)	0.4% (0% - 1%)
Chicago	0.8% (0% - 1.6%)	0.7% (0% - 1.5%)	0.6% (0% - 1.4%)	0.5% (0% - 1.2%)	0.5% (0% - 1.1%)	0.4% (0% - 1%)	0.4% (0% - 0.9%)	0.3% (0% - 0.7%)
Cleveland	1% (0.1% - 2%)	0.9% (0.1% - 1.8%)	0.8% (0% - 1.7%)	0.6% (0% - 1.4%)	0.6% (0% - 1.3%)	0.5% (0% - 1.2%)	0.5% (0% - 1.1%)	0.3% (0% - 0.9%)
Detroit	1.1% (0.2% - 2.1%)	1% (0.1% - 1.9%)	0.9% (0.1% - 1.8%)	0.8% (0% - 1.7%)	0.7% (0% - 1.4%)	0.6% (0% - 1.3%)	0.5% (0% - 1.2%)	0.4% (0% - 0.9%)
Houston	2.1% (0.9% - 3.4%)	1.8% (0.6% - 3%)	1.7% (0.5% - 2.8%)	1.3% (0.3% - 2.3%)	1.2% (0.2% - 2.2%)	1% (0.1% - 1.9%)	0.9% (0.1% - 1.8%)	0.6% (0% - 1.3%)
Los Angeles	0.9% (0.1% - 1.7%)	0.8% (0.1% - 1.6%)	0.7% (0.1% - 1.4%)	0.5% (0% - 1%)	0.5% (0% - 1%)	0.4% (0% - 0.9%)	0.3% (0% - 0.7%)	0.2% (0% - 0.4%)

Location	Percent of All Children Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
New York	1% (0.2% - 2%)	0.9% (0.1% - 1.9%)	0.8% (0.1% - 1.7%)	0.6% (0% - 1.3%)	0.6% (0% - 1.3%)	0.6% (0% - 1.3%)	0.5% (0% - 1.1%)	0.3% (0% - 0.9%)
Philadelphia	1.6% (0.4% - 2.8%)	1.4% (0.3% - 2.5%)	1.3% (0.2% - 2.4%)	1% (0.1% - 1.9%)	0.9% (0% - 1.9%)	0.8% (0% - 1.7%)	0.7% (0% - 1.6%)	0.5% (0% - 1.2%)
Sacramento	1% (0.2% - 1.8%)	0.9% (0.1% - 1.7%)	0.8% (0.1% - 1.5%)	0.6% (0% - 1.1%)	0.5% (0% - 1.1%)	0.5% (0% - 1%)	0.4% (0% - 0.8%)	0.3% (0% - 0.6%)
St. Louis	1.3% (0.2% - 2.4%)	1.1% (0.1% - 2.2%)	1% (0.1% - 2%)	0.8% (0% - 1.7%)	0.8% (0% - 1.6%)	0.7% (0% - 1.5%)	0.6% (0% - 1.3%)	0.4% (0% - 1%)
Washington, DC	1.9% (0.7% - 3.2%)	1.5% (0.4% - 2.7%)	1.5% (0.4% - 2.7%)	1.2% (0.2% - 2.2%)	1% (0.1% - 2%)	0.9% (0.1% - 1.8%)	0.8% (0% - 1.7%)	0.6% (0% - 1.3%)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	0.5% (0.1% - 1.2%)	0.4% (0.1% - 1.2%)	0.3% (0% - 1%)	0.2% (0% - 0.8%)	0.2% (0% - 0.7%)	0.2% (0% - 0.7%)	0.1% (0% - 0.6%)	0.1% (0% - 0.4%)
Boston	0.3% (0% - 0.8%)	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0% (0% - 0.3%)
Chicago	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0% (0% - 0.3%)	0% (0% - 0.2%)	0% (0% - 0.2%)
Cleveland	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0% (0% - 0.2%)
Detroit	0.2% (0% - 0.6%)	0.1% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0% (0% - 0.2%)
Houston	0.5% (0.1% - 1.2%)	0.4% (0.1% - 1%)	0.3% (0% - 0.9%)	0.2% (0% - 0.7%)	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)
Los Angeles	0.1% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0% (0% - 0.2%)	0% (0% - 0.1%)
New York	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.3%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0% (0% - 0.2%)
Philadelphia	0.3% (0% - 0.9%)	0.2% (0% - 0.8%)	0.2% (0% - 0.7%)	0.1% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)
Sacramento	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0% (0% - 0.2%)
St. Louis	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0% (0% - 0.3%)
Washington, DC	0.4% (0.1% - 1.1%)	0.3% (0% - 0.8%)	0.3% (0% - 0.8%)	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.3%)

*Percents are median (0.5 fractile) percents of children. Percents in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-19. Percent of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons: Based on Adjusting 2002 O_3 Concentrations*

Location	Percent of All Children Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	9.9% (7.5% - 14.1%)	9.7% (7.3% - 13.9%)	8.4% (6.2% - 12.5%)	7.3% (5.2% - 11.1%)	6.7% (4.7% - 10.4%)	6.7% (4.6% - 10.3%)	5.6% (3.7% - 8.9%)	4.3% (2.6% - 7%)
Boston	11.2% (8.7% - 15.3%)	9.7% (7.3% - 13.7%)	9.6% (7.2% - 13.5%)	9% (6.7% - 12.8%)	7.4% (5.3% - 11%)	6.6% (4.6% - 10%)	6.2% (4.2% - 9.5%)	4.6% (2.9% - 7.3%)
Chicago	9.6% (7.2% - 13.7%)	8.8% (6.5% - 12.9%)	8.2% (6% - 12.2%)	7.2% (5.1% - 11.1%)	6.4% (4.4% - 10%)	5.9% (4% - 9.4%)	5.3% (3.5% - 8.6%)	4% (2.4% - 6.5%)
Cleveland	12.3% (9.6% - 16.7%)	10.8% (8.3% - 15.2%)	10.5% (8% - 14.9%)	8.7% (6.3% - 12.9%)	8.2% (5.9% - 12.4%)	7.3% (5.1% - 11.3%)	6.9% (4.7% - 10.8%)	5.2% (3.3% - 8.4%)
Detroit	10.9% (8.3% - 15.2%)	9.6% (7.1% - 13.9%)	9.3% (6.9% - 13.6%)	9% (6.6% - 13.2%)	7.2% (5.1% - 11.2%)	6.4% (4.4% - 10.2%)	6% (4% - 9.6%)	4.5% (2.8% - 7.4%)
Houston	6.5% (4.6% - 9.7%)	5.7% (4% - 8.8%)	5.5% (3.8% - 8.5%)	4.4% (2.9% - 7%)	4.2% (2.7% - 6.7%)	3.9% (2.4% - 6.2%)	3.5% (2.2% - 5.6%)	2.6% (1.4% - 4.1%)
Los Angeles	3.3% (2.4% - 5.1%)	3.1% (2.3% - 4.9%)	2.7% (1.9% - 4.2%)	1.9% (1.3% - 3%)	1.9% (1.3% - 2.9%)	1.8% (1.3% - 2.8%)	1.4% (1% - 2.2%)	0.8% (0.5% - 1.2%)
New York	9.2% (6.8% - 13.4%)	8.6% (6.2% - 12.6%)	7.9% (5.7% - 11.9%)	6% (4% - 9.4%)	6.2% (4.2% - 9.8%)	5.8% (3.8% - 9.2%)	5.3% (3.4% - 8.4%)	4% (2.4% - 6.5%)
Philadelphia	12.6% (9.9% - 16.9%)	11.3% (8.7% - 15.6%)	10.9% (8.3% - 15.1%)	9% (6.6% - 13.1%)	8.5% (6.2% - 12.6%)	7.7% (5.5% - 11.7%)	7.2% (5% - 11.1%)	5.5% (3.6% - 8.8%)
Sacramento	6.5% (5.1% - 9.7%)	6% (4.7% - 9.1%)	5.5% (4.3% - 8.4%)	4.5% (3.4% - 7%)	4.2% (3.2% - 6.6%)	3.9% (2.9% - 6.1%)	3.4% (2.5% - 5.4%)	2.5% (1.8% - 3.8%)
St. Louis	12.3% (9.7% - 16.5%)	11.2% (8.6% - 15.4%)	10.5% (8.1% - 14.7%)	8.9% (6.6% - 12.9%)	8.2% (6% - 12.2%)	7.5% (5.4% - 11.4%)	6.9% (4.8% - 10.6%)	5.1% (3.3% - 8.3%)
Washington, DC	11.3% (8.7% - 15.6%)	9.7% (7.3% - 13.9%)	9.7% (7.2% - 13.8%)	8.2% (6% - 12.3%)	7.6% (5.4% - 11.5%)	6.7% (4.6% - 10.4%)	6.4% (4.4% - 10.1%)	4.9% (3.1% - 7.9%)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	3.8% (2.2% - 5.7%)	3.7% (2.2% - 5.5%)	3% (1.6% - 4.7%)	2.5% (1.1% - 4%)	2.2% (0.9% - 3.6%)	2.2% (0.9% - 3.6%)	1.7% (0.5% - 3%)	1.2% (0.1% - 2.2%)
Boston	4.7% (3% - 6.8%)	3.9% (2.3% - 5.7%)	3.8% (2.2% - 5.6%)	3.5% (2% - 5.2%)	2.6% (1.3% - 4.1%)	2.2% (1% - 3.6%)	2% (0.8% - 3.3%)	1.3% (0.3% - 2.4%)
Chicago	3.6% (2.1% - 5.4%)	3.2% (1.8% - 4.9%)	2.9% (1.5% - 4.5%)	2.4% (1.1% - 3.9%)	2% (0.8% - 3.4%)	1.8% (0.6% - 3.2%)	1.6% (0.4% - 2.8%)	1% (0.1% - 2.1%)
Cleveland	5.1% (3.3% - 7.2%)	4.3% (2.6% - 6.2%)	4.1% (2.5% - 6%)	3.1% (1.7% - 4.8%)	2.9% (1.5% - 4.5%)	2.4% (1.1% - 3.9%)	2.2% (0.9% - 3.7%)	1.5% (0.3% - 2.7%)
Detroit	4.3% (2.6% - 6.3%)	3.6% (2% - 5.4%)	3.4% (1.9% - 5.2%)	3.2% (1.8% - 5%)	2.4% (1.1% - 3.9%)	2% (0.8% - 3.4%)	1.8% (0.6% - 3.2%)	1.2% (0.1% - 2.4%)
Houston	2.2% (1% - 3.5%)	1.9% (0.7% - 3.1%)	1.7% (0.6% - 2.9%)	1.3% (0.3% - 2.3%)	1.2% (0.3% - 2.2%)	1.1% (0.2% - 2%)	0.9% (0.1% - 1.8%)	0.6% (0% - 1.3%)
Los Angeles	0.9% (0.2% - 1.7%)	0.9% (0.2% - 1.6%)	0.7% (0.1% - 1.4%)	0.5% (0% - 1%)	0.5% (0% - 1%)	0.5% (0% - 0.9%)	0.3% (0% - 0.7%)	0.2% (0% - 0.4%)

Location	Percent of All Children Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
New York	3.4% (1.9% - 5.2%)	3.1% (1.6% - 4.8%)	2.8% (1.4% - 4.4%)	1.8% (0.6% - 3.2%)	2% (0.7% - 3.3%)	1.8% (0.6% - 3.1%)	1.5% (0.4% - 2.8%)	1% (0.1% - 2.1%)
Philadelphia	5.4% (3.5% - 7.5%)	4.6% (2.8% - 6.6%)	4.3% (2.6% - 6.3%)	3.3% (1.8% - 5%)	3% (1.6% - 4.7%)	2.6% (1.3% - 4.2%)	2.4% (1.1% - 3.9%)	1.6% (0.4% - 2.9%)
Sacramento	2.3% (1.1% - 3.5%)	2% (0.9% - 3.2%)	1.8% (0.7% - 2.9%)	1.4% (0.4% - 2.3%)	1.3% (0.3% - 2.2%)	1.1% (0.3% - 2%)	1% (0.2% - 1.7%)	0.6% (0% - 1.2%)
St. Louis	5.2% (3.4% - 7.4%)	4.5% (2.8% - 6.5%)	4.2% (2.5% - 6.1%)	3.3% (1.8% - 5%)	2.9% (1.5% - 4.5%)	2.6% (1.2% - 4.1%)	2.3% (1% - 3.7%)	1.5% (0.4% - 2.7%)
Washington, DC	4.6% (2.9% - 6.6%)	3.7% (2.1% - 5.6%)	3.7% (2.1% - 5.5%)	2.9% (1.5% - 4.6%)	2.6% (1.2% - 4.2%)	2.2% (0.9% - 3.6%)	2.1% (0.8% - 3.4%)	1.4% (0.3% - 2.5%)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	1.1% (0.4% - 2.2%)	1% (0.3% - 2.2%)	0.7% (0.2% - 1.7%)	0.6% (0.1% - 1.4%)	0.5% (0.1% - 1.2%)	0.4% (0.1% - 1.2%)	0.3% (0% - 0.9%)	0.2% (0% - 0.7%)
Boston	1.6% (0.7% - 3%)	1.2% (0.5% - 2.3%)	1.1% (0.4% - 2.3%)	1% (0.4% - 2.1%)	0.6% (0.2% - 1.5%)	0.5% (0.1% - 1.2%)	0.4% (0.1% - 1.1%)	0.2% (0% - 0.7%)
Chicago	1% (0.3% - 2.1%)	0.8% (0.2% - 1.8%)	0.7% (0.1% - 1.6%)	0.5% (0.1% - 1.3%)	0.4% (0% - 1.1%)	0.3% (0% - 1%)	0.3% (0% - 0.9%)	0.2% (0% - 0.6%)
Cleveland	1.6% (0.6% - 3%)	1.2% (0.4% - 2.4%)	1.1% (0.3% - 2.3%)	0.7% (0.1% - 1.7%)	0.6% (0.1% - 1.6%)	0.5% (0% - 1.3%)	0.4% (0% - 1.2%)	0.2% (0% - 0.8%)
Detroit	1.2% (0.4% - 2.4%)	0.9% (0.2% - 2%)	0.8% (0.2% - 1.9%)	0.8% (0.2% - 1.8%)	0.5% (0% - 1.3%)	0.4% (0% - 1.1%)	0.3% (0% - 1%)	0.2% (0% - 0.7%)
Houston	0.5% (0.1% - 1.3%)	0.4% (0.1% - 1%)	0.4% (0.1% - 1%)	0.2% (0% - 0.7%)	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)
Los Angeles	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0% (0% - 0.2%)	0% (0% - 0.1%)
New York	0.9% (0.3% - 2%)	0.8% (0.2% - 1.7%)	0.6% (0.1% - 1.5%)	0.3% (0% - 1%)	0.4% (0% - 1.1%)	0.3% (0% - 1%)	0.3% (0% - 0.9%)	0.2% (0% - 0.6%)
Philadelphia	1.8% (0.8% - 3.3%)	1.4% (0.5% - 2.7%)	1.3% (0.4% - 2.5%)	0.8% (0.2% - 1.8%)	0.7% (0.2% - 1.7%)	0.6% (0.1% - 1.5%)	0.5% (0.1% - 1.3%)	0.3% (0% - 0.9%)
Sacramento	0.5% (0.1% - 1.3%)	0.4% (0.1% - 1.1%)	0.4% (0% - 1%)	0.3% (0% - 0.8%)	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.1% (0% - 0.4%)
St. Louis	1.7% (0.7% - 3.2%)	1.4% (0.5% - 2.7%)	1.2% (0.4% - 2.4%)	0.8% (0.2% - 1.8%)	0.7% (0.1% - 1.6%)	0.6% (0.1% - 1.4%)	0.5% (0% - 1.2%)	0.3% (0% - 0.8%)
Washington, DC	1.4% (0.6% - 2.8%)	1% (0.3% - 2.1%)	1% (0.3% - 2.1%)	0.7% (0.2% - 1.6%)	0.6% (0.1% - 1.4%)	0.4% (0% - 1.2%)	0.4% (0% - 1.1%)	0.2% (0% - 0.8%)

*Percents are median (0.5 fractile) percents of children. Percents in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Figure 3-7. Percent Reductions in Aggregate Numbers (Across All Locations) of Occurrences of Lung Function Response Among All School Age Children when O_3 Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, for Each of the Three Definitions of Response*

Figure 3-7a. Based on 2004 Data

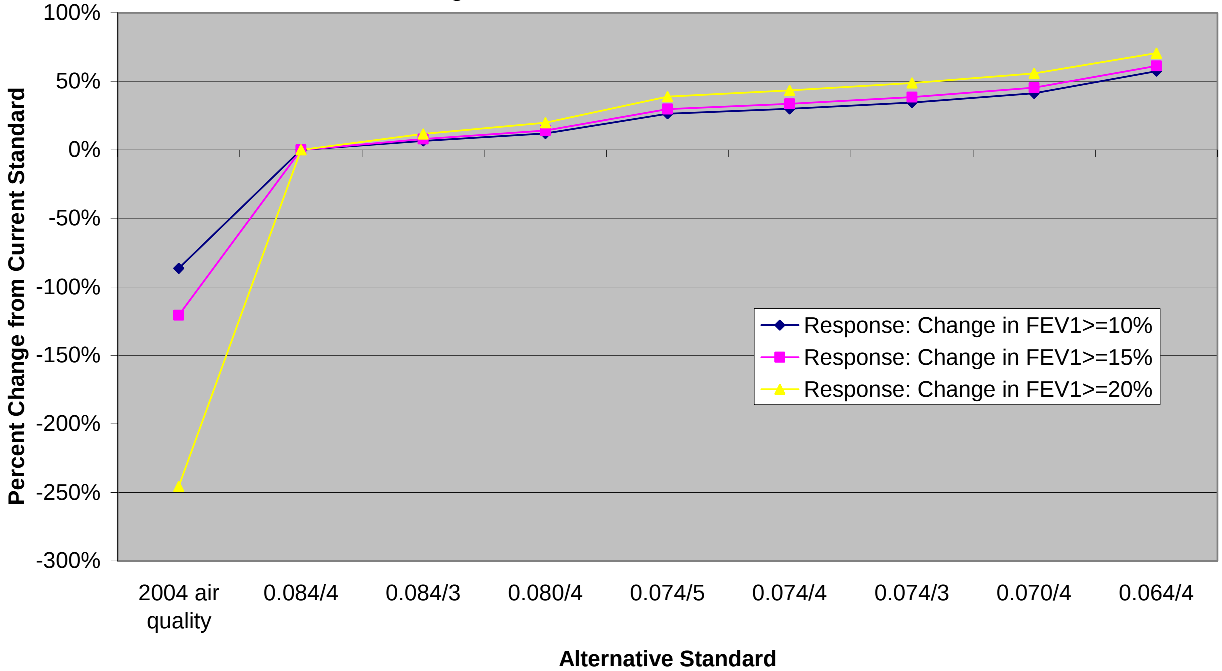
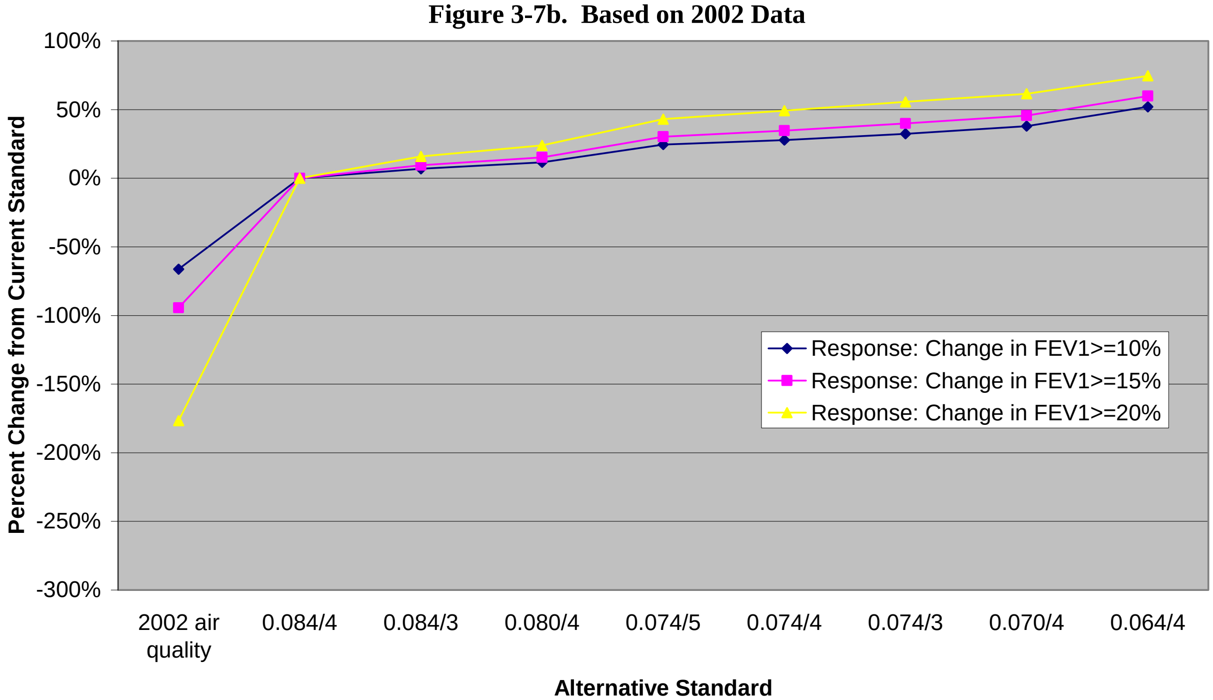


Figure 3-7b. Based on 2002 Data



* The 8-hr average standards shown in these figures, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. The figure also compares the current standard to a recent year of air quality.

Figure 3-8. Percent Reductions of Occurrences of Decrement in $FEV_1 \geq 15\%$ Among All School Age Children when O_3 Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, Separately for Each Location*

Figure 3-8a. Based on 2004 Data

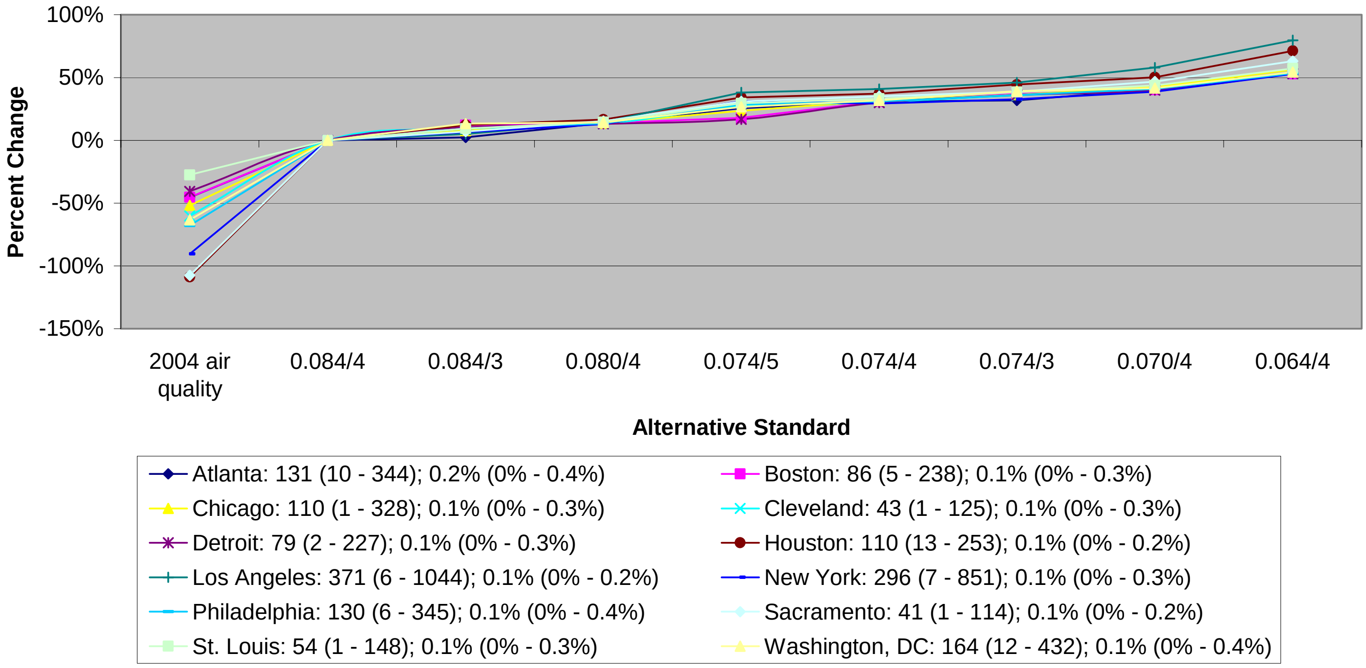
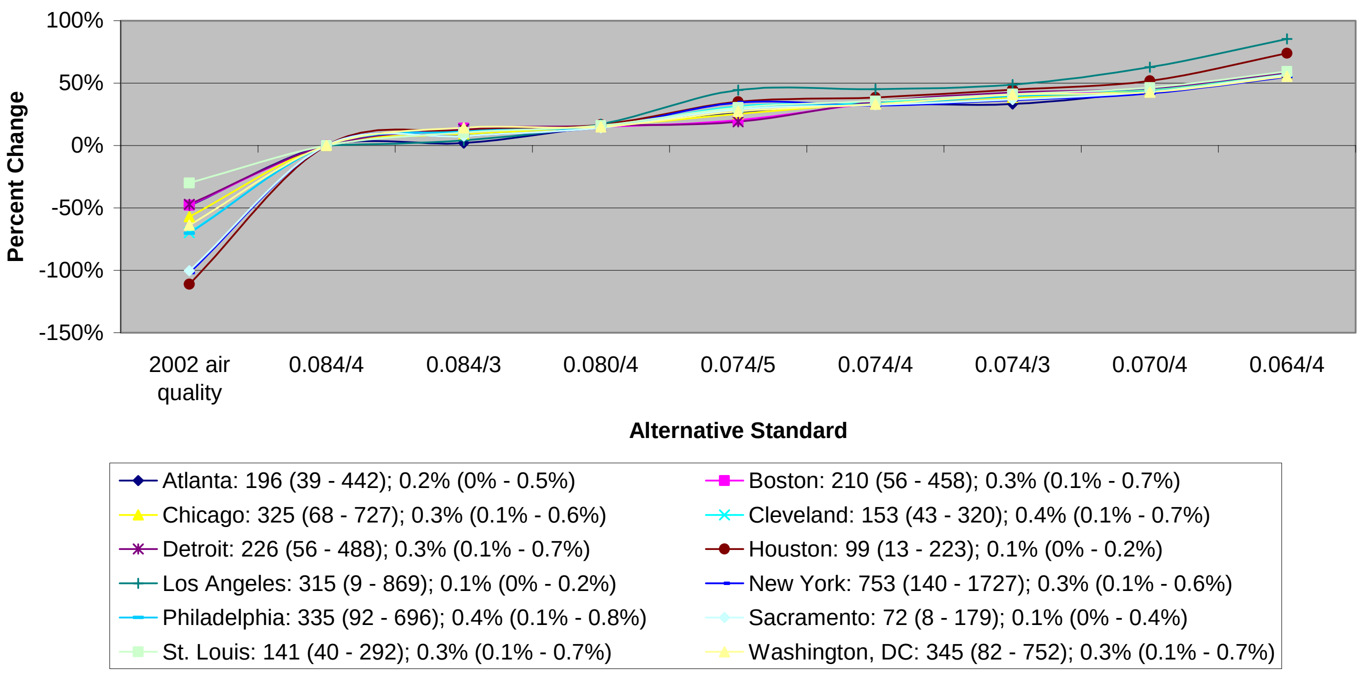


Figure 3-8b. Based on 2002 Data



* The 8-hr average standards shown in these figures, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. The figure also compares the current standard to a recent year of air quality. The percent reductions from the current standard (0.084/4) to a recent year of air quality were omitted for Los Angeles because they were so large in magnitude (-286% in 2004 and –290% in 2002). The incidence (and 95% credible interval) and percent of total incidence (and 95% credible interval) when O_3 concentrations just meet the current standard are shown for each location in the box below each figure.

Figure 3-9. Percent Reductions in Aggregate Numbers (Across All Locations) of All School Age Children Experiencing at Least One Occurrence of Lung Function Response when O_3 Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, for Each of the Three Definitions of Response*

Figure 3-9a. Based on 2004 Data

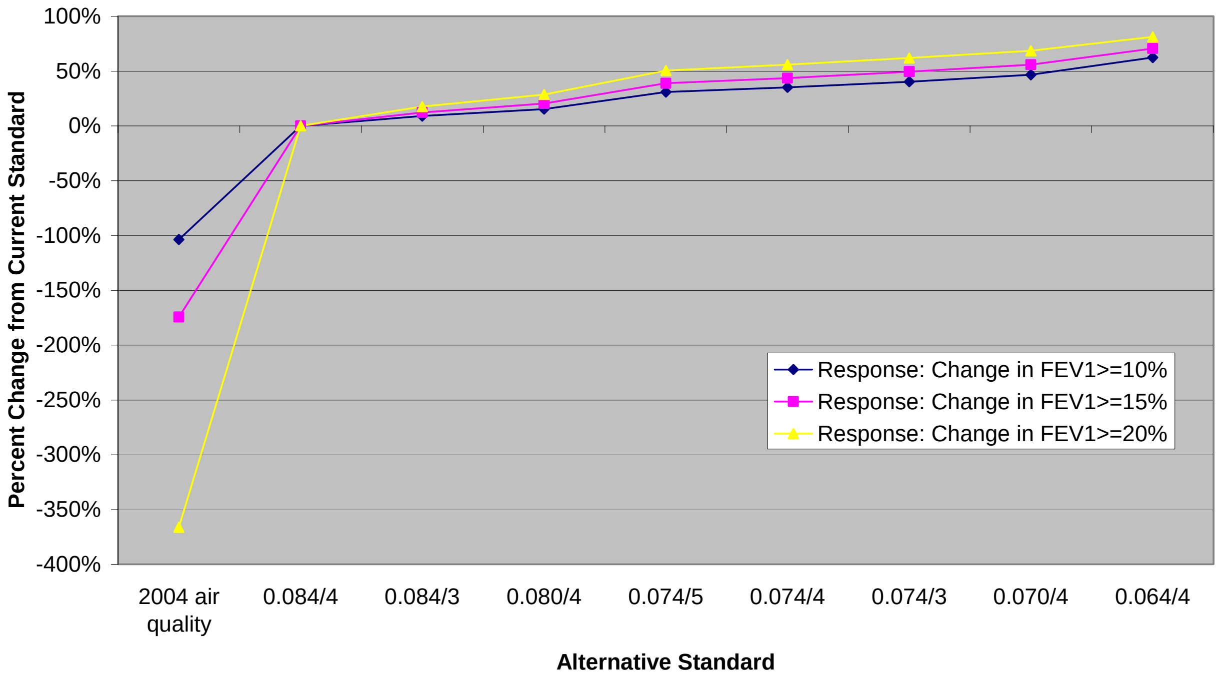
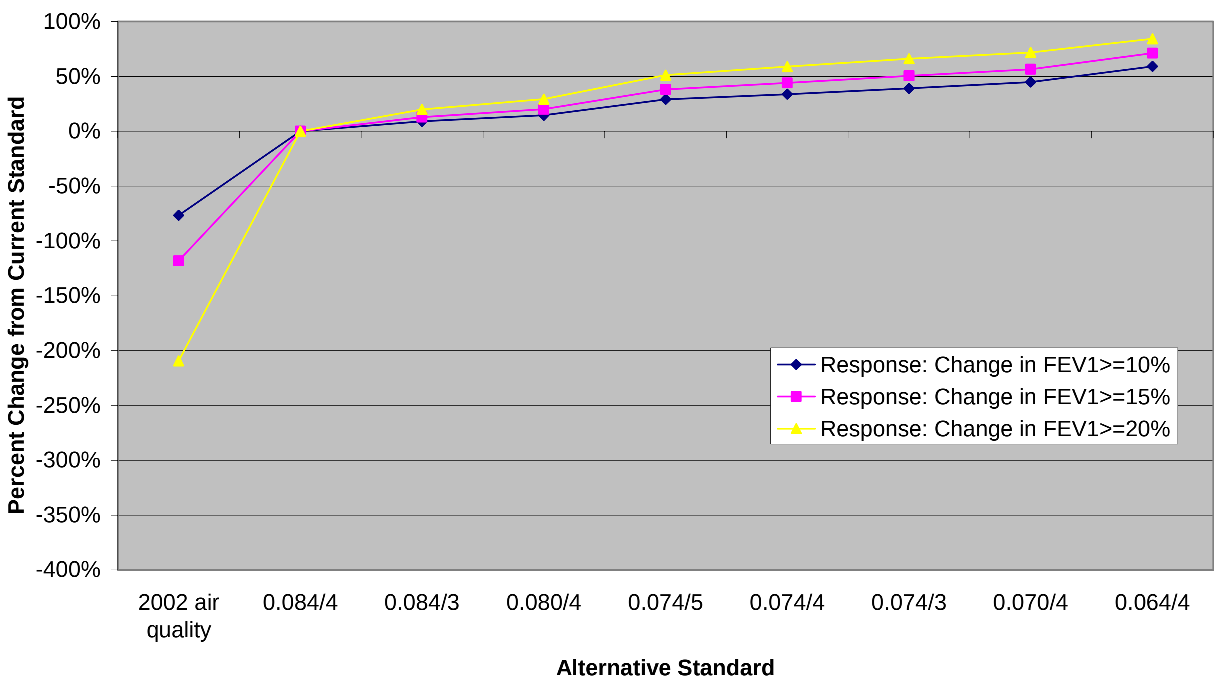


Figure 3-9b. Based on 2002 Data



* The 8-hr average standards shown in these figures, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. The figure also compares the current standard to a recent year of air quality.

Figure 3-10. Percent Reductions in Numbers of All School Age Children Experiencing at Least One Decrement in $FEV_1 \geq 15\%$ when O_3 Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, Separately for Each Location*

Figure 3-10a. Based on 2004 Data

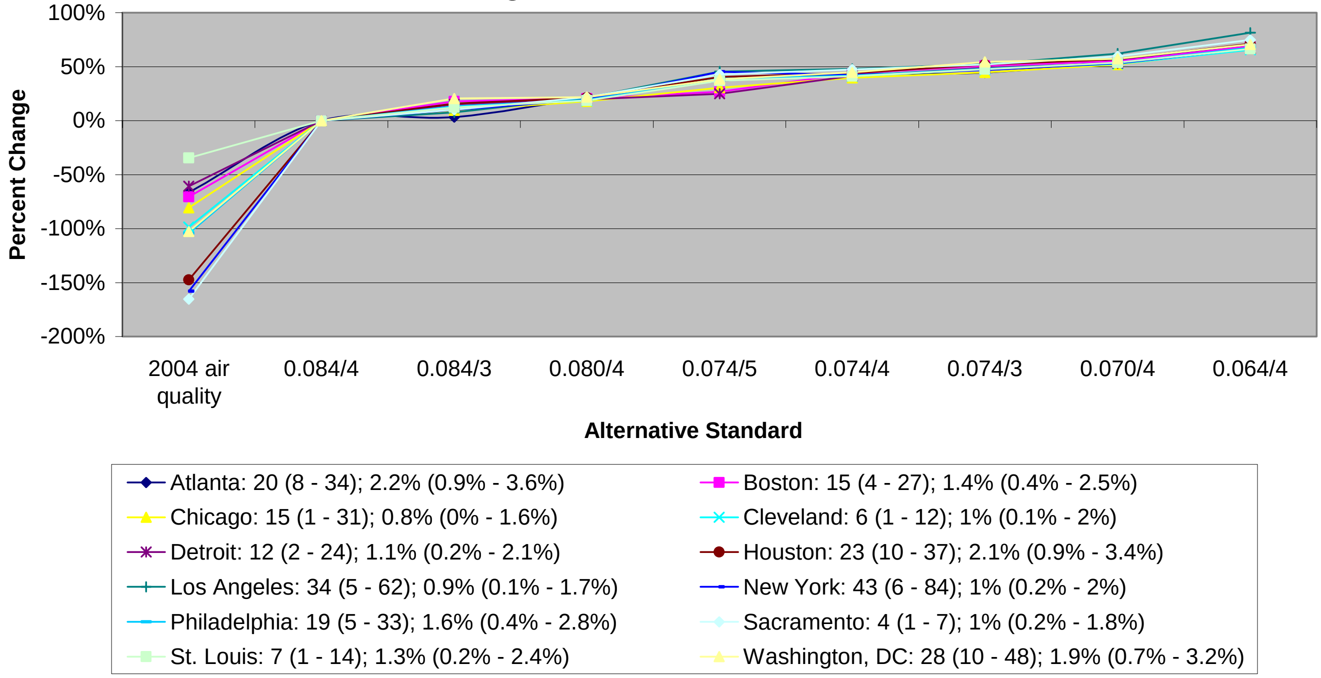
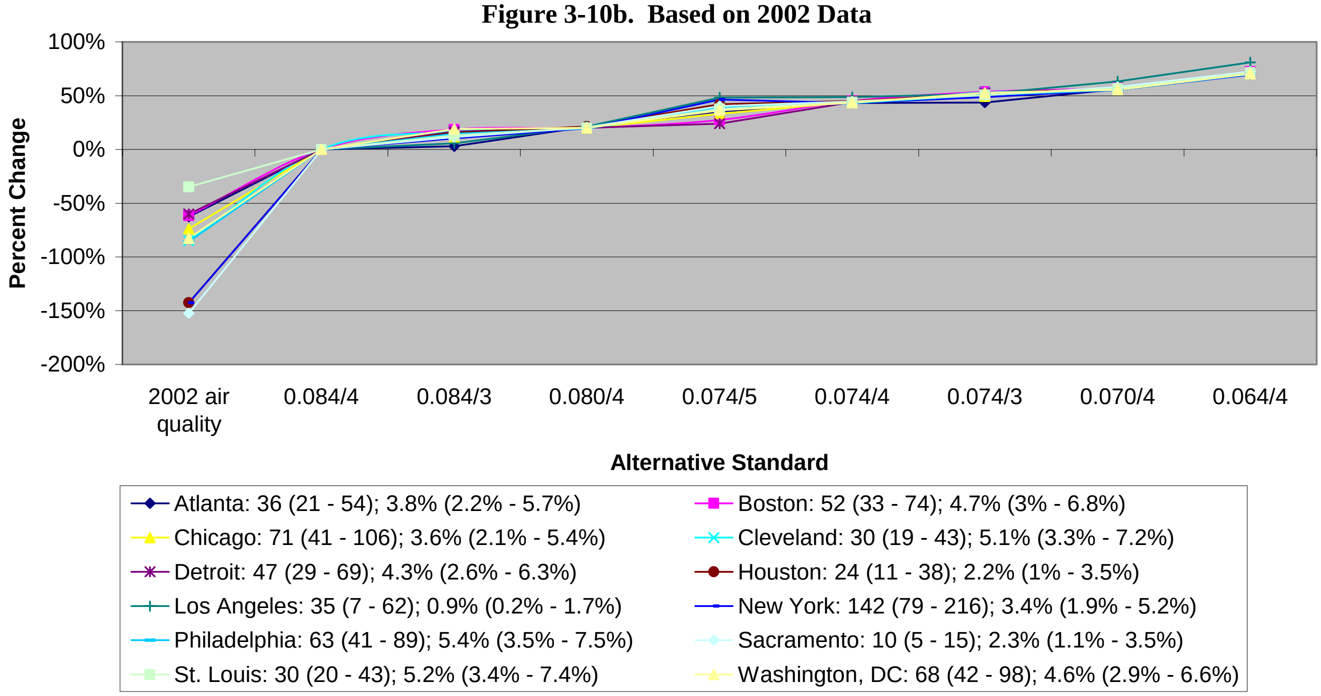


Figure 3-10b. Based on 2002 Data



** The 8-hr average standards shown in these figures, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. The figure also compares the current standard to a recent year of air quality. The percent reductions from the current standard (0.084/4) to a recent year of air quality were omitted for Los Angeles because they were so large in magnitude (-553% in 2004 and –528% in 2002). The incidence (and 95% credible interval) and percent of total incidence (and 95% credible interval) when O_3 concentrations just meet the current standard are shown for each location in the box below each figure.

The estimated reductions in occurrence of lung function response when O_3 concentrations just meet alternative daily maximum 8-hour standards, relative to when O_3 concentrations just meet the current standard are greater the more stringent the alternative standard. For example, at the 0.084 ppm 3rd daily maximum standard (the standard that is closest to the current standard of 0.084 ppm 4th daily maximum), the aggregate number of occurrences of decrements in $FEV_1 \geq 15\%$ (across all locations) among all school age children is 8 percent less than when O_3 concentrations just meet the current standard, based on 2004 air quality. At the most stringent standard considered (0.064 ppm 4th daily maximum), the aggregate number of such occurrences is estimated to be 61 percent less than when O_3 concentrations just meet the current standard. The pattern is the same when exposure estimates are based on 2002 air quality – the corresponding percents based on 2002 air quality are 10 percent and 60 percent.

Similarly, the estimated percent reductions in occurrence of lung function response from when O_3 concentrations just meet the current standard to when they just meet an alternative standard are greater the larger the decrement being measured. Using 2004 air quality data, at the most stringent standard considered, the aggregate number of decrements in $FEV_1 \geq 20\%$ among all school age children is estimated to be 71 percent less than when O_3 concentrations just meet the current standard (compared with 61 percent less for decrements in $FEV_1 \geq 15\%$, as noted above, and 58 percent less for decrements in $FEV_1 \geq 10\%$). The pattern is similar when 2002 air quality data are used.

The same patterns can be seen when the measure of interest is the number of children experiencing at least one occurrence of lung function response. The estimated reductions in aggregate number of children with at least one occurrence of lung function response when O_3 concentrations just meet alternative daily maximum 8-hour standards, relative to when O_3 concentrations just meet the current standard, are greater the more stringent the alternative standard. For example, at the 0.084 ppm 3rd daily maximum standard, the aggregate number of all school age children with at least one decrement in $FEV_1 \geq 15\%$ is 12 percent less than when O_3 concentrations just meet the current standard, based on 2004 air quality. At the most stringent standard considered, this aggregate number is estimated to be 71 percent less than when O_3 concentrations just meet the current standard. The pattern is the same when exposure estimates are based on 2002 air quality – the corresponding percents based on 2002 air quality are 13 percent and 71 percent.

Similarly, the estimated percent reductions in aggregate number of children with at least one lung function response from when O_3 concentrations just meet the current standard to when they just meet an alternative standard are greater the larger the decrement being measured. Using 2004 air quality data, at the most stringent standard considered, the aggregate number of all school age children experiencing at least one decrement in $FEV_1 \geq 20\%$ is estimated to be 81 percent less than when O_3 concentrations just meet the current standard (compared with about 71 percent less for decrements in $FEV_1 \geq 15\%$ and 62 percent less for decrements in $FEV_1 \geq 10\%$). The pattern is similar when 2002 air quality data are used.

The same patterns can be seen for active school age children. For example, at the 0.084 ppm 3rd daily maximum standard (the standard that is closest to the current standard of 0.084 ppm 4th daily maximum), the aggregate number of occurrences of decrements in $FEV_1 \geq 15\%$ among active school age children is 8 percent less than when O_3 concentrations just meet the current standard, based on 2004 air quality. At the most stringent standard considered, the aggregate number of such occurrences is estimated to be 61 percent less than when O_3 concentrations just meet the current standard. The pattern is the same when exposure estimates are based on 2002 air quality – the corresponding percents based on 2002 air quality are 9 percent and 60 percent.

3.2.2.2 Results for five locations for the current standard and two alternative standards, based on 2002, 2003, and 2004 air quality data

In addition to the original alternative seven 8-hour daily maximum standards, EPA staff identified a smaller set of three 8-hour daily maximum standards, including the current standard (0.084 ppm, 4th daily maximum) and two alternative standards (0.074 ppm, 4th daily maximum and 0.064 ppm. 4th daily maximum) from the original set of seven. Analyses were carried out for a subset of five locations due to time constraints for completing the assessment – Atlanta, Chicago, Houston, Los Angeles, and New York – based on adjusting 2002, 2003, and 2004 air quality data.

3.2.2.2.1 Results for all school age children

In this part of the analysis, lung function response of interest for all school age children is defined as a decrement in $FEV_1 \geq 15\%$. The estimated numbers and percentages of occurrences of lung function response associated with exposure to O_3 concentrations that just meet the current and each of the two alternative daily maximum 8-hour standards among all school age children (ages 5 – 18) engaged in moderate exercise for at least one 8-hour period during the O_3 season are given in Tables 3-20 and 3-21, respectively. The numbers and percentages of these children estimated to experience at least one lung function response associated with exposure to O_3 concentrations that just meet the current and each of the two alternative standards are given in Tables 3-22 and 3-23, respectively. Results based on 2002, 2003, and 2004 O_3 concentrations are shown in each table.

The percent reductions in numbers of school age children experiencing at least one occurrence of lung function response when O_3 concentrations are reduced from those just meeting the current standard to those that would just meet each alternative standard, as well as a recent year of air quality, are summarized in Figures 3-11a, b, and c, using 2004, 2003, and 2002 air quality data, respectively.

Table 3-20. Estimated Number of Occurrences of Lung Function Response (Change in FEV1>=15%) Associated with Exposure to O_3 Concentrations That Just Meet the Current and Two Alternative Daily Maximum 8-Hour Standards Among All Children (Ages 5-18) Engaged in Moderate Exertion, for Five Location-Specific O_3 Seasons, Based on 2002, 2003, and 2004 O_3 Concentrations*

Location	Number of Occurrences (in 1000s) of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
	A Recent Year of Air Quality	0.084/4***	0.074/4	0.064/4
	Based on 2002 Air Quality Data			
Atlanta	290 (88 - 593)	196 (39 - 442)	131 (12 - 330)	86 (1 - 240)
Chicago	511 (171 - 1015)	325 (68 - 727)	215 (21 - 537)	139 (2 - 388)
Houston	209 (62 - 419)	99 (13 - 223)	61 (3 - 145)	26 (0 - 54)
Los Angeles	1265 (355 - 2642)	315 (9 - 869)	173 (1 - 496)	46 (0 - 112)
New York	1522 (585 - 2885)	753 (140 - 1727)	513 (40 - 1314)	339 (4 - 962)
	Based on 2003 Air Quality Data			
Atlanta	186 (32 - 431)	136 (14 - 339)	92 (3 - 253)	61 (0 - 182)
Chicago	265 (36 - 640)	214 (20 - 542)	143 (4 - 400)	93 (0 - 284)
Houston	291 (96 - 567)	98 (8 - 234)	56 (1 - 137)	16 (0 - 25)
Los Angeles	1700 (610 - 3277)	311 (13 - 833)	147 (2 - 401)	27 (0 - 36)
New York	834 (237 - 1769)	413 (42 - 1061)	284 (8 - 806)	185 (0 - 571)
	Based on 2004 Air Quality Data			
Atlanta	191 (29 - 456)	131 (10 - 344)	91 (2 - 260)	62 (0 - 191)
Chicago	167 (6 - 460)	110 (1 - 328)	75 (0 - 239)	48 (0 - 161)
Houston	230 (63 - 465)	110 (13 - 253)	69 (3 - 168)	32 (0 - 73)
Los Angeles	1470 (393 - 3073)	371 (6 - 1044)	220 (1 - 651)	75 (0 - 220)
New York	563 (77 - 1383)	296 (7 - 851)	209 (0 - 648)	139 (0 - 458)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-21. Estimated Percent of Occurrences of Lung Function Response (Change in FEV1>=15%) Associated with Exposure to O_3 Concentrations That Just Meet the Current and Two Alternative Daily Maximum 8-Hour Standards Among All Children (Ages 5-18) Engaged in Moderate Exertion, for Five Location-Specific O_3 Seasons Based on 2002, 2003, and 2004 O_3 Concentrations*

Location	Percent of Occurrences of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
	A Recent Year of Air Quality	0.084/4***	0.074/4	0.064/4
	Based on 2002 Air Quality Data			
Atlanta	0.4% (0.1% - 0.7%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.1% (0% - 0.3%)
Chicago	0.4% (0.1% - 0.8%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.4%)	0.1% (0% - 0.3%)
Houston	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0%)
Los Angeles	0.3% (0.1% - 0.6%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0%)
New York	0.6% (0.2% - 1.1%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.5%)	0.1% (0% - 0.4%)
	Based on 2003 Air Quality Data			
Atlanta	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Chicago	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Houston	0.2% (0.1% - 0.4%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0%)
Los Angeles	0.4% (0.1% - 0.7%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0%)
New York	0.3% (0.1% - 0.7%)	0.2% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
	Based on 2004 Air Quality Data			
Atlanta	0.2% (0% - 0.6%)	0.2% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Chicago	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)
Houston	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)
Los Angeles	0.3% (0.1% - 0.6%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0%)
New York	0.2% (0% - 0.5%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)

*Percents are median (0.5 fractile) percents of occurrences. Percents in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-22. Number of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Change in FEV1>=15%) Associated with Exposure to O_3 Concentrations That Just Meet the Current and Two Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons, Based on 2002, 2003, and 2004 O_3 Concentrations*

Location	Number of All Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
	A Recent Year of Air Quality	0.084/4***	0.074/4	0.064/4
	Based on 2002 Air Quality Data			
Atlanta	59 (40 - 81)	36 (21 - 54)	21 (8 - 34)	11 (1 - 21)
Chicago	123 (83 - 169)	71 (41 - 106)	40 (15 - 66)	20 (2 - 40)
Houston	58 (38 - 80)	24 (11 - 38)	13 (3 - 24)	7 (0 - 14)
Los Angeles	220 (150 - 297)	35 (7 - 62)	18 (1 - 35)	7 (0 - 14)
New York	346 (244 - 462)	142 (79 - 216)	81 (29 - 138)	43 (3 - 86)
	Based on 2003 Air Quality Data			
Atlanta	34 (20 - 51)	23 (10 - 37)	13 (3 - 24)	7 (0 - 15)
Chicago	52 (25 - 81)	39 (15 - 65)	22 (3 - 42)	12 (0 - 26)
Houston	72 (49 - 98)	19 (6 - 32)	11 (1 - 21)	5 (0 - 12)
Los Angeles	309 (221 - 406)	37 (9 - 65)	18 (2 - 35)	6 (0 - 14)
New York	223 (145 - 312)	84 (34 - 140)	46 (7 - 88)	24 (0 - 54)
	Based on 2004 Air Quality Data			
Atlanta	34 (19 - 51)	20 (8 - 34)	12 (2 - 22)	6 (0 - 14)
Chicago	27 (6 - 49)	15 (1 - 31)	9 (0 - 21)	5 (0 - 13)
Houston	57 (37 - 79)	23 (10 - 37)	13 (3 - 24)	7 (0 - 14)
Los Angeles	220 (149 - 298)	34 (5 - 62)	17 (1 - 36)	6 (0 - 14)
New York	112 (55 - 176)	43 (6 - 84)	25 (0 - 56)	14 (0 - 35)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-23. Percent of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Change in FEV1>=15%) Associated with Exposure to O_3 Concentrations That Just Meet the Current and Two Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons, Based on 2002, 2003, and 2004 O_3 Concentrations*

Location	Percent of All Children Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
	A Recent Year of Air Quality	0.084/4***	0.074/4	0.064/4
	Based on 2002 Air Quality Data			
Atlanta	6.3% (4.2% - 8.6%)	3.8% (2.2% - 5.7%)	2.2% (0.9% - 3.6%)	1.2% (0.1% - 2.2%)
Chicago	6.3% (4.2% - 8.7%)	3.6% (2.1% - 5.4%)	2% (0.8% - 3.4%)	1% (0.1% - 2.1%)
Houston	5.3% (3.5% - 7.4%)	2.2% (1% - 3.5%)	1.2% (0.3% - 2.2%)	0.6% (0% - 1.3%)
Los Angeles	6% (4.1% - 8.1%)	0.9% (0.2% - 1.7%)	0.5% (0% - 1%)	0.2% (0% - 0.4%)
New York	8.3% (5.9% - 11.2%)	3.4% (1.9% - 5.2%)	2% (0.7% - 3.3%)	1% (0.1% - 2.1%)
	Based on 2003 Air Quality Data			
Atlanta	3.6% (2.1% - 5.4%)	2.4% (1.1% - 3.9%)	1.4% (0.3% - 2.5%)	0.7% (0% - 1.6%)
Chicago	2.6% (1.3% - 4.2%)	2% (0.8% - 3.3%)	1.1% (0.2% - 2.2%)	0.6% (0% - 1.3%)
Houston	6.6% (4.5% - 9%)	1.7% (0.6% - 3%)	1% (0.1% - 1.9%)	0.5% (0% - 1.1%)
Los Angeles	8.4% (6% - 11.1%)	1% (0.2% - 1.8%)	0.5% (0.1% - 1%)	0.2% (0% - 0.4%)
New York	5.4% (3.5% - 7.5%)	2% (0.8% - 3.4%)	1.1% (0.2% - 2.1%)	0.6% (0% - 1.3%)
	Based on 2004 Air Quality Data			
Atlanta	3.6% (2% - 5.4%)	2.2% (0.9% - 3.6%)	1.2% (0.2% - 2.3%)	0.7% (0% - 1.5%)
Chicago	1.4% (0.3% - 2.5%)	0.8% (0% - 1.6%)	0.5% (0% - 1.1%)	0.3% (0% - 0.7%)
Houston	5.2% (3.4% - 7.3%)	2.1% (0.9% - 3.4%)	1.2% (0.2% - 2.2%)	0.6% (0% - 1.3%)
Los Angeles	6% (4.1% - 8.1%)	0.9% (0.1% - 1.7%)	0.5% (0% - 1%)	0.2% (0% - 0.4%)
New York	2.7% (1.3% - 4.2%)	1% (0.2% - 2%)	0.6% (0% - 1.3%)	0.3% (0% - 0.9%)

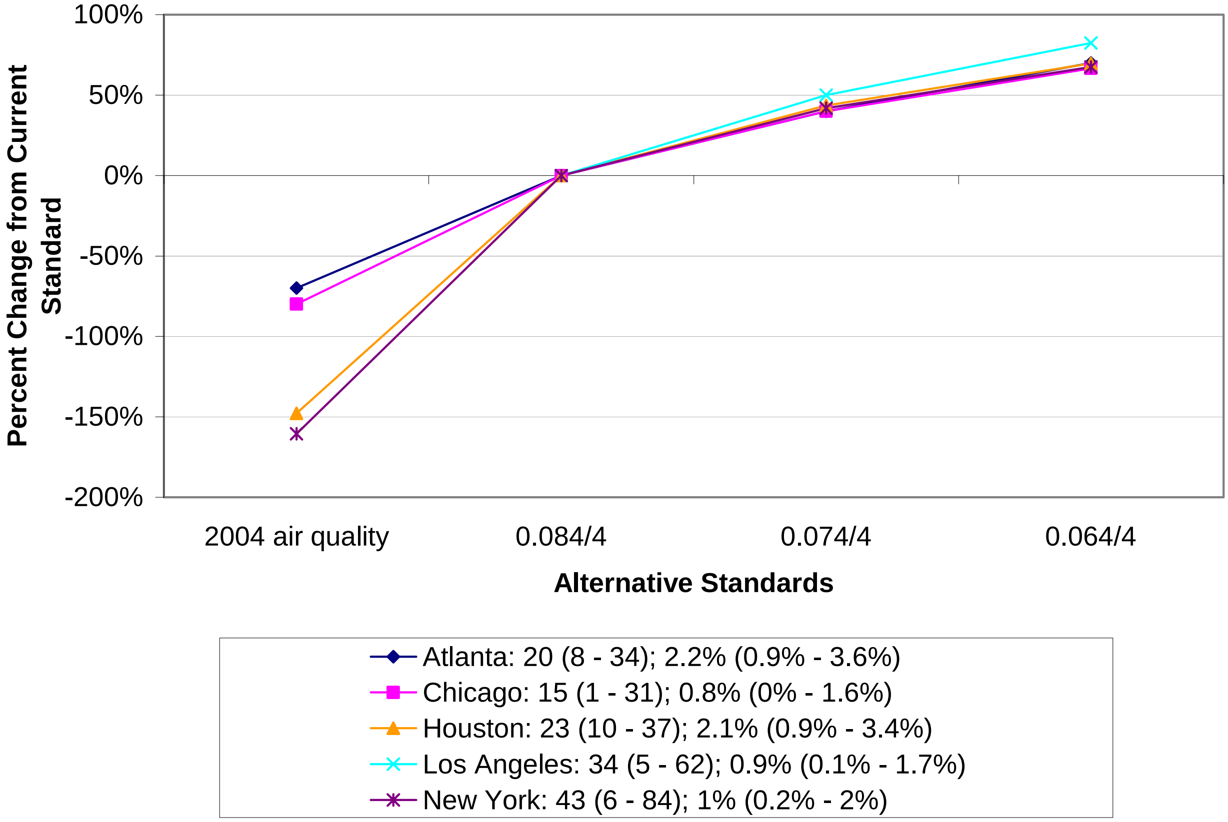
*Percents are median (0.5 fractile) percents of children. Percents in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Figure 3-11. Estimated Percent Reductions From the Current Standard to Two Alternative Standards in All Children (Ages 5-18) Engaged in Moderate Exertion Experiencing at Least One O_3-Related Decrement in $FEV_1 \geq 15\%$, Separately for Each of Five Locations*

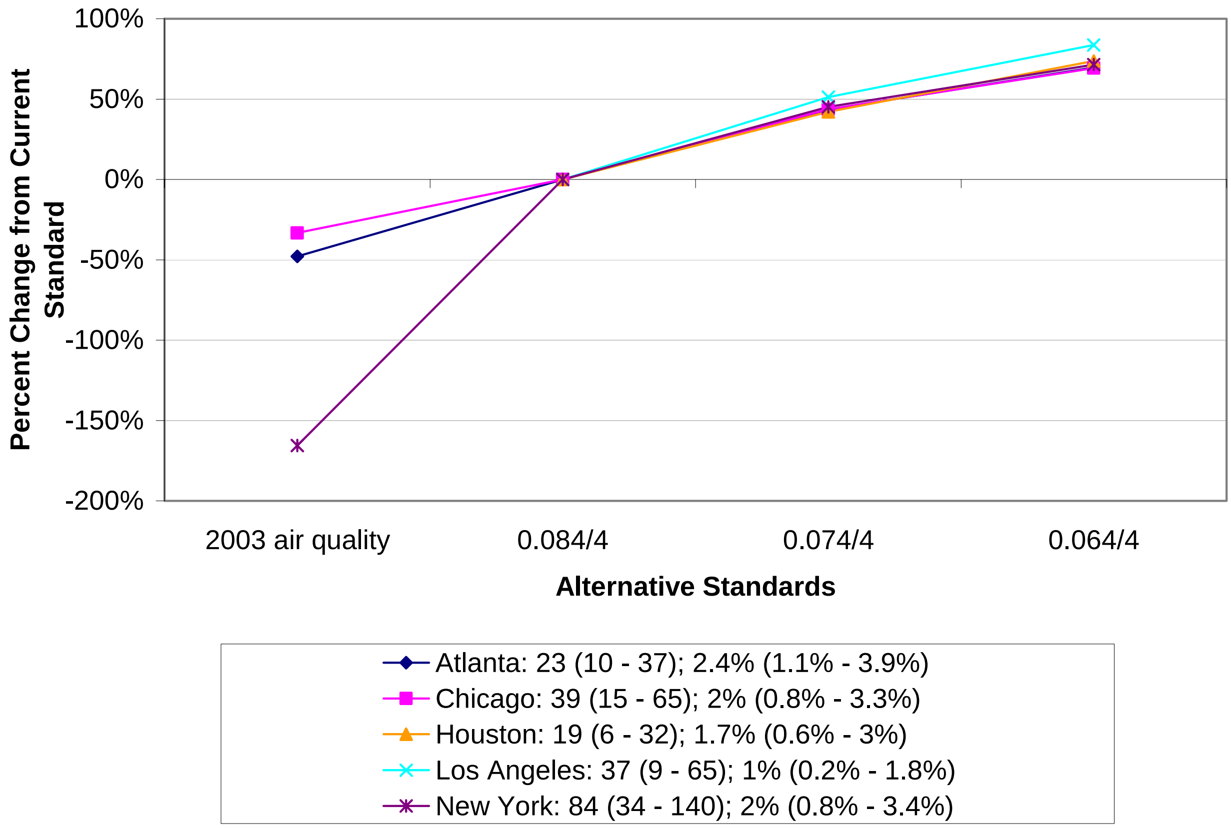
Figure 3-11a. Based on 2004 Air Quality**



* An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 – 0.084 ppm, 4th daily maximum 8-hr average. The 4th daily maximum standards, denoted m/4, require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm). The incidence (and 95% credible interval) and percent of total incidence (and 95% credible interval) when O_3 concentrations just meet the current standard are shown for each location in the box below each figure.

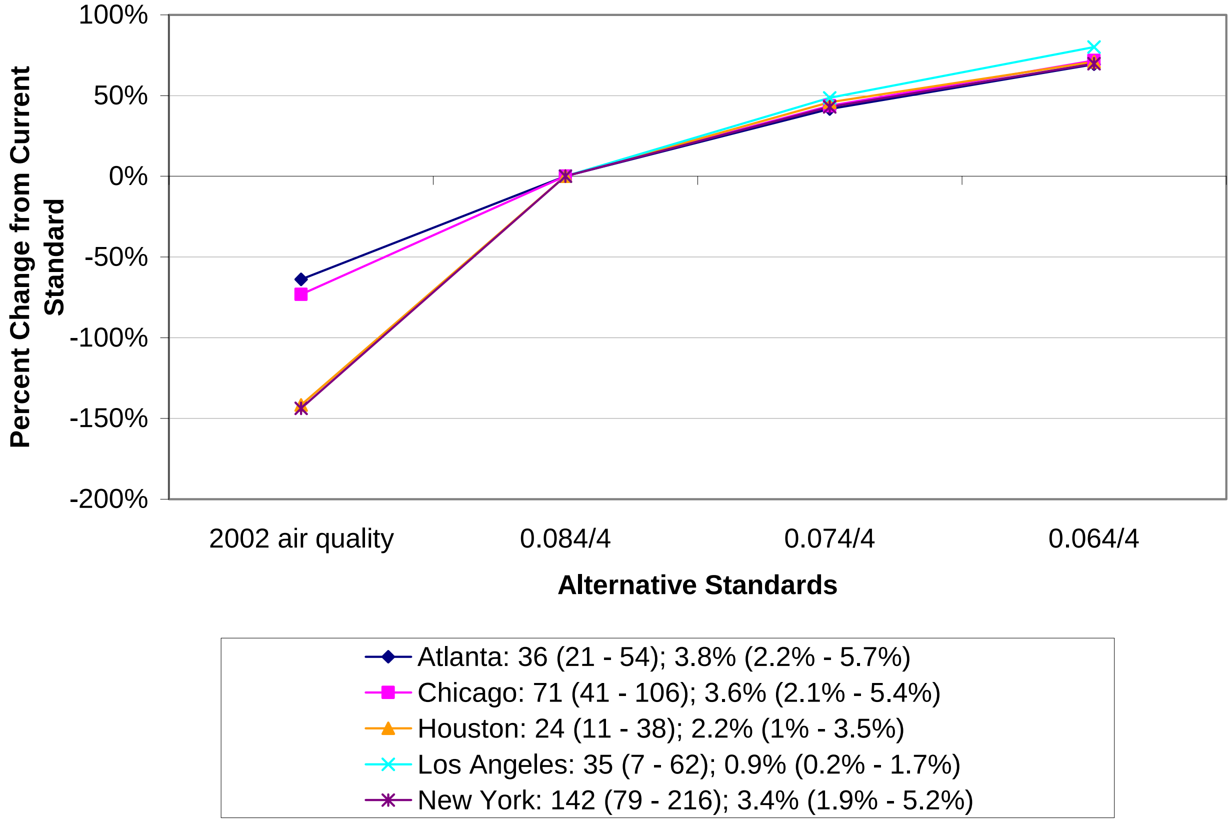
**The percent reduction from the current standard (0.084/4) to 2004 air quality was omitted for Los Angeles because it was so large in magnitude (-547%).

Figure 3-11b. Based on 2003 Air Quality**



**The percent reductions from the current standard (0.084/4) to 2003 air quality were omitted for Los Angeles and Houston because they were so large in magnitude (-735% in Los Angeles and –279% in Houston).

Figure 3-11c. Based on 2002 Air Quality**



**The percent reduction from the current standard (0.084/4) to 2002 air quality was omitted for Los Angeles because it was so large in magnitude (-529%).

In the great majority of cases, the estimated numbers of occurrences of lung function response associated with exposure to O_3 concentrations that just meet the current standard among all school age children (ages 5 – 18) engaged in moderate exercise for at least one 8-hour period during the O_3 season are substantially lower than the corresponding numbers associated with exposure to "as is" O_3 concentrations in any of the three years considered. As would be expected, the numbers of occurrences decline substantially as the standards become more stringent. Comparing the current standard to the 0.064, 4th daily maximum standard, the numbers of occurrences decline from 53% in Atlanta and New York in 2004 to as much as 91% in Los Angeles in 2003.

3.2.2.2.2 Results for asthmatic school age children

Lung function response of interest for asthmatic school age children was defined as a decrement in $FEV_1 \geq 10\%$. The estimated numbers and percentages of occurrences of lung function response associated with exposure to O_3 concentrations that just meet the current and each of the two alternative daily maximum 8-hour standards among asthmatic school age children (ages 5 – 18) engaged in moderate exercise for at least one 8-hour period during the O_3 season are given in Tables 3-24 and 3-25, respectively. The numbers and percentages of these children estimated to experience at least one lung function response associated with exposure to O_3 concentrations that just meet the current and each of the two alternative standards are given in Tables 3-26 and 3-27, respectively. Results based on 2002, 2003, and 2004 O_3 concentrations are shown in each table.

The percent reductions in numbers of school age children experiencing at least one occurrence of lung function response when O_3 concentrations are reduced from those just meeting the current standard to those that would just meet each alternative standard, as well as a recent year of air quality, are summarized in Figures 3-12a, b, and c, using 2004, 2003, and 2002 air quality data, respectively.

Table 3-24. Estimated Number of Occurrences of Lung Function Response (Change in FEV1>=10%) Associated with Exposure to O_3 Concentrations That Just Meet the Current and Two Alternative Daily Maximum 8-Hour Standards Among Asthmatic Children (Ages 5-18) Engaged in Moderate Exertion, for Five Location-Specific O_3 Seasons, Based on 2002, 2003, and 2004 O_3 Concentrations*

Location	Number of Occurrences (in 1000s) of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
	A Recent Year of Air Quality	0.084/4***	0.074/4	0.064/4
	Based on 2002 Air Quality Data			
Atlanta	145 (68 - 244)	109 (44 - 190)	81 (26 - 146)	58 (13 - 108)
Chicago	257 (125 - 427)	186 (75 - 324)	137 (44 - 247)	97 (22 - 182)
Houston	96 (45 - 158)	52 (20 - 88)	34 (11 - 57)	14 (5 - 19)
Los Angeles	561 (255 - 942)	182 (42 - 335)	102 (18 - 189)	25 (4 - 39)
New York	834 (435 - 1356)	509 (200 - 894)	385 (119 - 700)	275 (59 - 519)
	Based on 2003 Air Quality Data			
Atlanta	106 (40 - 187)	83 (26 - 150)	61 (14 - 114)	43 (7 - 82)
Chicago	163 (56 - 291)	137 (42 - 250)	100 (22 - 187)	69 (9 - 134)
Houston	131 (64 - 213)	55 (19 - 95)	32 (9 - 55)	7 (3 - 6)
Los Angeles	690 (352 - 1119)	177 (45 - 320)	86 (18 - 153)	11 (4 - 8)
New York	506 (215 - 868)	304 (88 - 557)	227 (47 - 431)	158 (19 - 310)
	Based on 2004 Air Quality Data			
Atlanta	109 (38 - 196)	82 (22 - 151)	61 (12 - 116)	44 (5 - 86)
Chicago	114 (27 - 214)	80 (12 - 154)	57 (5 - 113)	38 (1 - 78)
Houston	110 (51 - 181)	61 (22 - 103)	40 (12 - 68)	18 (5 - 27)
Los Angeles	660 (308 - 1108)	219 (49 - 405)	134 (21 - 253)	46 (4 - 84)
New York	399 (131 - 720)	240 (46 - 458)	179 (21 - 353)	124 (6 - 252)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-25. Estimated Percent of Occurrences of Lung Function Response (Change in FEV1>=10%) Associated with Exposure to O_3 Concentrations That Just Meet the Current and Two Alternative Daily Maximum 8-Hour Standards Among Asthmatic Children (Ages 5-18) Engaged in Moderate Exertion, for Five Location-Specific O_3 Seasons, Based on 2002, 2003, and 2004 O_3 Concentrations*

Location	Percent of Occurrences of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
	A Recent Year of Air Quality	0.084/4***	0.074/4	0.064/4
	Based on 2002 Air Quality Data			
Atlanta	1.3% (0.6% - 2.2%)	1% (0.4% - 1.7%)	0.7% (0.2% - 1.3%)	0.5% (0.1% - 1%)
Chicago	1.5% (0.7% - 2.4%)	1.1% (0.4% - 1.8%)	0.8% (0.2% - 1.4%)	0.6% (0.1% - 1%)
Houston	0.5% (0.3% - 0.9%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.1%)
Los Angeles	1% (0.5% - 1.7%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.3%)	0% (0% - 0.1%)
New York	1.9% (1% - 3.1%)	1.2% (0.5% - 2.1%)	0.9% (0.3% - 1.6%)	0.6% (0.1% - 1.2%)
	Based on 2003 Air Quality Data			
Atlanta	1% (0.4% - 1.7%)	0.7% (0.2% - 1.4%)	0.5% (0.1% - 1%)	0.4% (0.1% - 0.7%)
Chicago	0.9% (0.3% - 1.6%)	0.8% (0.2% - 1.4%)	0.6% (0.1% - 1.1%)	0.4% (0.1% - 0.8%)
Houston	0.7% (0.4% - 1.2%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.3%)	0% (0% - 0%)
Los Angeles	1.2% (0.6% - 2%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.3%)	0% (0% - 0%)
New York	1.2% (0.5% - 2%)	0.7% (0.2% - 1.3%)	0.5% (0.1% - 1%)	0.4% (0% - 0.7%)
	Based on 2004 Air Quality Data			
Atlanta	1% (0.3% - 1.8%)	0.7% (0.2% - 1.4%)	0.5% (0.1% - 1%)	0.4% (0% - 0.8%)
Chicago	0.7% (0.2% - 1.2%)	0.5% (0.1% - 0.9%)	0.3% (0% - 0.6%)	0.2% (0% - 0.4%)
Houston	0.6% (0.3% - 1%)	0.3% (0.1% - 0.6%)	0.2% (0.1% - 0.4%)	0.1% (0% - 0.2%)
Los Angeles	1.2% (0.6% - 2%)	0.4% (0.1% - 0.7%)	0.2% (0% - 0.5%)	0.1% (0% - 0.2%)
New York	0.9% (0.3% - 1.7%)	0.6% (0.1% - 1.1%)	0.4% (0% - 0.8%)	0.3% (0% - 0.6%)

*Percents are median (0.5 fractile) percents of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-26. Number of Asthmatic Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Change in FEV_1>=10%) Associated with Exposure to O_3 Concentrations That Just Meet the Current and Two Alternative Daily Maximum 8-Hour Standards, for Five Location-Specific O_3 Seasons, Based on 2002, 2003, and 2004 O_3 Concentrations*

Location	Number of Asthmatic Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
	A Recent Year of Air Quality	0.084/4***	0.074/4	0.064/4
	Based on 2002 Air Quality Data			
Atlanta	18 (14 - 23)	13 (10 - 18)	9 (6 - 13)	5 (3 - 9)
Chicago	40 (32 - 53)	27 (20 - 39)	18 (12 - 29)	11 (7 - 19)
Houston	17 (13 - 23)	9 (6 - 14)	6 (4 - 9)	4 (2 - 6)
Los Angeles	61 (51 - 79)	16 (11 - 24)	9 (6 - 14)	4 (2 - 6)
New York	118 (97 - 147)	63 (47 - 91)	43 (29 - 67)	27 (16 - 44)
	Based on 2003 Air Quality Data			
Atlanta	12 (9 - 17)	9 (6 - 13)	6 (4 - 10)	4 (2 - 6)
Chicago	21 (15 - 32)	18 (12 - 28)	12 (7 - 19)	7 (4 - 12)
Houston	20 (17 - 26)	8 (5 - 12)	5 (3 - 8)	3 (2 - 5)
Los Angeles	77 (65 - 95)	16 (12 - 25)	9 (6 - 14)	3 (2 - 5)
New York	81 (64 - 109)	42 (29 - 64)	27 (17 - 44)	17 (9 - 27)
	Based on 2004 Air Quality Data			
Atlanta	12 (9 - 17)	8 (6 - 12)	5 (3 - 9)	3 (2 - 5)
Chicago	14 (9 - 22)	9 (5 - 14)	6 (3 - 9)	3 (1 - 6)
Houston	17 (14 - 23)	9 (6 - 14)	6 (4 - 10)	4 (2 - 6)
Los Angeles	62 (52 - 81)	16 (11 - 25)	9 (6 - 14)	4 (2 - 6)
New York	51 (37 - 76)	26 (16 - 42)	17 (9 - 28)	11 (4 - 17)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-27. Percent of Asthmatic Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Change in FEV1>=10%) Associated with Exposure to O_3 Concentrations That Just Meet the Current and Two Alternative Daily Maximum 8-Hour Standards, for Five Location-Specific O_3 Seasons, Based on 2002, 2003, and 2004 O_3 Concentrations*

Location	Percent of Asthmatic Children Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
	A Recent Year of Air Quality	0.084/4***	0.074/4	0.064/4
	Based on 2002 Air Quality Data			
Atlanta	15.2% (12.2% - 19.8%)	10.9% (8.3% - 15.3%)	7.3% (5.1% - 11.2%)	4.6% (2.9% - 7.4%)
Chicago	14.5% (11.6% - 18.9%)	9.8% (7.3% - 14%)	6.5% (4.5% - 10.2%)	4.1% (2.5% - 6.7%)
Houston	12.5% (9.9% - 16.7%)	6.7% (4.8% - 10.1%)	4.4% (2.8% - 7%)	2.7% (1.5% - 4.2%)
Los Angeles	13.3% (11.1% - 17.2%)	3.4% (2.5% - 5.3%)	2% (1.4% - 3%)	0.8% (0.5% - 1.2%)
New York	18.3% (15.1% - 22.9%)	9.8% (7.3% - 14.1%)	6.6% (4.5% - 10.3%)	4.2% (2.6% - 6.8%)
	Based on 2003 Air Quality Data			
Atlanta	10.1% (7.6% - 14.5%)	7.5% (5.4% - 11.5%)	5.1% (3.3% - 8.2%)	3.2% (1.8% - 5.2%)
Chicago	7.6% (5.5% - 11.5%)	6.3% (4.3% - 9.8%)	4.2% (2.6% - 6.8%)	2.6% (1.4% - 4.2%)
Houston	15.1% (12.3% - 19.5%)	5.9% (4% - 9.2%)	3.9% (2.4% - 6.2%)	2.2% (1.1% - 3.4%)
Los Angeles	16.8% (14.3% - 20.9%)	3.5% (2.6% - 5.4%)	1.9% (1.4% - 3%)	0.7% (0.5% - 1.2%)
New York	12.7% (10% - 17%)	6.5% (4.5% - 10%)	4.2% (2.6% - 6.9%)	2.6% (1.3% - 4.2%)
	Based on 2004 Air Quality Data			
Atlanta	9.9% (7.4% - 14.2%)	6.9% (4.8% - 10.6%)	4.6% (2.9% - 7.4%)	2.9% (1.6% - 4.7%)
Chicago	4.9% (3.1% - 7.8%)	3.2% (1.8% - 5.1%)	2.1% (1% - 3.4%)	1.2% (0.3% - 2%)
Houston	12.6% (10% - 16.8%)	6.7% (4.7% - 10.1%)	4.4% (2.9% - 7%)	2.6% (1.5% - 4.2%)
Los Angeles	13.6% (11.4% - 17.7%)	3.5% (2.5% - 5.5%)	2% (1.4% - 3.1%)	0.8% (0.5% - 1.2%)
New York	8% (5.8% - 11.8%)	4.1% (2.5% - 6.6%)	2.7% (1.4% - 4.3%)	1.6% (0.6% - 2.7%)

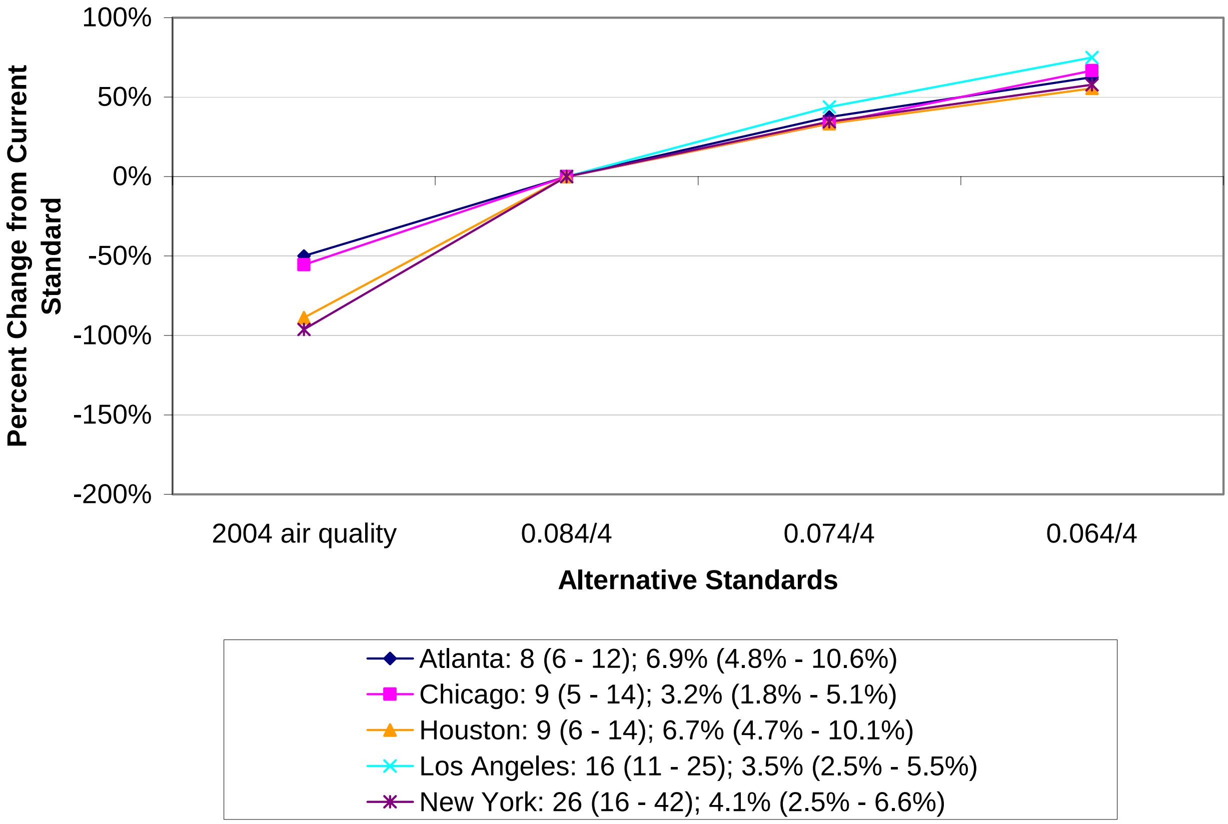
*Percents are median (0.5 fractile) percents of children. Percents in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Figure 3-12. Estimated Percent Reductions From the Current Standard to Two Alternative Standards in Asthmatic Children (Ages 5-18) Engaged in Moderate Exertion Experiencing at Least One O_3-Related Decrement in $FEV_1 \geq 10\%$, Separately for Each of Five Locations*

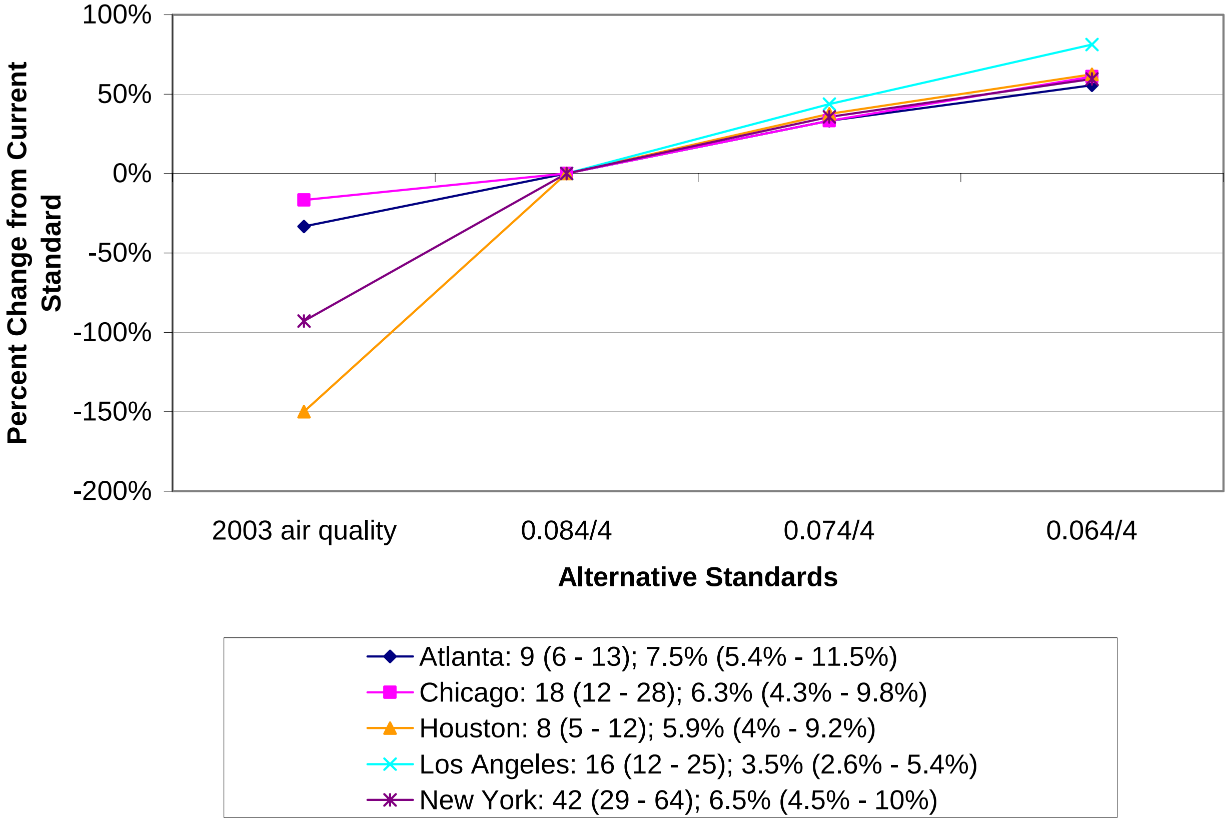
Figure 3-12a. Based on 2004 Air Quality**



* An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 – 0.084 ppm, 4th daily maximum 8-hr average. The 4th daily maximum standards, denoted m/4, require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm). The incidence (and 95% credible interval) and percent of total incidence (and 95% credible interval) when O_3 concentrations just meet the current standard are shown for each location in the box below each figure.

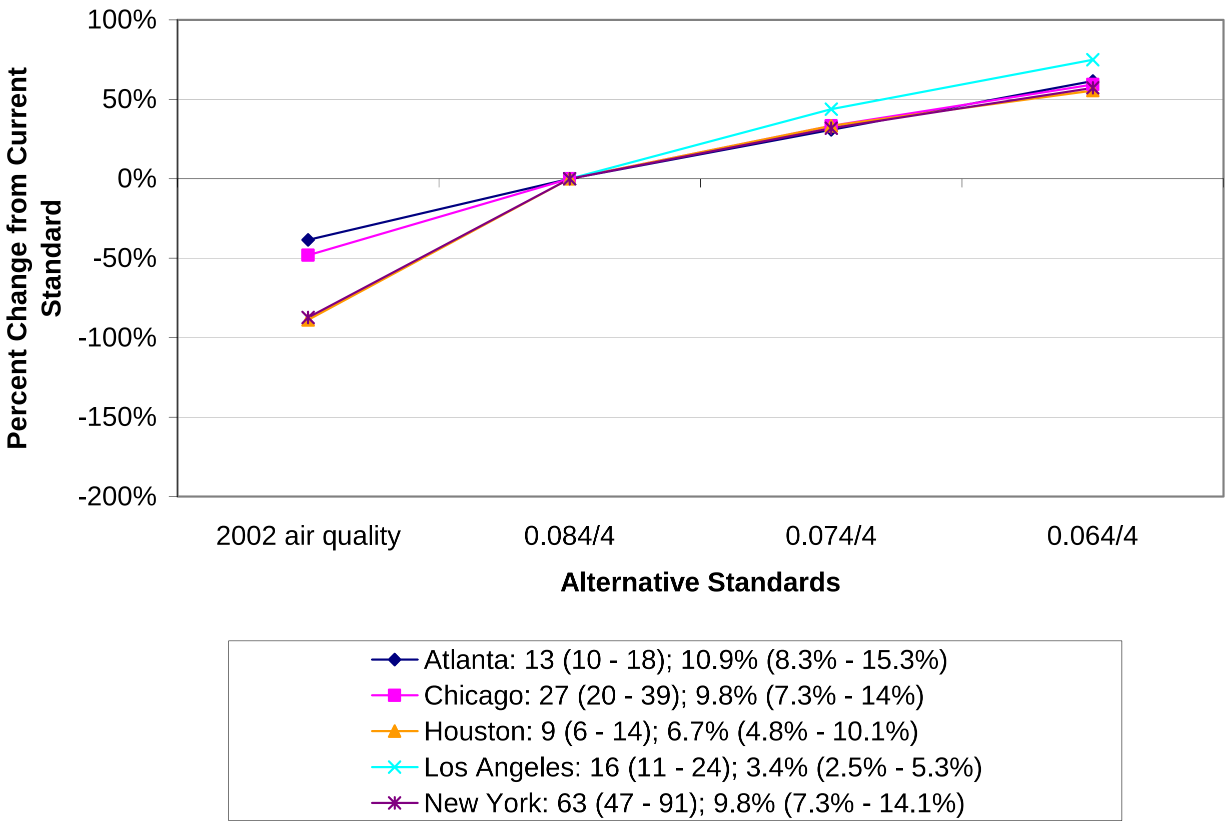
****** The percent reduction from the current standard (0.084/4) to 2004 air quality was omitted for Los Angeles because it was so large in magnitude (-288%).

Figure 3-12b. Based on 2003 Air Quality**



****** The percent reduction from the current standard (0.084/4) to 2003 air quality was omitted for Los Angeles because it was so large in magnitude (-381%).

Figure 3-12c. Based on 2002 Air Quality**



****** The percent reduction from the current standard (0.084/4) to 2002 air quality was omitted for Los Angeles because it was so large in magnitude (-281%).

The results for asthmatic school age children followed the same patterns as those for all school age children. In the great majority of cases, the estimated numbers of occurrences of lung function response associated with exposure to O_3 concentrations that just meet the current standard among asthmatic school age children (ages 5 – 18) engaged in moderate exercise for at least one 8-hour period during the O_3 season are substantially lower than the corresponding numbers associated with exposure to "as is" O_3 concentrations in any of the three years considered. As would be expected, the numbers of occurrences decline substantially as the standards become more stringent. Comparing the current standard to the 0.064, 4^{th} daily maximum standard, the numbers of occurrences decline from 46% in New York in 2002 and Atlanta in 2004 to as much as 94% in Los Angeles in 2003.

3.3 Sensitivity Analyses

Two sources of uncertainty about estimates of O_3-related lung function response among children that have been of particular concern are the estimates of PRB that go into the calculations and the form of the exposure-response function. We ran sensitivity analyses to address concerns about both of these sources of uncertainty.

3.3.1 PRB sensitivity analysis

The O_3 risk assessment presented in this report calculates the risks associated with O_3 concentrations – either "as is" O_3 concentrations or O_3 concentrations "rolled back" to just meet a standard – above PRB. The uncertainty about the PRB concentrations in each of the risk assessment locations induces a corresponding uncertainty about our estimates of risk. We selected three locations – Atlanta, Los Angeles, and New York – for this sensitivity analysis, and calculated lung function responses using (1) the original PRB estimates, (2) lower PRB estimates, and (3) higher PRB estimates for each location. For Los Angeles and New York, the lower PRB estimates were calculated by subtracting 5 ppb from the original PRB estimates; for Atlanta, the lower PRB estimates were calculated by subtracting 10 ppb from the original PRB estimates. In all three locations, the higher PRB estimates were calculated by adding 5 ppb to the original PRB estimates.[4] The analyses were run for all school age children, for whom "lung function response" was defined as a decrement in $FEV_1 \geq 15\%$, and for asthmatic school age children, for whom "lung function response" was defined as a decrement in $FEV_1 \geq 10\%$.

[4] Summarizing their assessment of the validity of the GEOS-CHEM model, the O_3 CD (EPA, 2006a) states, "in conclusion, we estimate that the PRB ozone values reported by Fiore et al. (2003) for afternoon surface air over the United States are likely 10 ppbv too high in the southeast in summer, and accurate within 5 ppbv in other regions and seasons." These error estimates are based on comparison of model output with observations for conditions that most nearly reflect those given in the PRB definition, i.e., at the lower end of the probability distribution.

Each table below shows the impact of changing PRB estimates on the assessment of lung function decrement associated with exposure to "as is" O_3 concentrations over PRB levels, as well as O_3 concentrations that just meet each of three alternative 8-hour daily maximum standards – 0.084 ppm, 0.074 ppm, and 0.064 ppm, 4^{th} daily maximum – over PRB levels. In all cases, the results are for school age children, ages 5 - 18 (either all such children or asthmatic children only) engaged in moderate exercise for at least one 8-hour period during the O_3 season in a given year. Results for both 2002 and 2004 are included in each table. As with the results presented in Section 3.2, all estimated numbers (of children and of occurrences) were rounded to the nearest 1000, and all percentages were rounded to one decimal place.

Table 3-28 shows the impact of alternative estimates of PRB on the estimated number of occurrences of lung function decrement among all school age children. Tables 3-29 and 3-30 show the impact on the estimated number and percent, respectively, of school age children estimated to experience at least one occurrence of lung function response. Tables 3-31, 3-32, and 3-33 show the corresponding results for asthmatic school age children.

Table 3-28. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Number of Occurrences of Lung Function Response (Change in FEV_1>=15%) Among All Children (Age 5-18) Engaged in Moderate Exertion Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons*

Location	Number of Lung Function Responses (in 1000s), Based on Adjusting 2004 O_3 Concentrations**				Number of Lung Function Responses (in 1000s), Based on Adjusting 2002 O_3 Concentrations**			
	2004 Air Quality	0.084/4***	0.074/4	0.064/4	2002 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	191 (29 - 456)	131 (10 - 344)	91 (2 - 260)	62 (0 - 191)	290 (88 - 593)	196 (39 - 442)	131 (12 - 330)	86 (1 - 240)
Atlanta - with lower PRB	213 (29 - 553)	153 (10 - 440)	112 (2 - 356)	83 (0 - 287)	312 (88 - 691)	218 (39 - 539)	153 (12 - 427)	108 (1 - 338)
Atlanta - with higher PRB	175 (29 - 396)	115 (10 - 283)	75 (2 - 199)	46 (0 - 130)	274 (88 - 532)	179 (39 - 380)	115 (12 - 268)	70 (1 - 178)
Los Angeles	1470 (393 - 3073)	371 (6 - 1044)	220 (1 - 651)	75 (0 - 220)	1265 (355 - 2642)	315 (9 - 869)	173 (1 - 496)	46 (0 - 112)
Los Angeles - with lower PRB	1559 (393 - 3424)	460 (6 - 1396)	308 (1 - 1003)	164 (0 - 571)	1352 (355 - 2988)	402 (9 - 1215)	260 (1 - 842)	133 (0 - 458)
Los Angeles - with higher PRB	1363 (393 - 2687)	265 (6 - 659)	113 (1 - 266)	0 (0 - 0)	1160 (355 - 2262)	210 (9 - 489)	68 (1 - 116)	0 (0 - 0)
New York	563 (77 - 1383)	296 (7 - 851)	209 (0 - 648)	139 (0 - 458)	1522 (585 - 2885)	753 (140 - 1727)	513 (40 - 1314)	339 (4 - 962)
New York - with lower PRB	602 (77 - 1553)	334 (7 - 1021)	247 (0 - 817)	177 (0 - 627)	1562 (585 - 3058)	793 (140 - 1900)	552 (40 - 1486)	378 (4 - 1135)
New York - with higher PRB	510 (77 - 1178)	243 (7 - 646)	156 (0 - 442)	86 (0 - 252)	1468 (585 - 2675)	699 (140 - 1517)	458 (40 - 1104)	284 (4 - 753)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-29. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Number of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Change in FEV_1>=15%) Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons*

Location	Number of All Children (in 1000s) with at Least One Response, Based on Adjusting 2004 O_3 Concentrations**				Number of All Children (in 1000s) with at Least One Response, Based on Adjusting 2002 O_3 Concentrations**			
	2004 Air Quality	0.084/4***	0.074/4	0.064/4	2002 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	34 (19 - 51)	20 (8 - 34)	12 (2 - 22)	6 (0 - 14)	59 (40 - 81)	36 (21 - 54)	21 (8 - 34)	11 (1 - 21)
Atlanta - with lower PRB	35 (19 - 54)	21 (8 - 36)	12 (2 - 25)	7 (0 - 16)	60 (40 - 84)	37 (21 - 56)	21 (8 - 37)	12 (1 - 24)
Atlanta - with higher PRB	33 (19 - 48)	19 (8 - 31)	11 (2 - 19)	5 (0 - 11)	58 (40 - 79)	35 (21 - 51)	20 (8 - 31)	10 (1 - 18)
Los Angeles	220 (149 - 298)	34 (5 - 62)	17 (1 - 36)	6 (0 - 14)	220 (150 - 297)	35 (7 - 62)	18 (1 - 35)	7 (0 - 14)
Los Angeles - with lower PRB	225 (149 - 312)	38 (5 - 75)	22 (1 - 49)	11 (0 - 27)	225 (150 - 311)	39 (7 - 75)	23 (1 - 48)	11 (0 - 27)
Los Angeles - with higher PRB	218 (149 - 293)	32 (5 - 57)	16 (1 - 31)	4 (0 - 9)	218 (150 - 292)	33 (7 - 57)	16 (1 - 30)	5 (0 - 9)
New York	112 (55 - 176)	43 (6 - 84)	25 (0 - 56)	14 (0 - 35)	346 (244 - 462)	142 (79 - 216)	81 (29 - 138)	43 (3 - 86)
New York - with lower PRB	114 (55 - 183)	45 (6 - 92)	27 (0 - 63)	16 (0 - 43)	348 (244 - 469)	144 (79 - 222)	83 (29 - 145)	45 (3 - 93)
New York - with higher PRB	110 (55 - 169)	41 (6 - 78)	23 (0 - 49)	12 (0 - 29)	343 (244 - 455)	140 (79 - 208)	79 (29 - 131)	41 (3 - 79)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-30. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Percent of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Change in FEV_1>=15%) Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons*

Location	Percent of All Children with at Least One Response, Based on Adjusting 2004 O_3 Concentrations**				Percent of All Children with at Least One Response, Based on Adjusting 2002 O_3 Concentrations**			
	2004 Air Quality	0.084/4***	0.074/4	0.064/4	2002 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	3.6% (2% - 5.4%)	2.2% (0.9% - 3.6%)	1.2% (0.2% - 2.3%)	0.7% (0% - 1.5%)	6.3% (4.2% - 8.6%)	3.8% (2.2% - 5.7%)	2.2% (0.9% - 3.6%)	1.2% (0.1% - 2.2%)
Atlanta - with lower PRB	3.7% (2% - 5.7%)	2.2% (0.9% - 3.9%)	1.3% (0.2% - 2.6%)	0.7% (0% - 1.7%)	6.3% (4.2% - 8.9%)	3.9% (2.2% - 6%)	2.3% (0.9% - 3.9%)	1.2% (0.1% - 2.5%)
Atlanta - with higher PRB	3.5% (2% - 5.1%)	2.1% (0.9% - 3.3%)	1.1% (0.2% - 2%)	0.6% (0% - 1.2%)	6.2% (4.2% - 8.3%)	3.7% (2.2% - 5.4%)	2.1% (0.9% - 3.3%)	1.1% (0.1% - 1.9%)
Los Angeles	6% (4.1% - 8.1%)	0.9% (0.1% - 1.7%)	0.5% (0% - 1%)	0.2% (0% - 0.4%)	6% (4.1% - 8.1%)	0.9% (0.2% - 1.7%)	0.5% (0% - 1%)	0.2% (0% - 0.4%)
Los Angeles - with lower PRB	6.1% (4.1% - 8.5%)	1% (0.1% - 2%)	0.6% (0% - 1.3%)	0.3% (0% - 0.7%)	6.1% (4.1% - 8.5%)	1.1% (0.2% - 2%)	0.6% (0% - 1.3%)	0.3% (0% - 0.7%)
Los Angeles - with higher PRB	5.9% (4.1% - 8%)	0.9% (0.1% - 1.5%)	0.4% (0% - 0.8%)	0.1% (0% - 0.2%)	6% (4.1% - 8%)	0.9% (0.2% - 1.5%)	0.4% (0% - 0.8%)	0.1% (0% - 0.2%)
New York	2.7% (1.3% - 4.2%)	1% (0.2% - 2%)	0.6% (0% - 1.3%)	0.3% (0% - 0.9%)	8.3% (5.9% - 11.2%)	3.4% (1.9% - 5.2%)	2% (0.7% - 3.3%)	1% (0.1% - 2.1%)
New York - with lower PRB	2.8% (1.3% - 4.4%)	1.1% (0.2% - 2.2%)	0.7% (0% - 1.5%)	0.4% (0% - 1%)	8.4% (5.9% - 11.3%)	3.5% (1.9% - 5.4%)	2% (0.7% - 3.5%)	1.1% (0.1% - 2.2%)
New York - with higher PRB	2.6% (1.3% - 4.1%)	1% (0.2% - 1.9%)	0.5% (0% - 1.2%)	0.3% (0% - 0.7%)	8.3% (5.9% - 11%)	3.4% (1.9% - 5%)	1.9% (0.7% - 3.2%)	1% (0.1% - 1.9%)

*Numbers are median (0.5 fractile) percents of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-31. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Number of Occurrences of Lung Function Response (Change in FEV_1>=10%) Among Asthmatic Children (Age 5-18) Engaged in Moderate Exertion Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons*

Location	Number of Lung Function Responses (in 1000s), Based on Adjusting 2004 O_3 Concentrations**				Number of Lung Function Responses (in 1000s), Based on Adjusting 2002 O_3 Concentrations**			
	2004 Air Quality	0.084/4***	0.074/4	0.064/4	2002 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	109 (38 - 196)	82 (22 - 151)	61 (12 - 116)	44 (5 - 86)	145 (68 - 244)	109 (44 - 190)	81 (26 - 146)	58 (13 - 108)
Atlanta - with lower PRB	129 (38 - 245)	101 (22 - 200)	80 (12 - 165)	63 (5 - 135)	165 (68 - 294)	129 (44 - 240)	101 (26 - 196)	78 (13 - 158)
Atlanta - with higher PRB	96 (38 - 167)	69 (22 - 121)	48 (12 - 86)	30 (5 - 56)	132 (68 - 215)	96 (44 - 161)	68 (26 - 117)	44 (13 - 78)
Los Angeles	660 (308 - 1108)	219 (49 - 405)	134 (21 - 253)	46 (4 - 84)	561 (255 - 942)	182 (42 - 335)	102 (18 - 189)	25 (4 - 39)
Los Angeles - with lower PRB	724 (308 - 1256)	283 (49 - 553)	198 (21 - 401)	110 (4 - 232)	625 (255 - 1089)	245 (42 - 482)	166 (18 - 336)	88 (4 - 186)
Los Angeles - with higher PRB	587 (308 - 950)	146 (49 - 247)	61 (21 - 95)	0 (4 - 0)	490 (255 - 787)	110 (42 - 180)	31 (18 - 34)	0 (4 - 0)
New York	399 (131 - 720)	240 (46 - 458)	179 (21 - 353)	124 (6 - 252)	834 (435 - 1356)	509 (200 - 894)	385 (119 - 700)	275 (59 - 519)
New York - with lower PRB	441 (131 - 822)	281 (46 - 560)	220 (21 - 455)	165 (6 - 354)	876 (435 - 1460)	551 (200 - 998)	427 (119 - 805)	317 (59 - 624)
New York - with higher PRB	347 (131 - 600)	187 (46 - 339)	126 (21 - 233)	71 (6 - 133)	781 (435 - 1234)	455 (200 - 773)	331 (119 - 579)	221 (59 - 398)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-32. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Number of Asthmatic Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Change in FEV_1>=10%) Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons*

Location	Number of Asthmatic Children (in 1000s) with at Least One Response, Based on Adjusting 2004 O_3 Concentrations**				Number of Asthmatic Children (in 1000s) with at Least One Response, Based on Adjusting 2002 O_3 Concentrations**			
	2004 Air Quality	0.084/4***	0.074/4	0.064/4	2002 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	12 (9 - 17)	8 (6 - 12)	5 (3 - 9)	3 (2 - 5)	18 (14 - 23)	13 (10 - 18)	9 (6 - 13)	5 (3 - 9)
Atlanta - with lower PRB	12 (9 - 18)	9 (6 - 14)	6 (3 - 10)	4 (2 - 7)	18 (14 - 24)	13 (10 - 19)	9 (6 - 14)	6 (3 - 10)
Atlanta - with higher PRB	11 (9 - 16)	7 (6 - 11)	5 (3 - 8)	3 (2 - 4)	17 (14 - 22)	12 (10 - 17)	8 (6 - 12)	5 (3 - 8)
Los Angeles	62 (52 - 81)	16 (11 - 25)	9 (6 - 14)	4 (2 - 6)	61 (51 - 79)	16 (11 - 24)	9 (6 - 14)	4 (2 - 6)
Los Angeles - with lower PRB	65 (52 - 86)	19 (11 - 30)	12 (6 - 19)	6 (2 - 11)	64 (51 - 84)	18 (11 - 29)	12 (6 - 19)	7 (2 - 11)
Los Angeles - with higher PRB	61 (52 - 79)	15 (11 - 23)	8 (6 - 12)	3 (2 - 4)	60 (51 - 77)	14 (11 - 22)	8 (6 - 12)	3 (2 - 4)
New York	51 (37 - 76)	26 (16 - 42)	17 (9 - 28)	11 (4 - 17)	118 (97 - 147)	63 (47 - 91)	43 (29 - 67)	27 (16 - 44)
New York - with lower PRB	53 (37 - 80)	28 (16 - 46)	19 (9 - 32)	12 (4 - 21)	119 (97 - 151)	65 (47 - 94)	44 (29 - 70)	29 (16 - 48)
New York - with higher PRB	50 (37 - 73)	24 (16 - 39)	16 (9 - 25)	9 (4 - 14)	116 (97 - 143)	61 (47 - 87)	41 (29 - 63)	25 (16 - 40)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table 3-33. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Percent of Asthmatic Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Change in FEV_1>=10%) Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons*

Location	Percent of Asthmatic Children with at Least One Response, Based on Adjusting 2004 O_3 Concentrations**				Percent of Asthmatic Children with at Least One Response, Based on Adjusting 2002 O_3 Concentrations**			
	2004 Air Quality	0.084/4***	0.074/4	0.064/4	2002 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	15.2% (12.2% - 19.8%)	10.9% (8.3% - 15.3%)	7.3% (5.1% - 11.2%)	4.6% (2.9% - 7.4%)	15.2% (12.2% - 19.8%)	10.9% (8.3% - 15.3%)	7.3% (5.1% - 11.2%)	4.6% (2.9% - 7.4%)
Atlanta - with lower PRB	15.7% (12.2% - 20.8%)	11.3% (8.3% - 16.3%)	7.8% (5.1% - 12.2%)	5% (2.9% - 8.5%)	15.7% (12.2% - 20.8%)	11.3% (8.3% - 16.3%)	7.8% (5.1% - 12.2%)	5% (2.9% - 8.5%)
Atlanta - with higher PRB	14.7% (12.2% - 18.9%)	10.4% (8.3% - 14.4%)	6.8% (5.1% - 10.3%)	4.1% (2.9% - 6.5%)	14.7% (12.2% - 18.9%)	10.4% (8.3% - 14.4%)	6.8% (5.1% - 10.3%)	4.1% (2.9% - 6.5%)
Los Angeles	13.3% (11.1% - 17.2%)	3.4% (2.5% - 5.3%)	2% (1.4% - 3%)	0.8% (0.5% - 1.2%)	13.3% (11.1% - 17.2%)	3.4% (2.5% - 5.3%)	2% (1.4% - 3%)	0.8% (0.5% - 1.2%)
Los Angeles - with lower PRB	13.9% (11.1% - 18.3%)	4% (2.5% - 6.4%)	2.6% (1.4% - 4.2%)	1.4% (0.5% - 2.3%)	13.9% (11.1% - 18.3%)	4% (2.5% - 6.4%)	2.6% (1.4% - 4.2%)	1.4% (0.5% - 2.3%)
Los Angeles - with higher PRB	13.1% (11.1% - 16.8%)	3.2% (2.5% - 4.9%)	1.7% (1.4% - 2.6%)	0.6% (0.5% - 0.8%)	13.1% (11.1% - 16.8%)	3.2% (2.5% - 4.9%)	1.7% (1.4% - 2.6%)	0.6% (0.5% - 0.8%)
New York	18.3% (15.1% - 22.9%)	9.8% (7.3% - 14.1%)	6.6% (4.5% - 10.3%)	4.2% (2.6% - 6.8%)	18.3% (15.1% - 22.9%)	9.8% (7.3% - 14.1%)	6.6% (4.5% - 10.3%)	4.2% (2.6% - 6.8%)
New York - with lower PRB	18.6% (15.1% - 23.4%)	10.1% (7.3% - 14.7%)	6.9% (4.5% - 10.9%)	4.5% (2.6% - 7.4%)	18.6% (15.1% - 23.4%)	10.1% (7.3% - 14.7%)	6.9% (4.5% - 10.9%)	4.5% (2.6% - 7.4%)
New York - with higher PRB	18% (15.1% - 22.3%)	9.5% (7.3% - 13.6%)	6.3% (4.5% - 9.8%)	3.9% (2.6% - 6.3%)	18% (15.1% - 22.3%)	9.5% (7.3% - 13.6%)	6.3% (4.5% - 9.8%)	3.9% (2.6% - 6.3%)

*Numbers are median (0.5 fractile) percents of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

The impact of changing the assumed PRB levels varied substantially from one location to another and from one standard to another. For example, assuming lower PRB levels increased the estimated number of occurrences associated with 2002 "as is" air quality among all children in New York by only 3 percent (from 1,522,000 to 1,562,000); however, it increased the estimated number of occurrences associated with O_3 concentrations that just meet the 0.064 4^{th} daily maximum standard among all children in Los Angeles by 189 percent (from 46,000 to 133,000), based on adjusting 2002 O_3 concentrations, and by 119 percent (from 75,000 to 164,000), based on adjusting 2004 O_3 concentrations.

The impact was similarly varied among asthmatic children. Assuming lower PRB levels increased the estimated number of occurrences associated with 2002 "as is" air quality among asthmatic children in New York by only 5 percent (from 834,000 to 876,000); however, it increased the estimated number of occurrences associated with O_3 concentrations that just meet the 0.064 4^{th} daily maximum standard among asthmatic children in Los Angeles by 252 percent (from 25,000 to 88,000), based on adjusting 2002 O_3 concentrations, and by 139 percent (from 46,000 to 110,000), based on adjusting 2004 O_3 concentrations. As would be expected, however, the impact on the number of lung function occurrences of assuming lower PRB levels increased from a recent year of air quality to the current standard and from the current standard to successively more stringent alternative standards, for both all children and asthmatic children. The impact on the number of children with at least one lung function occurrence generally followed the same pattern.

The impact of assuming higher PRB levels followed the same patterns but in the opposite direction, resulting in negative percent changes in estimated numbers of lung function occurrence that were successively greater in absolute value as we went from a recent year of air quality to the current standard and from the current standard to successively more stringent alternative standards. The impacts also varied substantially, ranging from a 4 percent decrease in the estimated number of occurrences associated with 2002 "as is" air quality among all children in New York to 100% decreases in the estimated numbers of occurrences associated with O_3 concentrations that just meet the 0.064 4^{th} daily maximum standard among all children in Los Angeles, based on adjusting 2002 and 2004 air quality data.[5] The results for lung function occurrences among asthmatic children were similar.

3.3.2 Exposure-response functional form sensitivity analysis

As noted above, the exposure-response functions used in the primary analyses are based on the assumption that the relationship between exposure and response has a logistic form with 90 percent probability and a linear (hockeystick) form with 10 percent probability. If we had assumed different probabilities for the two alternative functional forms, the resulting exposure-response curves, and the response probabilities associated with exposure to any given O_3 concentration, would have been different. In this

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[5] These percentages are based on the rounded occurrence values. If they had been based on the unrounded values, the percent decrease would have been large but not 100%.

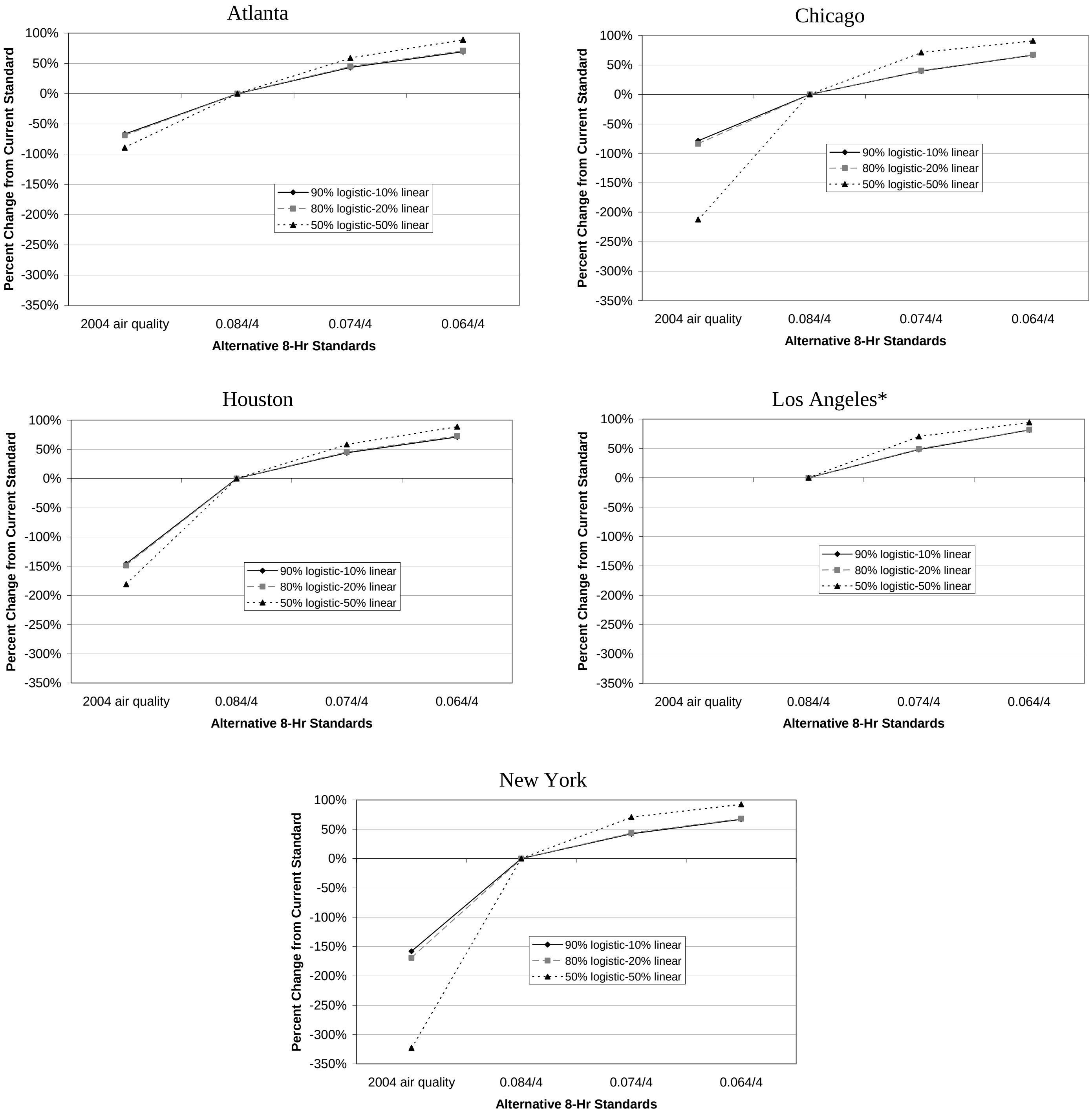
sensitivity analysis, we considered the impact of two alternative exposure-response functions, based on an 80 percent logistic/20 percent linear split and a 50 percent logistic /50 percent linear split, in five locations – Atlanta, Chicago, Houston, Los Angeles, and New York. Tables C-13 through C-16 in Appendix C show the impact of the alternative exposure-response functions on the estimated number of children, ages 5-18, engaged in moderate exertion experiencing at least one lung function response. Tables C-13 and C-14 show the impact on the estimated number of all school age children experiencing at least one lung function response, defined as a change in $FEV_1 \geq 15\%$, for a recent year of air quality as well as when O_3 concentrations just meet each of three 4^{th} daily maximum standards – 0.084/4, 0.074/4 and 0.064/4, based on adjusting 2004 and 2002 data, respectively. Tables C-15 and C-16 show the corresponding impacts on the estimated number of asthmatic school age children experiencing at least one lung function response, defined as a change in $FEV_1 \geq 10\%$. Figures 3-13 and 3-14 show the impacts of alternative estimates of exposure-response functions on estimated percent changes in response among all school age children and asthmatic school age children, respectively, when O_3 concentrations are changed from those just meeting the current standard to a recent year of air quality and to those just meeting each of the two alternative standards given above.

The impacts of changing the functional form varied substantially, and there was no discernable pattern. Not surprisingly, the impacts of changing from the 90%/10% split to the 80%/20% split were generally small, especially for all school age children. In most cases, the number of all school age children responding estimated by the 80%/20% split was within 5 percent of the estimate obtained using the 90%/10% split. There were, however, some more substantial changes. The largest differences for all school age children occurred for O_3 concentrations just meeting the most stringent standard, 0.064/4 – a 14% decrease in the estimated number of all children responding (as defined above) in Houston (from about 7,000 to about 6,000), based on adjusting 2004 air quality, and 14% decreases in the estimated number of children responding in Houston and Los Angeles (from about 7,000 to about 6,000 in each location), based on adjusting 2002 air quality. For asthmatic school age children, the differences in estimated number of children responding tended to be larger. The largest differences were a 33% increase in the estimated number of children responding in Atlanta (from about 3,000 to about 4,000) for O_3 concentrations just meeting the 0.064/4 standard, based on adjusting 2004 air quality, and a 20% increase in Atlanta (from about 5,000 to about 6,000) for O_3 concentrations just meeting the 0.064/4 standard, based on adjusting 2002 air quality.

The impacts of changing from the 90%/10% split to the 50%/50% split were generally (although not always) larger. The largest impacts were again seen for O_3 concentrations just meeting the most stringent standard of 0.064/4 – an 86% decrease in the estimated number of all children responding in New York (from about 14,000 to about 2,000), based on adjusting 2004 air quality, and a 71% decrease in the estimated number of all children responding in Los Angeles (from about 7,000 to about 2,000), based on adjusting 2002 air quality. For asthmatic children, there were several cases of increases from 50% to 67% for O_3 concentrations just meeting the 0.074/4 and 0.064/4 standards, based on adjusting both 2004 and 2002 air quality.

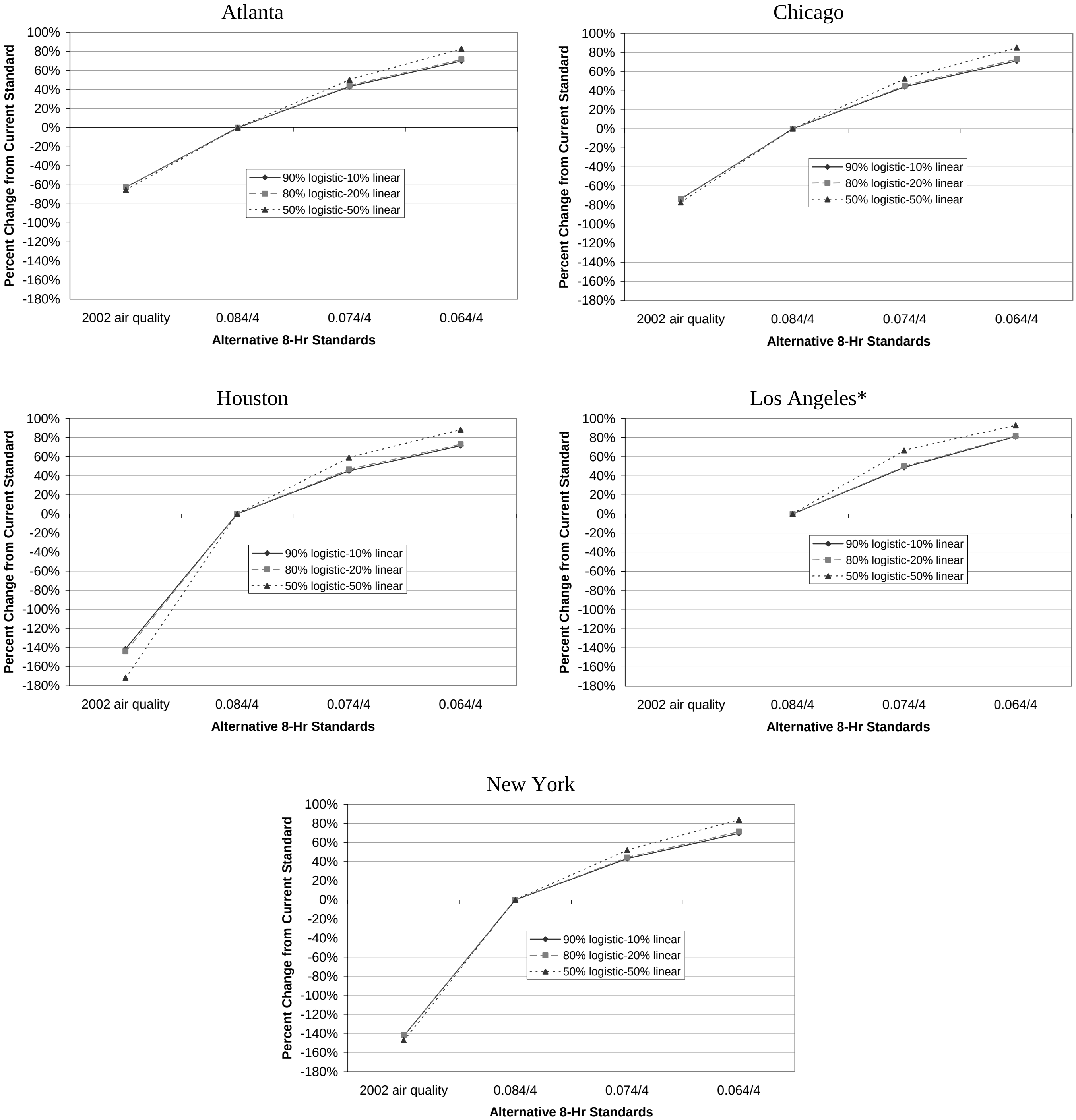
Figure 3-13. Sensitivity Analysis: Impact of Alternative Estimates of Exposure-Response Function on Estimated Percent Reductions in Numbers of All Children (Ages 5-18) Engaged in Moderate Exertion Experiencing at Least One Decrement in $FEV_1 \geq 15\%$ when O_3 Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each of Several Alternative Daily Maximum 8-Hour Standards, for Five Location-Specific O_3 Seasons

Figure 3-13a. Based on Adjusting 2004 O_3 Concentrations



* The percent reductions from the current standard (0.084/4) to 2004 air quality were omitted for Los Angeles because they were so large in magnitude (-553%, -587%, and –1027% for the 90/10, 80/20 and 50/50 splits, respectively).

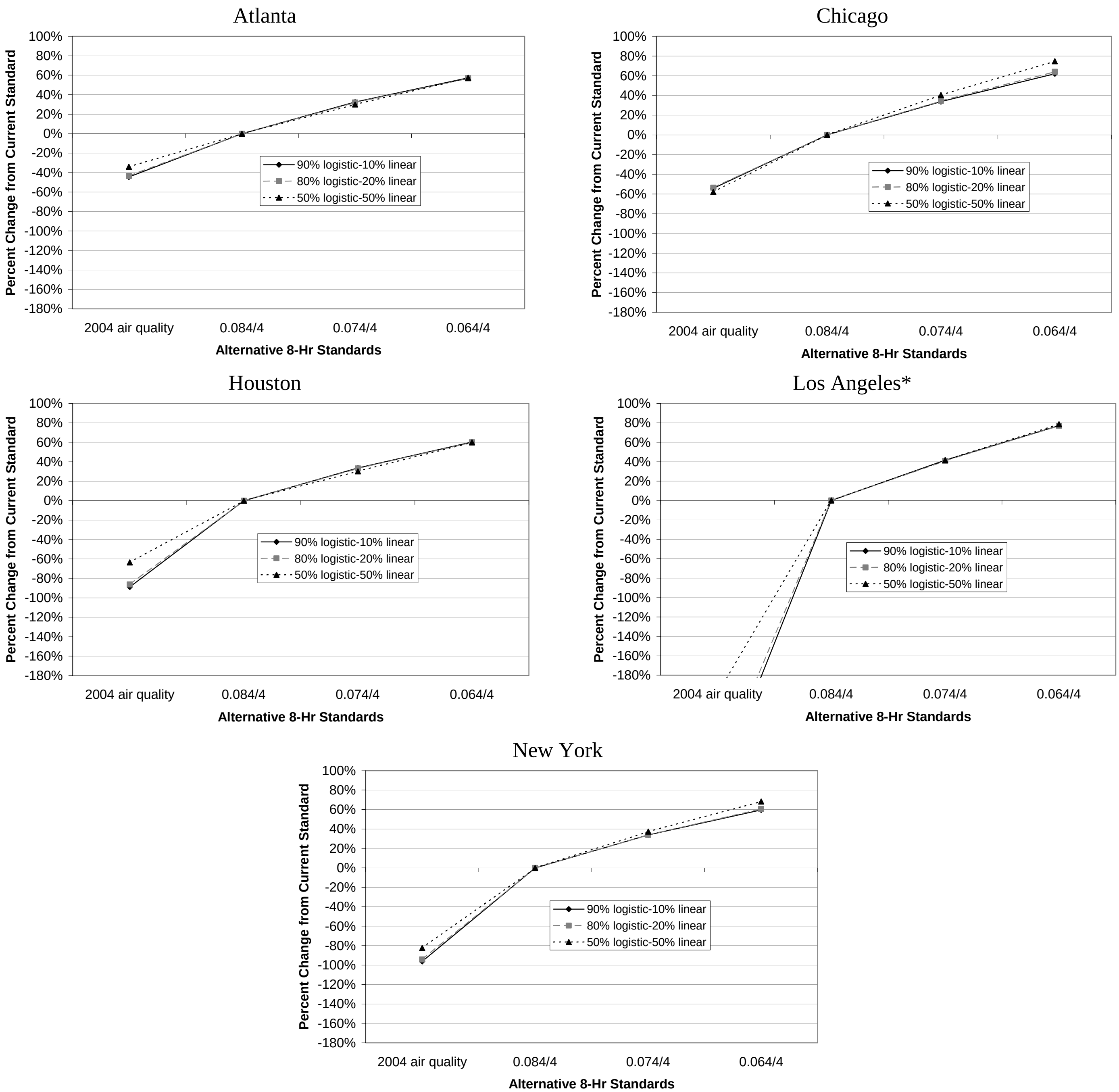
Figure 3-13b. Based on Adjusting 2002 O_3 Concentrations



* The percent reductions from the current standard (0.084/4) to 2002 air quality were omitted for Los Angeles because they were so large in magnitude (-526%, -549%, and –842% for the 90/10, 80/20 and 50/50 splits, respectively).

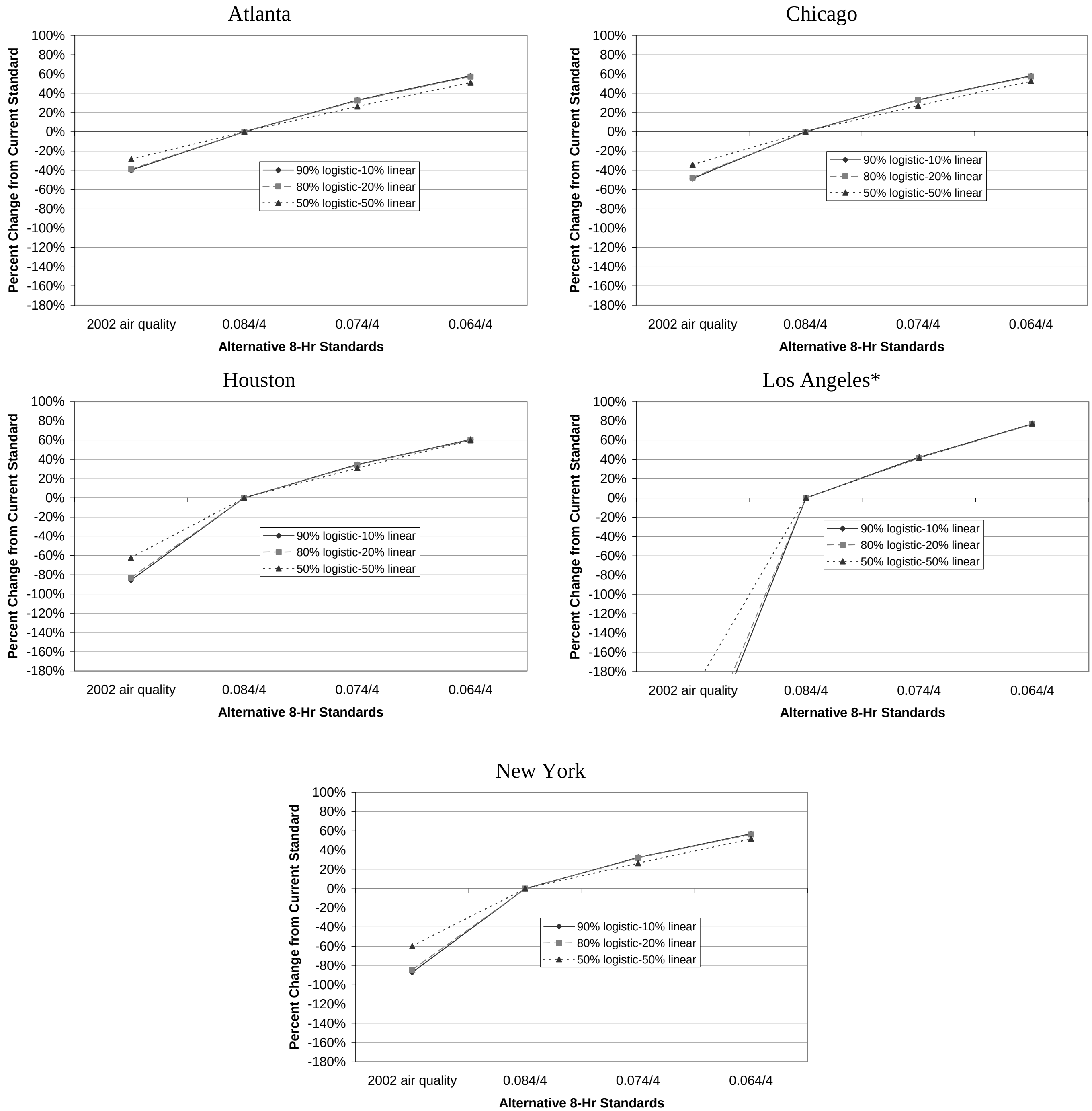
Figure 3-14. Sensitivity Analysis: Impact of Alternative Estimates of Exposure-Response Function on Estimated Percent Reductions in Numbers of Asthmatic Children (Ages 5-18) Engaged in Moderate Exertion Experiencing at Least One Decrement in $FEV_1 \geq 10\%$ when O_3 Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each of Several Alternative Daily Maximum 8-Hour Standards, for Five Location-Specific O_3 Seasons

Figure 3-14a. Based on Adjusting 2004 O_3 Concentrations



* The percent reductions from the current standard (0.084/4) to 2004 air quality, based on the 90/10, 80/20, and 50/50 split exposure-response functions for Los Angeles were -294%, -280%, and –201%, respectively.

Figure 3-14b. Based on Adjusting 2002 O_3 Concentrations



* The percent reductions from the current standard (0.084/4) to 2002 air quality, based on the 90/10, 80/20, and 50/50 split exposure-response functions for Los Angeles were -287%, -274%, and –198%, respectively.

4 ASSESSMENT OF RISK BASED ON EPIDEMIOLOGICAL STUDIES

As discussed in the O_3 CD, a significant number of epidemiological studies examining a variety of health effects associated with ambient O_3 concentrations in various locations throughout the U.S., Canada, Europe, and other regions of the world have been published since the last O_3 NAAQS review. As a result of the availability of these epidemiological studies and air quality information, EPA staff decided to expand the O_3 risk assessment to include an assessment of selected health risks attributable to ambient O_3 concentrations over PRB concentrations and the reduced health risks associated with just meeting the current O_3 standard and alternative O_3 standards in selected urban locations in the U.S. The methods and results of this portion of the risk assessment are discussed below.

4.1 Methods

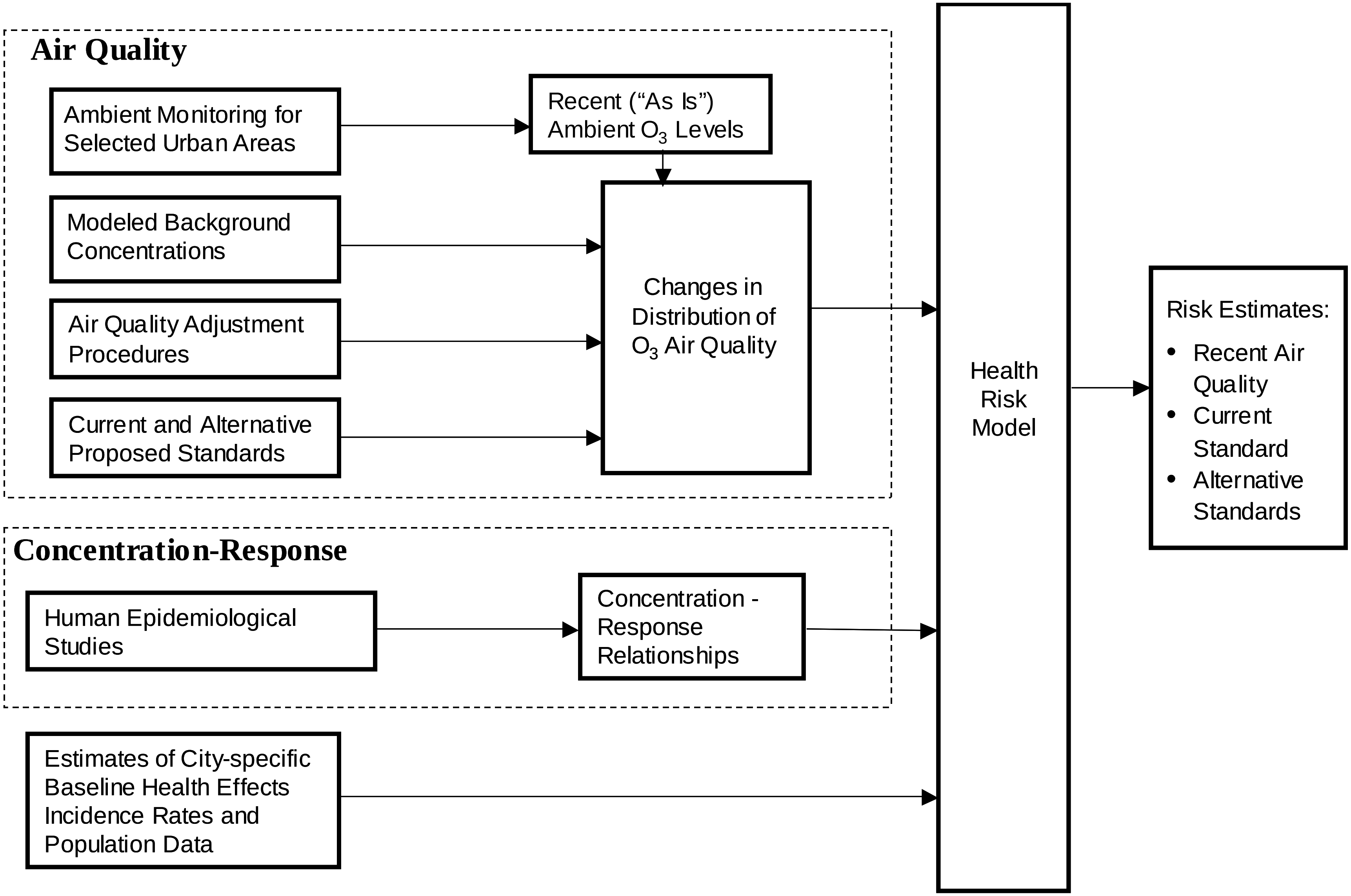
4.1.1 General approach

As in the recently completed particulate matter (PM) risk assessment (see EPA, 2005c, Chapter 4, and Abt Associates 2005), the general approach used in this part of the O_3 risk assessment relies upon C-R functions which have been estimated in epidemiological studies. Since these studies estimate C-R functions using ambient air quality data from fixed-site, population-oriented monitors, the appropriate application of these functions in a risk assessment similarly requires the use of ambient air quality data at fixed-site, ambient monitors. The general O_3 health risk model combines information about O_3 air quality for specific urban areas with C-R functions derived from epidemiological studies and baseline health incidence data for specific health endpoints and population estimates to derive estimates of the incidence of specified health effects attributable to ambient O_3 concentrations during the period examined. Although the O_3 season varies somewhat from one location to another, in most locations it coincides roughly with spring and summer. To allow comparisons across locations, and because O_3 effects observed in epidemiological studies have been more clearly and consistently shown for warm season analyses, all analyses for this portion of the risk assessment were carried out for the same time period, April through September. The analyses are conducted for "as is" air quality and for air quality simulated to reflect just meeting the current O_3 ambient standard, as well as air quality simulated to reflect just meeting alternative O_3 ambient standards. Because O_3 concentrations varied substantially over the 3-year period from 2002 through 2004, separate analyses were carried out using air quality data from 2002, in which O_3 concentrations were relatively higher in most locations for this 3-year period, and air quality data from 2004, in which O_3 concentrations were relatively lower in most locations for this 3-year period, to provide generally upper- and lower-end cases within this 3-year period. Two of the 12 urban areas, Houston and Los Angeles, had similar or higher O_3 concentrations in 2004 than in 2002. In addition to the 2002 and 2004 analyses, a more limited set of analyses, focusing only on mortality in a subset of five urban areas (Atlanta, Chicago, Houston, Los Angeles, and New York), was carried out using air quality data from 2003. The major components of the portion of the health risk assessment based on data from epidemiological studies are illustrated in Figure 4-1.

In the first part of the epidemiology-based portion of the risk assessment, we estimated health effects incidence associated with "as is" O_3 levels. In the second part, we estimated the reduced health effects incidence associated with those O_3 concentrations that would result if the current and alternative O_3 standards were just met in the assessment locations. In both parts, we considered only the incidence of health effects associated with O_3 concentrations in excess of estimated PRB O_3 levels.

Both parts of the epidemiology-based portion of the risk assessment may be viewed as assessing the change in incidence of the health effect associated with a change in O_3 concentrations from some upper levels to specified (lower) levels. The important operational difference between the two parts is in the upper O_3 levels. In the first part, the upper O_3 levels are "as is" concentrations. In contrast, the upper O_3 levels in the second part are the estimated O_3 levels that would occur when the current 8-hour daily maximum O_3 standard is just met in the assessment locations or when one of several alternative 8-hour daily maximum O_3 standards is just met in these locations. The second part therefore requires that a method be developed to simulate just meeting the current or alternative standards. This method is described in Chapter 4 of the Staff Paper and in Rizzo (2005, 2006).

Figure 4-1. Major Components of Ozone Health Risk Assessment Based on Epidemiology Studies



To estimate the change in incidence of a given health effect resulting from a change in ambient O_3 concentrations from "as is" levels to PRB levels, or from O_3 concentrations that just meet the current or an alternative standard to PRB levels, in an assessment location, the following analysis inputs are necessary:

- **Air quality information** including: (1) "as is" air quality data for O_3 from ambient monitors in the assessment location, (2) "as is" concentrations adjusted to reflect patterns of air quality estimated to occur when the area just meets the specified standard, and (3) estimates of PRB O_3 concentrations appropriate to this location. (These air quality inputs are discussed in more detail in Chapter 2 of this report and in Chapters 2 and 4 of the Staff Paper.

- **Concentration-response function(s)** which provide an estimate of the relationship between the health endpoint of interest and O_3 concentrations (preferably derived in the assessment location, although functions estimated in other locations can be used at the cost of increased uncertainty -- see Section 4.1.9.1.3).

- **Baseline health effects incidence rate and population**. The baseline incidence rate provides an estimate of the incidence rate (number of cases of the health effect per O_3 season, usually per 10,000 or 100,000 population) in the assessment location corresponding to "as is" O_3 levels in that location. To derive the total baseline incidence per O_3 season, the baseline incidence rate must be multiplied by the corresponding population number (e.g., if the baseline incidence rate is number of cases per O_3 season per 100,000 population, it must be multiplied by the number of 100,000s in the population). (Section 4.1.8 summarizes considerations related to the baseline incidence rate and population data inputs to the risk assessment).

These inputs are combined to estimate health effect incidence changes associated with specified changes in O_3 levels. Although some epidemiological studies have estimated linear or logistic C-R functions, by far the most common form is the exponential (or log-linear) form:

$$y = Be^{\beta x}, \tag{4-1}$$

where x is the ambient O_3 level, y is the incidence of the health endpoint of interest at O_3 level x, β is the coefficient of ambient O_3 concentration (describing the extent of change in y with a unit change in x), and B is the incidence at x=0, i.e., when there is no ambient O_3. The relationship between a specified ambient O_3 level, x_0, for example, and the incidence of a given health endpoint associated with that level (denoted as y_0) is then

$$y_0 = Be^{\beta x_0}. \tag{4-2}$$

Because the log-linear form of C-R function (equation (4-1)) is by far the most common form, we use this form to illustrate the "health impact function" used in this portion of the risk assessment.[6]

If we let x_0 denote the baseline (upper) O_3 level, and x_1 denote the lower O_3 level, and y_0 and y_1 denote the corresponding incidences of the health effect, we can derive the following relationship between the change in x, $\Delta x = (x_0 - x_1)$, and the corresponding change in y, Δy, from equation (4-1)[7]:

$$\Delta y = (y_0 - y_1) = y_0[1 - e^{-\beta\Delta x}]. \quad (4\text{-}3)$$

Alternatively, the difference in health effects incidence can be calculated indirectly using relative risk. Relative risk (RR) is a measure commonly used by epidemiologists to characterize the comparative health effects associated with a particular air quality comparison. The risk of mortality at ambient O_3 level x_0 relative to the risk of mortality at ambient O_3 level x_1, for example, may be characterized by the ratio of the two mortality rates: the mortality rate among individuals when the ambient O_3 level is x_0 and the mortality rate among (otherwise identical) individuals when the ambient O_3 level is x_1. This is the RR for mortality associated with the difference between the two ambient O_3 levels, x_0 and x_1. Given a C-R function of the form shown in equation (4-1) and a particular difference in ambient O_3 levels, Δx, the RR associated with that difference in ambient O_3, denoted as $RR_{\Delta x}$, is equal to $e^{\beta\Delta x}$. The difference in health effects incidence, Δy, corresponding to a given difference in ambient O_3 levels, Δx, can then be calculated based on this $RR_{\Delta x}$ as

$$\Delta y = (y_0 - y_1) = y_0[1 - (1/RR_{\Delta x})]. \quad (4\text{-}4)$$

Equations (4-3) and (4-4) are simply alternative ways of expressing the relationship between a given difference in ambient O_3 levels, $\Delta x > 0$, and the corresponding difference in health effects incidence, Δy. These health impact equations are the key equations that combine air quality information, C-R function information, and baseline health effects incidence information to estimate ambient O_3 health risk.

4.1.2 Air quality considerations

Air quality considerations are discussed in detail in Chapter 2 of this report and Chapters 2 and 4 of the Staff Paper and in Rizzo (2005, 2006). Here we describe those air quality considerations that are directly relevant to the estimation of health risks in the epidemiology-based portion of the risk assessment.

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[6] The derivations of health impact functions from concentration-response functions for all three functional forms found in the epidemiological literature – the log-linear, the linear and the logistic – are given in section B.2 of Appendix B.

[7] If $\Delta x < 0$ – i.e., if $\Delta x = (x_1 - x_0)$ – then the relationship between Δx and Δy can be shown to be $\Delta y = (y_1 - y_0) = y_0[e^{\beta\Delta x} - 1]$. If $\Delta x < 0$, Δy will similarly be negative. However, the *magnitude* of Δy will be the same whether $\Delta x > 0$ or $\Delta x < 0$ – i.e., the absolute value of Δy does not depend on which equation is used.

In the first part of the epidemiology-based portion of the risk assessment, we estimated the change in health effect incidence, Δy, associated with a change in O_3 concentrations from current ("as is") levels of O_3 to PRB levels. In the second part, we estimated the change in health effect incidence associated with a change in O_3 concentrations from the levels simulated to just meet a standard (i.e., the current 8-hour daily maximum standard as well as each of several alternative 8-hour daily maximum standards) to PRB levels.

To estimate the change in incidence of a health effect associated with a change in O_3 concentrations from "as is" levels to PRB levels in an assessment location, we need two time series of O_3 concentrations for that location: (1) hourly "as is" O_3 concentrations, and (2) hourly PRB O_3 concentrations. In order to be consistent with the approach generally used in the epidemiological studies that estimated O_3 C-R functions, the (spatial) average ambient O_3 concentration on each hour for which measured data are available is deemed most appropriate for the risk assessment. Consistent with the approach used in the recently completed PM risk assessment (see EPA, 2005c, Chapter 4, and Abt Associates 2005), a composite monitor data set was created for each assessment location. The concentration at the composite monitor in a given hour on a given day is simply the average of the monitor-specific concentrations for that hour on that day.

Several different exposure metrics, the 24-hour average, the daily 8-hour maximum, and the daily 1-hour maximum, have been used in epidemiological O_3 studies. We therefore calculated daily changes at the composite monitor in the O_3 exposure metric appropriate to a given C-R function. For example, if a C-R function related daily mortality to daily 1-hour maximum O_3 concentrations, we calculated the daily changes in 1-hour maximum O_3 concentrations at the composite monitor. In the first part of the epidemiology-based risk assessment, in which we estimated risks associated with the recent levels of O_3 ("as is" levels) above PRB levels, this required the following steps (we use the 1-hr daily maximum as an example in the discussion below):

- Using the monitor-specific input streams of hourly "as is" O_3 concentrations, calculate a stream of hourly "as is" O_3 concentrations at the composite monitor. The "as is" O_3 concentration at the composite monitor for a given hour on a given day is the average of the monitor-specific "as is" O_3 concentrations for that hour on that day.
- Using the stream of "as is" hourly O_3 concentrations at the composite monitor, just created, calculate the 1-hour maximum "as is" O_3 concentration for each day at the composite monitor.
- Using the monitor-specific input streams of hourly PRB O_3 concentrations, calculate a stream of hourly PRB O_3 concentrations at the composite monitor.
- Using the stream of PRB hourly O_3 concentrations at the composite monitor, just created, calculate the 1-hour maximum PRB O_3 concentration for each day at the composite monitor.

- For each day, calculate Δx = (the 1-hour maximum "as is" O_3 concentration for that day at the composite monitor) - (the 1-hour maximum PRB O_3 concentration for that day at the composite monitor).[8]

The calculations for the second part of the epidemiology-based risk assessment, in which we estimated risks associated with estimated O_3 levels that just meet the current and alternative 8-hr standards above PRB levels were done analogously, using the monitor-specific series of adjusted hourly concentrations rather than the monitor-specific series of "as is" hourly concentrations. Similarly, calculations for C-R functions that used a different exposure metric (e.g., the 24-hour average) were done analogously, using the exposure metric appropriate to the C-R function.

4.1.3 Selection of health endpoints

EPA staff has carefully reviewed the epidemiological evidence evaluated in Chapter 7 and in Chapter 7 Annex as well as in Appendix 8A of the O_3 CD. Tables 8A-1 through 8A-5 in Appendix 8A of the CD summarize the available U.S. and Canadian studies reporting effects of acute (short-term) O_3 exposures for various health effect categories. Given the substantial number of health endpoints and studies addressing O_3 effects, we included in this quantitative O_3 risk assessment only the better- understood (in terms of health consequences) health endpoint categories for which the weight of the evidence supports the inference of a likely causal relationship between O_3 and the effect category. In addition, we included only those categories for which there are studies that satisfy the study selection criteria discussed below.

Based on its review of the evidence evaluated in the O_3 CD, EPA staff included in the portion of the O_3 risk assessment based on epidemiology studies the following broad categories of health endpoints associated with short-term exposures:

- premature total, respiratory, and cardiorespiratory mortality;
- hospital admissions for respiratory illnesses; and
- asthmatic symptoms in moderate/severe asthmatic children.

4.1.4 Selection of urban areas

Several objectives were considered in selecting potential urban areas for which to conduct the epidemiology-based O_3 risk assessment. An urban area was considered for inclusion only if it satisfied the following criteria:

- It has sufficient air quality data for the 3-year period (2002-2004).
- It is the same as or close to the location where at least one C-R function for one of the recommended health endpoints (see above) has been estimated by a study that satisfies the study selection criteria (see below).

[8] Note that the maximum-concentration hour for a given day in the "as is" series is not necessarily the same hour as the maximum-concentration hour for that day in the PRB series.

- For the hospital admission categories, relatively recent location-specific baseline incidence data, specific to International Classification of Disease (ICD) codes, or an equivalent illness classification system, are available.[9]

Because baseline mortality incidence data are available at the county level, this is not a constraint in the selection of urban areas for the O_3 risk assessment. Data on hospital admissions for recent years, however, specific to ICD codes, are available in some cities but not others. The availability of this type of incidence data was therefore a consideration in the selection of urban areas to include in the analysis.

In addition, we took into account the following considerations in selecting from among those urban locations that satisfied the above selection criteria:

- Locations with more health endpoints were preferred to those with fewer.
- The overall set of urban locations should represent a range of geographic areas and population demographics among those areas not meeting the current O_3 8-hour daily maximum standard within the U.S.

Based on the selection criteria and additional considerations listed above, we included the following urban areas in our assessment of risk based on epidemiological studies:

- Atlanta
- Boston
- Chicago
- Cleveland
- Detroit
- Houston
- Los Angeles
- New York City
- Philadelphia
- Sacramento
- St. Louis
- Washington, D.C.

4.1.5 Selection of epidemiological studies

As discussed above, we included in the O_3 risk assessment only the better-understood health effects for which the weight of the evidence supports a likely causal inference. Thus, in cases where the majority of the available studies did not report a statistically significant relationship, the effect endpoint was not included. Once it had been determined that a health endpoint would be included in the analysis, however, inclusion of a study on that health endpoint was not based on statistical significance. That is, consistent with the approach taken in the

[9] The absence of hospital admissions baseline incidence data does not necessarily mean that we cannot use an urban area in the risk assessment, only that we cannot use it for the hospital admissions endpoint.

particulate matter (PM) risk assessment (see EPA, 2005c, Chapter 4, and Abt Associates, 2005), no credible study on an included health endpoint was excluded from the analysis on the basis of lack of statistical significance.

We applied the following selection criteria for any study that estimated one or more O_3 C-R functions for a selected health endpoint in an urban location to be used for the O_3 risk assessment:

- It is a published, peer-reviewed study that has been evaluated in the O_3 CD and judged adequate by EPA staff for purposes of inclusion in this risk assessment based on that evaluation.
- It directly measured, rather than estimated, O_3 on a reasonable proportion of the days in the study.
- It either did not rely on Generalized Additive Models (GAMs) using the S-Plus software to estimate C-R functions or has appropriately re-estimated these functions using revised methods.[10]
- For studies of mortality associated with short-term exposure to O_3, the study reported results for the O_3 season in the location in which the study was conducted.[11]

4.1.6 A summary of selected health endpoints, urban areas and studies

Based on applying the criteria and considerations discussed above, the health endpoints, urban locations, and epidemiology studies that were included in the O_3 risk assessment are given in Table 4-1.

Table 4-1. Locations and Health Endpoints Included in the O_3 Risk Assessment Based on Epidemiological Studies*

Urban Area	Premature Mortality	Hospital Admissions for Respiratory Illnesses	Asthmatic Symptoms in Children
Atlanta	Bell et al. (2004) Bell et al. (2004) – 95 cities Huang et al. (2004)** Huang et al. (2004) – 19 cities**		
Boston	Bell et al. (2004) – 95 cities		Gent et al. (2003)

[10] The GAM S-Plus problem was discovered prior to the recent final PM risk assessment carried out as part of the PM NAAQS review. It is discussed in the PM Criteria Document (EPA, 2004), PM Staff Paper (EPA, 2005c), and PM Health Risk Assessment Technical Support Document (Abt Associates, 2005).

[11] In most locations, the O_3 season is generally the warm season; in Houston, Los Angeles, and Sacramento, however, the O_3 season however, the O_3 season is all year.

Urban Area	Premature Mortality	Hospital Admissions for Respiratory Illnesses	Asthmatic Symptoms in Children
Chicago	Bell et al. (2004) – 95 cities Huang et al. (2004) Huang et al. (2004) – 19 cities Schwartz (2004) Schwartz (2004) – 14 cities		
Cleveland	Bell et al. (2004) Bell et al. (2004) – 95 cities Huang et al. (2004) Huang et al. (2004) – 19 cities	Schwartz et al. (1996)	
Detroit	Bell et al. (2004) Bell et al. (2004) – 95 cities Huang et al. (2004) Huang et al. (2004) – 19 cities Schwartz (2004) Schwartz (2004) – 14 cities Ito (2003)	Ito (2003)	
Houston	Bell et al. (2004) Bell et al. (2004) – 95 cities Huang et al. (2004) Huang et al. (2004) – 19 cities Schwartz (2004) Schwartz (2004) – 14 cities		
Los Angeles	Bell et al. (2004) Bell et al. (2004) – 95 cities Huang et al. (2004) Huang et al. (2004) – 19 cities	Linn et al. (2000)	
New York	Bell et al. (2004) – 95 cities Huang et al. (2004) Huang et al. (2004) – 19 cities	Thurston et al. (1992)	
Philadelphia	Bell et al. (2004) – 95 cities Huang et al. (2004) Huang et al. (2004) – 19 cities Moolgavkar et al. (1995)		
Sacramento	Bell et al. (2004) Bell et al. (2004) – 95 cities		
St. Louis	Bell et al. (2004) Bell et al. (2004) – 95 cities		
Washington, D.C.	Bell et al. (2004) – 95 cities		

*Studies listed for a given assessment location reported a C-R function specifically for that location unless otherwise specified. A study reporting a multi-city C-R function is listed for a given assessment location only if that location is included among the cities used to estimate the multi-city C-R function.
**This study estimated C-R functions for cardiorespiratory mortality.

4.1.7 Selection of concentration-response functions

Studies often report more than one estimated C-R function for the same location and health endpoint. Sometimes models including different sets of co-pollutants are estimated in a study; sometimes different lags are estimated. In some cases, two or more different studies estimated a C-R function for O_3 and the same health endpoint in the same location (this is the case, for example, with O_3 and mortality associated with short-term exposures). For some health endpoints, there are studies that estimated multi-city O_3 C-R functions, while other studies estimated single-city functions.

All else being equal, a C-R function estimated in the assessment location is preferable to a function estimated elsewhere, since it avoids uncertainties related to potential differences due to geographic location. That is why the urban areas selected for the epidemiological studies-based O_3 risk assessment are those locations in which C-R functions have been estimated. There are several advantages, however, to using estimates from multi-city studies versus studies carried out in single cities. Multi-city studies are applicable to a variety of settings, since they estimate a central tendency across multiple locations. When they are estimating a single C-R function based on several cities, multi-city studies also tend to have more statistical power and provide effect estimates with relatively greater precision than single city studies due to larger sample sizes, reducing the uncertainty around the estimated coefficient. In addition, because selection of cities is done *a priori* based on criteria such as population size, multi-city studies are less subject to publication bias than single-city studies. Because single-city and multi-city studies have different advantages, if a single-city C-R function has been estimated in a risk assessment location and a multi-city study that includes that location is also available for the same health endpoint, we used both functions for that location in the risk assessment.

Some O_3 epidemiological studies estimated C-R functions in which O_3 was the only pollutant entered into the health effects model (i.e., single pollutant models) as well as other C-R functions in which O_3 and one or more co-pollutants (e.g., PM, nitrogen dioxide, sulfur dioxide, carbon monoxide) were entered into the health effects model (i.e., multi-pollutant models). To the extent that any of the co-pollutants present in the ambient air may have contributed to the health effects attributed to O_3 in single pollutant models, risks attributed to O_3 might be overestimated where C-R functions are based on single pollutant models. However, if co-pollutants are highly correlated with O_3, their inclusion in an O_3 health effects model can lead to misleading conclusions in identifying a specific causal pollutant. When collinearity exists, inclusion of multiple pollutants in models often produces unstable and statistically insignificant effect estimates for both O_3 and the co-pollutants. Given that single and multi-pollutant models each have both potential advantages and disadvantages, with neither type clearly preferable over the other in all cases, we report risk estimates based on both single- and multi-pollutant models where both are available.

Many daily time-series epidemiological studies estimated C-R functions in which the O_3-related incidence on a given day depends only on same-day O_3 concentration or previous-day O_3 concentration (or some variant of those, such as a two-day average concentration). Such models necessarily assume that the longer pattern of O_3 levels preceding the O_3 concentration on a given day does not affect incidence of the health effect on that day. To the extent that an O_3-related health effect on a given day is affected by O_3 concentrations over a longer period of time, then these models would be mis-specified, and this mis-specification would affect the predictions of daily incidence based on the model.

A few recent studies (e.g., Bell et al., 2004; Huang et al., 2004) have estimated distributed lag models, in which health effect incidence is a function of O_3 concentrations on several days – that is, the incidence of the health endpoint on day t is a function of the O_3 concentration on day t, day (t-1), day (t-2), and so forth. Such models can be reconfigured so that the sum of the coefficients of the different O_3 lags in the model can be used to predict the changes in incidence on several days. For example, corresponding to a change in O_3 on day t in a distributed lag model with 0-day, 1-day, and 2-day lags considered, the sum of the coefficients of the 0-day, 1-day, and 2-day lagged O_3 concentrations can be used to predict the sum of incidence changes on days t, (t+1) and (t+2). This is explained more fully in Appendix G.

The extent to which time-series studies using single-day O_3 concentrations may underestimate the relationship between short-term O_3 exposure and mortality is unknown; however, there is some evidence, based on analyses of PM_{10} data, that mortality on a given day may be influenced by prior PM exposures up to more than a month before the date of death (Schwartz, 2000b). The extent to which short-term exposure studies (including those that consider distributed lags) may not capture the possible impact of long-term exposures to O_3 is similarly not known. Currently, there is insufficient information to adequately adjust for the potential impact of longer-term exposure on mortality associated with O_3 exposures, if any, and this uncertainty should be kept in mind as one considers the results from the short-term exposure O_3 risk assessment.

Epidemiological studies sometimes present several C-R functions, each incorporating a different lag structure. The question of lags and the problems of correctly specifying the lag structure in a model have been discussed extensively [see, for example, the PM CD (EPA, 2004, section 8.4.4); the PM Staff Paper (EPA, 2005c, sections 3.5.5.2 and 4.2.6.3); the O_3 CD (EPA, 2006a, section 7.1.3.3); and Schwartz, 2000)]. The O_3 CD notes that "analyzing a large number of lags and simply choosing the largest and most significant results may bias the air pollution risk estimates away from the null." (EPA, 2006a, section 7.1.3.3). On the other hand, there is recent evidence (Schwartz, 2000) that the relationship between PM and health effects may best be described by a distributed lag (i.e., the incidence of the health effect on day n is influenced by PM concentrations on day n, day n-1, day n-2 and so on). If this is true for O_3 as well, then a model with only a single lag may result in an underestimation of the multiday effect. For mortality associated with short-term exposure to O_3, Bell et al. (2004) and Huang et al. (2004) present the results for distributed lag models that take into account exposure from the previous 6 days. When a study reported several single lag models for a health effect, we based our initial selection of the appropriate lag structure for each health effect on the overall assessment provided in the O_3 CD (EPA, 2006a), based on all studies reporting C-R functions for that health effect.

In summary:

- if a single-city C-R function was estimated in a risk assessment location and a multi-city function which includes that location was also available for the same health endpoint, we used both functions for that location in the risk assessment;

- risk estimates based on both single- and multi-pollutant models were used when both were available;

- distributed lag models were used, when available; when a study reported several single lag models for a health effect, we based our initial selection of the appropriate lag structure for the health effect on the overall assessment in the O_3 CD (EPA, 2006a), based on all studies reporting C-R functions for that health effect.

The locations, health endpoints, studies, and C-R functions included in that portion of the risk assessment based on epidemiological studies are summarized in Table 4-2.

Table 4-2. Summary of Locations, Concentration-Response Functions, Months Included and Counties Included

Risk Assessment Location	Ozone Season in Risk Assessment Location	Study/C-R Function	Health Endpoint	Other Pollutants in Model	Exposure Metric	Months Included for C-R Functions[1]	Counties Included for C-R Functions
Atlanta	March - October	Bell et al. (2004) - 95 cities	non-accidental mortality	none[2]	24-hr avg.	April - October	---
		Bell et al. (2004) - Atlanta	non-accidental mortality	none	24-hr avg.	April - October	Fulton, De Kalb [3]
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	none	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	PM_{10}	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	NO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	SO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	CO	24-hr avg.	June - September	---
		Huang et al. (2004) - Atlanta	cardiorespiratory mortality	none	24-hr avg.	June - September	Fulton, De Kalb
Boston	April - September	Bell et al. (2004) - 95 cities	non-accidental mortality	none	24-hr avg.	April - October	---
		Gent et al. (2003)	Chest tightness in asthmatic children	none	1-hr max.	April - September	CT and Springfield area of MA[4]
		Gent et al. (2003)	Chest tightness in asthmatic children	none	8-hr max.	April - September	CT and Springfield area of MA[4]

Risk Assessment Location	Ozone Season in Risk Assessment Location	Study/C-R Function	Health Endpoint	Other Pollutants in Model	Exposure Metric	Months Included for C-R Functions[1]	Counties Included for C-R Functions
		Gent et al. (2003)	Chest tightness in asthmatic children	$PM_{2.5}$	1-hr max.	April - September	CT and Springfield area of MA[4]
		Gent et al. (2003)	Shortness of breath in asthmatic children	none	1-hr max.	April - September	CT and Springfield area of MA[4]
		Gent et al. (2003)	Shortness of breath in asthmatic children	none	8-hr max.	April - September	CT and Springfield area of MA[4]
		Gent et al. (2003)	Wheeze in asthmatic children	$PM_{2.5}$	1-hr max.	April - September	
Chicago	April - September	Bell et al. (2004) - 95 cities	non-accidental mortality	none	24-hr avg.	April - October	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	none	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	PM_{10}	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	NO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	SO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	CO	24-hr avg.	June - September	---
		Huang et al. (2004) - Chicago	cardiorespiratory mortality	none	24-hr avg.	June - September	Cook

Risk Assessment Location	Ozone Season in Risk Assessment Location	Study/C-R Function	Health Endpoint	Other Pollutants in Model	Exposure Metric	Months Included for C-R Functions[1]	Counties Included for C-R Functions
		Schwartz (2004) - 14-city	non-accidental mortality	none	1-hr max.	May - September	---
		Schwartz (2004) - Chicago	non-accidental mortality	none	1-hr max.	May - September	Cook [5]
Cleveland	April - October	Bell et al. (2004) - 95 cities	non-accidental mortality	none	24-hr avg.	April - October	---
		Bell et al. (2004) - Cleveland	non-accidental mortality	none	24-hr avg.	April - October	Cuyahoga
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	none	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	PM_{10}	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	NO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	SO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	CO	24-hr avg.	June - September	---
		Huang et al. (2004) - Cleveland	cardiorespiratory mortality	none	24-hr avg.	June - September	Cuyahoga
		Schwartz et al. (1996)	hosp. adms. for resp. illness	none	1-hr max.	“warm season”	Cuyahoga
Detroit	April - October	Bell et al. (2004) - 95 cities	non-accidental mortality	none	24-hr avg.	April - October	---
		Bell et al. (2004) - Detroit	non-accidental mortality	none	24-hr avg.	April - October	Wayne

Risk Assessment Location	Ozone Season in Risk Assessment Location	Study/C-R Function	Health Endpoint	Other Pollutants in Model	Exposure Metric	Months Included for C-R Functions[1]	Counties Included for C-R Functions
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	none	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	PM_{10}	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	NO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	SO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	CO	24-hr avg.	June - September	---
		Huang et al. (2004) - Detroit	cardiorespiratory mortality	none	24-hr avg.	June - September	Wayne
		Schwartz (2004) - 14-city	non-accidental mortality	none	1-hr max.	May - September	---
		Schwartz (2004) - Detroit	non-accidental mortality	none	1-hr max.	May - September	Wayne [5]
		Ito (2003) – GAM stringent[6]	non-accidental mortality	none	24-hr avg.	April - October	Wayne
		Ito (2003) – GAM stringent	respiratory mortality	none	24-hr avg.	April - October	Wayne
		Ito (2003) – GAM stringent	unscheduled hospital adms. for pnuemonia	none	24-hr avg.	April - October	Wayne
		Ito (2003) – GAM stringent	unscheduled hospital adms. for COPD	none	24-hr avg.	April - October	Wayne
		Ito (2003) – GLM[7]	unscheduled hospital adms. for pnuemonia	none	24-hr avg.	April - October	Wayne

Risk Assessment Location	Ozone Season in Risk Assessment Location	Study/C-R Function	Health Endpoint	Other Pollutants in Model	Exposure Metric	Months Included for C-R Functions[1]	Counties Included for C-R Functions
		Ito (2003) – GLM	unscheduled hospital adms. For COPD	none	24-hr avg.	April - October	Wayne
Houston	All year	Bell et al. (2004) - 95 cities	non-accidental mortality	none	24-hr avg.	April - October	---
		Bell et al. (2004) - Houston	non-accidental mortality	none	24-hr avg.	All year	Harris
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	none	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	PM_{10}	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	NO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	SO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	CO	24-hr avg.	June - September	---
		Huang et al. (2004) - Houston	cardiorespiratory mortality	none	24-hr avg.	June - September	Harris
		Schwartz (2004) - 14-city	non-accidental mortality	none	1-hr max.	May - September	---
		Schwartz (2004) - Houston	non-accidental mortality	none	1-hr max.	May - September	Harris [5]
Los Angeles	All year	Bell et al. (2004) - 95 cities	non-accidental mortality	none	24-hr avg.	April - October	---
		Bell et al. (2004) - Los Angeles	non-accidental mortality	none	24-hr avg.	All year	Los Angeles

Risk Assessment Location	Ozone Season in Risk Assessment Location	Study/C-R Function	Health Endpoint	Other Pollutants in Model	Exposure Metric	Months Included for C-R Functions[1]	Counties Included for C-R Functions
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	none	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	PM_{10}	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	NO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	SO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	CO	24-hr avg.	June - September	---
		Huang et al. (2004) - Los Angeles	cardiorespiratory mortality	none	24-hr avg.	June - September	Los Angeles
		Linn et al. (2000)	unscheduled hosp. adms. for pulmonary illness	none	24-hr avg.	All year; separately by season	Los Angeles, Riverside, San Bernardino, Orange[8]
New York	April - September	Bell et al. (2004) - 95 cities	non-accidental mortality	none	24-hr avg.	April - October	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	none	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	PM_{10}	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	NO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	SO_2	24-hr avg.	June - September	---

Risk Assessment Location	Ozone Season in Risk Assessment Location	Study/C-R Function	Health Endpoint	Other Pollutants in Model	Exposure Metric	Months Included for C-R Functions[1]	Counties Included for C-R Functions
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	CO	24-hr avg.	June - September	---
		Huang et al. (2004) - New York	cardiorespiratory mortality	none	24-hr avg.	June - September	Bronx, Kings, New York, Richmond, Queens, Westchester
		Thurston et al. (1992)	unscheduled hosp. adms. for respiratory illness	none	1-hr max.	June - August	Bronx, Kings, New York, Richmond, Queens[9]
		Thurston et al. (1992)	unscheduled hosp. adms. for asthma	none	1-hr max.	June - August	Bronx, Kings, New York, Richmond, Queens
Philadelphia	April - October	Bell et al. (2004) - 95 cities	non-accidental mortality	none	24-hr avg.	April - October	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	none	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	PM_{10}	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	NO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	SO_2	24-hr avg.	June - September	---
		Huang et al. (2004) - 19 cities	cardiorespiratory mortality	CO	24-hr avg.	June - September	---

Risk Assessment Location	Ozone Season in Risk Assessment Location	Study/C-R Function	Health Endpoint	Other Pollutants in Model	Exposure Metric	Months Included for C-R Functions[1]	Counties Included for C-R Functions
		Huang et al. (2004) - Phila.	cardiorespiratory mortality	none	24-hr avg.	June - September	Philadelphia
		Moolgavkar et al. (1995)	non-accidental mortality	none	24-hr avg.	June - August	Philadelphia
		Moolgavkar et al. (1995)	non-accidental mortality	TSP, SO_2	24-hr avg.	June - August	Philadelphia
Sacramento	All year	Bell et al. (2004) - 95 cities	non-accidental mortality	none	24-hr avg.	April - October	---
		Bell et al. (2004) - Sacramento	non-accidental mortality	none	24-hr avg.	All year	Sacramento
St. Louis	April - October	Bell et al. (2004) - 95 cities	non-accidental mortality	none	24-hr avg.	April - October	---
		Bell et al. (2004) - St. Louis	non-accidental mortality	none	24-hr avg.		St. Louis city (FIPS 29510)
Washington, D.C.	April - October	Bell et al. (2004) - 95 cities	non-accidental mortality	none	24-hr avg.	April - October	---

[1] The months listed here are the months for which the C-R function was estimated. However, all C-R functions were *applied* in the risk assessment to April – Sept.
[2] The authors report that the results were robust to adjustment for PM_{10}, but do not report the multi-pollutant functions.
[3] Counties used by Bell et al. and Huang et al. are provided at http://www.ihapss.jhsph.edu/data/NMMAPS/documentation/counties.htm and in the June 2000 NMMAPS report (Number 94, Part II) are given in Appendix A, Table A.1.
[4] Specific counties not given.
[5] Personal communication via email (6-12-05) from J. Schwartz.
[6] Generalized Additive Model, using a stringent convergence criterion.
[7] Generalized Linear Model.
[8] Excluding mountain and desert regions of the first three counties.
[9] The paper doesn't list the counties, but notes that, in the case of New York City, surrounding counties were not included; this implies that only the five counties of which New York City is comprised are included in the analysis. This was confirmed in a personal communication from the author (G. Thurston).

4.1.8 Baseline health effects incidence considerations

The most common epidemiologically-based health risk model expresses the reduction in health risk (Δy) associated with a given reduction in O_3 concentrations (Δx) as a percentage of the baseline incidence (y). To accurately assess the impact of changes in O_3 air quality on health risk in the selected urban areas, information on the baseline incidence of health effects (i.e., the incidence under "as is" air quality conditions) in each location is therefore needed.

Incidence rates express the occurrence of a disease or event (e.g., asthma episode, hospital admission, premature death) in a specific period of time, usually per year. Rates are expressed either as a value per population group (e.g., the number of cases in Philadelphia County) or a value per number of people (e.g., number of cases per 10,000 population), and may be age and sex specific. Incidence rates vary among geographic areas due to differences in population characteristics (e.g, age distribution) and factors promoting illness (e.g., smoking, air pollution levels). The sizes of the populations in the assessment locations that are relevant to the risk assessment (i.e., the populations for which the O_3 C-R functions are estimated and to which the baseline incidences refer) are given in Table 4-3.

We obtained estimates of location-specific baseline mortality rates for each of the O_3 risk assessment locations for 2002 from CDC Wonder, an interface for public health data dissemination from the Centers for Disease Control (CDC).[12] Rates were calculated for the specific sets of counties for which C-R functions were estimated. The mortality rates are derived from U.S. death records and U.S. Census Bureau post-censal population estimates, and are reported in Table 4-4. National rates are provided from CDC Wonder for 2002 for comparison. The epidemiological studies used in the risk assessment reported causes of mortality using the ninth revision of the International Classification of Diseases (ICD-9) codes. However, the tenth revision has since come out, and baseline mortality incidence rates for 2002 shown in Table 4-4 use ICD-10 codes. The groupings of ICD-9 codes used in the epidemiological studies and the corresponding ICD-10 codes used to calculate year 2002 baseline incidence rates are given in Table 4-5.

[12] United States Department of Health and Human Services (US DHHS), Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), Compressed Mortality File (CMF) compiled from CMF 1968-1988, Series 20, No. 2A 2000, CMF 1989-1998, Series 20, No. 2E 2003 and CMF 1999-2002, Series 20, No. 2H 2004 on CDC WONDER On-line Database. See http://wonder.cdc.gov/.

Table 4-3. Relevant Population Sizes for O_3 Risk Assessment Locations

City	Counties	Population*			
		Total	Ages ≥30	Ages ≥ 65	Children, Ages ≤ 12, with moderate/severe asthma**
Atlanta	Fulton, DeKalb	1,482,000	---	---	---
Boston	Suffolk	690,000	---	---	
Boston	Essex, Middlesex, Norfolk, Suffolk, Worcester	---	---	---	25,000
Chicago	Cook	5,376,000	---	---	---
Cleveland	Cuyahoga	1,394,000	---	217,000	
Detroit	Wayne	2,061,000	---	---	---
Houston	Harris	3,400,000	---	---	---
Los Angeles	Los Angeles	9,518,000	---	---	---
Los Angeles	Los Angeles, Riverside, San Bernardino, Orange	---	8,378,000	---	---
New York	Bronx, Kings, Queens, New York, Richmond	8,006,000	---	---	---
New York	Bronx, Kings, Queens, New York, Richmond, Westchester	8,930,000	---	---	---
Philadelphia	Philadelphia	1,517,000	---	---	---
Sacramento	Sacramento	1,223,000	---	---	---
St. Louis	St. Louis City	348,000	---	---	---
Washington, D.C.	Washington, D.C.	572,000	---	---	---

* Total population and age-specific population estimates taken from the 2000 U.S. Census. Populations are rounded to the nearest thousand. The urban areas given in this table are those considered in the studies used in the O_3 risk assessment, with the exception of the larger Boston area, which is the CSA for Boston (since the study that estimated a C-R function for respiratory symptoms observed in moderate and severe asthmatic children (ages 0 -12) was conducted in Springfield, MA and CT).

** Population derived as follows: The populations of children <5 and 5 - 12 in the counties listed were multiplied by corresponding percents of children [in each age group] in New England with "current asthma" -- 5.1% and 10.7% for the two age groups, respectively (see "The Burden of Asthma in New England." Asthma Regional Council. March 2006. Table S-2. www.asthmaregionalcouncil.org). These estimated numbers of asthmatic children were then multiplied by the estimated percent of asthmatic children using maintenance medications (40%) (obtained via email 4-05-06 from Jeanne Moorman, CDC) and the results were summed.

Table 4-4. Baseline Mortality Rates (per 100,000 Population) for 2002 for O_3 Risk Assessment Locations*

City	Counties	Type of Mortality (ICD-9 Codes)		
		Non-accidental (<800)	Cardiorespiratory (390-448; 490-496; 487; 480-486; 507)	Respiratory (460-519)
Boston	Suffolk	736	---	---
Philadelphia	Philadelphia	1,057	242	---
New York	Bronx, Kings, Queens, New York, Richmond, Westchester	704	199	---
Washington, D.C.	Washington, D.C.	942	---	---
Atlanta	Fulton, DeKalb	623	131	---
St. Louis	St. Louis City	1147	---	---
Chicago	Cook	781	189	---
Houston	Harris	533	123	---
Los Angeles	Los Angeles	569	155	---
Sacramento	Sacramento	686	---	---
Detroit	Wayne	913	234	76
Cleveland	Cuyahoga	1,058	268	---
National	---	790	196	80

* Data from United States Department of Health and Human Services (US DHHS), Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), Compressed Mortality File (CMF) compiled from CMF 1968-1988, Series 20, No. 2A 2000, CMF 1989-1998, Series 20, No. 2E 2003 and CMF 1999-2002, Series 20, No. 2H 2004 on CDC WONDER On-line Database. See http://wonder.cdc.gov/.

Table 4-5. ICD-9 Codes used in Epidemiological Studies and Corresponding ICD-10 Codes

Causes of Death	ICD-9 Codes	ICD-10 Codes
Non-accidental	<800	A00-R99
Cardiorespiratory	390-448; 490-496; 487; 480-486; 507	G45.0-G45.2, G45.4-G45.9, G54.0, G93.6, G93.8, G93.8, G95.1, I00-I13.9, I20.0-I22.9, I24.1-I64, I67.0-I78.9, M21.9, M30.0-M31.9, R00.1, R00.8, R01.2, J40-J47, J67, J10-J18, J69
Respiratory	460-519	J00-J01.9, J02.8-J02.9, J03.8-J64, J66.0-J94.9, J98.0-J98.9, P28.8, R06.5, R09.1

Hospital admissions studies included in the O_3 risk assessment were conducted in Los Angeles, Cleveland, Detroit, and New York City. Because Thurston et al. (1992) estimated a linear C-R function for New York City, a baseline incidence rate is not required to estimate risks. However, a baseline incidence rate is needed to calculate hospital admissions as a percent of the total (baseline) hospital admissions. Baseline rates of unscheduled hospital admissions for respiratory illnesses and for asthma in New York City (the five boroughs) were calculated from the year 2001 data provided to us by the New York Statewide Planning and Research Cooperative. Baseline rates for Detroit were calculated from hospitalization data for Wayne County for the year 2000, obtained from the Michigan Health and Hospital Association in April 2002. Baseline rates of unscheduled hospital admissions for Los Angeles (Los Angeles, Riverside, San Bernardino, and Orange Counties) were calculated from patient discharge data for 1999, obtained from California's Office of Statewide Health Planning and Development, which also provided records of hospital admissions for the study by Linn et al. (2000). The records provided for the Linn study included both ICD codes and All-Patient-Refined Diagnosis-Related Group (APR-DRG). Because Linn et al. (2000) used diagnosis categories based on the APR-DRG, we made sure that the records we obtained from California's Office of Statewide Health Planning and Development also contained the APR-DRG so that baseline incidence rates could be calculated for hospital admissions categories that matched those used in the Linn study. In addition, we used a flag in the dataset indicating whether an admission was scheduled or unscheduled to ensure that the rates we calculated were for unscheduled admissions only.

Schwartz et al. (1996) report several percentiles as well as the mean of the distribution of daily hospital admissions for respiratory illness (ICD-9 codes 460-519) among people ages 65 and older in Cuyahoga County, which contains Cleveland, Ohio, during the years 1988-90. The mean daily hospital admissions in this age group in Cuyahoga County was 22 in 1988-90. To estimate a daily rate, we obtained the population age 65 and older in Cuyahoga County in 1990[13] and divided the mean daily

[13] 1990 U.S. Census, at: http://factfinder.census.gov/servlet/BasicFactsServlet

hospital admissions for respiratory illness by that population. Baseline incidence rates for hospital admissions used in the risk assessment are shown in Table 4-6.

Table 4-6. Baseline Rates for Hospital Admissions Used in the O_3 Risk Assessment

	Rate per 100,000 Relevant Population			
	Los Angeles[1]	New York[2]	Detroit[3]	Cleveland[4]
Relevant Population:	**Ages 30+**	**All Ages**	**Ages 65+**	**Ages 65+**
Admissions for:				
Pulmonary illness (DRG Codes 75 – 101) – spring	208	---	---	---
Pulmonary illness (DRG Codes 75 – 101) – summer	174	---	---	---
Respiratory illness (ICD codes 466, 480-486, 490, 491, 492, 493)	---	800	---	---
Asthma (ICD code 493)	---	327	---	---
Pneumonia (ICD codes 480-486)	---	---	2,068	---
COPD (ICD codes 490-496)	---	---	1,593	---
Respiratory illness ((ICD codes 460-519)	---	---	---	3,632

[1] Rates of unscheduled hospital admissions were calculated from patient discharge data for 1999, obtained from California's Office of Statewide Health Planning and Development, which also provided records of hospital admissions for the study by Linn et al. (2000).
[2] Rates of unscheduled hospital admissions were calculated from patient discharge data for 2001, obtained from the New York Statewide Planning and Research Cooperative.
[3] Rates were calculated from hospitalization data for Wayne County for the year 2000, obtained from the Michigan Health and Hospital Association in April 2002.
[4] Based on mean daily hospital admissions for ages 65+ for ICD-9 codes 460-519 -- Table 1 in Schwartz et al. (1996).

Baseline rates of symptoms among moderate/severe asthmatic children in the Boston area were estimated by using the median rates of the respiratory symptoms reported in Table 3 of Gent et al. (2003). Each symptom rate, the percentage of days on which the symptom occurred, was calculated for each subject by dividing the number of days of the symptom by the number of days of participation in the study and then multiplying by 100. Median symptom rates among maintenance medication users for wheeze, chest tightness, and shortness of breath were 2.8%, 1.2%, and 1.5% of days, respectively.

4.1.9 Addressing uncertainty and variability

Any estimation of "as is" risk and reduced risks associated with just meeting the current O_3 standards should address both the variability and uncertainty that generally underlie such an analysis. In Section 3.1.5 we discussed the difference between uncertainty and variability, and gave examples of each. The discussion in that section is applicable to the uncertainty and variability to be addressed in the portion of the risk assessment based on epidemiological studies as well.

As with the controlled human exposure studies portion of the risk assessment, the epidemiology-based portion incorporates some of the variability in key inputs to the analysis by using location-specific inputs (e.g., location-specific population data and baseline incidence rates). Although spatial variability in these key inputs across all U.S. locations has not been fully characterized, variability across the selected locations is imbedded in the analysis by using, to the extent possible, inputs specific to each urban area. As in the controlled human exposure studies portion of the risk assessment, temporal variability is more difficult to address, because the risk assessment focuses on some unspecified time in the future. To minimize the degree to which values of inputs to the analysis may be different from the values of those inputs at that unspecified time, we have used recent input data – for example, year 2004 and year 2002 air quality data for all of the urban locations, and recent population data (from the 2000 Census). However, future changes in inputs have not been predicted (e.g., future population levels). To address the impact of variability in O_3 concentrations from one year to another, we carried out the risk assessment for two years separately – 2002 and 2004 – which represent generally upper- and lower-ends of overall O_3 concentrations during the three-year period under consideration.

A number of important sources of uncertainty in the epidemiology-based portion of the risk assessment were addressed where possible. The following are among the major sources of uncertainty:

- Uncertainties related to estimating the C-R functions, including
    - uncertainty about the extent to which the association between O_3 and the health endpoint actually reflects a causal relationship.
    - uncertainty surrounding estimates of O_3 coefficients in C-R functions used in the analyses.
    - uncertainty about the specification of the model (including the shape of the C-R relationship), particularly whether or not there are thresholds below which no response occurs.
    - uncertainty related to the transferability of O_3 C-R functions from study locations and time periods to the locations and time periods selected for the risk assessment. A C-R function in a study location may not provide an accurate representation of the C-R relationship in the analysis location(s) and time periods because of
        - the possible role of associated co-pollutants, which vary from location to location and over time, in influencing O_3 risk,

- variations in the relationship of total ambient exposure (both outdoor and ambient contributions to indoor exposure) to ambient monitoring in different locations (e.g, due to differences in air conditioning use in different regions of the U.S. or changes in usage over time),
- differences in population characteristics (e.g., the proportions of members of sensitive subpopulations) and population behavior patterns across locations or over time in the same location.

- Uncertainties related to the air quality data, including

  - the adjustment procedure that was used to simulate just meeting the current and alternative O_3 standards.

  - uncertainties about estimated background concentrations for each location.

- Uncertainties associated with use of baseline health effects incidence information that is not specific to the analysis locations.

The specific sources of uncertainty in the O_3 risk assessment are described in detail below and are summarized in Table 4-7.

Table 4-7. Key Uncertainties in the Risk Assessment

Uncertainty	Comments
Causality	Statistical association does not prove causation. However, the risk assessment considers only health endpoints for which the overall weight of the evidence supports the assumption that O_3 is likely causally related based on the totality of the health effects evidence.
Empirically estimated C-R relations	Because C-R functions are empirically estimated, there is uncertainty surrounding these estimates. Omitted confounding variables could cause bias in the estimated O_3 coefficients. However, including potential confounding variables that are highly correlated with one another can lead to unstable estimators. Both single- and multi-pollutant models were used where available. In addition, for those studies which provided both single-location and multiple-location estimates, single-location estimates were adjusted, using a Bayesian adjustment procedure, to make more efficient use of the data in the study. This is explained more fully below.
Functional form of C-R relation	Statistical significance of coefficients in an estimated C-R function does not necessarily mean that the mathematical form of the function is the best model of the true C-R relation.
Lag structure of C-R relation	There is some evidence that a distributed lag might be the most appropriate model for O_3 effects associated with short-term exposures. Most studies, however, included only a single lag term in their models. (Two important exceptions are Bell et al. (2004) and Huang et al. (2004).) Omitted lags could cause an underestimation in the predicted incidence associated with a given reduction in O_3 concentrations.
Transferability of C-R relations	C-R functions may not provide an adequate representation of the C-R relationship in times and places other than those in which they were estimated. For example, populations in the analysis locations may have more or fewer members of sensitive subgroups than locations in which functions were derived, which would introduce additional uncertainty related to the use of a given C-R function in the analysis location. However, in the majority of cases, the risk assessment relies on C-R functions estimated from studies conducted in the same location.
Extrapolation of C-R relations beyond the range of observed O_3 data	A C-R relationship estimated by an epidemiological study may not be valid at concentrations outside the range of concentrations observed during the study.

Uncertainty	Comments
Adequacy of ambient O_3 monitors as surrogate for population exposure	Possible differences in how the spatial variation in ambient O_3 levels across each urban area are characterized in the original epidemiological studies compared to the more recent ambient O_3 data used to characterize current air quality would contribute to uncertainty in the health risk estimates.
Adjustment of air quality distributions to simulate just meeting current O_3 standards.	The pattern and extent of daily reductions in O_3 concentrations that would result if the current O_3 standard or alternative O_3 standards were just met is not known. There remains uncertainty about the shape of the air quality distribution of hourly levels upon just meeting an O_3 standard that will depend on future air quality control strategies.
Background O_3 concentrations	The calculation of O_3 risk associated with "as is" air quality and of reduced risks that would result if the current or an alternative standard were just met requires as inputs the background O_3 concentrations in each of the assessment locations. Background concentrations for each location were estimated based on the GEOS-CHEM model simulations for all hours of an "average day" in a given month, for each of the months from April through September. There is uncertainty about these estimated background levels.
Baseline health effects data	Data on baseline incidence is uncertain for a variety of reasons. For example, location- and age-group-specific baseline rates may not be available in all cases. Baseline incidence may change over time for reasons unrelated to O_3.

We handled uncertainties in the risk assessment as follows:

- Limitations and assumptions in estimating risks and reduced risks are clearly stated and explained.

- The uncertainty resulting from the statistical uncertainty associated with the estimate of the O_3 coefficient in a C-R function was characterized either by confidence intervals or by Bayesian credible intervals around the corresponding point estimate of risk. Confidence intervals and credible intervals express the range within which the true risk is likely to fall if the uncertainty surrounding the O_3 coefficient estimate were the only uncertainty in the analysis. They do not, for example, reflect the uncertainty concerning whether the O_3 coefficients in the study location and the assessment location are the same.

- Where possible, we made use of multi-city information to adjust location-specific estimates to make more efficient use of the data (see Section 4.1.9.1.2 below).

Although the O_3 risk assessment considered mortality as well as morbidity health effects, not all health effects that may result from O_3 exposure were included. Only those for which there was sufficient epidemiological evidence from studies that met the study selection criteria (see Section 4.1.5) were included in the risk assessment. Other health effects reported to be associated with exposure to O_3 (e.g., increased doctor's visits, increased emergency department visits) are considered qualitatively in the Staff Paper. Thus, it is important to recognize that the O_3 risk assessment represents only a portion of the health risks associated with O_3 exposures.

In addition, we limited application of a C-R function to only that portion of the population on which estimation of the function was based. For example, unscheduled hospital admissions for pneumonia were examined in Ito (2003) for people ages 65 and older. It is likely that the effect of O_3 on hospital admissions for these illnesses and conditions does not begin at age 65; however, data are not available to estimate the number of cases avoided for younger age groups for the urban area examined by Ito (2003). Therefore, some number of potentially avoided health effects was not captured in this analysis.

4.1.9.1 Concentration-response functions

The C-R function is a key element of the O_3 risk assessment. The quality of the risk assessment depends, in part, on (1) whether the C-R functions used in the risk assessment are good estimates of the relationship between the population health response and ambient O_3 concentration in the study locations, (2) how applicable these functions are to the analysis periods and locations, and (3) the extent to which these relationships apply beyond the range of the O_3 concentrations from which they were estimated. These issues are discussed in the subsections below.

4.1.9.1.1 Uncertainty associated with the appropriate model form

The relationship between a health endpoint and O_3 can be characterized in terms of the form of the function describing the relationship – e.g., linear, log-linear, or logistic – and the value of the O_3 coefficient in that function. Although most epidemiological studies estimated O_3 coefficients in log-linear models, there is still substantial uncertainty about the correct functional form of the relationship between O_3 and various health endpoints – especially at the low end of the range of O_3 values, where data are generally too sparse to discern possible thresholds. While there are likely biological thresholds in individuals for specific health responses, the available epidemiological studies generally have not supported or refuted the existence of thresholds at the population level for O_3 exposures within the range of air quality observed in the studies. A recent study, Bell et al. (2006), specifically addressed the question of thresholds, however, and found no evidence to support the threshold hypothesis. Applying several different statistical approaches specifically designed to address the threshold issue to data on air pollution, weather and mortality for 98 U.S. cities from 1987 to 2000, they found that "even low levels of tropospheric ozone are associated with increased risk of premature mortality" (Bell et al., 2006).

4.1.9.1.2 Uncertainty associated with the estimated concentration-response functions in the study locations

The uncertainty associated with an estimate of the O_3 coefficient in a C-R function reported by a study depends on the sample size and the study design. The O_3 CD has evaluated the substantial body of O_3 epidemiological studies. In general, critical considerations in evaluating the design of an epidemiological study include the adequacy of the measurement of ambient O_3, the adequacy of the health effects incidence data, and the consideration of potentially important health determinants and potential confounders and effect modifiers such as:

- other pollutants;
- exposure to other health risks, such as smoking and occupational exposure; and
- demographic characteristics, including age, sex, socioeconomic status, and access to medical care.

The possible confounding effects of copollutants, including other criteria air pollutants, has often been noted as a problem in air pollutant risk assessments, particularly when these other pollutants are highly correlated with the pollutant of interest. O_3 is generally not highly correlated with other criteria air pollutants, although it may be more highly correlated with fine particles, especially during the summer months. A recent meta-analysis of time-series studies of O_3 and mortality, however, found that the effect of O_3 on mortality was insensitive to whether particulate matter was included in the model (Bell et al., 2005). The issue of possible confounding by copollutants is discussed in more detail in Section 3.4.2.2 of the Staff Paper (EPA, 2007a).

The selection of studies included in the O_3 risk assessment was guided by the evaluations in the O_3 CD. One of the criteria for selecting studies addresses the adequacy of the measurement of ambient O_3. This criterion was that O_3 was directly measured, rather than estimated, on a reasonable proportion of the days in the study. This criterion was designed to minimize error in the estimated O_3 coefficients in the C-R functions used in the risk assessment.

Ambient concentrations at central monitors, however, may not provide a good representation of personal exposures. The O_3 CD (EPA, 2006a) identifies the following three components to exposure measurement error: (1) the use of average population rather than individual exposure data; (2) the difference between average personal ambient exposure and ambient concentrations at central monitoring sites; and (3) the difference between true and measured ambient concentrations (O_3 CD, p. 7-7). The O_3 CD notes that "these components are expected to have different effects, with the first and third likely not causing bias in a particular direction ("nondifferential error") but increasing the standard error, while the second component may result in downward bias, or attenuation of the risk estimate" (O_3 CD, pp. 7-7 to 7-8). While a concentration-response function may understate the effect of personal exposures to O_3 on the incidence of a health effect, however, it will give an unbiased estimate of the effect of ambient concentrations on the incidence of the health effect, if the ambient concentrations at monitoring stations provide an unbiased estimate of the ambient concentrations to which the population is exposed. In this case, if O_3 is actually the causal agent, the understatement of the impact of personal exposures isn't an issue (since EPA regulates ambient concentrations rather than personal exposures). If O_3 is not the causal agent, however, then there is a problem of confounding copollutants or other factors, so that reducing ambient O_3 concentrations might not result in the expected reductions in the health effect. A more comprehensive discussion of exposure measurement is given in Section 3.4.2.1 of EPA's Staff Paper (EPA, 2007a).

To the extent that a study did not address all relevant factors (i.e., all factors that affect the health endpoint), there is uncertainty associated with the C-R function estimated in that study, beyond that reflected in the confidence or credible interval. It may result in either over- or underestimates of risk associated with ambient O_3 concentrations in the location in which the study was carried out. Techniques for addressing the problem of confounding factors and other study design issues have improved over the years, however, and the epidemiological studies currently available for use in the O_3 risk assessment provide a higher level of confidence in study quality than ever before.

When a study is conducted in a single location, the problem of possible confounding co-pollutants may be particularly difficult, if co-pollutants are highly correlated in the study location. Single-pollutant models, which omit co-pollutants, may produce overestimates of the O_3 effect, if some of the effects of other pollutants (omitted from the model) are falsely attributed to O_3. Statistical estimates of an O_3 effect based on a multi-pollutant model can be more uncertain, and even statistically insignificant, if the co-pollutants included in the model are highly correlated with O_3. As a result of these considerations, we report risk estimates based on both single-pollutant and multi-pollutant models, when both are reported by a study.

As noted above, the uncertainty resulting from the statistical uncertainty associated with the estimate of the O_3 coefficient in a C-R function was characterized either by confidence intervals (if the coefficient was estimated using a classical statistical approach) or by Bayesian credible intervals (if the coefficient was estimated using a Bayesian approach) around the corresponding point estimate of risk.

Two studies, Bell et al. (2004) and Huang et al. (2004), reported both multi-location and single-location C-R functions in a variety of locations, using a Bayesian two-stage hierarchical model. In these cases, the single-location estimates can be adjusted to make more efficient use of the data from all locations. The resulting "shrinkage" estimates are so called because they "shrink" the location-specific estimates towards the overall mean estimate (the mean of the posterior distribution of the multi-location C-R function coefficient). The greater the uncertainty about the estimate of the location-specific coefficient relative to the estimate of between-study heterogeneity, the more the location-specific estimate is "pulled in" towards the overall mean estimate. Bell et al. (2004) calculated these shrinkage estimates, which were presented in Figure 2 of that paper. These location-specific shrinkage estimates, and their adjusted standard errors were provided to us by the study authors and were used in the risk assessment.

The location-specific estimates reported in Table 1 of Huang et al. (2004) are not "shrinkage" estimates. However, the study authors provided us with the posterior distribution for the heterogeneity parameter, τ, for their distributed lag model, shown in Figure 4(b) of their paper. Given this posterior distribution, and the original location-specific estimates presented in Table 1 of their paper, we calculated location-specific "shrinkage" estimates using a Bayesian method described in DuMouchel (1994) (see Section B-3 in Appendix B for a complete explanation of the calculation of these "shrinkage" estimates). As with the shrinkage estimates presented in Bell et al. (2004), the resulting Bayesian shrinkage estimates use the data from all of the locations considered in the study more efficiently than do the original location-specific estimates. The calculation of these shrinkage estimates is thus one way to address the relatively large uncertainty surrounding estimates of coefficients in location-specific C-R functions.

Several recent meta-analyses (Bell et al. 2005; Levy et al., 2005; and Ito et al., 2005) have addressed the impact of various factors on estimates of mortality associated with short-term exposures to O_3. We reviewed these meta-analyses for additional information that might be used to assist in characterizing the uncertainties associated with risk estimates for this health outcome. Overall, the meta-analyses helped delineate the sources of heterogeneity in the estimated relationships between mortality and short-term exposure to O_3, the robustness of these estimated relationships to inclusion of PM in the model, the relative importance of 0-day lag among the different lag structures considered, and the indication of publication bias in single-city studies and meta-analyses of such studies. Because of this last issue in particular, while the meta-analyses provided insight into relevant issues, we considered multi-city studies preferable for use in the risk assessment.

4.1.9.1.3 Applicability of concentration-response functions in different locations

As described in Section 4.1.4, risk assessment locations were selected on the basis of where C-R functions have been estimated, to avoid the uncertainties associated with applying a C-R function estimated in one location to another location. However, multi-city C-R functions were also applied to any risk assessment location contained in the set of locations used to estimate the C-R function. The accuracy of the results based on a multi-location C-R function rests in part on how well this multi-location C-R function represents the relationship between ambient O_3 and the given population health response in the individual cities involved in the study.

The relationship between ambient O_3 concentration and the incidence of a given health endpoint in the population (the population health response) depends on (1) the relationship between ambient O_3 concentration and personal exposure to ambient-generated O_3 and (2) the relationship between personal exposure to ambient-generated O_3 and the population health response. Both of these are likely to vary to some degree from one location to another.

The relationship between ambient O_3 concentration and personal exposure to ambient-generated O_3 will depend on patterns of behavior, such as the amount of time spent outdoors, as well as on factors affecting the extent to which ambient-generated O_3 infiltrates into indoor environments. The relationship between personal exposure to ambient-generated O_3 and the population health response will depend on the population exposed.

Exposed populations differ from one location to another in characteristics that are likely to affect their susceptibility to O_3 air pollution. For instance, people with pre-existing conditions such as chronic bronchitis are probably more susceptible to the adverse effects of exposure to O_3, and populations vary from one location to another in the prevalence of specific diseases. Also, some age groups may be more susceptible than others, and population age distributions also vary from one location to another. Closely matching populations observed in studies to the populations of the assessment locations is not possible for many characteristics (for example, smoking status, workplace exposure, socioeconomic status, and the prevalence of highly susceptible subgroups).

Other pollutants may also play a role in either causing or modifying health effects, either independently or in combination with O_3 (see Section 8.1.3.2 in the 2004 PM CD and Section 7.1.3.5 in the O_3 CD). Inter-locational differences in these pollutants could also induce differences in the O_3 C-R relationship between one location and another.

In summary, the C-R relationship is most likely not the same everywhere. Even if the relationship between personal exposure to ambient-generated O_3 and population health response were the same everywhere, the relationship between ambient concentrations and personal exposure to ambient-generated O_3 differs among locations. Similarly, even if the relationship between ambient concentrations and personal exposure to ambient-generated O_3 were the same everywhere, the relationship between personal exposure to ambient-generated O_3 and population health response may differ among locations. In either case, the C-R relationship would differ.

4.1.9.1.4 Extrapolation beyond observed air quality levels

Although a C-R function describes the relationship between ambient O_3 and a given health endpoint for all possible O_3 levels (potentially down to zero), the estimation of a C-R function is based on real ambient O_3 values that are limited to the range of O_3 concentrations in the location in which the study was conducted. Thus, uncertainty in the shape of the estimated C-R function increases considerably outside the range of O_3 concentrations observed in the study.

Because we are interested in the effects of anthropogenic O_3, in this initial analysis, the O_3 risk assessment assumes that the estimated C-R functions adequately represent the true C-R relationship down to PRB O_3 levels in the assessment locations. Because those studies that reported the minimum O_3 levels observed all reported levels below PRB O_3 levels, the problem of extrapolation to levels below those air quality levels observed in a study does not arise.

The C-R relationship may also be less certain towards the upper end of the concentration range being considered in a risk assessment, particularly if the O_3 concentrations in the assessment location exceed the O_3 concentrations observed in the study location. Even though it may be reasonable to model the C-R relationship as log-linear over the ranges of O_3 concentrations typically observed in epidemiological studies, it may not be log-linear over the entire range of O_3 levels at the locations considered in the O_3 risk assessment.

4.1.9.2 The air quality data

4.1.9.2.1 Adequacy of O_3 air quality data

The method of averaging data from monitors across a metropolitan area in the risk assessment is similar to the methods used to characterize ambient air quality in most of the epidemiology studies. Ideally, the measurement of average hourly ambient O_3 concentrations in the study location is unbiased. In this case, unbiased risk predictions in the assessment location depend, in part, on an unbiased measurement of average hourly ambient O_3 concentrations in the assessment location as well. If, however, the measurement of average hourly ambient O_3 concentrations in the study location is biased, unbiased risk predictions in the assessment location are still possible if the measurement of average hourly ambient O_3 concentrations in the assessment location incorporates the same bias as exists in the study location measurements. Because this is not known, however, the errors in the O_3 measurements in the assessment locations are a source of uncertainty in the risk assessment.

O_3 air quality data were not available for all hours of the ozone season in the year chosen for the risk assessment in all of the assessment locations. Missing O_3 concentrations were filled in, as described in section 3.2 of the Exposure Assessment TSD.

The results of the risk assessment are generalizable to other years only to the extent that ambient O_3 levels in the available data are similar to ambient O_3 levels in those locations in the other years. A substantial difference between O_3 levels in the year used in the risk assessment and O_3 levels in the other years could imply a substantial difference in predicted incidences of health effects. For the initial phase of the assessment, we selected two years, 2002 and 2004, in the 2002 – 2004 three-year period. O_3 levels in 2004 in most of the 12 urban areas were somewhat lower than in other recent years, due to both meteorological conditions that were not conducive to O_3 formation and lower emissions of NO_x due to newly implemented regional controls on major power plants in the eastern U.S. O_3 levels in 2002 were generally higher than in either 2003 or 2004 except in Detroit, Houston and Los Angeles. For 5 urban areas (Atlanta, Chicago, Houston, Los Angeles, New York) additional risk estimates were developed based on 2003 air quality data.

4.1.9.2.2 Estimation of PRB O_3 concentrations

The PRB O_3 concentrations that were used in the risk assessment are monthly averaged GEOS-CHEM model predictions, and the measured ambient O_3 concentrations are frequently lower than these PRB values. After assessing the uncertainty of the GEOS-Chem model predictions, the O_3 CD estimates that "the PRB ozone values reported by Fiore et al. (2003a) for afternoon surface air over the United States are likely 10 ppbv too high in the southeast in summer, and accurate within 5 ppbv in other regions and seasons" (O_3 CD, page 3-53). This raises the question of how best to deal with this in our estimation of risk above PRB. We considered two different approaches, described in Appendix F, calculating the bias expected in each case. As described in Appendix F, the relative magnitudes of the expected biases from the two approaches depends on whether we have overestimated or underestimated the monthly average PRB. The frequency with which the measured ambient O_3 concentrations are lower than our estimated PRB values suggests that these monthly PRB averages were overestimated. Fiore et al. (2002a) noted that the GEOS-CHEM model tends to overpredict O_3 concentrations in highly populated coastal areas, lending additional support for this hypothesis in Houston, where the frequency of estimated PRB concentrations above monitored "as is" concentrations was the greatest. On the assumption that monthly PRB averages were overestimated, the lowest-bias method to estimating risk above PRB is to set negative ΔO_3 (= "as is" O_3 concentration – PRB O_3 concentration) to zero. We believe this approach minimizes bias.

4.1.9.2.3 Simulation of reductions in O_3 concentrations to just meet the current or an alternative standard

The pattern of hourly O_3 concentrations that would result if the current O_3 standard or an alternative standard were just met in any of the assessment locations is, of course, not known. This therefore adds uncertainty to estimates of reduced risk when O_3 concentrations just meet a standard.

Although the initial phase of health risk assessment uses air quality data from two years, 2002 and 2004, it simulates just attaining a standard in each year separately, since we are estimating annual reduced health risks. Design values based on the most recent three-year period available are used to determine the amount of adjustment to apply to each of these years. Because O_3 levels in 2004 were, in most locations, the lowest of the three most recent years, applying a design value based on the most recent three-year period available only to O_3 levels in 2004 would result in lower estimates of remaining risk than would be the case if either of the other two years of the three-year period were evaluated in the assessment. Conversely, because O_3 levels in 2002 were, in most locations, the highest of the three most recent years, applying the same design value only to O_3 levels in 2002 would result in higher estimates of remaining risk than would be the case if either of the other two years of the three-year period were evaluated in the assessment. Using both a year of generally higher O_3 levels (2002) and a year of generally lower O_3 levels (2004) provides plausible ranges of estimates of annual remaining risk and reductions in health risks in each location.

4.1.9.3 Baseline health effects incidence rates

Most of the C-R functions used in the O_3 risk assessment are log-linear (see equation 4-1 in Section 4.1.1). Given this functional form, the percent change in incidence of a health effect corresponding to a change in O_3 depends only on the change in O_3 levels (and not the actual value of either the initial or final O_3 concentration). This percent change is multiplied by a baseline incidence, y_0, in order to determine the change in health effects incidence, as shown in equation (4-3) in Section 4.1.1:

$$\Delta y = y_0[1 - e^{-\beta\Delta x}]$$

Predicted changes in incidence therefore depend on the baseline incidence of the health effect.

4.1.9.3.1 Quality of incidence data

County-specific incidence data were available for mortality for all counties. We have also obtained hospital admissions baseline incidence data for all the urban areas for which we have hospital admissions C-R functions for O_3 (Detroit, Los Angeles, and Cleveland). This is clearly preferable to using non-local data, such as national or regional incidence rates. As with any health statistics, however, misclassification of disease, errors in coding, and difficulties in correctly assigning residence location are potential problems. These same potential sources of error are present in most epidemiological studies. In most cases, the reporting institutions and agencies utilize standard forms and codes for reporting, and quality control is monitored.

Data on hospital admissions are actually hospital discharge data rather than admissions data. Because of this, the date associated with a given hospital stay is the date of discharge rather than the date of admissions. Therefore, there may be some hospital admissions in an assessment location that are within the O_3 season that are not included in the baseline incidence rate, if the date of discharge was after the ozone season ended, even though the date of admissions was within the ozone season. Similarly, there may be some hospital admissions that preceded the O_3 season that are included in the baseline incidence rate because the date of discharge was within the ozone season. This is a very minor problem, however, partly because the percentage of such cases is likely to be very small, and partly because the error at the beginning of the O_3 season (i.e., admissions that should not have been included but were) will largely cancel the error at the end of the O_3 season (i.e., admissions that should have been included but were not).

Another minor uncertainty surrounding the hospital admissions baseline incidence rates arises from the fact that these rates are based on the reporting of hospitals within each of the assessment counties. Hospitals report the numbers of ICD code-specific discharges in a given year. If people from outside the county use these hospitals, and/or if residents of the county use hospitals outside the county, these rates will not accurately reflect the numbers of county residents who were admitted to the hospital for specific illnesses during the year, the rates that are desired for the risk assessment. Once again, however, this is likely to be a very minor problem because the health conditions studied tend to be acute events that require immediate hospitalization, rather than planned hospital stays.

Regardless of the data source, if actual incidence rates are higher than the incidence rates used, risks will be underestimated. If actual incidence rates are lower than the incidence rates used, then risks will be overestimated.

Both morbidity and mortality rates change over time for various reasons. One of the most important of these is that population age distributions change over time. The old and the extremely young are more susceptible to many health problems than is the population as a whole. The most recent available data were used in the risk assessment. However, the average age of the population in many locations will increase as post-World War II children age. Consequently, the baseline incidence rates for some endpoints may rise, resulting in an increase in the number of cases attributable to any given level of O_3 pollution. Alternatively, areas which experience rapid in-migration, as is currently occurring in the South and West, may tend to have a decreasing mean population age and corresponding changes in incidence rates and risk. Temporal changes in incidence are relevant to both morbidity and mortality endpoints. However, recent data were used in all cases, so temporal changes are not expected to be a large source of uncertainty.

4.1.9.3.2 Lack of daily health effects incidence rates

Both ambient O_3 levels and the daily health effects incidence rates corresponding to ambient O_3 levels vary somewhat from day to day. Those analyses based on C-R functions estimated by short-term exposure studies calculate daily changes in incidence and sum them over the days of the O_3 season to predict a total change in health effect incidence during the O_3 season (standardized in this analysis to April through September). However, only annual baseline incidence rates are available. Average daily baseline incidence rates, necessary for short-term daily C-R functions, were calculated by dividing the annual rate by the number of days in the year for which the baseline incidence rates were obtained. To the extent that O_3 affects health, however, actual incidence rates would be expected to be somewhat higher than average on days with high O_3 concentrations; using an average daily incidence rate would therefore result in underestimating the changes in incidence on such days. Similarly, actual incidence rates would be expected to be somewhat lower than average on days with low O_3 concentrations; using an average daily incidence rate would therefore result in overestimating the changes in incidence on low O_3 days. Both effects would be expected to be small, however, and should largely cancel one another out.

4.2 Results

The results of the assessment of health risks associated with "as is" O_3 concentrations (representing levels measured in a recent year) over PRB levels are presented in Section 4.2.1. The assessment of health risks associated with 2004 and 2002 "as is" O_3 concentrations over PRB levels for all of the assessment locations are presented in Section 4.2.1.1. The mortality-specific results associated with 2003 "as is" O_3 concentrations are presented, for a subset of five locations (Atlanta, Chicago, Houston, Los Angeles, and New York), in Section 4.2.1.2.

The results of the assessment of the reduced health risks associated with O_3 concentrations that just meet the current 8-hour daily maximum standard are presented in Section 4.2.2. The results for all locations for the current standard and the original set of seven standards, based on 2002 and 2004 air quality data, are presented in Section 4.2.2.1. The results for the five locations listed above for the current standard and five alternative standards, based on 2002, 2003, and 2004 air quality data, are presented in Section 4.2.2.2.

In both portions of the risk assessment, with the exception of respiratory symptoms-days, all estimated incidences were rounded to the nearest whole number, and all estimated incidences per 100,000 relevant population and all percentages were rounded to one decimal place. Estimated incidences of respiratory symptom-days and corresponding incidences per 100,000 relevant population were rounded to the nearest 100. These rounding conventions are not intended to imply confidence in that level of precision, but rather to avoid the confusion that can result when a greater amount of rounding is used (for example, when the central tendency estimate and both the lower and upper bounds of the 95 confidence or credible interval of incidence per 100,000 relevant population are all less than 0.5.)

There is uncertainty surrounding all estimates of incidence associated with "as is" O_3 concentrations in any location. Because we had to simulate the profiles of O_3 concentrations that just meet the current and alternative 8-hour daily maximum O_3 standards in each location, there is additional uncertainty surrounding estimates of the reduced incidence associated with O_3 concentrations that just meet these O_3 standards. We tried to minimize the extent of this uncertainty by avoiding the application of a C-R function estimated in one location to another location as much as possible. As discussed in Section 4.1.9, however, there are other sources of uncertainty. The uncertainty surrounding risk estimates resulting from the statistical uncertainty of the O_3 coefficients in the C-R functions used is characterized by ninety-five percent confidence or credible intervals around estimates of incidence, incidence per 100,000 relevant population, and the percent of total incidence that is O_3-related. In some cases, the lower bound of a confidence interval falls below zero. This does not imply that additional exposure to O_3 has a beneficial effect, but only that the estimated O_3 coefficient in the C-R function was not statistically significantly different from zero. Lack of statistical significance could mean that there is no relationship between O_3 and the health endpoint or it could mean that there wasn't sufficient statistical power to detect a relationship that exists. Conversely, statistical significance does not prove causation. The case for a causal relationship between O_3 and a health endpoint rests on a variety of types of supporting evidence, and overall confidence in such a causal relationship varies substantially across health endpoints that have been associated with ambient O_3, as illustrated in Figure 3-5 of the Staff Paper (EPA, 2007a).

4.2.1 Assessment of the health risks associated with "as is" O_3 concentrations in excess of policy relevant background levels

4.2.1.1 Assessment of the health risks associated with 2004 and 2002 "as is" O_3 concentrations in excess of policy relevant background levels

The results of the assessment of mortality risks associated with "as is" O_3 concentrations (representing levels measured in 2004 and in 2002 for all of the assessment locations are summarized across urban areas in Figures 4-2a and b through 4-8a and b, and in Tables 4-8 and 4-11. Figures 4-2a and b through 4-8a and b show results expressed as percent of total incidence. The corresponding figures showing results expressed as number of cases per 100,000 relevant population are given in Appendix D. Figures 4-2a through 4-8a show results based on year 2004 air quality data; Figures 4-2b through 4-8b show results based on 2002 air quality data. Only one study, Ito (2003) for hospital admissions in Detroit, provided different lag models. The results from these different lag models are shown in Figures 4-6a and b. All results are for health risks associated with short-term exposures to O_3 concentrations in excess of PRB levels from April through September.

Although we carried out the analysis in each of the assessment locations, to reduce the number of tables in this section of the report, we selected one location (New

York City) to include here for illustrative purposes. Tables 4-12 and 4-13 show results in New York for health endpoints associated with short-term exposure to “as is” O_3 concentrations in excess of estimated PRB concentrations for 2004 and 2002 air quality data, respectively. Results for the other locations corresponding to those shown for New York in Tables 4-12 and 4-13 are shown in Appendix D, in Tables D-1 through D-22.

The central tendency estimates in all of the figures and in Tables 4-8 through 4-13 and D-1 through D-22 are based on the O_3 coefficients estimated in the studies, or, in the case of the location-specific estimates from Huang et al. (2004), on “shrinkage” estimates based on the O_3 coefficients estimated in the study (see Section 4.1.9.1.2). The ranges are based either on the 95 percent confidence intervals (CIs) around those estimates (if the coefficients were estimated using classical statistical techniques) or on the 95 percent credible intervals (if the coefficients were estimated using Bayesian statistical techniques).

Figure 4-2. Estimated Annual Percent of (Non-Accidental) Mortality Associated with Short-Term Exposure to O_3 Above Background: Single-Pollutant, Single-City Models (April – September)

Figure 4-2a. Based on 2004 Air Quality

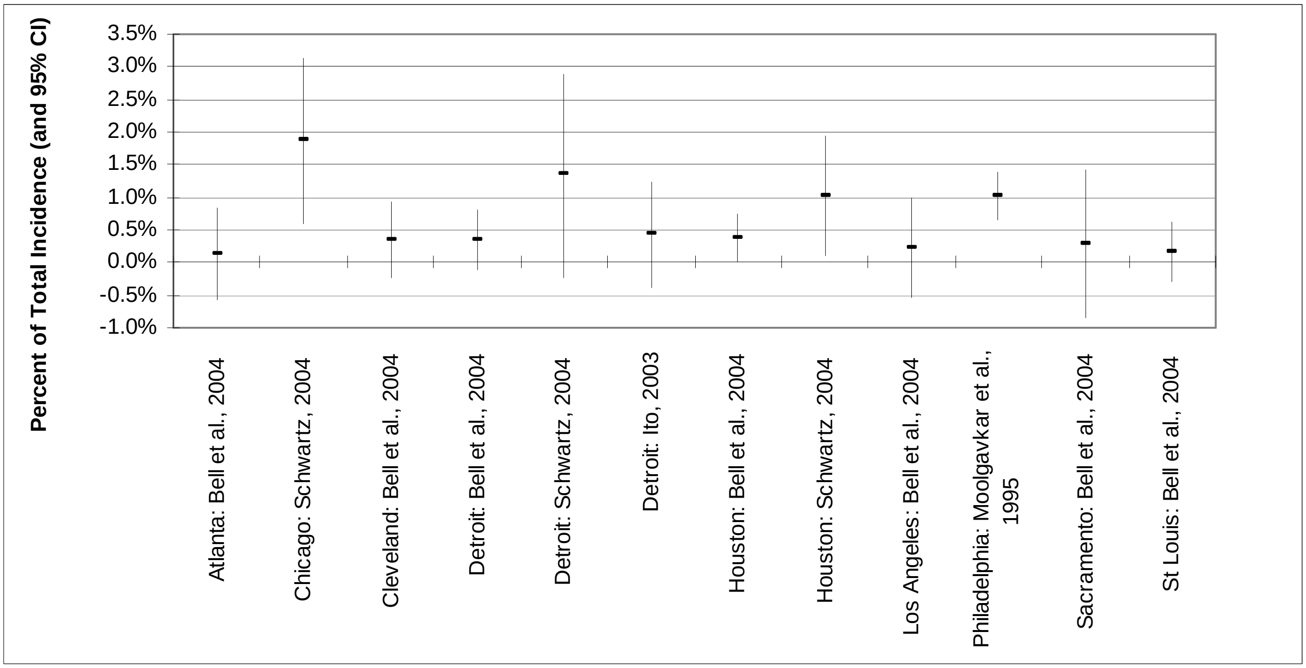


Figure 4-2b. Based on 2002 Air Quality

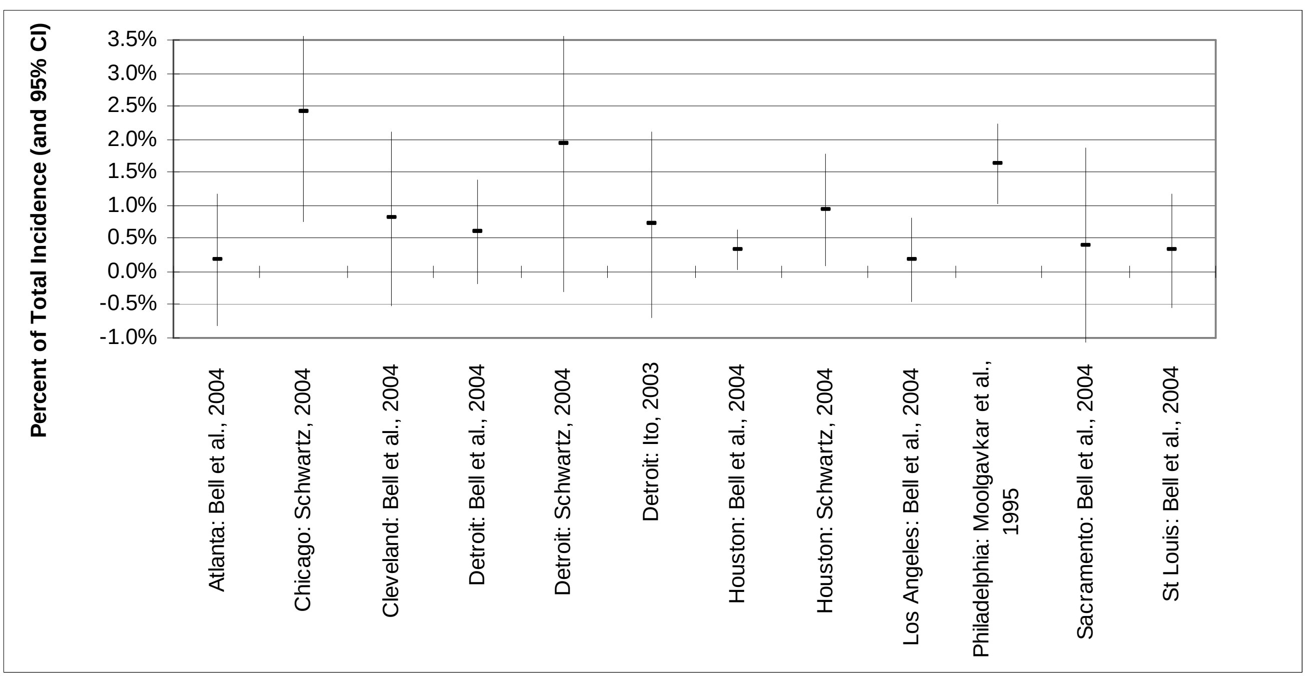


Figure 4-3. Estimated Annual Percent of Cardiorespiratory Mortality Associated with Short-Term Exposure to O_3 Above Background (April – September): Single-Pollutant vs. Multi-Pollutant Models [Huang et al. (2004), additional pollutants, from left to right: none, CO, NO_2, PM_{10}, SO_2]

Figure 4-3a. Based on 2004 Air Quality

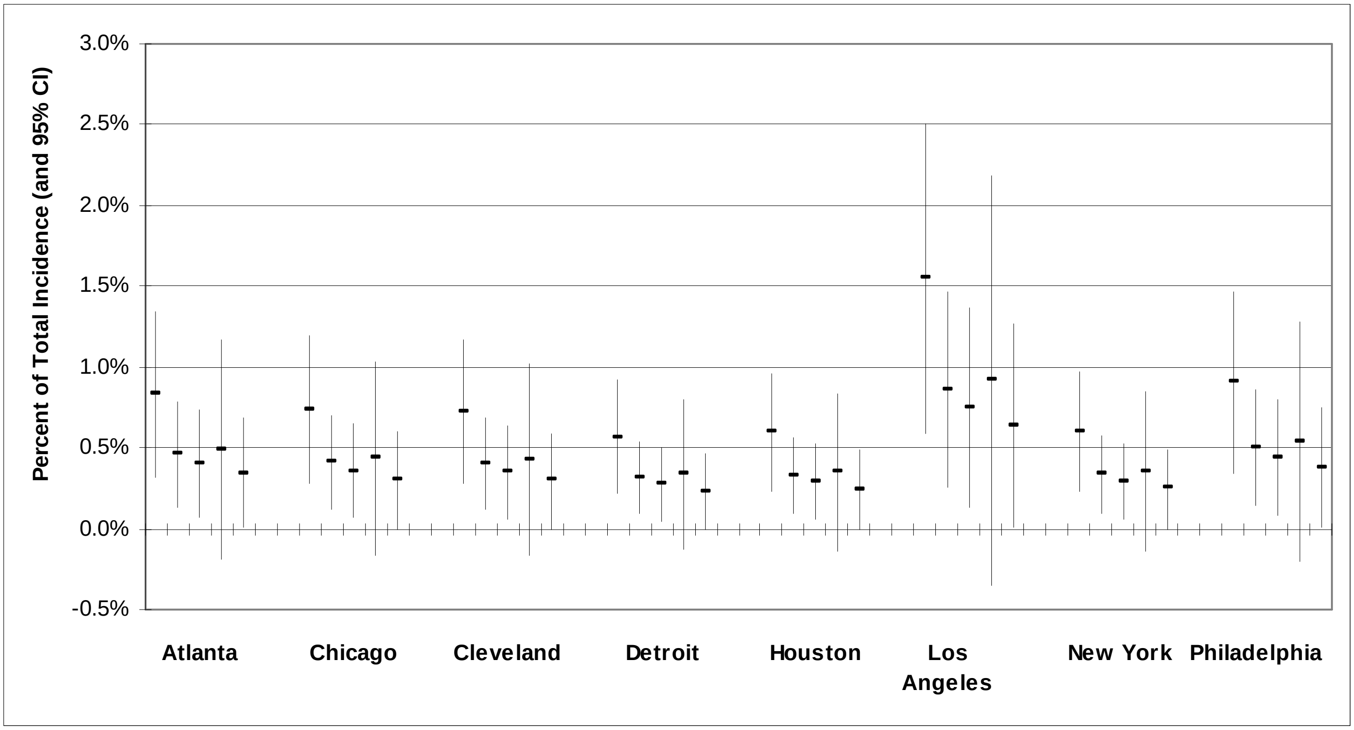


Figure 4-3b. Based on 2002 Air Quality

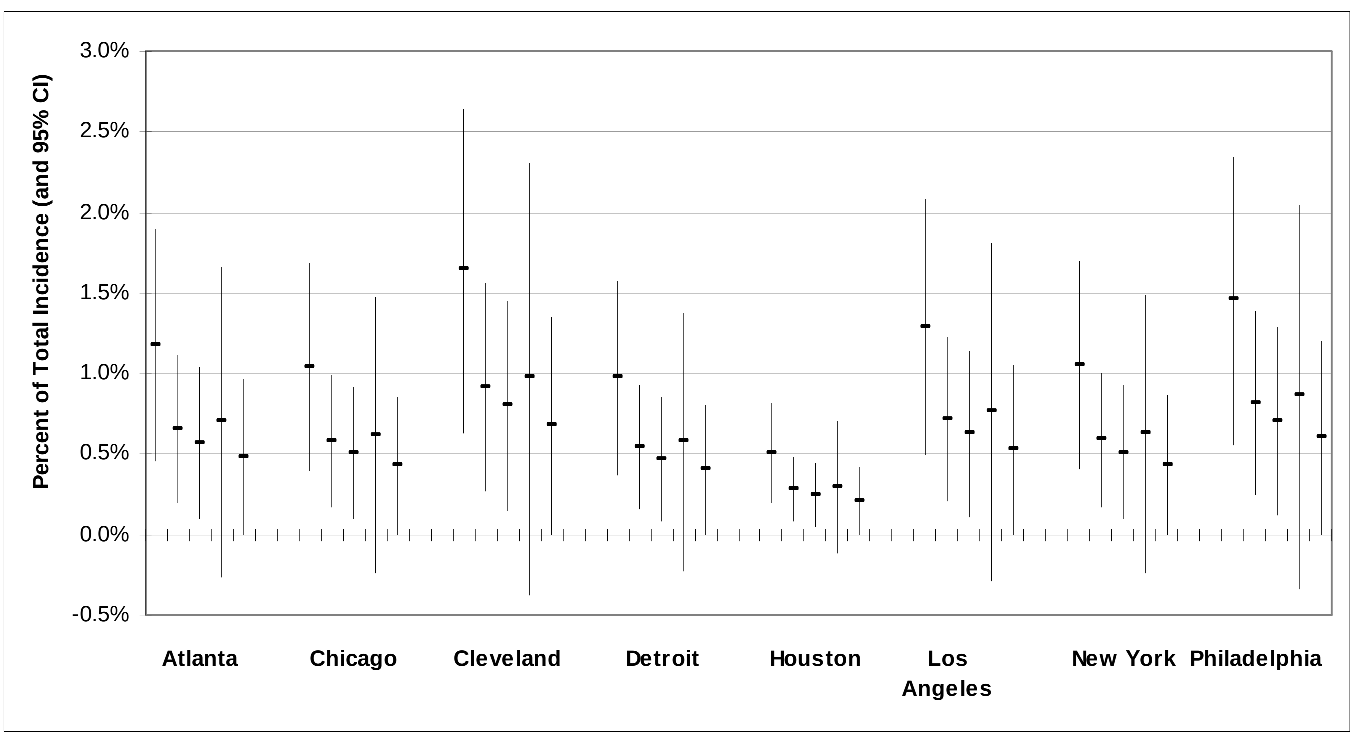


Figure 4-4. Estimated Annual Percent of (Non-Accidental) Mortality Associated with Short-Term Exposure to O_3 Above Background (April – September): Single-City Model (left bar) vs. Multi-City Model (right bar)

Figure 4-4a. Based on 2004 Air Quality

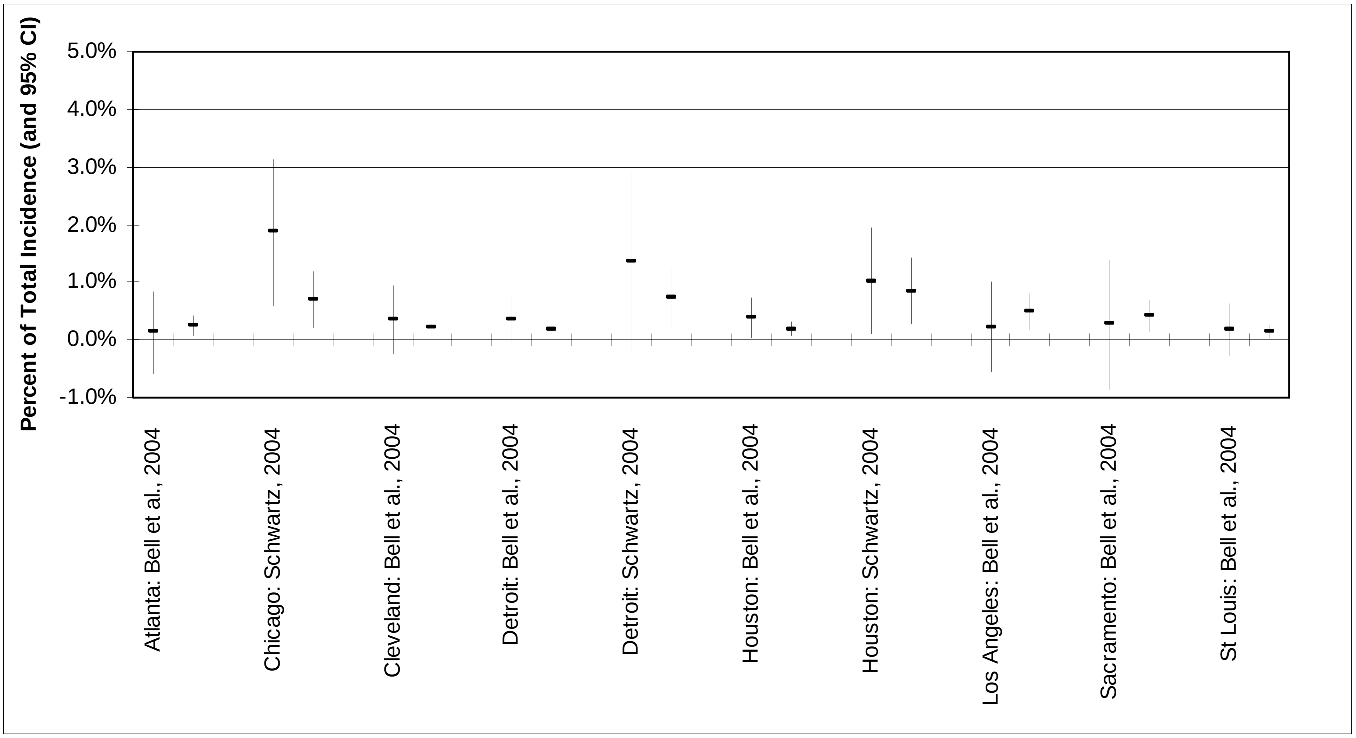


Figure 4-4b. Based on 2002 Air Quality

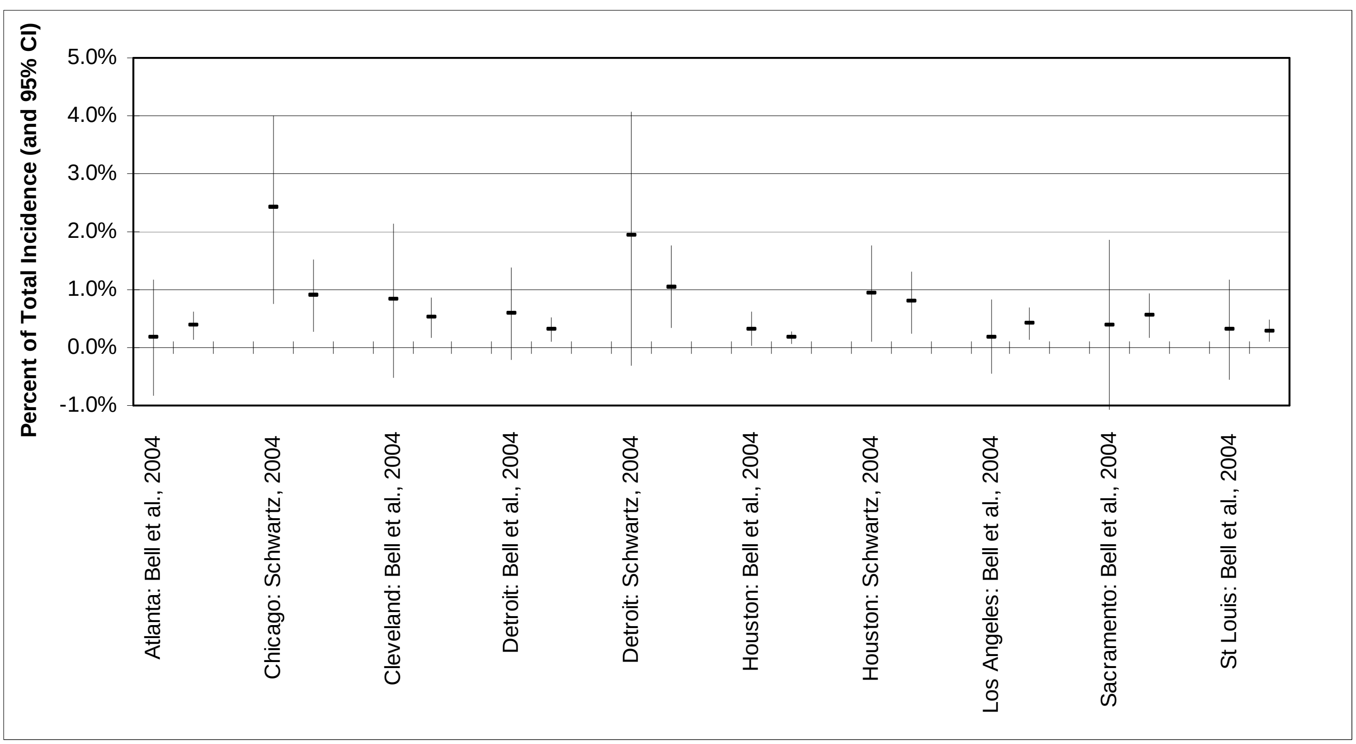


Figure 4-5. Estimated Annual Percent of Cardiorespiratory Mortality Associated with Short-Term Exposure to O_3 Above Background (April – September): Single-City Model (left bar) vs. Multi-City Model (right bar) – Based on Huang et al. (2004)

Figure 4-5a. Based on 2004 Air Quality

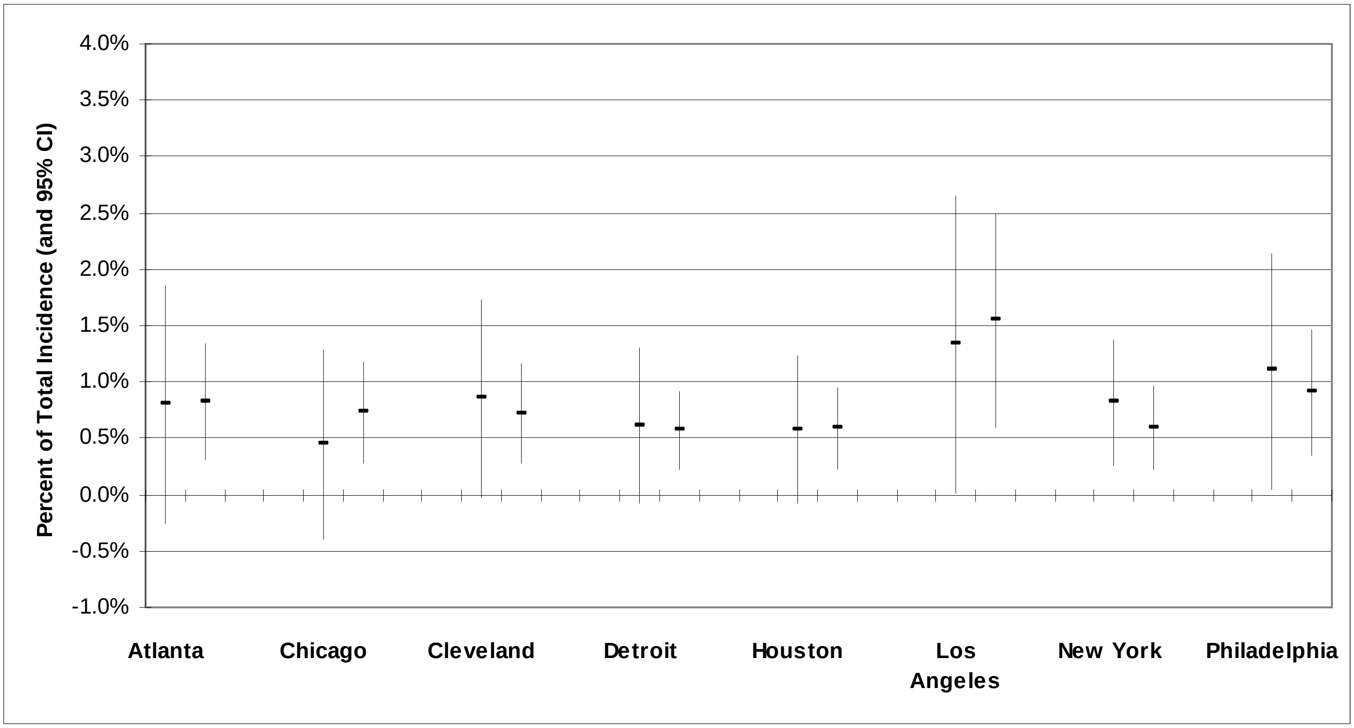


Figure 4-5b. Based on 2002 Air Quality

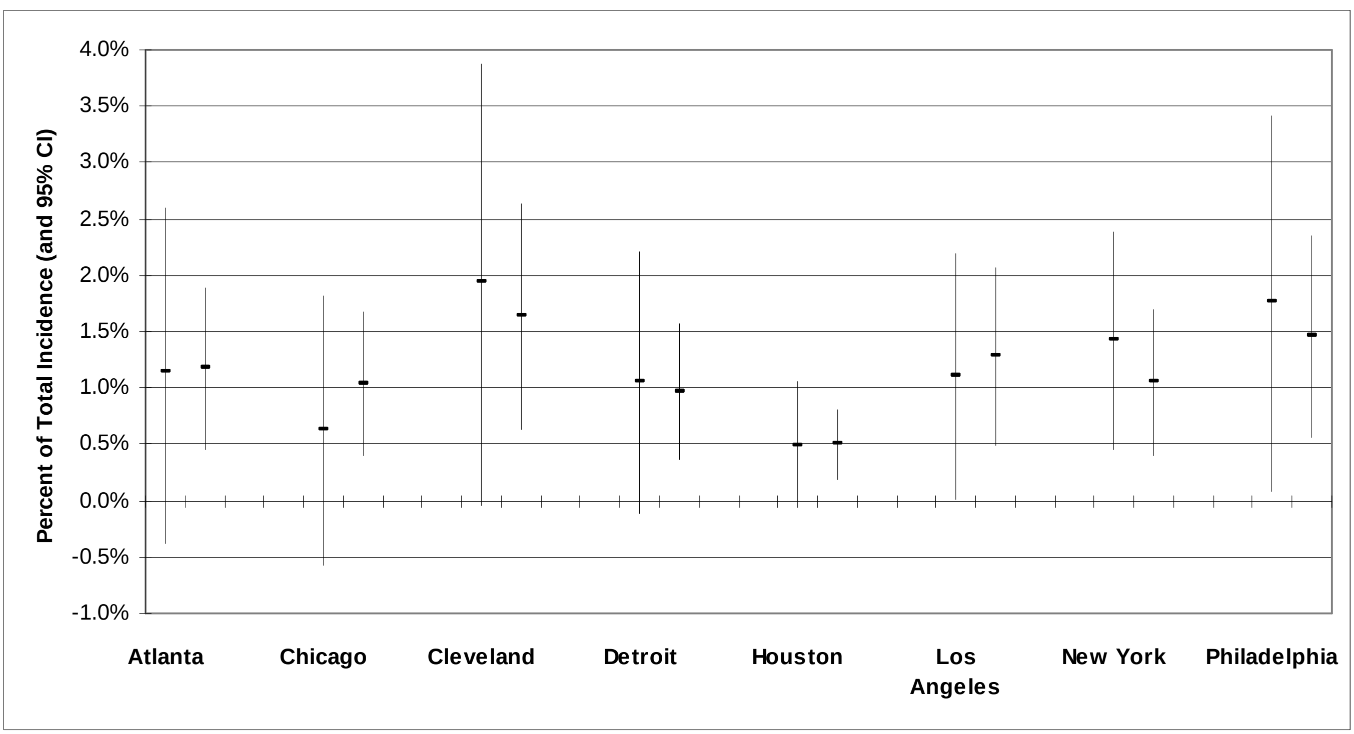


Figure 4-6. Estimated Annual Percent of (Unscheduled) Hospital Admissions for Pneumonia in Detroit Associated with Short-Term Exposure to O_3 Above Background (April – September): Different Lag Models – Based on Ito (2003) [bars from left to right are 0-day, 1-day, 2-day, and 3-day lag models]

Figure 4-6a. Based on 2004 Air Quality

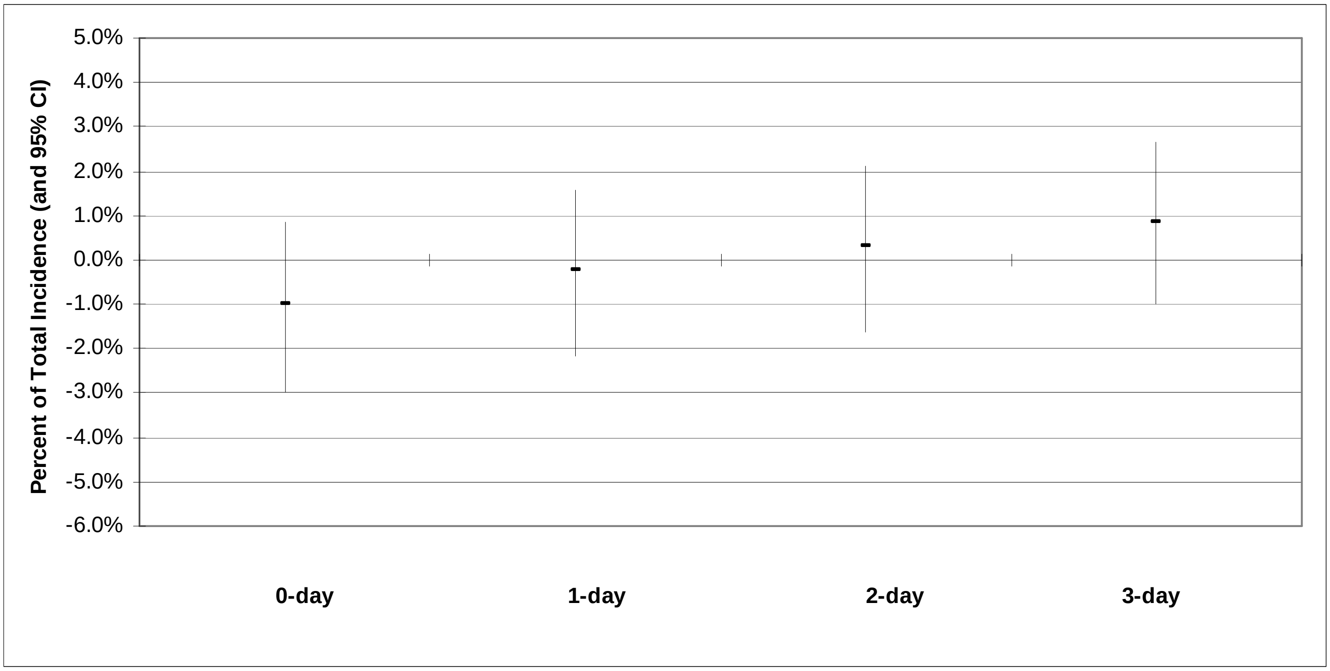


Figure 4-6b. Based on 2002 Air Quality

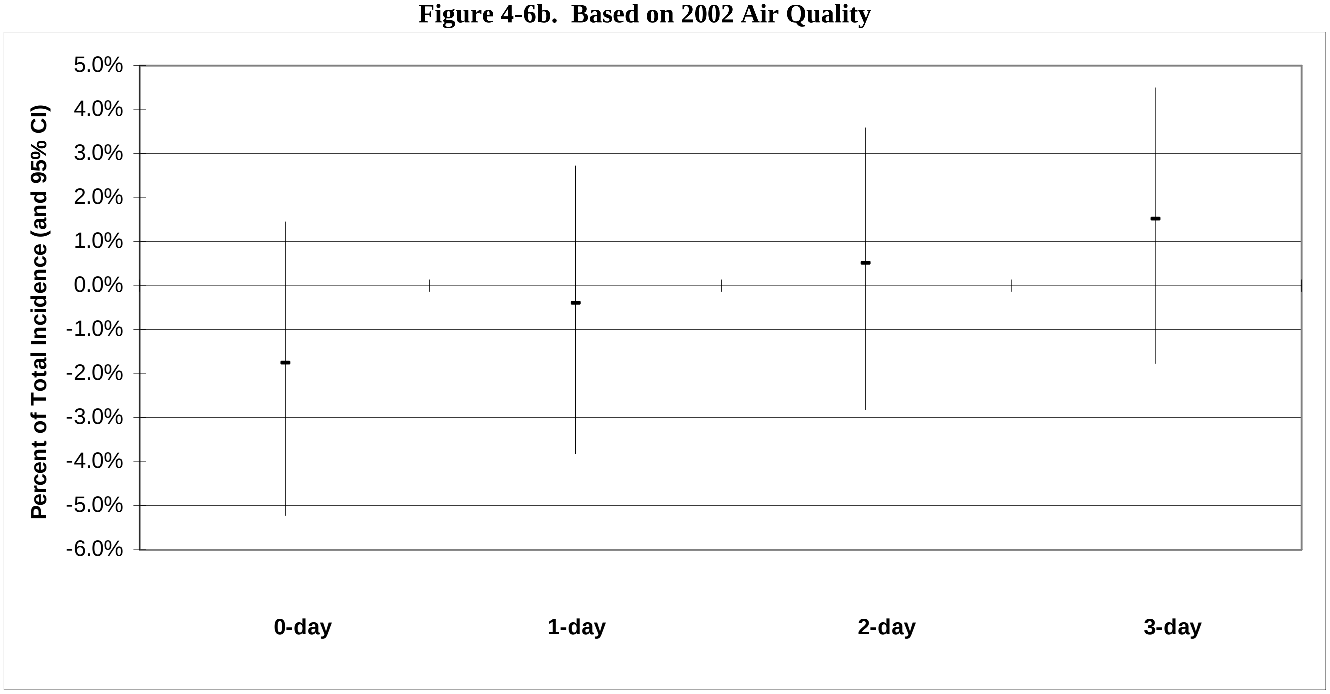


Figure 4-7. Estimated Annual Percent of Non-Accidental Mortality Associated with Short-Term Exposure to "As Is" O_3 Above Background for the Period April – September (Based on Bell et al., 2004 – 95 U.S. Cities) – Total and Contribution of 24-Hour O_3 Ranges

Figure 4-7a. Based on 2004 Air Quality

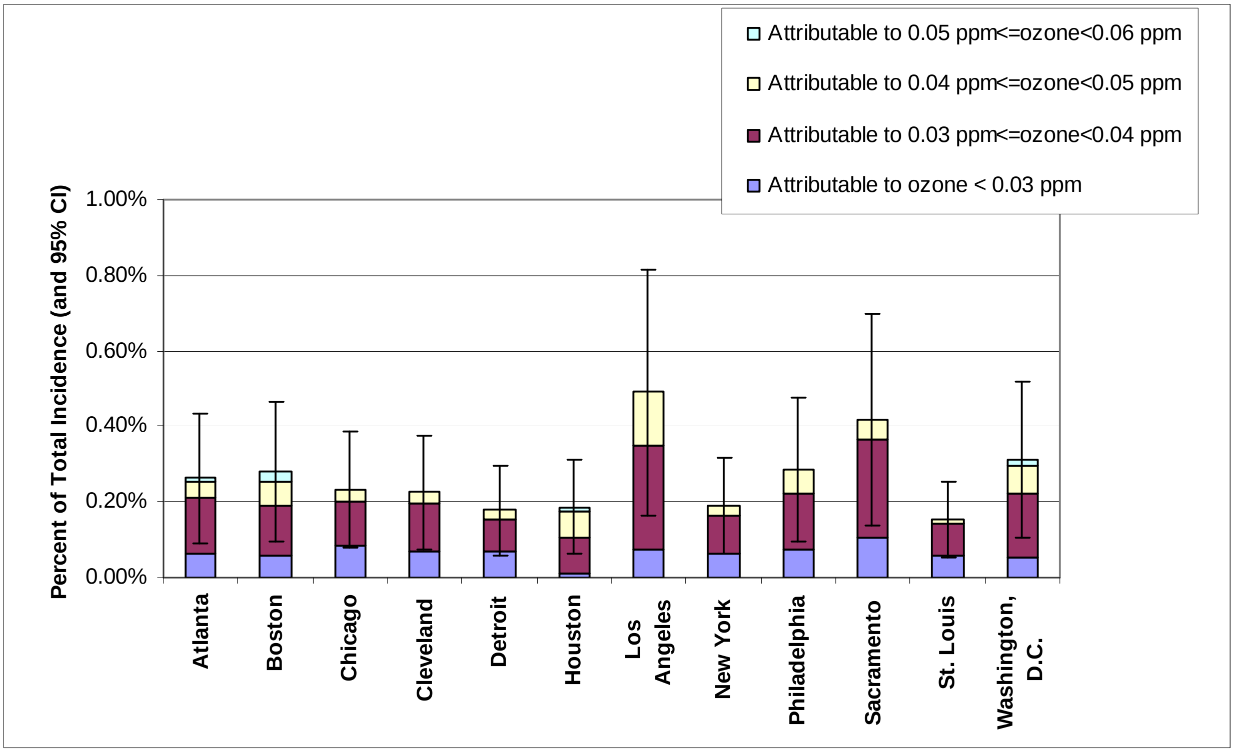


Figure 4-7b. Based on 2002 Air Quality

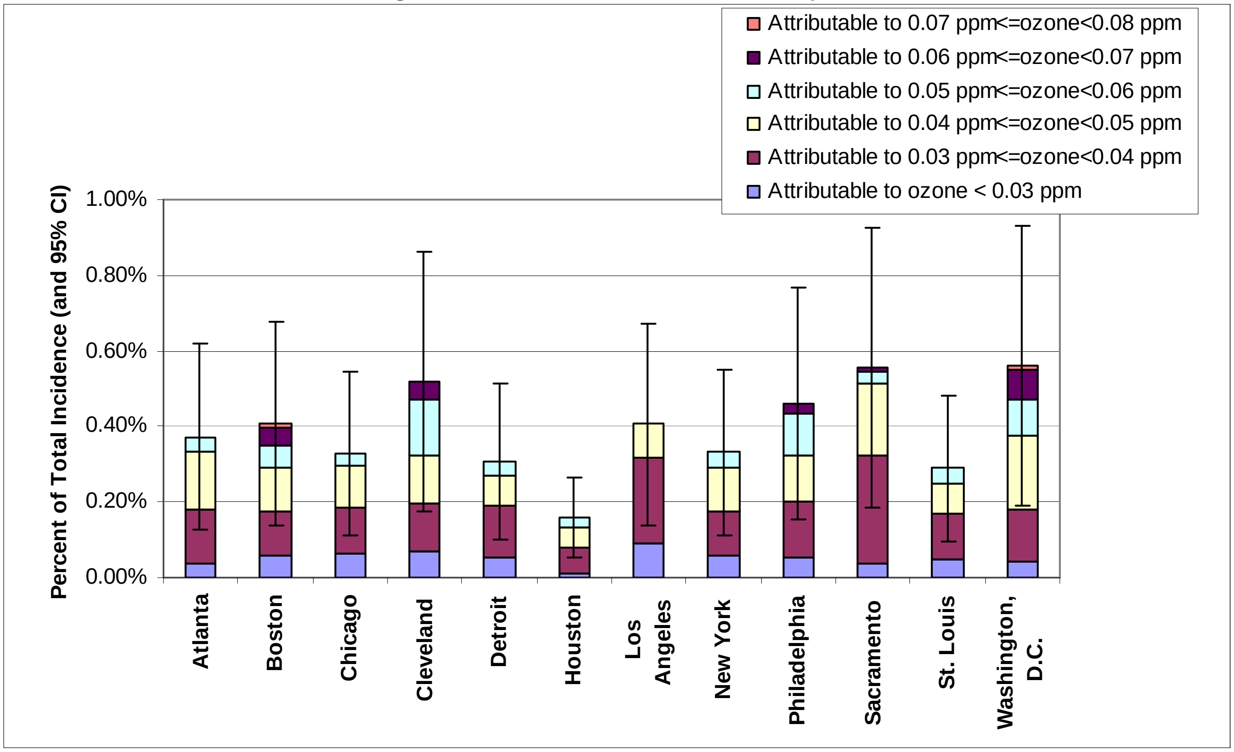


Figure 4-8. Estimated Annual Percent of Cardiorespiratory Mortality Associated with Short-Term Exposure to "As Is" O_3 Above Background for the Period April – September (Based on Huang et al., 2004 – 19 U.S. Cities) – Total and Contribution of 24-Hour O_3 Ranges

Figure 4-8a. Based on 2004 Air Quality

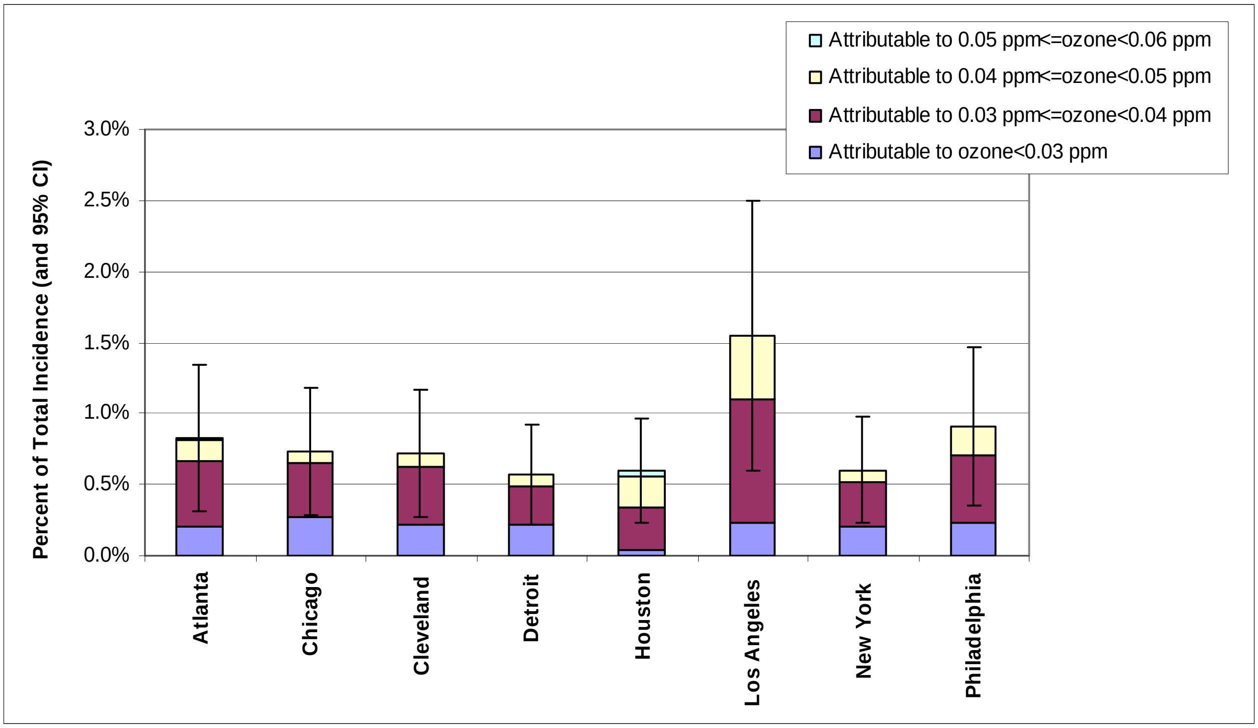


Figure 4-8b. Based on 2002 Air Quality

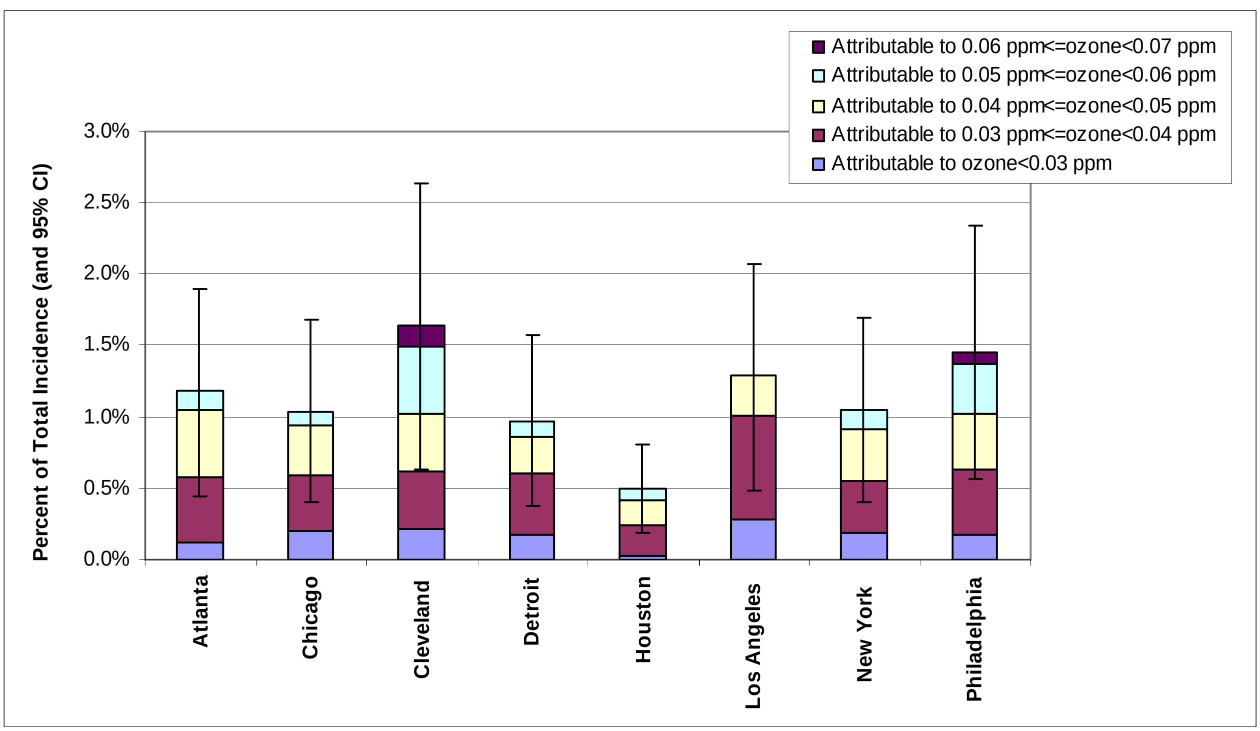


Table 4-8. Estimated Non-Accidental Mortality Associated with "As Is" O_3 Concentrations: April - September, 2004*

Location	Study	Lag	Exposure Metric	Non-Accidental Mortality Associated with O_3 Above Policy Relevant Background Levels**		
				Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	6 (-26 - 38)	0.4 (-1.8 - 2.6)	0.1% (-0.6% - 0.8%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 20)	0.8 (0.3 - 1.4)	0.3% (0.1% - 0.4%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	7 (2 - 12)	1.0 (0.3 - 1.7)	0.3% (0.1% - 0.5%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	49 (16 - 81)	0.9 (0.3 - 1.5)	0.2% (0.1% - 0.4%)
	Schwartz (2004)	0-day lag	1 hr max.	394 (125 - 658)	7.3 (2.3 - 12.2)	1.9% (0.6% - 3.1%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	148 (46 - 250)	2.8 (0.9 - 4.6)	0.7% (0.2% - 1.2%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	27 (-17 - 69)	1.9 (-1.2 - 5)	0.4% (-0.2% - 0.9%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 28)	1.2 (0.4 - 2)	0.2% (0.1% - 0.4%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	33 (-11 - 76)	1.6 (-0.5 - 3.7)	0.4% (-0.1% - 0.8%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 28)	0.8 (0.3 - 1.4)	0.2% (0.1% - 0.3%)
	Schwartz (2004)	0-day lag	1 hr max.	128 (-21 - 274)	6.2 (-1 - 13.3)	1.4% (-0.2% - 2.9%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	70 (22 - 117)	3.4 (1.1 - 5.7)	0.7% (0.2% - 1.2%)
	Ito (2003)	0-day lag	24 hr avg.	40 (-37 - 116)	2.0 (-1.8 - 5.6)	0.4% (-0.4% - 1.2%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	35 (2 - 67)	1.0 (0.1 - 2)	0.4% (0% - 0.7%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 28)	0.5 (0.2 - 0.8)	0.2% (0.1% - 0.3%)
	Schwartz (2004)	0-day lag	1 hr max.	93 (9 - 176)	2.7 (0.3 - 5.2)	1% (0.1% - 1.9%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	78 (24 - 130)	2.3 (0.7 - 3.8)	0.9% (0.3% - 1.4%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	62 (-149 - 271)	0.6 (-1.6 - 2.8)	0.2% (-0.5% - 1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	133 (45 - 221)	1.4 (0.5 - 2.3)	0.5% (0.2% - 0.8%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	60 (20 - 100)	0.7 (0.2 - 1.1)	0.2% (0.1% - 0.3%)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	23 (8 - 38)	1.5 (0.5 - 2.5)	0.3% (0.1% - 0.5%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	82 (52 - 112)	5.4 (3.4 - 7.4)	1% (0.6% - 1.4%)

Location	Study	Lag	Exposure Metric	Non-Accidental Mortality Associated with O_3 Above Policy Relevant Background Levels**		
				Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	12 (-36 - 59)	1.0 (-3 - 4.8)	0.3% (-0.9% - 1.4%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	18 (6 - 29)	1.4 (0.5 - 2.4)	0.4% (0.1% - 0.7%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	3 (-6 - 13)	1.0 (-1.7 - 3.6)	0.2% (-0.3% - 0.6%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	3 (1 - 5)	0.9 (0.3 - 1.5)	0.2% (0.1% - 0.3%)
Washington, D.C.	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	8 (3 - 14)	1.5 (0.5 - 2.4)	0.3% (0.1% - 0.5%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-9. Estimated Non-Accidental Mortality Associated with "As Is" O_3 Concentrations: April - September, 2002*

Location	Study	Lag	Exposure Metric	Non-Accidental Mortality Associated with O_3 Above Policy Relevant Background Levels**		
				Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	9 (-37 - 54)	0.6 (-2.5 - 3.6)	0.2% (-0.8% - 1.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 29)	1.2 (0.4 - 1.9)	0.4% (0.1% - 0.6%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	10 (3 - 17)	1.5 (0.5 - 2.5)	0.4% (0.1% - 0.7%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	69 (23 - 115)	1.3 (0.4 - 2.1)	0.3% (0.1% - 0.5%)
	Schwartz (2004)	0-day lag	1 hr max.	505 (161 - 840)	9.4 (3 - 15.6)	2.4% (0.8% - 4%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	191 (60 - 321)	3.6 (1.1 - 6)	0.9% (0.3% - 1.5%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	61 (-38 - 157)	4.3 (-2.7 - 11.3)	0.8% (-0.5% - 2.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	38 (13 - 64)	2.8 (0.9 - 4.6)	0.5% (0.2% - 0.9%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	57 (-18 - 131)	2.8 (-0.9 - 6.3)	0.6% (-0.2% - 1.4%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	29 (10 - 48)	1.4 (0.5 - 2.3)	0.3% (0.1% - 0.5%)
	Schwartz (2004)	0-day lag	1 hr max.	181 (-30 - 385)	8.8 (-1.4 - 18.7)	1.9% (-0.3% - 4.1%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	99 (31 - 165)	4.8 (1.5 - 8)	1% (0.3% - 1.8%)
	Ito (2003)	0-day lag	24 hr avg.	69 (-64 - 198)	3.4 (-3.1 - 9.6)	0.7% (-0.7% - 2.1%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	29 (2 - 57)	0.9 (0.1 - 1.7)	0.3% (0% - 0.6%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	14 (5 - 24)	0.4 (0.1 - 0.7)	0.2% (0.1% - 0.3%)
	Schwartz (2004)	0-day lag	1 hr max.	85 (8 - 161)	2.5 (0.2 - 4.7)	0.9% (0.1% - 1.8%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	71 (22 - 119)	2.1 (0.7 - 3.5)	0.8% (0.2% - 1.3%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	51 (-124 - 224)	0.5 (-1.3 - 2.4)	0.2% (-0.5% - 0.8%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	110 (37 - 184)	1.2 (0.4 - 1.9)	0.4% (0.1% - 0.7%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	105 (35 - 174)	1.2 (0.4 - 2)	0.3% (0.1% - 0.6%)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	37 (12 - 62)	2.4 (0.8 - 4.1)	0.5% (0.2% - 0.8%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	132 (83 - 180)	8.7 (5.5 - 11.9)	1.6% (1% - 2.2%)

Location	Study	Lag	Exposure Metric	Non-Accidental Mortality Associated with O_3 Above Policy Relevant Background Levels**		
				Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	16 (-48 - 78)	1.3 (-3.9 - 6.4)	0.4% (-1.1% - 1.9%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	23 (8 - 39)	1.9 (0.6 - 3.2)	0.6% (0.2% - 0.9%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	6 (-11 - 23)	1.9 (-3.1 - 6.7)	0.3% (-0.5% - 1.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	6 (2 - 10)	1.7 (0.6 - 2.8)	0.3% (0.1% - 0.5%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	15 (5 - 25)	2.6 (0.9 - 4.4)	0.6% (0.2% - 0.9%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-10. Estimated Cardiorespiratory Mortality Associated with "As Is" O_3 Concentrations: April - September, 2004*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality Associated with O_3 Above Policy Relevant Background Levels**		
		Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Atlanta	Atlanta	8 (-3 - 18)	0.5 (-0.2 - 1.2)	0.8% (-0.3% - 1.8%)
	19 U.S. Cities	8 (3 - 13)	0.5 (0.2 - 0.9)	0.8% (0.3% - 1.3%)
Chicago	Chicago	23 (-21 - 66)	0.4 (-0.4 - 1.2)	0.4% (-0.4% - 1.3%)
	19 U.S. Cities	38 (14 - 61)	0.7 (0.3 - 1.1)	0.7% (0.3% - 1.2%)
Cleveland	Cleveland	16 (0 - 32)	1.2 (0 - 2.3)	0.9% (0% - 1.7%)
	19 U.S. Cities	14 (5 - 22)	1.0 (0.4 - 1.6)	0.7% (0.3% - 1.2%)
Detroit	Detroit	15 (-2 - 31)	0.7 (-0.1 - 1.5)	0.6% (-0.1% - 1.3%)
	19 U.S. Cities	14 (5 - 22)	0.7 (0.3 - 1.1)	0.6% (0.2% - 0.9%)
Houston	Houston	12 (-2 - 26)	0.4 (0 - 0.8)	0.6% (-0.1% - 1.2%)
	19 U.S. Cities	13 (5 - 20)	0.4 (0.1 - 0.6)	0.6% (0.2% - 1%)
Los Angeles	Los Angeles	99 (1 - 195)	1.0 (0 - 2.1)	1.3% (0% - 2.6%)
	19 U.S. Cities	115 (44 - 185)	1.2 (0.5 - 1.9)	1.6% (0.6% - 2.5%)
New York	New York	73 (23 - 123)	0.8 (0.3 - 1.4)	0.8% (0.3% - 1.4%)
	19 U.S. Cities	54 (21 - 87)	0.6 (0.2 - 1)	0.6% (0.2% - 1%)
Philadelphia	Philadelphia	20 (1 - 39)	1.3 (0.1 - 2.6)	1.1% (0.1% - 2.1%)
	19 U.S. Cities	17 (6 - 27)	1.1 (0.4 - 1.8)	0.9% (0.3% - 1.5%)

*All results are for cardiorespiratory mortality (among all ages) associated with short-term exposures to O_3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-11. Estimated Cardiorespiratory Mortality Associated with "As Is" O_3 Concentrations: April - September, 2002*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality Associated with O_3 Above Policy Relevant Background Levels**		
		Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Atlanta	Atlanta	11 (-4 - 25)	0.7 (-0.2 - 1.7)	1.1% (-0.4% - 2.6%)
	19 U.S. Cities	11 (4 - 18)	0.8 (0.3 - 1.2)	1.2% (0.5% - 1.9%)
Chicago	Chicago	32 (-29 - 93)	0.6 (-0.5 - 1.7)	0.6% (-0.6% - 1.8%)
	19 U.S. Cities	53 (20 - 86)	1.0 (0.4 - 1.6)	1% (0.4% - 1.7%)
Cleveland	Cleveland	36 (-1 - 72)	2.6 (-0.1 - 5.2)	2% (0% - 3.9%)
	19 U.S. Cities	31 (12 - 49)	2.2 (0.8 - 3.5)	1.6% (0.6% - 2.6%)
Detroit	Detroit	26 (-3 - 54)	1.2 (-0.1 - 2.6)	1.1% (-0.1% - 2.2%)
	19 U.S. Cities	24 (9 - 38)	1.1 (0.4 - 1.8)	1% (0.4% - 1.6%)
Houston	Houston	10 (-1 - 22)	0.3 (0 - 0.6)	0.5% (-0.1% - 1%)
	19 U.S. Cities	11 (4 - 17)	0.3 (0.1 - 0.5)	0.5% (0.2% - 0.8%)
Los Angeles	Los Angeles	82 (1 - 162)	0.9 (0 - 1.7)	1.1% (0% - 2.2%)
	19 U.S. Cities	95 (36 - 153)	1.0 (0.4 - 1.6)	1.3% (0.5% - 2.1%)
New York	New York	128 (41 - 213)	1.4 (0.5 - 2.4)	1.4% (0.5% - 2.4%)
	19 U.S. Cities	94 (36 - 151)	1.1 (0.4 - 1.7)	1.1% (0.4% - 1.7%)
Philadelphia	Philadelphia	33 (2 - 63)	2.2 (0.1 - 4.1)	1.8% (0.1% - 3.4%)
	19 U.S. Cities	27 (10 - 43)	1.8 (0.7 - 2.8)	1.5% (0.6% - 2.3%)

*All results are for cardiorespiratory mortality (among all ages) associated with short-term exposures to O_3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-12. Estimated Health Risks Associated with "As Is" O_3 Concentrations: New York, NY, April - September, 2004

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)***	all	distributed lag	24 hr avg.	none	60 (20 - 100)	0.7 (0.2 - 1.1)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. (2004)***	all	distributed lag	24 hr avg.	none	73 (23 - 123)	0.8 (0.3 - 1.4)	0.8% (0.3% - 1.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	distributed lag	24 hr avg.	none	54 (21 - 87)	0.6 (0.2 - 1)	0.6% (0.2% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	CO	30 (9 - 51)	0.3 (0.1 - 0.6)	0.3% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	NO2	26 (5 - 47)	0.3 (0.1 - 0.5)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	PM10	32 (-12 - 76)	0.4 (-0.1 - 0.8)	0.4% (-0.1% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	SO2	22 (0 - 44)	0.2 (0 - 0.5)	0.2% (0% - 0.5%)
Hospital admissions (unscheduled), respiratory	Thurston et al. (1992)****	all	3-day lag	1 hr max.	none	447 (108 - 786)	5.6 (1.4 - 9.8)	1.3% (0.3% - 2.2%)
Hospital admissions (unscheduled), asthma	Thurston et al. (1992)****	all	1-day lag	1 hr max.	none	382 (81 - 683)	4.8 (1 - 8.5)	2.9% (0.6% - 5.2%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***New York in this study is defined as the five boroughs of New York City plus Westchester County.

****New York in this study is defined as the five boroughs of New York City.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-13. Estimated Health Risks Associated with "As Is" O_3 Concentrations: New York, NY, April - September, 2002

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)***	all	distributed lag	24 hr avg.	none	105 (35 - 174)	1.2 (0.4 - 2)	0.3% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. (2004)***	all	distributed lag	24 hr avg.	none	128 (41 - 213)	1.4 (0.5 - 2.4)	1.4% (0.5% - 2.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	distributed lag	24 hr avg.	none	94 (36 - 151)	1.1 (0.4 - 1.7)	1.1% (0.4% - 1.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	CO	52 (15 - 89)	0.6 (0.2 - 1)	0.6% (0.2% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	NO2	45 (8 - 82)	0.5 (0.1 - 0.9)	0.5% (0.1% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	PM10	56 (-22 - 132)	0.6 (-0.2 - 1.5)	0.6% (-0.2% - 1.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	SO2	39 (0 - 77)	0.4 (0 - 0.9)	0.4% (0% - 0.9%)
Hospital admissions (unscheduled), respiratory	Thurston et al. (1992)****	all	3-day lag	1 hr max.	none	608 (147 - 1068)	7.6 (1.8 - 13.3)	1.7% (0.4% - 3%)
Hospital admissions (unscheduled), asthma	Thurston et al. (1992)****	all	1-day lag	1 hr max.	none	519 (110 - 928)	6.5 (1.4 - 11.6)	4% (0.8% - 7.1%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***New York in this study is defined as the five boroughs of New York City plus Westchester County.

****New York in this study is defined as the five boroughs of New York City.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

As discussed in Section 4.1.4, assessment locations were chosen in part on the basis of whether an acceptable C-R function had been reported for that location. As a result, risks were estimated in a given assessment location only for those health endpoints for which there is at least one acceptable C-R function reported for that location. The set of health effects shown in Tables 4-12 and 4-13 and Tables C-1 through C-22 therefore varies from one location to another. For example, hospital admissions for pneumonia associated with short-term exposure to O_3 is included in Tables C-9 and C-10 for Detroit, but no hospital admissions endpoints are included in Tables C-1 through C-6 for Atlanta, Boston, and Chicago, because there was no study that met the selection criteria that reports a C-R function for hospital admissions reported in the O_3 epidemiological literature for any of those cities evaluated in the O_3 CD. For non-accidental mortality associated with short-term exposure to O_3, Figures 4-4a and b display estimates for only nine of the twelve risk assessment locations because single-city C-R functions for this health outcome were not available for the other three locations.

All results discussed below are for April through September. The top graph on each page shows results based on 2004 air quality, and the bottom graph shows results based on 2002 air quality. Figures 4-2a and b show estimated percent of non-accidental mortality related to "as is" O_3 concentrations over PRB levels, based on single-pollutant, single-city models across all locations for which such models were available. Tables 4-8 and 4-9 show estimates of incidence, incidence per 100,000 relevant population, and percent of total incidence of non-accidental mortality related to "as is" O_3 concentrations over PRB levels in all locations, based on both single-city and multi-city models, using air quality data for 2004 and 2002, respectively.

Estimates of O_3-related (non-accidental) mortality based on 2004 air quality (Table 4-8) ranged from 0.4 per 100,000 relevant population in Atlanta (Bell et al., 2004) to 7.3 per 100,000 relevant population in Chicago (Schwartz, 2004). The corresponding range based on 2002 air quality (Table 4-9) is from 0.4 per 100,000 relevant population in Houston (Bell et al., 2004) to 9.4 per 100,000 relevant population in Chicago (Schwartz, 2004). Estimated O_3-related (non-accidental) mortality reported by Schwartz (2004) for Chicago, Detroit, and Houston, based on both the single-city and the multi-city C-R functions, tend to be higher than other estimates in those locations in large part because Schwartz used the 1-hr maximum O_3 concentration, rather than the 24-hour average, as the exposure metric. The changes from "as is" 1-hr maximum to PRB 1-hr maximum O_3 concentrations were generally larger in the assessment locations than the corresponding changes from "as is" 24-hr average to PRB 24-hr average O_3 concentrations. As a percent of total incidence, estimated O_3-related (non-accidental) mortality ranged from 0.1 percent in Atlanta (Bell et al., 2004) to 1.9 percent in Chicago (Schwartz, 2004), using 2004 air quality data. Using 2002 air quality data, the range was from 0.2 percent in Atlanta (Bell et al., 2004), Houston (Bell et al., 2004), and Los Angeles (Bell et al., 2004) to 2.4 percent in Chicago (Schwartz, 2004). Although 7 of the 12 estimates from single-city single-pollutant models shown in Figure 4-4 were not statistically significant, all 12 were positive.

Figures 4-3a and b show estimated percent of cardiorespiratory mortality related to “as is” O_3 concentrations over PRB levels, based on multi-city single-pollutant versus multi-pollutant models from Huang et al. (2004) across all locations for which such models were available. Tables 4-10 and 4-11 show estimates of incidence, incidence per 100,000 relevant population, and percent of total incidence of cardiorespiratory mortality related to “as is” O_3 concentrations over PRB levels in all risk assessment locations covered in Huang et al. (2004), based on both single-city and multi-city single-pollutant models from that study. Estimates of O_3-related cardiorespiratory mortality ranged from 0.4 per 100,000 relevant population in Chicago (using the single-city C-R function) and Houston (using both the single-city and the multi-city C-R functions) to 1.3 per 100,000 relevant population in Philadelphia (using the single-city C-R function), when 2004 air quality data was used. The corresponding range using 2002 air quality data was from 0.3 per 100,000 relevant population in Houston (using both the single-city and the multi-city C-R functions) to 2.6 per 100,000 relevant population in Cleveland (using the single-city C-R function). As a percent of total incidence, estimated O_3-related cardiorespiratory mortality ranged from 0.4 percent in Chicago (using the single-city C-R function) to 1.6 percent in Los Angeles (using the multi-city C-R function), when 2004 air quality data was used. The corresponding range using 2002 air quality data was from 0.5 percent in Houston (using both the single-city and the multi-city C-R functions) to 2 percent in Cleveland (using the single-city C-R function). All of the estimates of O_3-related cardiorespiratory mortality based on Huang et al. (2004), from both single-city and multi-city models, and from both single-pollutant and multi-pollutant models, were positive. Five of the single-city single-pollutant “shrinkage” estimates (for Atlanta, Chicago, Cleveland, Detroit, and Houston) and the estimate from the multi-city multi-pollutant model with PM_{10} were not statistically significant. All the rest of the estimates of O_3-related cardiorespiratory mortality based on Huang et al. (2004) were statistically significant.

Figures 4-4a and b show estimated percent of non-accidental mortality that is O_3-related, based on single-city versus multi-city models across all locations for which both types of model were available. Estimates of O_3-related non-accidental mortality based on single-city models tended to have wider confidence or credible intervals than those based on multi-city models, with both multi-city models (from Bell et al., 2004 and Schwartz, 2004) producing statistically significant results. However, the choice of single-city versus multi-city model did not have a uniform affect on the magnitude of the point estimate. In some cases (Atlanta, Los Angeles, and Sacramento), the multi-city models produced larger estimates than the single-city models, while in other cases (Chicago, Cleveland, Detroit, Houston, and St. Louis) the reverse was true.

Bayesian credible intervals around the “shrinkage” estimates of O_3-related cardiorespiratory mortality (see Section 4.1.9.1.2) based on single-city models in Huang et al. (2004) were uniformly larger than the corresponding credible intervals around estimates based on the multi-city model from that study. As noted above, all of the estimates were positive and, with the exception of the single-city estimate for Chicago, all were statistically significant.

Estimated O_3-related pneumonia hospital admissions in Detroit (Ito 2003), shown in Figures 4-6a and b, increased monotonically with increasing lag, with the greatest estimate predicted by a 3-day lag model. None of the estimates of O_3-related unscheduled hospital admissions in Detroit were statistically significant.

Figures 4-7a and b and 4-8a and b show the estimated annual percent of non-accidental mortality and cardiorespiratory mortality, respectively, associated with short-term exposure to "as is" O_3 concentrations within specified ranges. In 2004, all O_3-related non-accidental mortality was associated with O_3 concentrations less than 0.06 ppm, and most of that was associated with O_3 concentrations less than 0.04 ppm. In 2002, all O_3-related non-accidental mortality was associated with O_3 concentrations less than 0.08 ppm, and the great majority was associated with O_3 concentrations less than 0.06 ppm. The results for cardiorespiratory mortality follow a similar pattern.

4.2.1.2 Assessment of the mortality risks associated with 2003 "as is" O_3 concentrations in excess of policy relevant background levels in five urban areas

The non-accidental mortality risks associated with 2003 "as is" O_3 concentrations in excess of PRB levels in Atlanta, Chicago, Houston, Los Angeles, and New York are shown in Table 4-14. The corresponding cardiorespiratory mortality risks are shown in Table 4-15. The non-accidental mortality risks associated with 2003 "as is" O_3 concentrations in excess of PRB levels, measured as percent of total incidence, are very similar to those associated with 2002 and/or 2004 "as is" O_3 concentrations in excess of PRB levels, as can be seen by comparing the results in Table 4-14 with the results for a recent year of air quality in Tables H-6 (for 2004) and 4-36 (for 2002) for the five locations included in the 2003 analysis. The cardiorespiratory mortality risks associated with 2003 "as is" O_3 concentrations in excess of PRB levels, measured as percent of total incidence, are similarly very close to those associated with 2002 and/or 2004 "as is" O_3 concentrations in excess of PRB levels, as can be seen by comparing the results in Table 4-15 with the results for a recent year of air quality in Tables H-12 (for 2004) and 4-39 (for 2002) for the five locations included in the 2003 analysis.

Table 4-14. Estimated Non-Accidental Mortality Associated with "As Is" O_3 Concentrations: April - September, 2003*

Location	Study	Lag	Exposure Metric	Non-Accidental Mortality Associated with O_3 Above Policy Relevant Background Levels**		
				Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	6 (-26 - 37)	0.4 (-1.7 - 2.5)	0.1% (-0.6% - 0.8%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 20)	0.8 (0.3 - 1.3)	0.3% (0.1% - 0.4%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	64 (22 - 107)	1.2 (0.4 - 2)	0.3% (0.1% - 0.5%)
	Schwartz (2004)	0-day lag	1 hr max.	445 (141 - 742)	8.3 (2.6 - 13.8)	2.1% (0.7% - 3.5%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	168 (53 - 282)	3.1 (1 - 5.3)	0.8% (0.2% - 1.3%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	36 (2 - 70)	1.1 (0.1 - 2)	0.4% (0% - 0.8%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	18 (6 - 30)	0.5 (0.2 - 0.9)	0.2% (0.1% - 0.3%)
	Schwartz (2004)	0-day lag	1 hr max.	101 (9 - 191)	3.0 (0.3 - 5.6)	1.1% (0.1% - 2.1%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	84 (26 - 141)	2.5 (0.8 - 4.2)	0.9% (0.3% - 1.6%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	56 (-136 - 246)	0.6 (-1.4 - 2.6)	0.2% (-0.5% - 0.9%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	121 (41 - 201)	1.3 (0.4 - 2.1)	0.4% (0.1% - 0.7%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	79 (27 - 132)	0.9 (0.3 - 1.5)	0.3% (0.1% - 0.4%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-15. Estimated Cardiorespiratory Mortality Associated with "As Is" O_3 Concentrations: April - September, 2003*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality Associated with O_3 Above Policy Relevant Background Levels**		
		Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Atlanta	Atlanta	8 (-2 - 17)	0.5 (-0.2 - 1.2)	0.8% (-0.3% - 1.8%)
	19 U.S. Cities	8 (3 - 13)	0.5 (0.2 - 0.9)	0.8% (0.3% - 1.3%)
Chicago	Chicago	30 (-27 - 86)	0.6 (-0.5 - 1.6)	0.6% (-0.5% - 1.7%)
	19 U.S. Cities	49 (19 - 80)	0.9 (0.4 - 1.5)	1% (0.4% - 1.6%)
Houston	Houston	13 (-2 - 27)	0.4 (0 - 0.8)	0.6% (-0.1% - 1.3%)
	19 U.S. Cities	13 (5 - 21)	0.4 (0.1 - 0.6)	0.6% (0.2% - 1%)
Los Angeles	Los Angeles	90 (1 - 178)	0.9 (0 - 1.9)	1.2% (0% - 2.4%)
	19 U.S. Cities	104 (40 - 168)	1.1 (0.4 - 1.8)	1.4% (0.5% - 2.3%)
New York	New York	97 (31 - 161)	1.1 (0.3 - 1.8)	1.1% (0.3% - 1.8%)
	19 U.S. Cities	71 (27 - 114)	0.8 (0.3 - 1.3)	0.8% (0.3% - 1.3%)

*All results are for cardiorespiratory mortality (among all ages) associated with short-term exposures to O_3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

4.2.2 Assessment of the reduced health risks associated with O_3 concentrations that just meet the current and alternative 8-hour standards

The results of the assessment of the reduced health risks associated with O_3 concentrations that just meet the current and alternative 8-hour daily maximum standards are presented in two parts. In Section 4.2.2.1, we present results for the current standard and the original set of seven alternative 8-hour daily maximum standards considered, based on adjusting 2002 and 2004 air quality. In Section 4.2.2.2, we present results for the current standard and a smaller set of two alternative standards in Atlanta, Chicago, Houston, Los Angeles, and New York, based on 2002, 2003, and 2004 air quality. As noted above (see Section 3.2.2), an 8-hr average standard, denoted m/n, is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 – 0.084 ppm, 4th daily maximum 8-hr average. The 3^{rd}, 4^{th}, and 5^{th} daily maximum standards, denoted m/n, for n = 3, 4, and 5, require that the average of the three annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

4.2.2.1 Results for all locations for the current standard and the original set of seven standards, based on 2002 and 2004 air quality data

The results of the assessment of the reduced mortality risks associated with O_3 concentrations that just meet the current and alternative 8-hour daily maximum standards (based on 2004 and in 2002 air quality data for all of the assessment locations) are summarized across urban areas in Figures 4-9a and b through 4-17a and b, and in Tables 4-16 through 4-27. Figures 4-9a and b through 4-15a and b show results expressed as percent of total incidence. The corresponding figures showing results expressed as number of cases per 100,000 relevant population are given in Appendix E. Figures 4-16a and b and 4-17a and b show results for O_3-related non-accidental and cardiorespiratory mortality, respectively, expressed as estimated percent reductions from the current standard to alternative standards, separately for each location. These percent reductions were calculated as mortality under the current standard minus mortality under an alternative standard divided by mortality under the current standard. A reduction in mortality therefore results in a positive percent – i.e., a positive reduction. Figures 4-9a through 4-17a show results based on year 2004 air quality data; Figures 4-9b through 4-17b show results based on 2002 air quality data. Tables 4-16, 4-17, and 4-18 show estimated incidence, incidence per 100,000 relevant population, and percent of total incidence, respectively, of non-accidental mortality associated with O_3 concentrations that just meet the current and alternative 8-hour daily maximum standards, based on 2004 O_3 concentrations. Tables 4-19, 4-20, and 4-21 show results for the same measures of non-accidental mortality risk based on 2002 O_3 concentrations. Tables 4-22 through 4-27 show the corresponding results for cardiorespiratory mortality. All results are for health risks associated with short-term exposures to O_3 concentrations in excess of PRB levels from April through September.

Tables 4-28 through 4-30 show results in New York City for health endpoints associated with short-term exposure to O_3 concentrations that just meet the current and alternative 8-hour daily maximum standards, based on 2004 O_3 concentrations. Tables 4-31 through 4-33 show the corresponding results based on 2002 O_3 concentrations. Results for the other locations corresponding to those shown for New York in Tables 4-28 through 4-33 are shown in Appendix E, in Tables E-1 through E-66.

As described in the previous section, the central tendency estimates in all of the figures and tables are based on the O_3 coefficients estimated in the studies, or, in the case of the location-specific estimates from Huang et al. (2004), on "shrinkage" estimates based on the O_3 coefficients estimated in the study (see Section 4.1.9.1.2). The ranges are based either on the 95 percent confidence intervals around those estimates (if the coefficients were estimated using classical statistical techniques) or on the 95 percent credible intervals (if the coefficients were estimated using Bayesian statistical techniques).

Figure 4-9. Estimated Annual Percent of (Non-Accidental) Mortality Associated with Short-Term Exposure to O_3 Above Background When the Current 8-Hour Standard is Just Met: Single-Pollutant, Single-City Models (April – September)

Figure 4-9a. Based on 2004 Air Quality

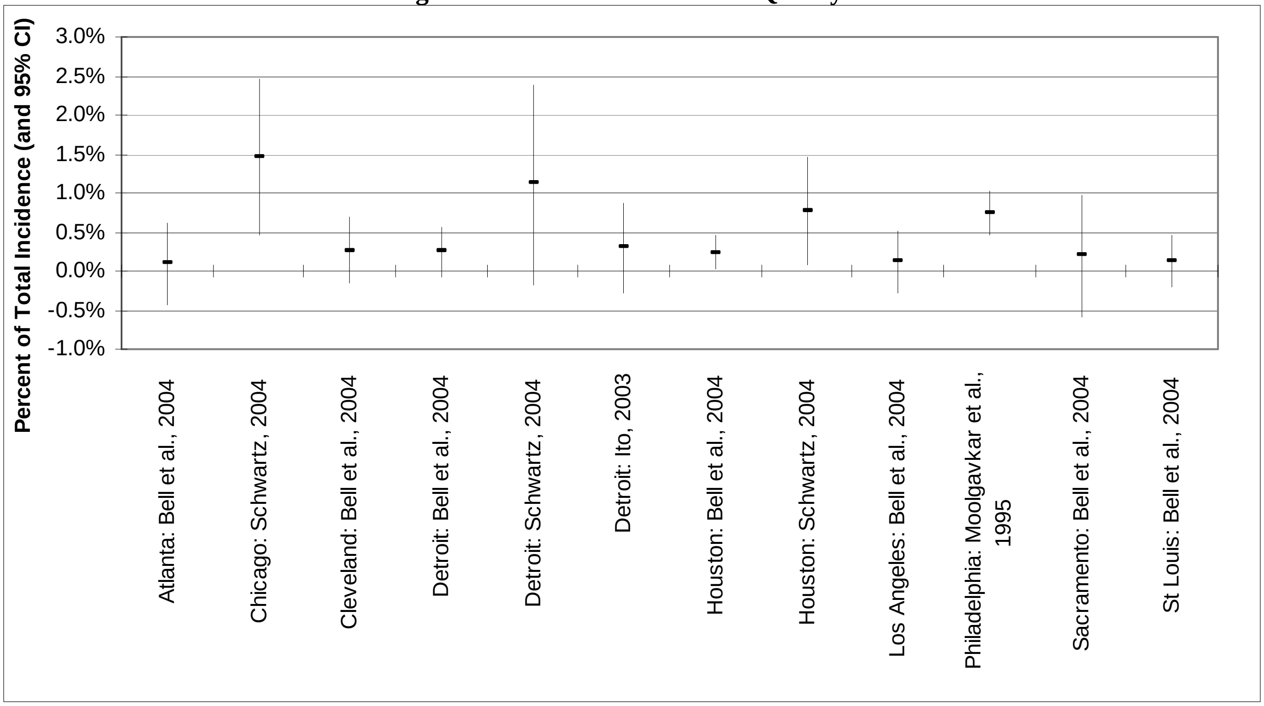


Figure 4-9b. Based on 2002 Air Quality

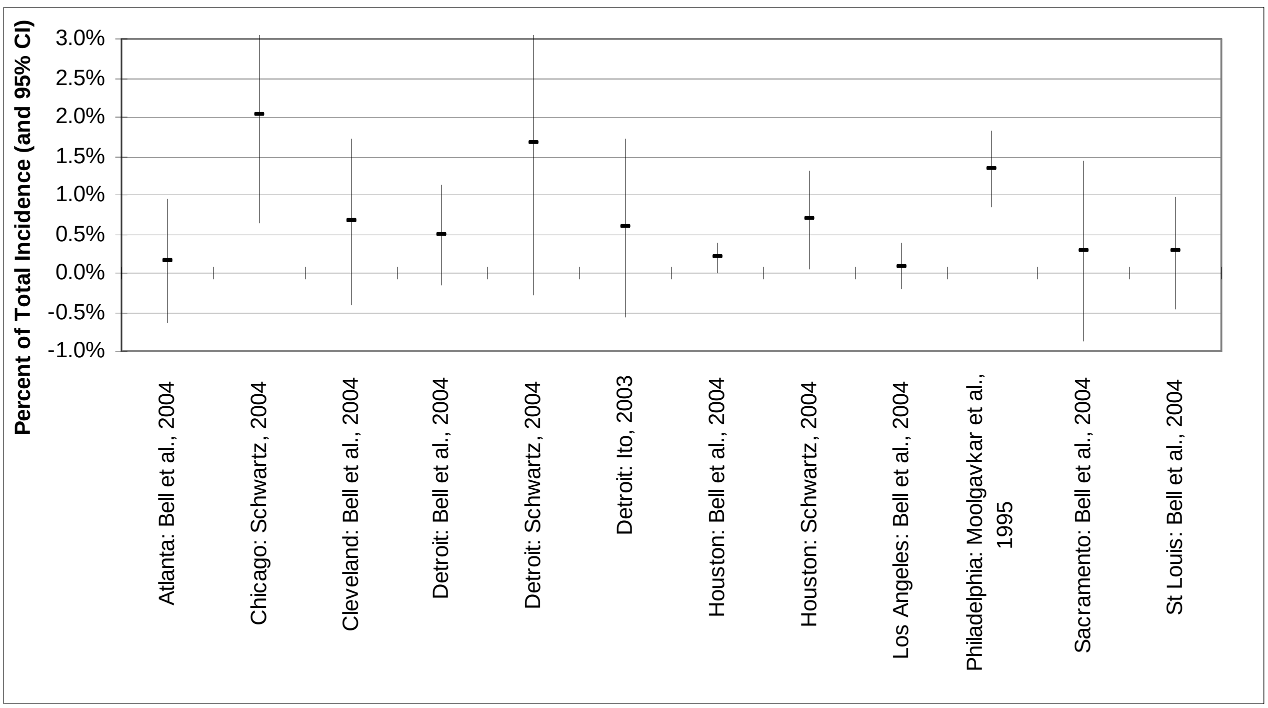


Figure 4-10. Estimated Annual Percent of Cardiorespiratory Mortality Associated with Short-Term Exposure to O_3 Above Background When the Current 8-Hour Standard is Just Met (April – September): Single-Pollutant vs. Multi-Pollutant Models [Huang et al. (2004), additional pollutants, from left to right: none, CO, NO_2, PM_{10}, SO_2]

Figure 4-10a. Based on 2004 Air Quality

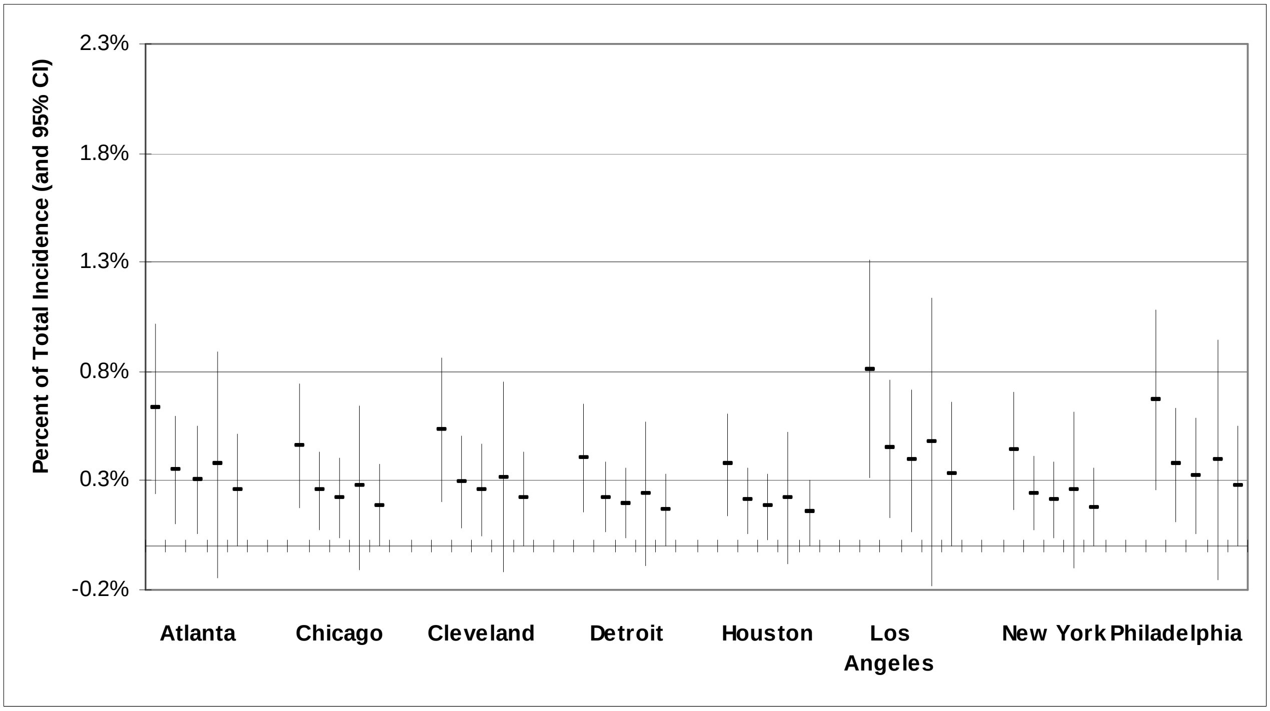


Figure 4-10b. Based on 2002 Air Quality

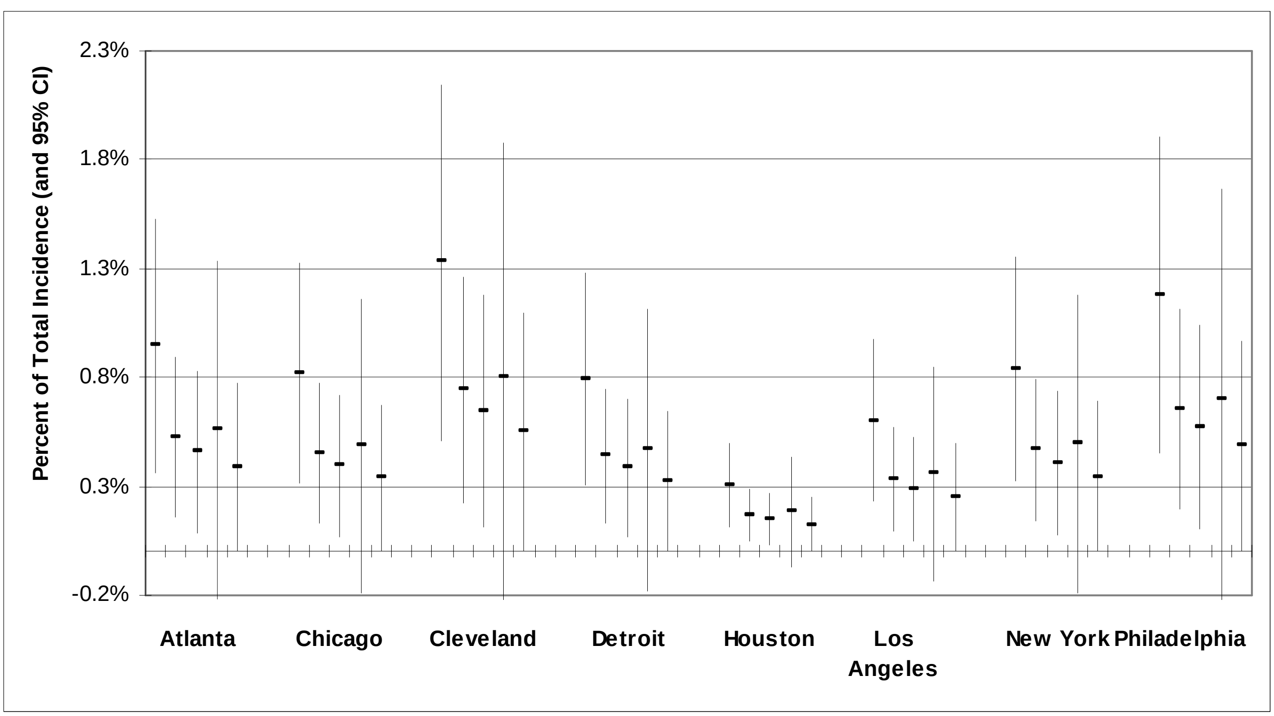


Figure 4-11. Estimated Annual Percent of (Non-Accidental) Mortality Associated with Short-Term Exposure to O_3 Above Background When the Current 8-Hour Standard is Just Met (April – September): Single-City Model (left bar) vs. Multi-City Model (right bar)

Figure 4-11a. Based on 2004 Air Quality

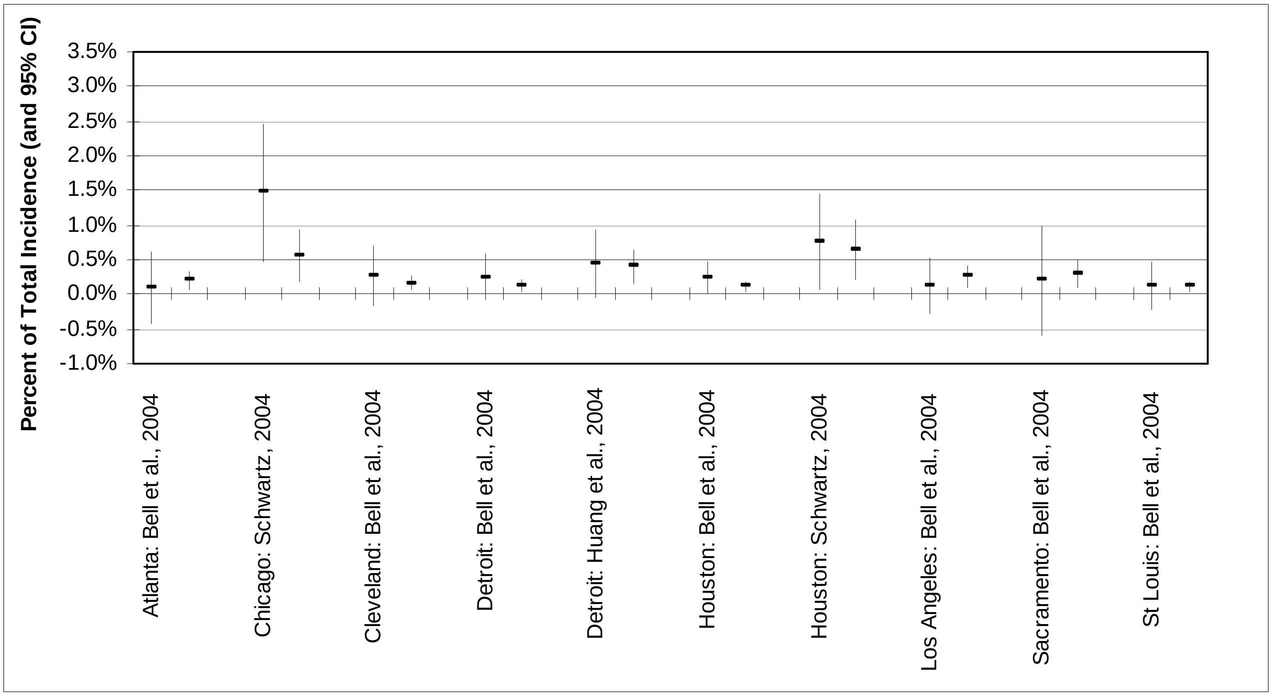


Figure 4-11b. Based on 2002 Air Quality

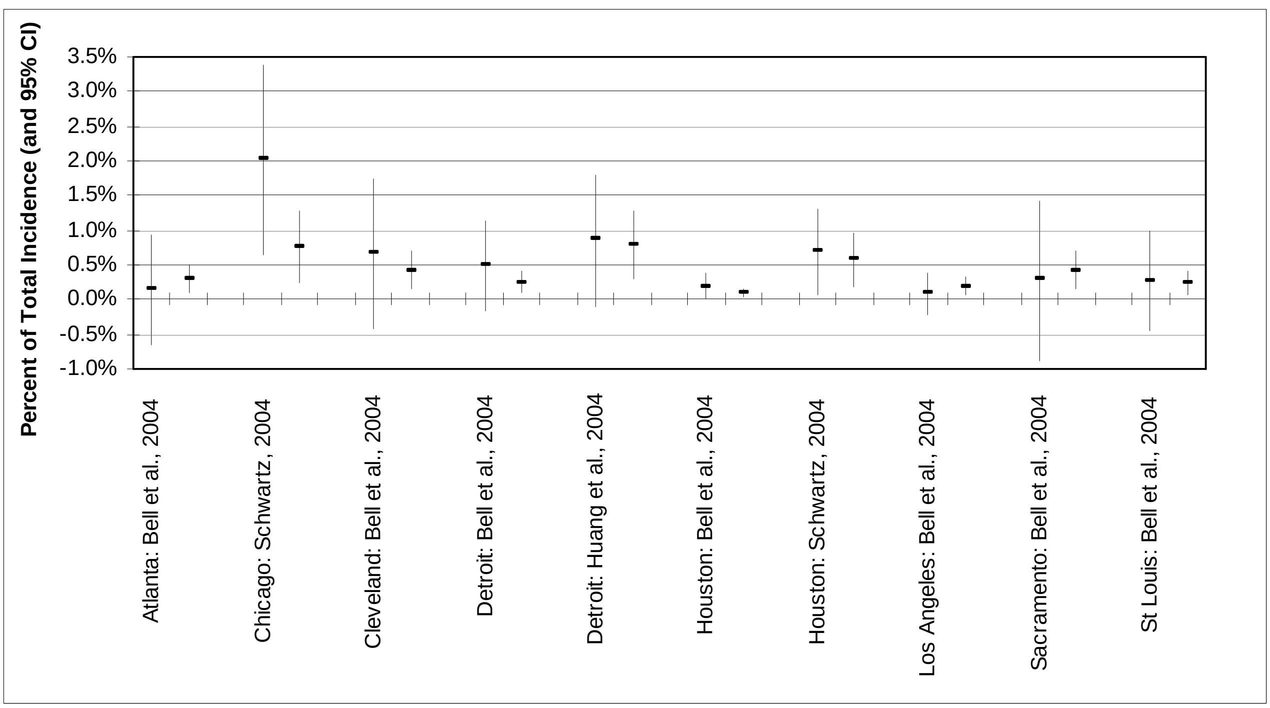


Figure 4-12. Estimated Annual Percent of Cardiorespiratory Mortality Associated with Short-Term Exposure to O_3 Above Background When the Current 8-Hour Standard is Just Met (April – September): Single-City Model (left bar) vs. Multi-City Model (right bar) – Based on Huang et al. (2004)

Figure 4-12a. Based on 2004 Air Quality

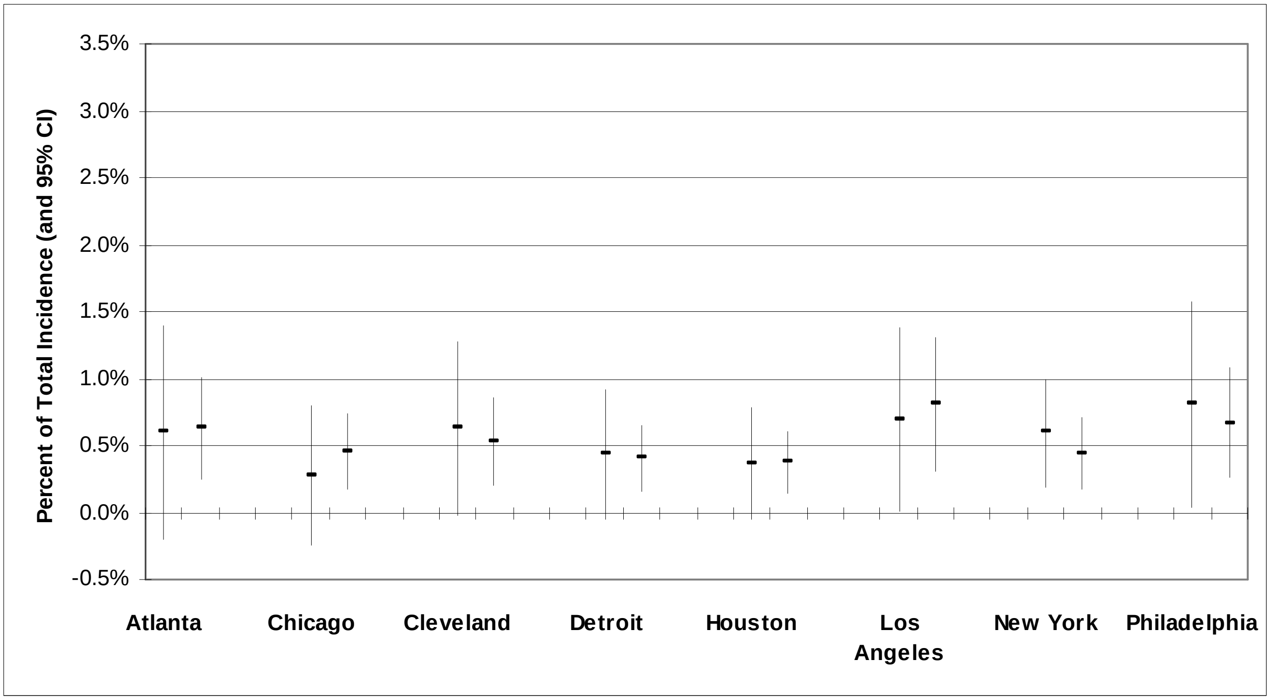


Figure 4-12b. Based on 2002 Air Quality

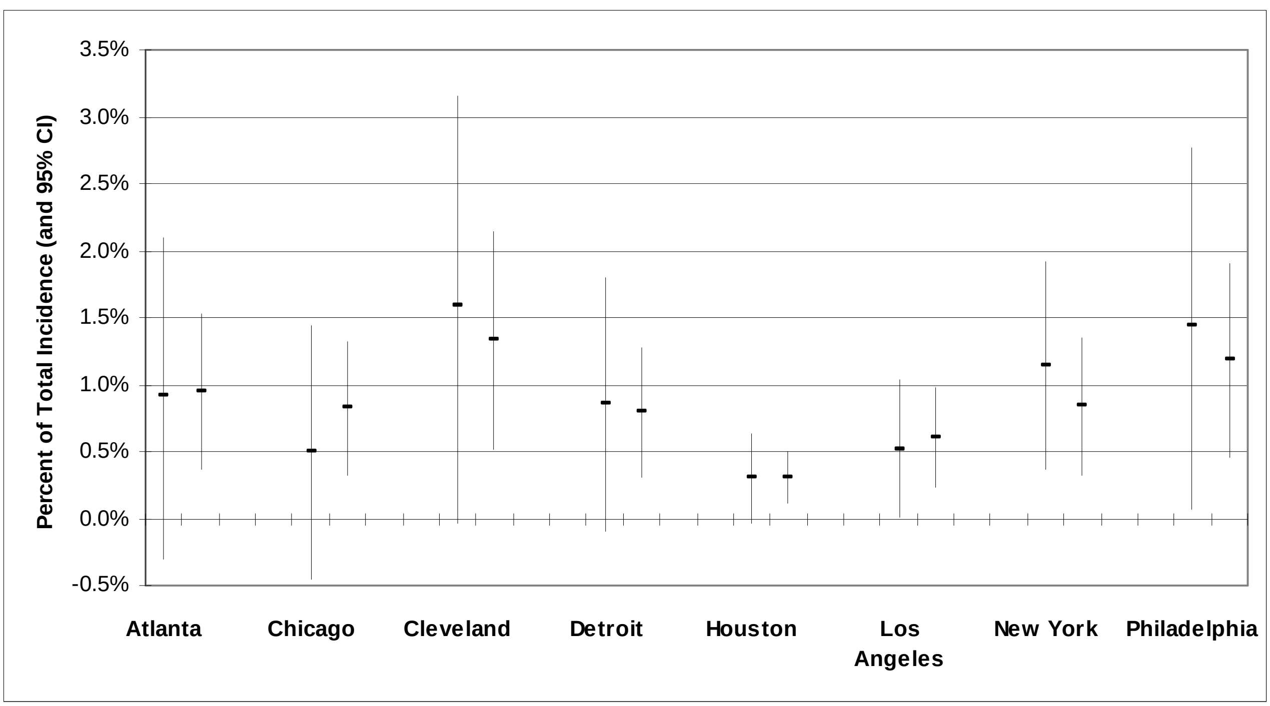


Figure 4-13. Estimated Annual Percent of (Unscheduled) Hospital Admissions for Pneumonia in Detroit Associated with Short-Term Exposure to O_3 Above Background When the Current 8-Hour Standard is Just Met (April – September): Different Lag Models – Based on Ito (2003) [bars from left to right are 0-day, 1-day, 2-day, and 3-day lag models]

Figure 4-13a. Based on 2004 Air Quality

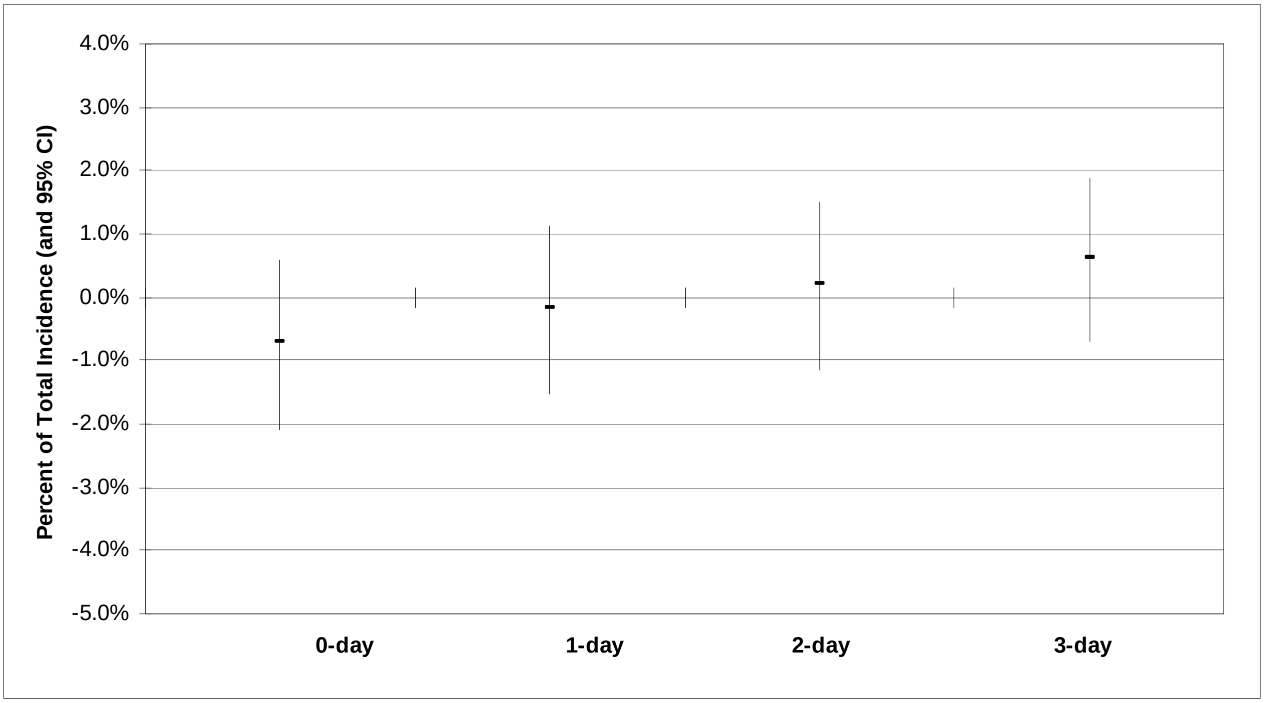


Figure 4-13b. Based on 2002 Air Quality

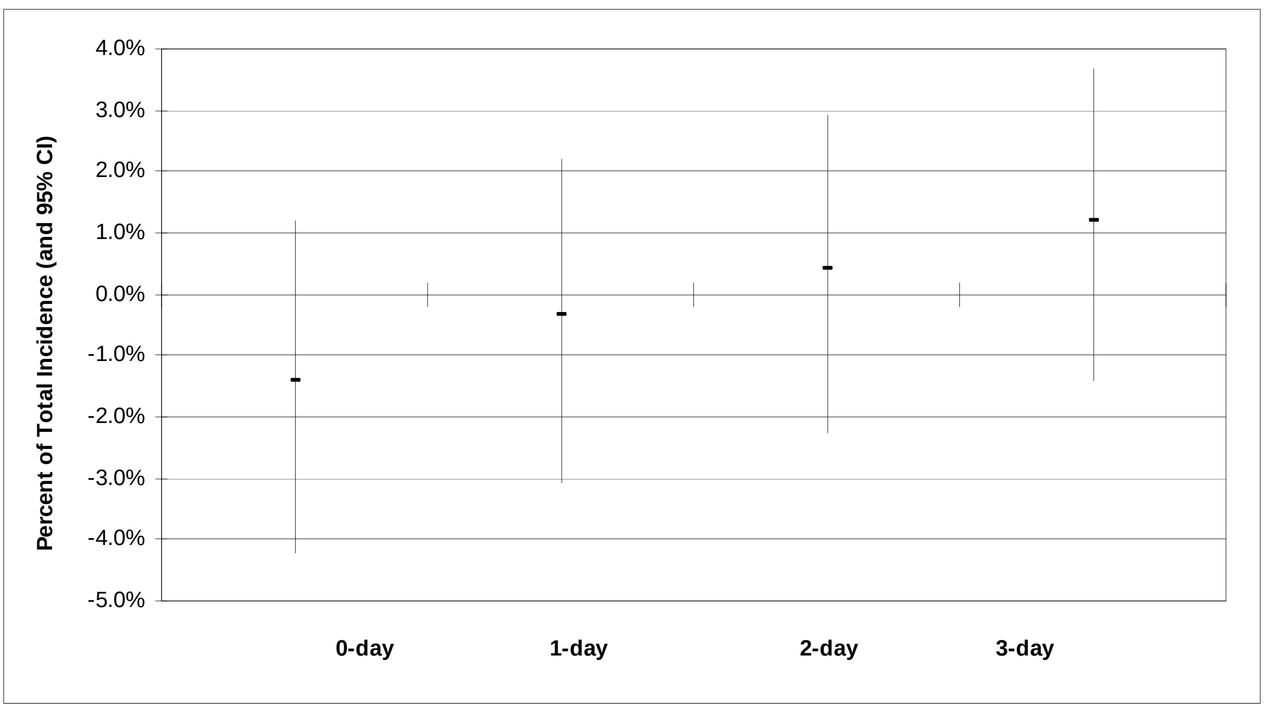


Figure 4-14. Estimated Annual Percent of Non-Accidental Mortality Associated with Short-Term Exposure to O_3 Above Policy Relevant Background for the Period April – September When the Current 8-Hour Standard is Just Met (Based on Bell et al., 2004 – 95 U.S. Cities) – Total and Contribution of 24-Hour O_3 Ranges

Figure 4-14a. Based on 2004 Air Quality

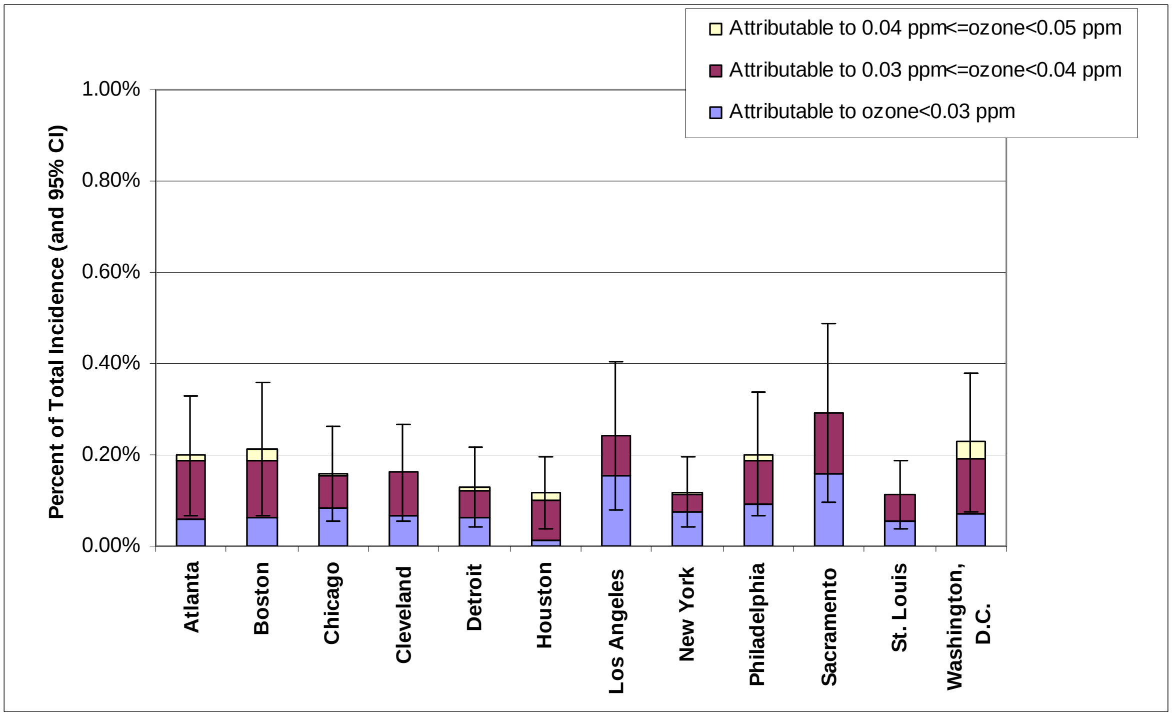


Figure 4-14b. Based on 2002 Air Quality

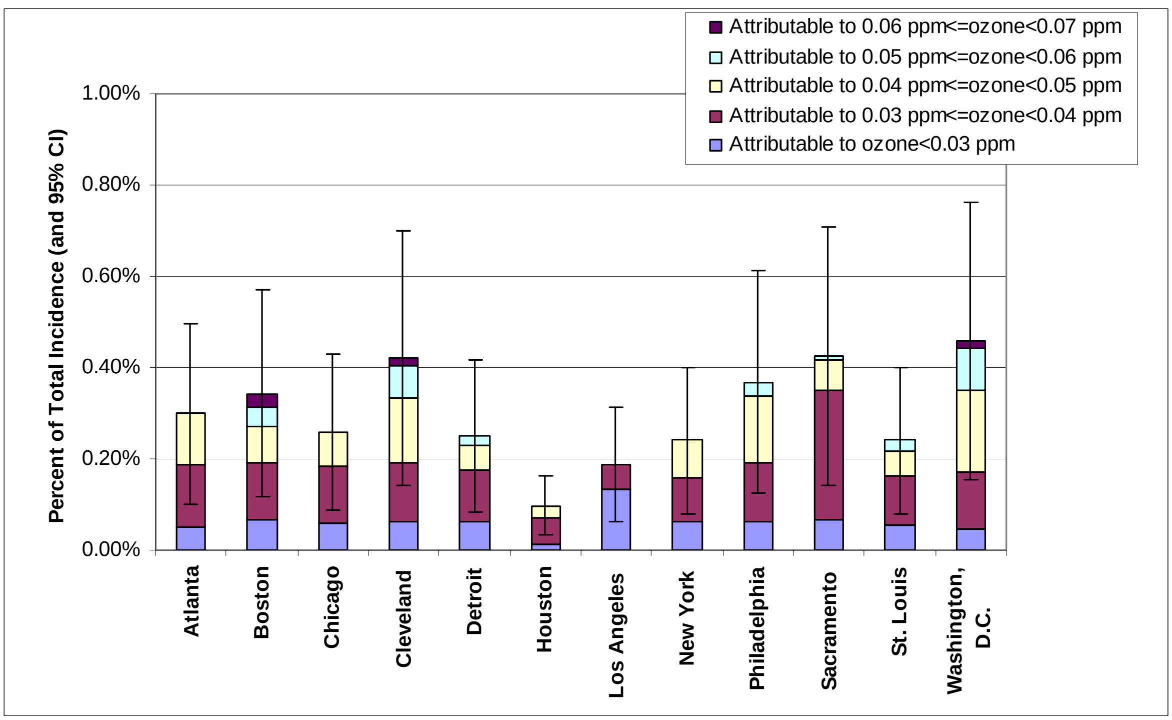


Figure 4-15. Estimated Annual Percent of Cardiorespiratory Mortality Associated with Short-Term Exposure to O_3 Above Policy Relevant Background for the Period April – September When the Current 8-Hour Standard is Just Met (Based on Huang et al., 2004 – 19 U.S. Cities) – Total and Contribution of 24-Hour O_3 Ranges

Figure 4-15a. Based on 2004 Air Quality

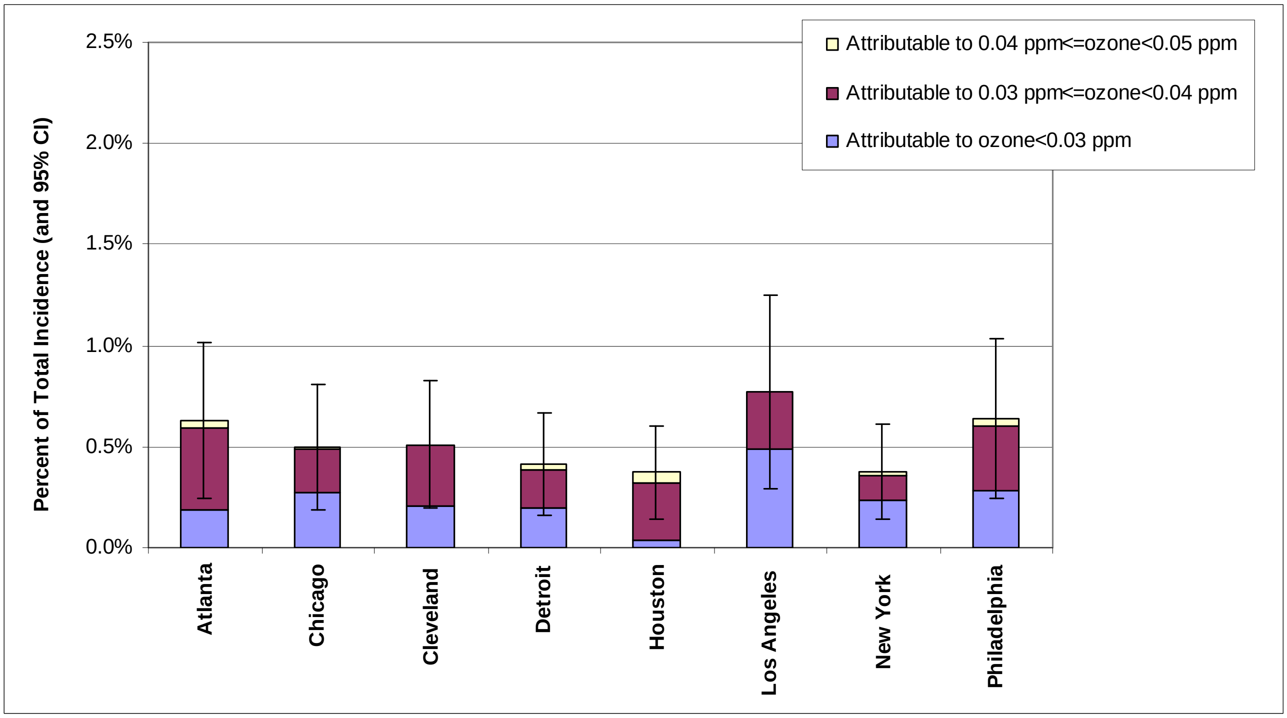


Figure 4-15b. Based on 2002 Air Quality

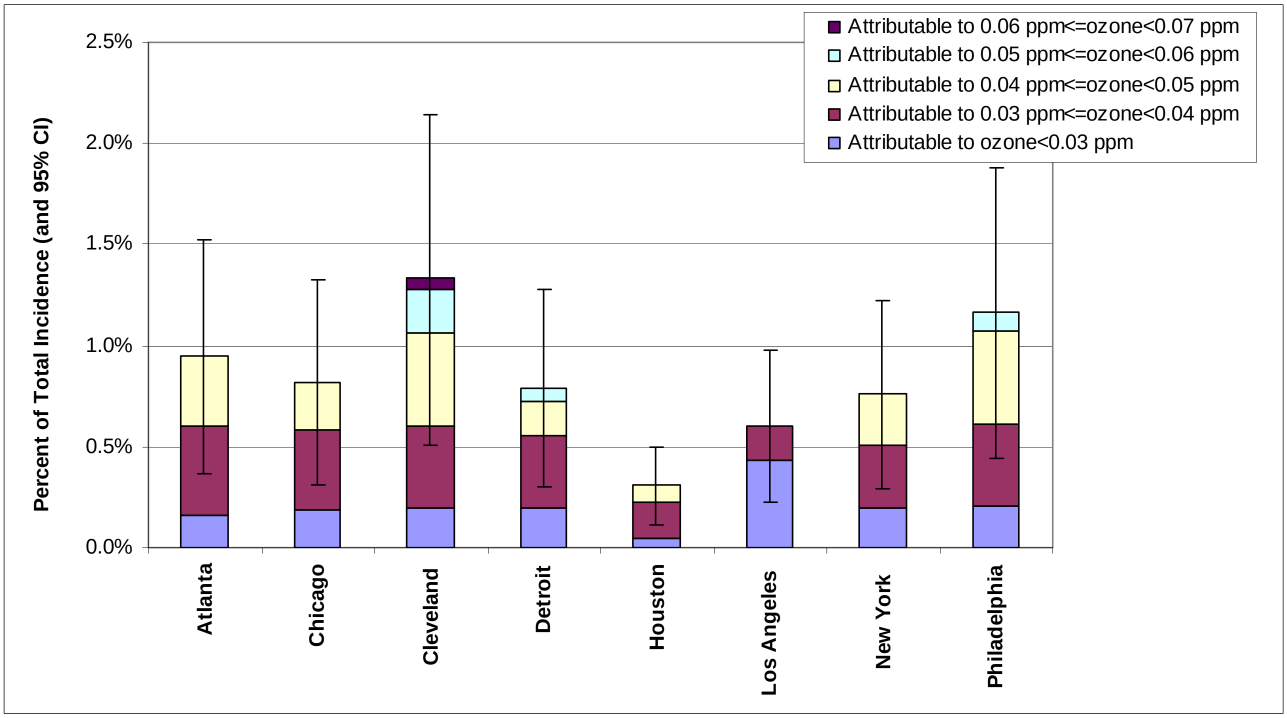
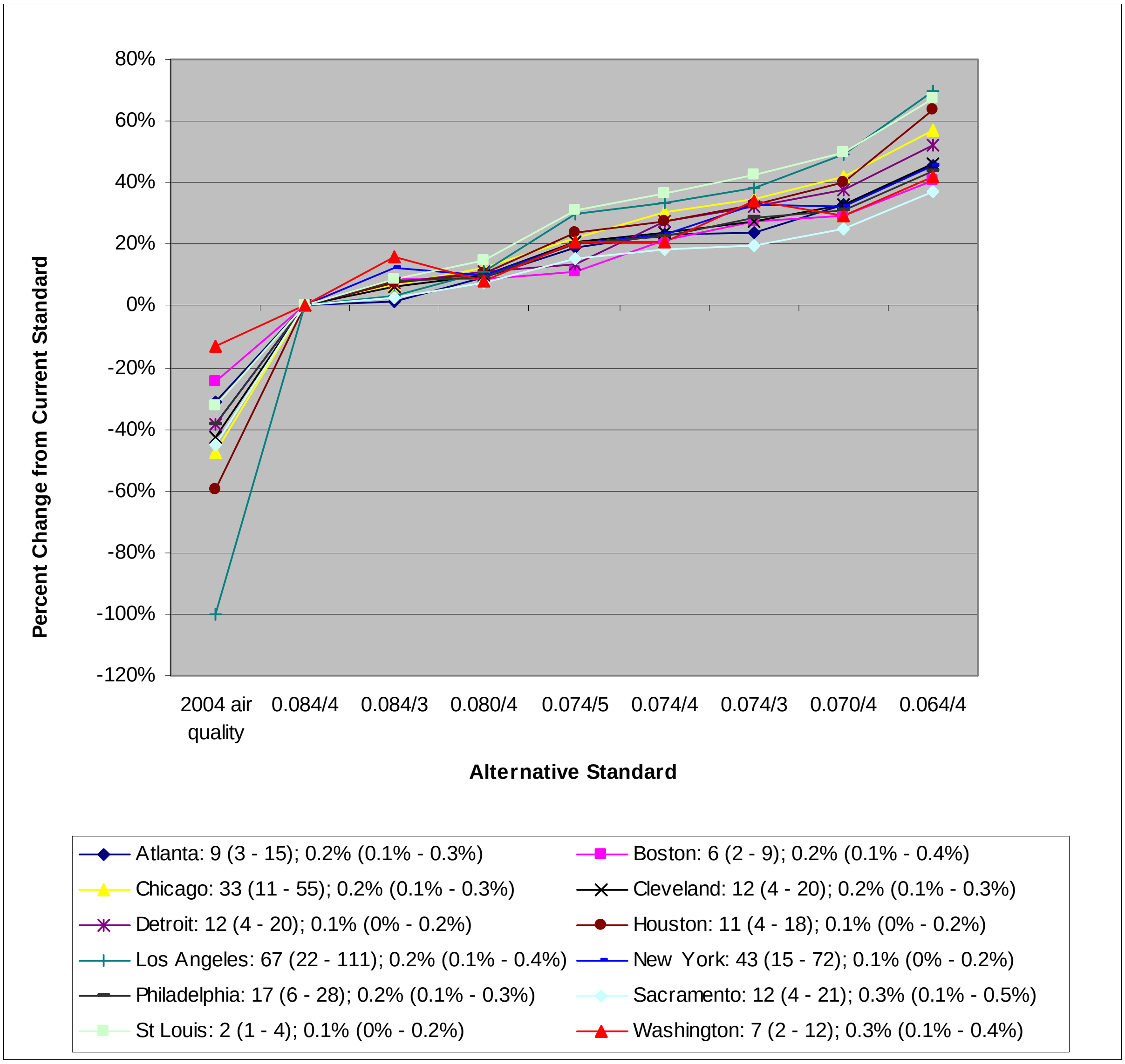


Figure 4-16. Estimated Percent Reductions From the Current Standard to Alternative Standards in O_3-Related Non-Accidental Mortality, Separately for Each Location (Based on Bell et al., 2004 -- 95 U.S. Cities)*

Figure 4-16a. Based on 2004 Air Quality



* The 8-hr average standards shown in these figures, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. The figure also compares the current standard to a recent year of air quality. The incidence (and 95% credible interval) and percent of total incidence (and 95% credible interval) when O_3 concentrations just meet the current standard are shown for each location in the box below each figure.

Figure 4-16b. Based on 2002 Air Quality

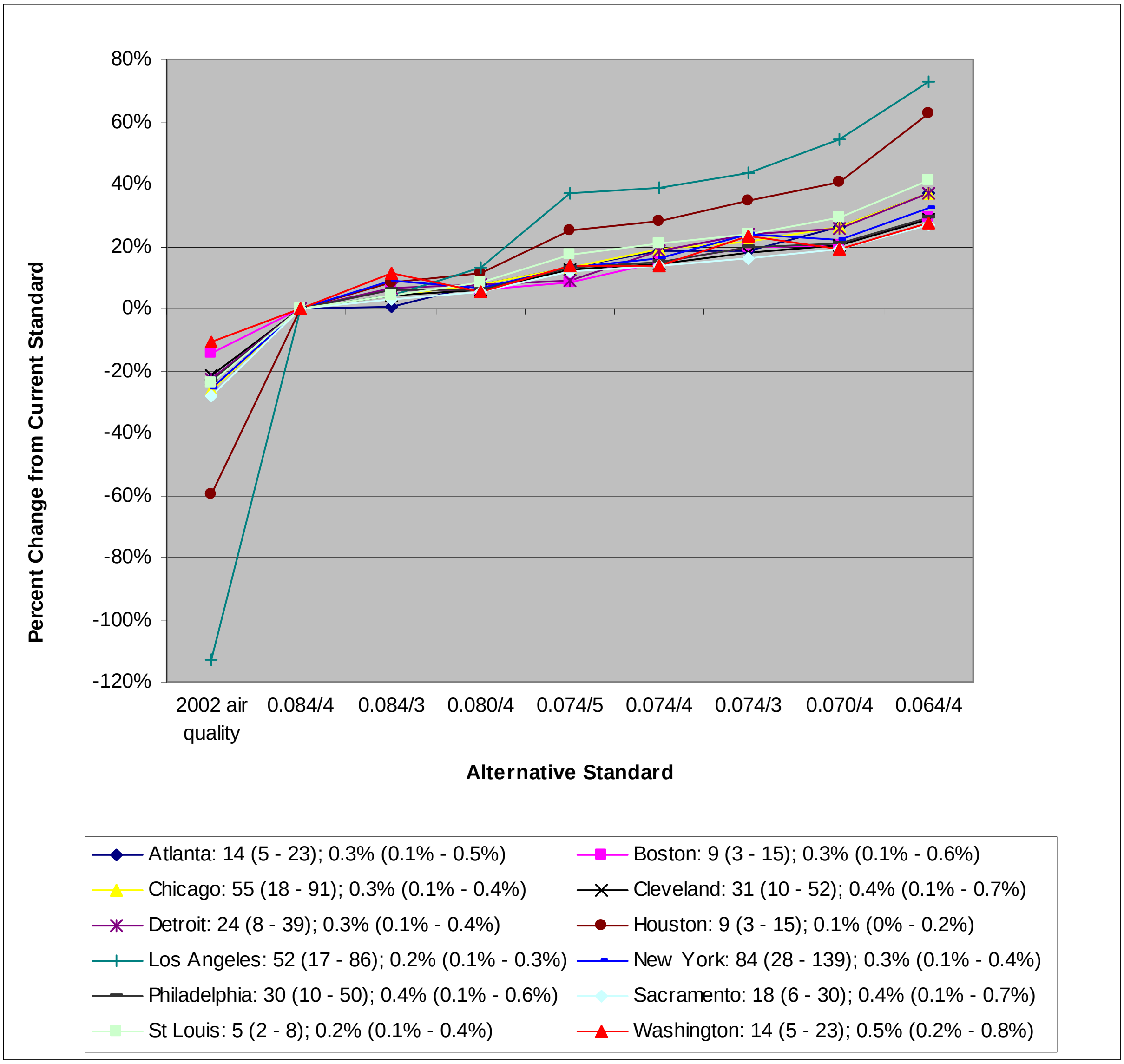
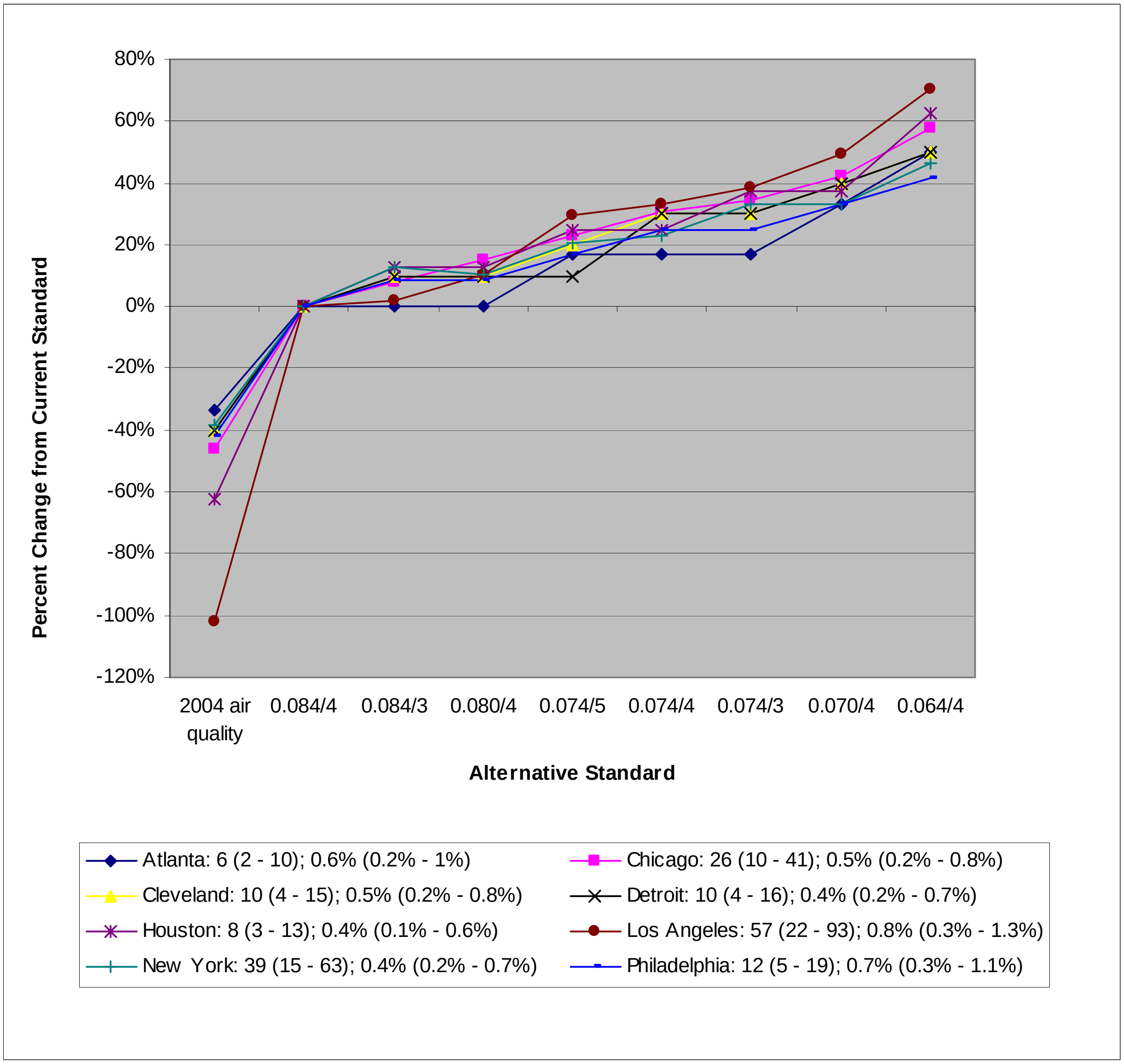


Figure 4-17. Estimated Percent Reductions From the Current Standard to Alternative Standards in O_3-Related Cardiorespiratory Mortality, Separately for Each Location (Based on Huang et al., 2004 -- 19 U.S. Cities)*

Figure 4-17a. Based on 2004 Air Quality



* The 8-hr average standards shown in these figures, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. The figure also compares the current standard to a recent year of air quality. The incidence (and 95% credible interval) and percent of total incidence (and 95% credible interval) when O_3 concentrations just meet the current standard are shown for each location in the box below each figure.

Figure 4-17b. Based on 2002 Air Quality

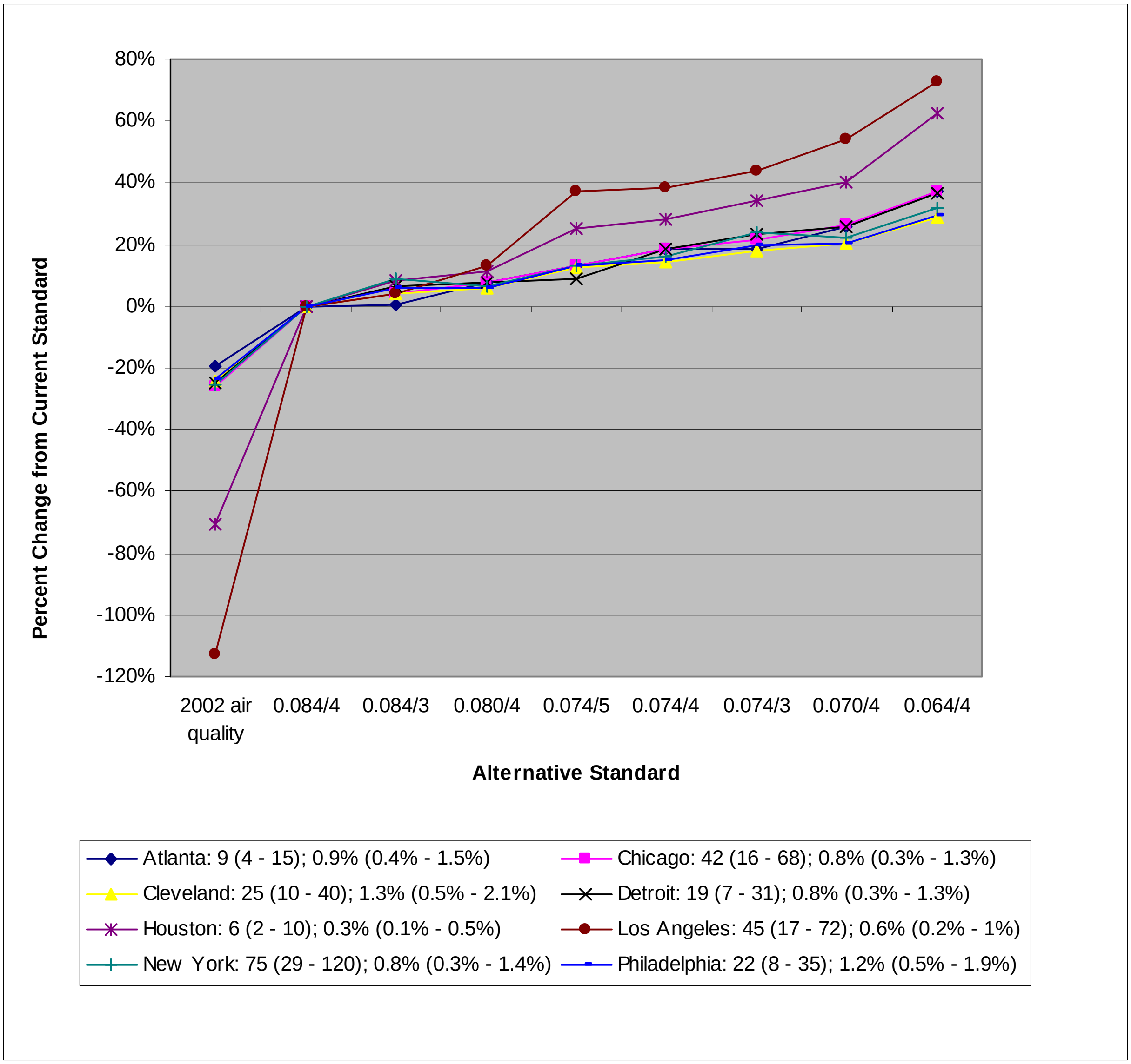


Table 4-16. Estimated Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2004 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
				0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	5 (-20 - 29)	5 (-20 - 29)	4 (-18 - 26)	4 (-16 - 23)	4 (-15 - 22)	4 (-15 - 22)	3 (-13 - 19)	3 (-11 - 16)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	9 (3 - 15)	9 (3 - 15)	8 (3 - 14)	7 (2 - 12)	7 (2 - 12)	7 (2 - 12)	6 (2 - 10)	5 (2 - 8)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	6 (2 - 9)	5 (2 - 9)	5 (2 - 9)	5 (2 - 8)	4 (1 - 7)	4 (1 - 7)	4 (1 - 7)	3 (1 - 6)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	33 (11 - 55)	31 (10 - 52)	29 (10 - 48)	26 (9 - 43)	23 (8 - 39)	22 (7 - 36)	19 (6 - 32)	14 (5 - 24)
	Schwartz (2004)	0-day lag	1 hr max.	314 (99 - 525)	300 (95 - 501)	288 (91 - 482)	268 (85 - 448)	249 (79 - 417)	238 (75 - 399)	222 (70 - 372)	183 (58 - 307)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	118 (37 - 199)	113 (35 - 190)	108 (34 - 182)	101 (31 - 170)	93 (29 - 157)	89 (28 - 151)	83 (26 - 140)	69 (21 - 116)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	19 (-12 - 49)	18 (-11 - 46)	17 (-11 - 44)	15 (-9 - 39)	14 (-9 - 37)	14 (-9 - 36)	13 (-8 - 33)	10 (-6 - 26)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 20)	11 (4 - 19)	11 (4 - 18)	9 (3 - 16)	9 (3 - 15)	9 (3 - 14)	8 (3 - 13)	6 (2 - 11)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	24 (-8 - 56)	22 (-7 - 51)	21 (-7 - 49)	21 (-7 - 48)	17 (-6 - 40)	16 (-5 - 38)	15 (-5 - 35)	11 (-4 - 27)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 20)	11 (4 - 19)	11 (4 - 18)	11 (4 - 18)	9 (3 - 15)	8 (3 - 14)	8 (3 - 13)	6 (2 - 10)
	Schwartz (2004)	0-day lag	1 hr max.	107 (-17 - 229)	102 (-17 - 218)	99 (-16 - 212)	97 (-16 - 209)	87 (-14 - 186)	83 (-13 - 178)	78 (-13 - 168)	66 (-11 - 142)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	58 (18 - 98)	55 (17 - 93)	54 (17 - 91)	53 (17 - 89)	47 (15 - 79)	45 (14 - 76)	42 (13 - 72)	36 (11 - 61)
	Ito (2003)	0-day lag	24 hr avg.	29 (-27 - 85)	27 (-25 - 78)	26 (-24 - 75)	25 (-23 - 73)	21 (-20 - 62)	20 (-18 - 57)	18 (-17 - 53)	14 (-13 - 41)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	22 (1 - 42)	20 (1 - 39)	19 (1 - 37)	17 (1 - 32)	16 (1 - 30)	15 (1 - 28)	13 (1 - 25)	8 (0 - 15)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	11 (4 - 18)	10 (3 - 16)	10 (3 - 16)	8 (3 - 13)	8 (3 - 13)	7 (2 - 12)	6 (2 - 11)	4 (1 - 6)
	Schwartz (2004)	0-day lag	1 hr max.	70 (6 - 132)	66 (6 - 126)	65 (6 - 123)	59 (5 - 112)	57 (5 - 109)	55 (5 - 104)	52 (5 - 99)	42 (4 - 80)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	58 (18 - 98)	55 (17 - 93)	54 (17 - 91)	49 (15 - 83)	48 (15 - 81)	46 (14 - 77)	43 (14 - 73)	35 (11 - 59)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	31 (-74 - 135)	30 (-72 - 131)	27 (-66 - 120)	22 (-52 - 95)	20 (-49 - 90)	19 (-46 - 83)	16 (-38 - 69)	9 (-22 - 41)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	67 (22 - 111)	64 (22 - 107)	59 (20 - 98)	47 (16 - 78)	44 (15 - 74)	41 (14 - 68)	34 (11 - 56)	20 (7 - 33)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	43 (15 - 72)	38 (13 - 63)	39 (13 - 65)	35 (12 - 58)	33 (11 - 55)	29 (10 - 48)	29 (10 - 49)	24 (8 - 39)

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
				0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 28)	15 (5 - 25)	15 (5 - 25)	13 (4 - 22)	13 (4 - 21)	12 (4 - 20)	11 (4 - 19)	9 (3 - 15)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	59 (37 - 81)	54 (34 - 75)	54 (34 - 74)	47 (30 - 65)	46 (29 - 63)	42 (27 - 58)	41 (26 - 56)	33 (21 - 46)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	8 (-25 - 42)	8 (-25 - 41)	8 (-23 - 39)	7 (-21 - 35)	7 (-21 - 34)	7 (-20 - 34)	6 (-19 - 31)	5 (-16 - 26)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 21)	12 (4 - 20)	11 (4 - 19)	10 (4 - 17)	10 (3 - 17)	10 (3 - 17)	9 (3 - 15)	8 (3 - 13)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	3 (-4 - 9)	2 (-4 - 8)	2 (-4 - 8)	2 (-3 - 6)	2 (-3 - 6)	1 (-2 - 5)	1 (-2 - 5)	1 (-1 - 3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	2 (1 - 4)	2 (1 - 3)	2 (1 - 3)	2 (1 - 3)	1 (0 - 2)	1 (0 - 2)	1 (0 - 2)	1 (0 - 1)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	7 (2 - 12)	6 (2 - 10)	6 (2 - 11)	6 (2 - 9)	6 (2 - 9)	5 (2 - 8)	5 (2 - 8)	4 (1 - 7)

*All results are for mortality (among all ages) associated with short-term exposures to O3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-17. Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: April - September, Based Adjusting on 2004 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
				0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.3 (-1.3 - 1.9)	0.3 (-1.3 - 1.9)	0.3 (-1.2 - 1.8)	0.3 (-1.1 - 1.6)	0.2 (-1 - 1.5)	0.2 (-1 - 1.5)	0.2 (-0.9 - 1.3)	0.2 (-0.7 - 1.1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.6)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.8 (0.3 - 1.4)	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.2)	0.6 (0.2 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.4)
	Schwartz (2004)	0-day lag	1 hr max.	5.8 (1.9 - 9.8)	5.6 (1.8 - 9.3)	5.4 (1.7 - 9)	5 (1.6 - 8.3)	4.6 (1.5 - 7.7)	4.4 (1.4 - 7.4)	4.1 (1.3 - 6.9)	3.4 (1.1 - 5.7)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.2 (0.7 - 3.7)	2.1 (0.7 - 3.5)	2 (0.6 - 3.4)	1.9 (0.6 - 3.2)	1.7 (0.5 - 2.9)	1.7 (0.5 - 2.8)	1.6 (0.5 - 2.6)	1.3 (0.4 - 2.2)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	1.3 (-0.8 - 3.5)	1.3 (-0.8 - 3.3)	1.2 (-0.8 - 3.2)	1.1 (-0.7 - 2.8)	1 (-0.6 - 2.7)	1 (-0.6 - 2.6)	0.9 (-0.6 - 2.4)	0.7 (-0.5 - 1.9)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.9 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.3)	0.7 (0.2 - 1.1)	0.6 (0.2 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	1.2 (-0.4 - 2.7)	1.1 (-0.3 - 2.5)	1 (-0.3 - 2.4)	1 (-0.3 - 2.3)	0.8 (-0.3 - 2)	0.8 (-0.3 - 1.8)	0.7 (-0.2 - 1.7)	0.6 (-0.2 - 1.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)
	Schwartz (2004)	0-day lag	1 hr max.	5.2 (-0.8 - 11.1)	4.9 (-0.8 - 10.6)	4.8 (-0.8 - 10.3)	4.7 (-0.8 - 10.1)	4.2 (-0.7 - 9)	4 (-0.7 - 8.6)	3.8 (-0.6 - 8.2)	3.2 (-0.5 - 6.9)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.8 (0.9 - 4.7)	2.7 (0.8 - 4.5)	2.6 (0.8 - 4.4)	2.6 (0.8 - 4.3)	2.3 (0.7 - 3.8)	2.2 (0.7 - 3.7)	2.1 (0.6 - 3.5)	1.7 (0.5 - 2.9)
	Ito (2003)	0-day lag	24 hr avg.	1.4 (-1.3 - 4.1)	1.3 (-1.2 - 3.8)	1.3 (-1.2 - 3.6)	1.2 (-1.1 - 3.6)	1 (-1 - 3)	1 (-0.9 - 2.8)	0.9 (-0.8 - 2.6)	0.7 (-0.6 - 2)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.6 (0 - 1.2)	0.6 (0 - 1.1)	0.6 (0 - 1.1)	0.5 (0 - 0.9)	0.5 (0 - 0.9)	0.4 (0 - 0.8)	0.4 (0 - 0.7)	0.2 (0 - 0.4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.1 (0 - 0.2)
	Schwartz (2004)	0-day lag	1 hr max.	2 (0.2 - 3.9)	1.9 (0.2 - 3.7)	1.9 (0.2 - 3.6)	1.7 (0.2 - 3.3)	1.7 (0.2 - 3.2)	1.6 (0.1 - 3.1)	1.5 (0.1 - 2.9)	1.2 (0.1 - 2.3)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	1.7 (0.5 - 2.9)	1.6 (0.5 - 2.7)	1.6 (0.5 - 2.7)	1.4 (0.5 - 2.4)	1.4 (0.4 - 2.4)	1.3 (0.4 - 2.3)	1.3 (0.4 - 2.1)	1 (0.3 - 1.7)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.3 (-0.8 - 1.4)	0.3 (-0.8 - 1.4)	0.3 (-0.7 - 1.3)	0.2 (-0.5 - 1)	0.2 (-0.5 - 0.9)	0.2 (-0.5 - 0.9)	0.2 (-0.4 - 0.7)	0.1 (-0.2 - 0.4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.2 (0.1 - 0.4)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.4)

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
				0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.1 (0.4 - 1.8)	1 (0.3 - 1.7)	1 (0.3 - 1.7)	0.9 (0.3 - 1.5)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.3)	0.6 (0.2 - 1)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	3.9 (2.5 - 5.3)	3.6 (2.3 - 4.9)	3.5 (2.2 - 4.9)	3.1 (2 - 4.3)	3 (1.9 - 4.2)	2.8 (1.8 - 3.8)	2.7 (1.7 - 3.7)	2.2 (1.4 - 3)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.7 (-2.1 - 3.4)	0.7 (-2 - 3.3)	0.6 (-1.9 - 3.1)	0.6 (-1.8 - 2.9)	0.6 (-1.7 - 2.8)	0.5 (-1.7 - 2.7)	0.5 (-1.5 - 2.5)	0.4 (-1.3 - 2.2)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1 (0.3 - 1.7)	1 (0.3 - 1.6)	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.4)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.6 (0.2 - 1.1)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.7 (-1.2 - 2.7)	0.7 (-1.1 - 2.4)	0.6 (-1 - 2.3)	0.5 (-0.8 - 1.8)	0.5 (-0.8 - 1.7)	0.4 (-0.7 - 1.5)	0.4 (-0.6 - 1.3)	0.2 (-0.4 - 0.9)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.7 (0.2 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.2 (0.4 - 2.1)	1 (0.3 - 1.7)	1.1 (0.4 - 1.9)	1 (0.3 - 1.6)	1 (0.3 - 1.6)	0.8 (0.3 - 1.4)	0.9 (0.3 - 1.5)	0.7 (0.2 - 1.2)

*All results are for mortality (among all ages) associated with short-term exposures to O3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-18. Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2004 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
				0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.4% - 0.6%)	0.1% (-0.4% - 0.6%)	0.1% (-0.4% - 0.6%)	0.1% (-0.3% - 0.5%)	0.1% (-0.3% - 0.5%)	0.1% (-0.3% - 0.5%)	0.1% (-0.3% - 0.4%)	0.1% (-0.2% - 0.3%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	1.5% (0.5% - 2.5%)	1.4% (0.5% - 2.4%)	1.4% (0.4% - 2.3%)	1.3% (0.4% - 2.1%)	1.2% (0.4% - 2%)	1.1% (0.4% - 1.9%)	1.1% (0.3% - 1.8%)	0.9% (0.3% - 1.5%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.6% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	0.3% (-0.2% - 0.7%)	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.1% (-0.1% - 0.4%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	0.3% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.1% (0% - 0.3%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	1.1% (-0.2% - 2.4%)	1.1% (-0.2% - 2.3%)	1.1% (-0.2% - 2.3%)	1% (-0.2% - 2.2%)	0.9% (-0.1% - 2%)	0.9% (-0.1% - 1.9%)	0.8% (-0.1% - 1.8%)	0.7% (-0.1% - 1.5%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.1% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.6%)
	Ito (2003)	0-day lag	24 hr avg.	0.3% (-0.3% - 0.9%)	0.3% (-0.3% - 0.8%)	0.3% (-0.3% - 0.8%)	0.3% (-0.2% - 0.8%)	0.2% (-0.2% - 0.7%)	0.2% (-0.2% - 0.6%)	0.2% (-0.2% - 0.6%)	0.1% (-0.1% - 0.4%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	0.8% (0.1% - 1.5%)	0.7% (0.1% - 1.4%)	0.7% (0.1% - 1.4%)	0.6% (0.1% - 1.2%)	0.6% (0.1% - 1.2%)	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1.1%)	0.5% (0% - 0.9%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.3% - 0.5%)	0.1% (-0.3% - 0.5%)	0.1% (-0.2% - 0.4%)	0.1% (-0.2% - 0.3%)	0.1% (-0.2% - 0.3%)	0.1% (-0.2% - 0.3%)	0.1% (-0.1% - 0.3%)	0% (-0.1% - 0.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
				0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	0.7% (0.5% - 1%)	0.7% (0.4% - 0.9%)	0.7% (0.4% - 0.9%)	0.6% (0.4% - 0.8%)	0.6% (0.4% - 0.8%)	0.5% (0.3% - 0.7%)	0.5% (0.3% - 0.7%)	0.4% (0.3% - 0.6%)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.6% - 1%)	0.2% (-0.6% - 1%)	0.2% (-0.6% - 0.9%)	0.2% (-0.5% - 0.8%)	0.2% (-0.5% - 0.8%)	0.2% (-0.5% - 0.8%)	0.1% (-0.5% - 0.7%)	0.1% (-0.4% - 0.6%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.2% - 0.5%)	0.1% (-0.2% - 0.4%)	0.1% (-0.2% - 0.4%)	0.1% (-0.1% - 0.3%)	0.1% (-0.1% - 0.3%)	0.1% (-0.1% - 0.3%)	0.1% (-0.1% - 0.2%)	0% (-0.1% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)

*All results are for mortality (among all ages) associated with short-term exposures to O3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-19. Estimated Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2002 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
				0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	7 (-30 - 43)	7 (-30 - 43)	6 (-28 - 40)	6 (-26 - 38)	6 (-24 - 35)	6 (-24 - 35)	5 (-22 - 32)	4 (-19 - 27)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	14 (5 - 23)	14 (5 - 23)	13 (4 - 21)	12 (4 - 20)	11 (4 - 19)	11 (4 - 19)	10 (3 - 17)	9 (3 - 14)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	9 (3 - 15)	8 (3 - 14)	8 (3 - 14)	8 (3 - 13)	7 (3 - 12)	7 (2 - 12)	7 (2 - 12)	6 (2 - 10)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	55 (18 - 91)	52 (18 - 87)	50 (17 - 84)	47 (16 - 79)	44 (15 - 74)	43 (14 - 71)	40 (13 - 67)	34 (11 - 57)
	Schwartz (2004)	0-day lag	1 hr max.	427 (136 - 712)	412 (131 - 687)	401 (127 - 669)	381 (121 - 636)	361 (115 - 603)	350 (111 - 585)	335 (106 - 559)	294 (93 - 493)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	161 (51 - 271)	156 (49 - 261)	151 (47 - 254)	144 (45 - 242)	136 (43 - 229)	132 (41 - 222)	126 (39 - 212)	111 (35 - 187)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	49 (-31 - 128)	47 (-30 - 123)	46 (-29 - 120)	43 (-27 - 112)	42 (-26 - 109)	40 (-25 - 105)	39 (-25 - 102)	35 (-22 - 91)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	31 (10 - 52)	30 (10 - 50)	29 (10 - 49)	27 (9 - 45)	27 (9 - 44)	26 (9 - 43)	25 (8 - 41)	22 (7 - 37)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	46 (-15 - 106)	43 (-14 - 100)	43 (-14 - 98)	42 (-14 - 97)	38 (-12 - 87)	35 (-11 - 81)	34 (-11 - 79)	29 (-9 - 67)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	24 (8 - 39)	22 (7 - 37)	22 (7 - 36)	22 (7 - 36)	19 (6 - 32)	18 (6 - 30)	18 (6 - 29)	15 (5 - 25)
	Schwartz (2004)	0-day lag	1 hr max.	158 (-26 - 336)	150 (-24 - 320)	148 (-24 - 316)	147 (-24 - 313)	134 (-22 - 287)	128 (-21 - 274)	125 (-20 - 268)	111 (-18 - 239)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	86 (27 - 144)	82 (26 - 137)	81 (25 - 136)	80 (25 - 134)	73 (23 - 123)	70 (22 - 117)	68 (21 - 115)	61 (19 - 102)
	Ito (2003)	0-day lag	24 hr avg.	56 (-52 - 162)	53 (-49 - 151)	52 (-48 - 150)	51 (-48 - 147)	46 (-42 - 132)	43 (-40 - 124)	42 (-39 - 120)	36 (-33 - 103)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	18 (1 - 34)	16 (1 - 32)	16 (1 - 31)	13 (1 - 26)	13 (1 - 25)	12 (1 - 23)	11 (1 - 21)	7 (0 - 13)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	9 (3 - 15)	8 (3 - 13)	8 (3 - 13)	7 (2 - 11)	6 (2 - 10)	6 (2 - 10)	5 (2 - 9)	3 (1 - 5)
	Schwartz (2004)	0-day lag	1 hr max.	63 (6 - 119)	59 (5 - 113)	58 (5 - 110)	53 (5 - 100)	51 (5 - 97)	48 (4 - 92)	46 (4 - 87)	36 (3 - 69)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	53 (16 - 88)	50 (16 - 84)	49 (15 - 82)	44 (14 - 74)	43 (13 - 72)	40 (13 - 68)	38 (12 - 64)	30 (9 - 51)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	24 (-58 - 105)	23 (-55 - 100)	21 (-50 - 91)	15 (-36 - 66)	15 (-35 - 64)	13 (-32 - 59)	11 (-26 - 48)	7 (-16 - 29)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	52 (17 - 86)	49 (17 - 82)	45 (15 - 74)	33 (11 - 54)	32 (11 - 53)	29 (10 - 48)	24 (8 - 39)	14 (5 - 23)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	84 (28 - 139)	76 (25 - 126)	78 (26 - 130)	73 (24 - 121)	70 (23 - 116)	64 (21 - 106)	65 (22 - 108)	57 (19 - 95)

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
				0.084/4* **	**0.084/3**	**0.080/4**	**0.074/5**	**0.074/4**	**0.074/3**	**0.070/4**	**0.064/4**
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	30 (10 - 50)	28 (10 - 47)	28 (9 - 47)	26 (9 - 43)	26 (9 - 42)	24 (8 - 40)	24 (8 - 40)	21 (7 - 35)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	107 (67 - 146)	101 (63 - 138)	101 (63 - 137)	93 (58 - 127)	91 (57 - 124)	86 (54 - 117)	85 (53 - 116)	75 (47 - 103)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	12 (-37 - 60)	12 (-36 - 58)	11 (-35 - 57)	11 (-32 - 53)	10 (-32 - 52)	10 (-31 - 50)	10 (-30 - 49)	9 (-27 - 44)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	18 (6 - 30)	17 (6 - 29)	17 (6 - 28)	16 (5 - 26)	15 (5 - 26)	15 (5 - 25)	14 (5 - 24)	13 (4 - 22)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	5 (-9 - 20)	5 (-9 - 19)	5 (-8 - 18)	4 (-8 - 16)	4 (-7 - 15)	4 (-7 - 15)	4 (-6 - 14)	3 (-5 - 12)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	5 (2 - 8)	5 (2 - 8)	4 (1 - 7)	4 (1 - 7)	4 (1 - 6)	4 (1 - 6)	3 (1 - 6)	3 (1 - 5)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	14 (5 - 23)	12 (4 - 20)	13 (4 - 21)	12 (4 - 19)	12 (4 - 19)	10 (3 - 17)	11 (4 - 18)	10 (3 - 16)

*All results are for mortality (among all ages) associated with short-term exposures to O3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-20. Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2002 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
				0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.5 (-2 - 2.9)	0.5 (-2 - 2.9)	0.4 (-1.9 - 2.7)	0.4 (-1.8 - 2.5)	0.4 (-1.6 - 2.4)	0.4 (-1.7 - 2.4)	0.3 (-1.5 - 2.2)	0.3 (-1.3 - 1.8)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.3)	0.7 (0.2 - 1.1)	0.6 (0.2 - 1)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.3 (0.4 - 2.1)	1.2 (0.4 - 2)	1.2 (0.4 - 2)	1.2 (0.4 - 1.9)	1.1 (0.4 - 1.8)	1 (0.3 - 1.7)	1 (0.3 - 1.7)	0.9 (0.3 - 1.5)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1 (0.3 - 1.7)	1 (0.3 - 1.6)	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.5)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.7 (0.3 - 1.2)	0.6 (0.2 - 1.1)
	Schwartz (2004)	0-day lag	1 hr max.	7.9 (2.5 - 13.2)	7.7 (2.4 - 12.8)	7.5 (2.4 - 12.4)	7.1 (2.3 - 11.8)	6.7 (2.1 - 11.2)	6.5 (2.1 - 10.9)	6.2 (2 - 10.4)	5.5 (1.7 - 9.2)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	3 (0.9 - 5)	2.9 (0.9 - 4.9)	2.8 (0.9 - 4.7)	2.7 (0.8 - 4.5)	2.5 (0.8 - 4.3)	2.5 (0.8 - 4.1)	2.3 (0.7 - 3.9)	2.1 (0.6 - 3.5)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	3.5 (-2.2 - 9.2)	3.4 (-2.1 - 8.8)	3.3 (-2.1 - 8.6)	3.1 (-1.9 - 8)	3 (-1.9 - 7.8)	2.9 (-1.8 - 7.5)	2.8 (-1.8 - 7.3)	2.5 (-1.6 - 6.5)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	2.2 (0.8 - 3.7)	2.2 (0.7 - 3.6)	2.1 (0.7 - 3.5)	2 (0.7 - 3.3)	1.9 (0.6 - 3.2)	1.8 (0.6 - 3.1)	1.8 (0.6 - 3)	1.6 (0.5 - 2.7)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	2.2 (-0.7 - 5.2)	2.1 (-0.7 - 4.8)	2.1 (-0.7 - 4.8)	2 (-0.7 - 4.7)	1.8 (-0.6 - 4.2)	1.7 (-0.6 - 3.9)	1.7 (-0.5 - 3.8)	1.4 (-0.5 - 3.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.1 (0.4 - 1.9)	1.1 (0.4 - 1.8)	1.1 (0.4 - 1.8)	1 (0.3 - 1.7)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.4)	0.7 (0.2 - 1.2)
	Schwartz (2004)	0-day lag	1 hr max.	7.7 (-1.3 - 16.3)	7.3 (-1.2 - 15.5)	7.2 (-1.2 - 15.4)	7.1 (-1.2 - 15.2)	6.5 (-1.1 - 13.9)	6.2 (-1 - 13.3)	6.1 (-1 - 13)	5.4 (-0.9 - 11.6)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	4.2 (1.3 - 7)	4 (1.2 - 6.6)	3.9 (1.2 - 6.6)	3.9 (1.2 - 6.5)	3.5 (1.1 - 6)	3.4 (1.1 - 5.7)	3.3 (1 - 5.6)	2.9 (0.9 - 4.9)
	Ito (2003)	0-day lag	24 hr avg.	2.7 (-2.5 - 7.8)	2.6 (-2.4 - 7.4)	2.5 (-2.3 - 7.3)	2.5 (-2.3 - 7.2)	2.2 (-2.1 - 6.4)	2.1 (-1.9 - 6)	2 (-1.9 - 5.8)	1.7 (-1.6 - 5)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.5 (0 - 1)	0.5 (0 - 0.9)	0.5 (0 - 0.9)	0.4 (0 - 0.8)	0.4 (0 - 0.7)	0.3 (0 - 0.7)	0.3 (0 - 0.6)	0.2 (0 - 0.4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.1 (0 - 0.2)
	Schwartz (2004)	0-day lag	1 hr max.	1.8 (0.2 - 3.5)	1.7 (0.2 - 3.3)	1.7 (0.2 - 3.2)	1.5 (0.1 - 2.9)	1.5 (0.1 - 2.9)	1.4 (0.1 - 2.7)	1.3 (0.1 - 2.6)	1.1 (0.1 - 2)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	1.5 (0.5 - 2.6)	1.5 (0.5 - 2.5)	1.4 (0.4 - 2.4)	1.3 (0.4 - 2.2)	1.3 (0.4 - 2.1)	1.2 (0.4 - 2)	1.1 (0.4 - 1.9)	0.9 (0.3 - 1.5)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.3 (-0.6 - 1.1)	0.2 (-0.6 - 1.1)	0.2 (-0.5 - 1)	0.2 (-0.4 - 0.7)	0.2 (-0.4 - 0.7)	0.1 (-0.3 - 0.6)	0.1 (-0.3 - 0.5)	0.1 (-0.2 - 0.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.1 (0 - 0.2)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.4)	0.9 (0.3 - 1.5)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.2)	0.6 (0.2 - 1.1)

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
				0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	2 (0.7 - 3.3)	1.9 (0.6 - 3.1)	1.9 (0.6 - 3.1)	1.7 (0.6 - 2.9)	1.7 (0.6 - 2.8)	1.6 (0.5 - 2.6)	1.6 (0.5 - 2.6)	1.4 (0.5 - 2.3)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	7 (4.4 - 9.6)	6.6 (4.2 - 9.1)	6.6 (4.2 - 9.1)	6.1 (3.9 - 8.4)	6 (3.8 - 8.2)	5.7 (3.6 - 7.7)	5.6 (3.5 - 7.6)	5 (3.1 - 6.8)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	1 (-3 - 4.9)	1 (-2.9 - 4.8)	0.9 (-2.8 - 4.6)	0.9 (-2.6 - 4.3)	0.9 (-2.6 - 4.2)	0.8 (-2.5 - 4.1)	0.8 (-2.4 - 4)	0.7 (-2.2 - 3.6)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.5 (0.5 - 2.4)	1.4 (0.5 - 2.4)	1.4 (0.5 - 2.3)	1.3 (0.4 - 2.1)	1.3 (0.4 - 2.1)	1.2 (0.4 - 2)	1.2 (0.4 - 2)	1.1 (0.4 - 1.8)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	1.6 (-2.6 - 5.6)	1.5 (-2.5 - 5.4)	1.4 (-2.4 - 5.2)	1.3 (-2.2 - 4.7)	1.2 (-2.1 - 4.5)	1.2 (-2 - 4.3)	1.1 (-1.8 - 4)	0.9 (-1.5 - 3.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.4 (0.5 - 2.3)	1.3 (0.4 - 2.2)	1.3 (0.4 - 2.1)	1.2 (0.4 - 1.9)	1.1 (0.4 - 1.8)	1.1 (0.4 - 1.8)	1 (0.3 - 1.6)	0.8 (0.3 - 1.4)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	2.4 (0.8 - 3.9)	2.1 (0.7 - 3.5)	2.2 (0.8 - 3.7)	2 (0.7 - 3.4)	2 (0.7 - 3.4)	1.8 (0.6 - 3)	1.9 (0.6 - 3.2)	1.7 (0.6 - 2.9)

*All results are for mortality (among all ages) associated with short-term exposures to O3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-21. Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2002 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
				0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.7% - 0.9%)	0.1% (-0.6% - 0.9%)	0.1% (-0.6% - 0.9%)	0.1% (-0.6% - 0.8%)	0.1% (-0.5% - 0.8%)	0.1% (-0.5% - 0.8%)	0.1% (-0.5% - 0.7%)	0.1% (-0.4% - 0.6%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)
	Schwartz (2004)	0-day lag	1 hr max.	2% (0.6% - 3.4%)	2% (0.6% - 3.3%)	1.9% (0.6% - 3.2%)	1.8% (0.6% - 3%)	1.7% (0.5% - 2.9%)	1.7% (0.5% - 2.8%)	1.6% (0.5% - 2.7%)	1.4% (0.4% - 2.3%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.8% (0.2% - 1.3%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	0.7% (-0.4% - 1.7%)	0.6% (-0.4% - 1.7%)	0.6% (-0.4% - 1.6%)	0.6% (-0.4% - 1.5%)	0.6% (-0.4% - 1.5%)	0.5% (-0.3% - 1.4%)	0.5% (-0.3% - 1.4%)	0.5% (-0.3% - 1.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	0.5% (-0.2% - 1.1%)	0.5% (-0.1% - 1.1%)	0.5% (-0.1% - 1%)	0.4% (-0.1% - 1%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)
	Schwartz (2004)	0-day lag	1 hr max.	1.7% (-0.3% - 3.6%)	1.6% (-0.3% - 3.4%)	1.6% (-0.3% - 3.4%)	1.6% (-0.3% - 3.3%)	1.4% (-0.2% - 3%)	1.4% (-0.2% - 2.9%)	1.3% (-0.2% - 2.8%)	1.2% (-0.2% - 2.5%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.9% (0.3% - 1.5%)	0.9% (0.3% - 1.5%)	0.9% (0.3% - 1.4%)	0.8% (0.3% - 1.4%)	0.8% (0.2% - 1.3%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.2%)	0.6% (0.2% - 1.1%)
	Ito (2003)	0-day lag	24 hr avg.	0.6% (-0.6% - 1.7%)	0.6% (-0.5% - 1.6%)	0.6% (-0.5% - 1.6%)	0.5% (-0.5% - 1.6%)	0.5% (-0.5% - 1.4%)	0.5% (-0.4% - 1.3%)	0.4% (-0.4% - 1.3%)	0.4% (-0.3% - 1.1%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	0.7% (0.1% - 1.3%)	0.7% (0.1% - 1.2%)	0.6% (0.1% - 1.2%)	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1.1%)	0.5% (0% - 1%)	0.5% (0% - 1%)	0.4% (0% - 0.8%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.2% - 0.4%)	0.1% (-0.2% - 0.4%)	0.1% (-0.2% - 0.3%)	0.1% (-0.1% - 0.2%)	0.1% (-0.1% - 0.2%)	0% (-0.1% - 0.2%)	0% (-0.1% - 0.2%)	0% (-0.1% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
				0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	1.3% (0.8% - 1.8%)	1.3% (0.8% - 1.7%)	1.3% (0.8% - 1.7%)	1.2% (0.7% - 1.6%)	1.1% (0.7% - 1.5%)	1.1% (0.7% - 1.5%)	1.1% (0.7% - 1.4%)	0.9% (0.6% - 1.3%)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.3% (-0.9% - 1.4%)	0.3% (-0.8% - 1.4%)	0.3% (-0.8% - 1.3%)	0.3% (-0.8% - 1.3%)	0.2% (-0.8% - 1.2%)	0.2% (-0.7% - 1.2%)	0.2% (-0.7% - 1.2%)	0.2% (-0.6% - 1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.3% (-0.5% - 1%)	0.3% (-0.4% - 0.9%)	0.2% (-0.4% - 0.9%)	0.2% (-0.4% - 0.8%)	0.2% (-0.4% - 0.8%)	0.2% (-0.3% - 0.7%)	0.2% (-0.3% - 0.7%)	0.2% (-0.3% - 0.6%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5% (0.2% - 0.8%)	0.4% (0.1% - 0.7%)	0.5% (0.2% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)

*All results are for mortality (among all ages) associated with short-term exposures to O3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-22. Estimated Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2004 O_3 Concentrations*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
		0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Atlanta	Atlanta	6 (-2 - 14)	6 (-2 - 13)	5 (-2 - 12)	5 (-2 - 11)	5 (-1 - 10)	4 (-1 - 10)	4 (-1 - 9)	3 (-1 - 7)
	19 U.S. Cities	6 (2 - 10)	6 (2 - 10)	6 (2 - 9)	5 (2 - 8)	5 (2 - 8)	5 (2 - 8)	4 (2 - 7)	3 (1 - 5)
Chicago	Chicago	16 (-14 - 45)	15 (-13 - 42)	14 (-12 - 39)	12 (-11 - 35)	11 (-10 - 31)	10 (-9 - 29)	9 (-8 - 26)	7 (-6 - 19)
	19 U.S. Cities	26 (10 - 41)	24 (9 - 39)	22 (9 - 36)	20 (8 - 32)	18 (7 - 29)	17 (6 - 27)	15 (6 - 24)	11 (4 - 18)
Cleveland	Cleveland	11 (0 - 23)	11 (0 - 21)	10 (0 - 21)	9 (0 - 18)	9 (0 - 17)	8 (0 - 17)	8 (0 - 15)	6 (0 - 12)
	19 U.S. Cities	10 (4 - 15)	9 (3 - 15)	9 (3 - 14)	8 (3 - 12)	7 (3 - 12)	7 (3 - 11)	6 (2 - 10)	5 (2 - 8)
Detroit	Detroit	11 (-1 - 23)	10 (-1 - 21)	10 (-1 - 20)	9 (-1 - 20)	8 (-1 - 17)	7 (-1 - 15)	7 (-1 - 14)	5 (-1 - 11)
	19 U.S. Cities	10 (4 - 16)	9 (4 - 15)	9 (3 - 14)	9 (3 - 14)	7 (3 - 12)	7 (3 - 11)	6 (2 - 10)	5 (2 - 8)
Houston	Houston	8 (-1 - 16)	7 (-1 - 15)	7 (-1 - 15)	6 (-1 - 12)	6 (-1 - 12)	5 (-1 - 11)	5 (-1 - 10)	3 (0 - 6)
	19 U.S. Cities	8 (3 - 13)	7 (3 - 12)	7 (3 - 11)	6 (2 - 10)	6 (2 - 9)	5 (2 - 8)	5 (2 - 8)	3 (1 - 5)
Los Angeles	Los Angeles	50 (0 - 98)	48 (0 - 95)	44 (0 - 88)	35 (0 - 69)	33 (0 - 65)	30 (0 - 61)	25 (0 - 50)	15 (0 - 30)
	19 U.S. Cities	57 (22 - 93)	56 (21 - 90)	51 (19 - 83)	40 (15 - 65)	38 (15 - 62)	35 (13 - 57)	29 (11 - 47)	17 (7 - 28)
New York	New York	53 (17 - 89)	47 (15 - 78)	48 (15 - 80)	43 (14 - 71)	41 (13 - 68)	36 (11 - 60)	36 (11 - 60)	29 (9 - 49)
	19 U.S. Cities	39 (15 - 63)	34 (13 - 55)	35 (13 - 57)	31 (12 - 50)	30 (11 - 48)	26 (10 - 42)	26 (10 - 42)	21 (8 - 34)
Philadelphia	Philadelphia	15 (1 - 28)	14 (1 - 26)	13 (1 - 26)	12 (1 - 23)	11 (1 - 22)	10 (0 - 20)	10 (0 - 20)	8 (0 - 16)
	19 U.S. Cities	12 (5 - 19)	11 (4 - 18)	11 (4 - 18)	10 (4 - 16)	9 (4 - 15)	9 (3 - 14)	8 (3 - 13)	7 (3 - 11)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-23. Estimated Cardiorespiratory Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2004 O_3 Concentrations*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
		0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Atlanta	Atlanta	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.8)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)
	19 U.S. Cities	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
Chicago	Chicago	0.3 (-0.3 - 0.8)	0.3 (-0.2 - 0.8)	0.3 (-0.2 - 0.7)	0.2 (-0.2 - 0.7)	0.2 (-0.2 - 0.6)	0.2 (-0.2 - 0.5)	0.2 (-0.2 - 0.5)	0.1 (-0.1 - 0.4)
	19 U.S. Cities	0.5 (0.2 - 0.8)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.3)
Cleveland	Cleveland	0.8 (0 - 1.6)	0.8 (0 - 1.5)	0.7 (0 - 1.5)	0.6 (0 - 1.3)	0.6 (0 - 1.2)	0.6 (0 - 1.2)	0.5 (0 - 1.1)	0.4 (0 - 0.9)
	19 U.S. Cities	0.7 (0.3 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.7)	0.4 (0.1 - 0.6)
Detroit	Detroit	0.5 (-0.1 - 1.1)	0.5 (-0.1 - 1)	0.5 (-0.1 - 1)	0.5 (-0.1 - 1)	0.4 (0 - 0.8)	0.4 (0 - 0.8)	0.3 (0 - 0.7)	0.3 (0 - 0.5)
	19 U.S. Cities	0.5 (0.2 - 0.8)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
Houston	Houston	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)
	19 U.S. Cities	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.2)	0.1 (0.1 - 0.2)	0.1 (0 - 0.1)
Los Angeles	Los Angeles	0.5 (0 - 1)	0.5 (0 - 1)	0.5 (0 - 0.9)	0.4 (0 - 0.7)	0.3 (0 - 0.7)	0.3 (0 - 0.6)	0.3 (0 - 0.5)	0.2 (0 - 0.3)
	19 U.S. Cities	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.6)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.3)
New York	New York	0.6 (0.2 - 1)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.5 (0.1 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.5)
	19 U.S. Cities	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.6)	0.4 (0.2 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
Philadelphia	Philadelphia	1 (0 - 1.9)	0.9 (0 - 1.7)	0.9 (0 - 1.7)	0.8 (0 - 1.5)	0.8 (0 - 1.5)	0.7 (0 - 1.3)	0.7 (0 - 1.3)	0.5 (0 - 1.1)
	19 U.S. Cities	0.8 (0.3 - 1.3)	0.7 (0.3 - 1.2)	0.7 (0.3 - 1.2)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.4 (0.2 - 0.7)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-24. Estimated Percent of Total Incidence of Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: April - September, Based Adjusting on 2004 O_3 Concentrations*

Risk Assessment Location	Study Location	Percent of Total Incidence of Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
		0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Atlanta	Atlanta	0.6% (-0.2% - 1.4%)	0.6% (-0.2% - 1.4%)	0.6% (-0.2% - 1.3%)	0.5% (-0.2% - 1.1%)	0.5% (-0.2% - 1.1%)	0.5% (-0.2% - 1.1%)	0.4% (-0.1% - 0.9%)	0.3% (-0.1% - 0.8%)
	19 U.S. Cities	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.4% (0.2% - 0.7%)	0.3% (0.1% - 0.6%)
Chicago	Chicago	0.3% (-0.3% - 0.9%)	0.3% (-0.3% - 0.8%)	0.3% (-0.2% - 0.8%)	0.2% (-0.2% - 0.7%)	0.2% (-0.2% - 0.6%)	0.2% (-0.2% - 0.6%)	0.2% (-0.2% - 0.5%)	0.1% (-0.1% - 0.4%)
	19 U.S. Cities	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.4% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.3%)
Cleveland	Cleveland	0.6% (0% - 1.2%)	0.6% (0% - 1.1%)	0.5% (0% - 1.1%)	0.5% (0% - 1%)	0.5% (0% - 0.9%)	0.4% (0% - 0.9%)	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)
	19 U.S. Cities	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.7%)	0.4% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.4%)
Detroit	Detroit	0.5% (-0.1% - 0.9%)	0.4% (0% - 0.9%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)
	19 U.S. Cities	0.4% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Houston	Houston	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.1% (0% - 0.3%)
	19 U.S. Cities	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.1% (0.1% - 0.2%)
Los Angeles	Los Angeles	0.7% (0% - 1.3%)	0.6% (0% - 1.3%)	0.6% (0% - 1.2%)	0.5% (0% - 0.9%)	0.4% (0% - 0.9%)	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)	0.2% (0% - 0.4%)
	19 U.S. Cities	0.8% (0.3% - 1.3%)	0.8% (0.3% - 1.2%)	0.7% (0.3% - 1.1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.4% (0.2% - 0.6%)	0.2% (0.1% - 0.4%)
New York	New York	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.5%)
	19 U.S. Cities	0.4% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.2% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)
Philadelphia	Philadelphia	0.8% (0% - 1.5%)	0.7% (0% - 1.4%)	0.7% (0% - 1.4%)	0.6% (0% - 1.2%)	0.6% (0% - 1.2%)	0.6% (0% - 1.1%)	0.6% (0% - 1.1%)	0.4% (0% - 0.9%)
	19 U.S. Cities	0.7% (0.3% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-25. Estimated Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2002 O_3 Concentrations*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
		0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Atlanta	Atlanta	9 (-3 - 20)	9 (-3 - 20)	8 (-3 - 19)	8 (-3 - 18)	7 (-2 - 17)	7 (-2 - 17)	7 (-2 - 15)	6 (-2 - 13)
	19 U.S. Cities	9 (4 - 15)	9 (4 - 15)	9 (3 - 14)	8 (3 - 13)	8 (3 - 12)	8 (3 - 12)	7 (3 - 11)	6 (2 - 9)
Chicago	Chicago	26 (-23 - 73)	25 (-22 - 70)	24 (-21 - 68)	22 (-20 - 64)	21 (-19 - 60)	20 (-18 - 57)	19 (-17 - 54)	16 (-14 - 46)
	19 U.S. Cities	42 (16 - 68)	40 (15 - 65)	39 (15 - 63)	36 (14 - 59)	34 (13 - 55)	33 (13 - 53)	31 (12 - 50)	26 (10 - 43)
Cleveland	Cleveland	30 (-1 - 59)	28 (-1 - 57)	28 (-1 - 56)	26 (-1 - 52)	25 (-1 - 51)	24 (-1 - 49)	24 (-1 - 47)	21 (-1 - 42)
	19 U.S. Cities	25 (10 - 40)	24 (9 - 39)	24 (9 - 38)	22 (8 - 35)	21 (8 - 34)	21 (8 - 33)	20 (8 - 32)	18 (7 - 29)
Detroit	Detroit	21 (-2 - 44)	20 (-2 - 41)	19 (-2 - 40)	19 (-2 - 40)	17 (-2 - 36)	16 (-2 - 33)	16 (-2 - 33)	13 (-2 - 28)
	19 U.S. Cities	19 (7 - 31)	18 (7 - 29)	18 (7 - 29)	17 (7 - 28)	16 (6 - 25)	15 (6 - 24)	14 (5 - 23)	12 (5 - 20)
Houston	Houston	6 (-1 - 13)	6 (-1 - 12)	6 (-1 - 12)	5 (-1 - 10)	5 (-1 - 10)	4 (-1 - 9)	4 (0 - 8)	2 (0 - 5)
	19 U.S. Cities	6 (2 - 10)	6 (2 - 10)	6 (2 - 9)	5 (2 - 8)	5 (2 - 7)	4 (2 - 7)	4 (1 - 6)	2 (1 - 4)
Los Angeles	Los Angeles	38 (0 - 76)	37 (0 - 73)	33 (0 - 66)	24 (0 - 48)	24 (0 - 47)	22 (0 - 43)	18 (0 - 35)	11 (0 - 21)
	19 U.S. Cities	45 (17 - 72)	43 (16 - 69)	39 (15 - 62)	28 (11 - 45)	27 (10 - 44)	25 (10 - 41)	20 (8 - 33)	12 (5 - 20)
New York	New York	102 (33 - 170)	93 (30 - 155)	95 (31 - 159)	89 (28 - 148)	86 (27 - 143)	78 (25 - 130)	79 (25 - 133)	70 (22 - 116)
	19 U.S. Cities	75 (29 - 120)	68 (26 - 109)	70 (27 - 113)	65 (25 - 105)	63 (24 - 101)	57 (22 - 92)	58 (22 - 94)	51 (19 - 82)
Philadelphia	Philadelphia	26 (1 - 51)	25 (1 - 48)	25 (1 - 48)	23 (1 - 44)	23 (1 - 44)	21 (1 - 41)	21 (1 - 41)	19 (1 - 36)
	19 U.S. Cities	22 (8 - 35)	21 (8 - 33)	21 (8 - 33)	19 (7 - 30)	19 (7 - 30)	18 (7 - 28)	17 (7 - 28)	15 (6 - 25)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-26. Estimated Cardiorespiratory Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2002 O_3 Concentrations*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
		0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Atlanta	Atlanta	0.6 (-0.2 - 1.4)	0.6 (-0.2 - 1.4)	0.6 (-0.2 - 1.3)	0.5 (-0.2 - 1.2)	0.5 (-0.2 - 1.1)	0.5 (-0.2 - 1.1)	0.4 (-0.1 - 1)	0.4 (-0.1 - 0.9)
	19 U.S. Cities	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.7)	0.4 (0.1 - 0.6)
Chicago	Chicago	0.5 (-0.4 - 1.4)	0.5 (-0.4 - 1.3)	0.4 (-0.4 - 1.3)	0.4 (-0.4 - 1.2)	0.4 (-0.3 - 1.1)	0.4 (-0.3 - 1.1)	0.4 (-0.3 - 1)	0.3 (-0.3 - 0.9)
	19 U.S. Cities	0.8 (0.3 - 1.3)	0.7 (0.3 - 1.2)	0.7 (0.3 - 1.2)	0.7 (0.3 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.8)
Cleveland	Cleveland	2.1 (-0.1 - 4.2)	2 (-0.1 - 4.1)	2 (-0.1 - 4)	1.9 (0 - 3.7)	1.8 (0 - 3.6)	1.8 (0 - 3.5)	1.7 (0 - 3.4)	1.5 (0 - 3)
	19 U.S. Cities	1.8 (0.7 - 2.9)	1.7 (0.7 - 2.8)	1.7 (0.6 - 2.7)	1.6 (0.6 - 2.5)	1.5 (0.6 - 2.5)	1.5 (0.6 - 2.4)	1.4 (0.5 - 2.3)	1.3 (0.5 - 2.1)
Detroit	Detroit	1 (-0.1 - 2.1)	1 (-0.1 - 2)	0.9 (-0.1 - 2)	0.9 (-0.1 - 1.9)	0.8 (-0.1 - 1.7)	0.8 (-0.1 - 1.6)	0.8 (-0.1 - 1.6)	0.6 (-0.1 - 1.3)
	19 U.S. Cities	0.9 (0.4 - 1.5)	0.9 (0.3 - 1.4)	0.9 (0.3 - 1.4)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.2)	0.7 (0.3 - 1.1)	0.7 (0.3 - 1.1)	0.6 (0.2 - 1)
Houston	Houston	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.1)
	19 U.S. Cities	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.1 (0.1 - 0.2)	0.1 (0.1 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)
Los Angeles	Los Angeles	0.4 (0 - 0.8)	0.4 (0 - 0.8)	0.4 (0 - 0.7)	0.3 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.1 (0 - 0.2)
	19 U.S. Cities	0.5 (0.2 - 0.8)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.1 (0 - 0.2)
New York	New York	1.1 (0.4 - 1.9)	1 (0.3 - 1.7)	1.1 (0.3 - 1.8)	1 (0.3 - 1.7)	1 (0.3 - 1.6)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.5)	0.8 (0.2 - 1.3)
	19 U.S. Cities	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.2)	0.8 (0.3 - 1.3)	0.7 (0.3 - 1.2)	0.7 (0.3 - 1.1)	0.6 (0.2 - 1)	0.7 (0.2 - 1.1)	0.6 (0.2 - 0.9)
Philadelphia	Philadelphia	1.7 (0.1 - 3.4)	1.6 (0.1 - 3.2)	1.6 (0.1 - 3.2)	1.5 (0.1 - 2.9)	1.5 (0.1 - 2.9)	1.4 (0.1 - 2.7)	1.4 (0.1 - 2.7)	1.2 (0.1 - 2.4)
	19 U.S. Cities	1.4 (0.5 - 2.3)	1.4 (0.5 - 2.2)	1.4 (0.5 - 2.2)	1.2 (0.5 - 2)	1.2 (0.5 - 2)	1.2 (0.4 - 1.9)	1.1 (0.4 - 1.8)	1 (0.4 - 1.6)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).
Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-27. Estimated Percent of Total Incidence of Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2002 O_3 Concentrations*

Risk Assessment Location	Study Location	Percent of Total Incidence of Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
		0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Atlanta	Atlanta	0.9% (-0.3% - 2.1%)	0.9% (-0.3% - 2.1%)	0.8% (-0.3% - 1.9%)	0.8% (-0.3% - 1.8%)	0.7% (-0.2% - 1.7%)	0.7% (-0.2% - 1.7%)	0.7% (-0.2% - 1.6%)	0.6% (-0.2% - 1.3%)
	19 U.S. Cities	0.9% (0.4% - 1.5%)	0.9% (0.4% - 1.5%)	0.9% (0.3% - 1.4%)	0.8% (0.3% - 1.3%)	0.8% (0.3% - 1.2%)	0.8% (0.3% - 1.2%)	0.7% (0.3% - 1.1%)	0.6% (0.2% - 1%)
Chicago	Chicago	0.5% (-0.5% - 1.4%)	0.5% (-0.4% - 1.4%)	0.5% (-0.4% - 1.3%)	0.4% (-0.4% - 1.2%)	0.4% (-0.4% - 1.2%)	0.4% (-0.4% - 1.1%)	0.4% (-0.3% - 1.1%)	0.3% (-0.3% - 0.9%)
	19 U.S. Cities	0.8% (0.3% - 1.3%)	0.8% (0.3% - 1.3%)	0.8% (0.3% - 1.2%)	0.7% (0.3% - 1.2%)	0.7% (0.3% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.8%)
Cleveland	Cleveland	1.6% (0% - 3.2%)	1.5% (0% - 3%)	1.5% (0% - 3%)	1.4% (0% - 2.8%)	1.4% (0% - 2.7%)	1.3% (0% - 2.6%)	1.3% (0% - 2.5%)	1.1% (0% - 2.3%)
	19 U.S. Cities	1.3% (0.5% - 2.1%)	1.3% (0.5% - 2.1%)	1.3% (0.5% - 2%)	1.2% (0.4% - 1.9%)	1.1% (0.4% - 1.8%)	1.1% (0.4% - 1.8%)	1.1% (0.4% - 1.7%)	1% (0.4% - 1.5%)
Detroit	Detroit	0.9% (-0.1% - 1.8%)	0.8% (-0.1% - 1.7%)	0.8% (-0.1% - 1.7%)	0.8% (-0.1% - 1.6%)	0.7% (-0.1% - 1.5%)	0.7% (-0.1% - 1.4%)	0.6% (-0.1% - 1.3%)	0.5% (-0.1% - 1.1%)
	19 U.S. Cities	0.8% (0.3% - 1.3%)	0.7% (0.3% - 1.2%)	0.7% (0.3% - 1.2%)	0.7% (0.3% - 1.2%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.8%)
Houston	Houston	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.1% (0% - 0.2%)
	19 U.S. Cities	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)
Los Angeles	Los Angeles	0.5% (0% - 1%)	0.5% (0% - 1%)	0.5% (0% - 0.9%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)	0.1% (0% - 0.3%)
	19 U.S. Cities	0.6% (0.2% - 1%)	0.6% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
New York	New York	1.1% (0.4% - 1.9%)	1% (0.3% - 1.7%)	1.1% (0.3% - 1.8%)	1% (0.3% - 1.7%)	1% (0.3% - 1.6%)	0.9% (0.3% - 1.5%)	0.9% (0.3% - 1.5%)	0.8% (0.2% - 1.3%)
	19 U.S. Cities	0.8% (0.3% - 1.4%)	0.8% (0.3% - 1.2%)	0.8% (0.3% - 1.3%)	0.7% (0.3% - 1.2%)	0.7% (0.3% - 1.1%)	0.6% (0.2% - 1%)	0.7% (0.2% - 1.1%)	0.6% (0.2% - 0.9%)
Philadelphia	Philadelphia	1.4% (0.1% - 2.8%)	1.4% (0.1% - 2.6%)	1.4% (0.1% - 2.6%)	1.2% (0.1% - 2.4%)	1.2% (0.1% - 2.4%)	1.2% (0.1% - 2.2%)	1.1% (0.1% - 2.2%)	1% (0% - 2%)
	19 U.S. Cities	1.2% (0.5% - 1.9%)	1.1% (0.4% - 1.8%)	1.1% (0.4% - 1.8%)	1% (0.4% - 1.7%)	1% (0.4% - 1.6%)	1% (0.4% - 1.5%)	0.9% (0.4% - 1.5%)	0.8% (0.3% - 1.3%)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-28. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: New York, NY, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	43 (15 - 72)	38 (13 - 63)	39 (13 - 65)	35 (12 - 58)	33 (11 - 55)	29 (10 - 48)	29 (10 - 49)	24 (8 - 39)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	53 (17 - 89)	47 (15 - 78)	48 (15 - 80)	43 (14 - 71)	41 (13 - 68)	36 (11 - 60)	36 (11 - 60)	29 (9 - 49)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	39 (15 - 63)	34 (13 - 55)	35 (13 - 57)	31 (12 - 50)	30 (11 - 48)	26 (10 - 42)	26 (10 - 42)	21 (8 - 34)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	CO	22 (6 - 37)	19 (6 - 32)	20 (6 - 33)	17 (5 - 29)	17 (5 - 28)	14 (4 - 25)	15 (4 - 25)	12 (3 - 20)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO2	19 (3 - 34)	16 (3 - 30)	17 (3 - 31)	15 (3 - 27)	14 (3 - 26)	13 (2 - 23)	13 (2 - 23)	10 (2 - 19)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM10	23 (-9 - 55)	20 (-8 - 48)	21 (-8 - 50)	19 (-7 - 44)	18 (-7 - 42)	16 (-6 - 37)	16 (-6 - 37)	13 (-5 - 30)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO2	16 (0 - 32)	14 (0 - 28)	14 (0 - 29)	13 (0 - 25)	12 (0 - 24)	11 (0 - 21)	11 (0 - 22)	9 (0 - 17)
Hospital admissions (unscheduled), respiratory illness	Thurston et al. (1992)******	all	3-day lag	1 hr max.	none	366 (89 - 644)	334 (81 - 588)	341 (82 - 599)	314 (76 - 551)	304 (73 - 534)	279 (67 - 490)	278 (67 - 489)	241 (58 - 424)
Hospital admissions (unscheduled), asthma	Thurston et al. (1992)******	all	1-day lag	1 hr max.	none	313 (66 - 559)	286 (61 - 510)	291 (62 - 520)	268 (57 - 479)	259 (55 - 464)	238 (51 - 425)	238 (51 - 425)	206 (44 - 368)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

*****New York in this study is defined as the five boroughs of New York City plus Westchester County.

******New York in this study is defined as the five boroughs of New York City.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-29. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: New York, NY, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.6 (0.2 - 1)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.5 (0.1 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.6)	0.4 (0.2 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	CO	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO2	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM10	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.4)	0.2 (-0.1 - 0.4)	0.1 (-0.1 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO2	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)
Hospital admissions (unscheduled), respiratory illness	Thurston et al. (1992)******	all	3-day lag	1 hr max.	none	4.6 (1.1 - 8)	4.2 (1 - 7.3)	4.3 (1 - 7.5)	3.9 (0.9 - 6.9)	3.8 (0.9 - 6.7)	3.5 (0.8 - 6.1)	3.5 (0.8 - 6.1)	3 (0.7 - 5.3)
Hospital admissions (unscheduled), asthma	Thurston et al. (1992)******	all	1-day lag	1 hr max.	none	3.9 (0.8 - 7)	3.6 (0.8 - 6.4)	3.6 (0.8 - 6.5)	3.3 (0.7 - 6)	3.2 (0.7 - 5.8)	3 (0.6 - 5.3)	3 (0.6 - 5.3)	2.6 (0.5 - 4.6)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

*****New York in this study is defined as the five boroughs of New York City plus Westchester County.

******New York in this study is defined as the five boroughs of New York City.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-30. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: New York, NY, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.4% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.2% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	CO	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO2	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM10	0.3% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.1% (-0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO2	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Hospital admissions (unscheduled), respiratory illness	Thurston et al. (1992)******	all	3-day lag	1 hr max.	none	1% (0.3% - 1.8%)	0.9% (0.2% - 1.7%)	1% (0.2% - 1.7%)	0.9% (0.2% - 1.6%)	0.9% (0.2% - 1.5%)	0.8% (0.2% - 1.4%)	0.8% (0.2% - 1.4%)	0.7% (0.2% - 1.2%)
Hospital admissions (unscheduled), asthma	Thurston et al. (1992)******	all	1-day lag	1 hr max.	none	2.4% (0.5% - 4.3%)	2.2% (0.5% - 3.9%)	2.2% (0.5% - 4%)	2% (0.4% - 3.6%)	2% (0.4% - 3.5%)	1.8% (0.4% - 3.2%)	1.8% (0.4% - 3.2%)	1.6% (0.3% - 2.8%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

*****New York in this study is defined as the five boroughs of New York City plus Westchester County.

******New York in this study is defined as the five boroughs of New York City.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-31. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: New York, NY, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	84 (28 - 139)	76 (25 - 126)	78 (26 - 130)	73 (24 - 121)	70 (23 - 116)	64 (21 - 106)	65 (22 - 108)	57 (19 - 95)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	102 (33 - 170)	93 (30 - 155)	95 (31 - 159)	89 (28 - 148)	86 (27 - 143)	78 (25 - 130)	79 (25 - 133)	70 (22 - 116)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	75 (29 - 120)	68 (26 - 109)	70 (27 - 113)	65 (25 - 105)	63 (24 - 101)	57 (22 - 92)	58 (22 - 94)	51 (19 - 82)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	CO	42 (12 - 71)	38 (11 - 64)	39 (11 - 66)	36 (11 - 61)	35 (10 - 59)	32 (9 - 54)	32 (9 - 55)	28 (8 - 48)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO2	36 (6 - 66)	33 (6 - 60)	34 (6 - 61)	31 (6 - 57)	30 (5 - 55)	28 (5 - 50)	28 (5 - 51)	25 (4 - 45)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM10	45 (-17 - 105)	41 (-16 - 96)	42 (-16 - 98)	39 (-15 - 91)	37 (-14 - 88)	34 (-13 - 80)	35 (-13 - 82)	30 (-12 - 72)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO2	31 (0 - 61)	28 (0 - 56)	29 (0 - 57)	27 (0 - 53)	26 (0 - 51)	23 (0 - 47)	24 (0 - 48)	21 (0 - 42)
Hospital admissions (unscheduled), respiratory illness	Thurston et al. (1992)******	all	3-day lag	1 hr max.	none	513 (124 - 902)	472 (114 - 830)	483 (117 - 850)	452 (109 - 795)	439 (106 - 772)	404 (98 - 710)	410 (99 - 721)	365 (88 - 642)
Hospital admissions (unscheduled), asthma	Thurston et al. (1992)******	all	1-day lag	1 hr max.	none	438 (93 - 783)	403 (86 - 720)	413 (88 - 738)	386 (82 - 690)	375 (80 - 670)	345 (73 - 617)	350 (75 - 626)	312 (66 - 558)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

*****New York in this study is defined as the five boroughs of New York City plus Westchester County.

******New York in this study is defined as the five boroughs of New York City.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-32. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: New York, NY, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.4)	0.9 (0.3 - 1.5)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.2)	0.6 (0.2 - 1.1)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	1.1 (0.4 - 1.9)	1 (0.3 - 1.7)	1.1 (0.3 - 1.8)	1 (0.3 - 1.7)	1 (0.3 - 1.6)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.5)	0.8 (0.2 - 1.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.2)	0.8 (0.3 - 1.3)	0.7 (0.3 - 1.2)	0.7 (0.3 - 1.1)	0.6 (0.2 - 1)	0.7 (0.2 - 1.1)	0.6 (0.2 - 0.9)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	CO	0.5 (0.1 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO2	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM10	0.5 (-0.2 - 1.2)	0.5 (-0.2 - 1.1)	0.5 (-0.2 - 1.1)	0.4 (-0.2 - 1)	0.4 (-0.2 - 1)	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO2	0.3 (0 - 0.7)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.5)
Hospital admissions (unscheduled), respiratory illness	Thurston et al. (1992)******	all	3-day lag	1 hr max.	none	6.4 (1.5 - 11.3)	5.9 (1.4 - 10.4)	6 (1.5 - 10.6)	5.6 (1.4 - 9.9)	5.5 (1.3 - 9.6)	5 (1.2 - 8.9)	5.1 (1.2 - 9)	4.6 (1.1 - 8)
Hospital admissions (unscheduled), asthma	Thurston et al. (1992)******	all	1-day lag	1 hr max.	none	5.5 (1.2 - 9.8)	5 (1.1 - 9)	5.2 (1.1 - 9.2)	4.8 (1 - 8.6)	4.7 (1 - 8.4)	4.3 (0.9 - 7.7)	4.4 (0.9 - 7.8)	3.9 (0.8 - 7)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

*****New York in this study is defined as the five boroughs of New York City plus Westchester County.

******New York in this study is defined as the five boroughs of New York City.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-33. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: New York, NY, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	1.1% (0.4% - 1.9%)	1% (0.3% - 1.7%)	1.1% (0.3% - 1.8%)	1% (0.3% - 1.7%)	1% (0.3% - 1.6%)	0.9% (0.3% - 1.5%)	0.9% (0.3% - 1.5%)	0.8% (0.2% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.8% (0.3% - 1.4%)	0.8% (0.3% - 1.2%)	0.8% (0.3% - 1.3%)	0.7% (0.3% - 1.2%)	0.7% (0.3% - 1.1%)	0.6% (0.2% - 1%)	0.7% (0.2% - 1.1%)	0.6% (0.2% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	CO	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO2	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM10	0.5% (-0.2% - 1.2%)	0.5% (-0.2% - 1.1%)	0.5% (-0.2% - 1.1%)	0.4% (-0.2% - 1%)	0.4% (-0.2% - 1%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.9%)	0.3% (-0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO2	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.5%)
Hospital admissions (unscheduled), respiratory illness	Thurston et al. (1992)******	all	3-day lag	1 hr max.	none	1.5% (0.4% - 2.6%)	1.3% (0.3% - 2.3%)	1.4% (0.3% - 2.4%)	1.3% (0.3% - 2.2%)	1.2% (0.3% - 2.2%)	1.1% (0.3% - 2%)	1.2% (0.3% - 2%)	1% (0.2% - 1.8%)
Hospital admissions (unscheduled), asthma	Thurston et al. (1992)******	all	1-day lag	1 hr max.	none	3.3% (0.7% - 6%)	3.1% (0.7% - 5.5%)	3.1% (0.7% - 5.6%)	2.9% (0.6% - 5.3%)	2.9% (0.6% - 5.1%)	2.6% (0.6% - 4.7%)	2.7% (0.6% - 4.8%)	2.4% (0.5% - 4.2%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

*****New York in this study is defined as the five boroughs of New York City plus Westchester County.

******New York in this study is defined as the five boroughs of New York City.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

The results in this portion of the risk assessment follow the same patterns as the results discussed in Section 4.2.1 for risks associated with "as is" O_3 concentrations, because they are largely driven by the same C-R function coefficient estimates and confidence or credible intervals.

All results discussed below are for April through September. The top graph on each page shows results based on 2004 air quality, and the bottom graph shows results based on 2002 air quality. Figures 4-9a and b show estimated percent of non-accidental mortality related to O_3 concentrations that just meet the current 8-hour O_3 standard, based on single-pollutant, single-city models across all locations for which such models were available. Tables 4-16, 4-17, and 4-18 show estimates of incidence, incidence per 100,000 relevant population, and percent of total incidence, respectively, of non-accidental mortality related to O_3 concentrations that just meet the current and alternative 8-hour O_3 standards, based on both single-city and multi-city models, using air quality data for 2004. Tables 4-19, 4-20, and 4-21 show estimates of the same measures of non-accidental mortality risk, using air quality data for 2002.

Using 2004 O_3 concentrations, estimates of non-accidental mortality related to O_3 concentrations that just meet the current 8-hour O_3 standards ranged from 0.3 per 100,000 relevant population in Atlanta (Bell et al., 2004), Houston (Bell et al., 2004 – 95 U.S. Cities), and Los Angeles (Bell et al., 2004) to 5.8 per 100,000 relevant population in Chicago (Schwartz, 2004). The corresponding results based on 2002 O_3 concentrations ranged from 0.3 per 100,000 relevant population in Houston (Bell et al., 2004 – 95 U.S. Cities) and Los Angeles (Bell et al., 2004) to 7.9 per 100,000 relevant population in Chicago (Schwartz, 2004). As was the case for the analysis of effects associated with "as is" O_3 concentrations, estimated O_3-related (non-accidental) mortality reported by Schwartz (2004) for Chicago, Detroit, and Houston, based on both the single-city and the multi-city C-R functions, tend to be higher than other estimates in those locations in large part because Schwartz used the 1-hr maximum O_3 concentration, rather than the 24-hour average, as the exposure metric. The changes from 1-hr maximum O_3 concentrations that just meet the current 8-hour O_3 standard to PRB 1-hr maximum O_3 concentrations were generally larger in the assessment locations than the corresponding changes using the 24-hr average metric.

As a percent of total incidence, estimated non-accidental mortality related to O_3 concentrations that just meet the current 8-hour O_3 standard, based on 2004 O_3 concentrations, ranged from 0.1 percent in several locations (Atlanta, Chicago, Detroit, Houston, Los Angeles, New York, and St. Louis) to 1.5 percent in Chicago (Schwartz, 2004). The corresponding results based on 2002 O_3 concentrations ranged from 0.1 percent in Houston and Los Angeles to 2 percent in Chicago. Although 7 of the 12 estimates from single-city single-pollutant models shown in Figures 4-9a and b were not statistically significant, all 12 were positive.

Figures 4-10a and b show estimated percent of cardiorespiratory mortality and cases per 100,000 relevant population related to O_3 concentrations that just meet the current 8-hour O_3 standard, based on multi-city single-pollutant versus multi-pollutant models from Huang et al. (2004) across all locations for which such models were available. Tables 4-22, 4-23, and 4-24 show estimates of incidence, incidence per 100,000 relevant population, and percent of total incidence, respectively, of cardiorespiratory mortality related to O_3 concentrations that just meet the current and alternative 8-hour O_3 standards in all risk assessment locations covered in Huang et al. (2004), using air quality data for 2004. Tables 4-25, 4-26, and 4-27 show estimates of the same measures of cardiorespiratory mortality risk, using air quality data for 2002.

Using 2004 O_3 concentrations, estimates of O_3-related cardiorespiratory mortality related to O_3 concentrations that just meet the current 8-hour O_3 standards ranged from 0.2 per 100,000 relevant population in Houston (using both the single-city and the multi-city C-R functions) to 1.0 per 100,000 relevant population in Philadelphia (using the single-city C-R function). The corresponding results based on 2002 O_3 concentrations ranged from 0.2 per 100,000 relevant population in Houston to 2.1 per 100,000 relevant population in Cleveland.

As a percent of total incidence, using 2004 O_3 concentrations, estimated O_3-related cardiorespiratory mortality ranged from 0.3 percent in Chicago (using the single-city C-R function) to 0.8 percent in Los Angeles (using the multi-city C-R function) and Philadelphia (using the single-city C-R function). The corresponding results based on 2002 O_3 concentrations ranged from 0.3 percent in Houston to 1.6 percent in Cleveland.

All of the estimates of O_3-related cardiorespiratory mortality based on Huang et al. (2004), from both single-pollutant and multi-pollutant models (see Figures 10a and b) and from both single-city and multi-city models (see Tables 4-22 through 4-27) were positive. Five of the single-city single-pollutant "shrinkage" estimates (for Atlanta, Chicago, Cleveland, Detroit, and Houston) and the estimate from the multi-city multi-pollutant model with PM_{10} were not statistically significant. All the rest of the estimates of O_3-related cardiorespiratory mortality based on Huang et al. (2004) were statistically significant.

Figures 4-11a and b show estimated percent of non-accidental mortality and cases per 100,000 relevant population related to O_3 concentrations that just meet the current 8-hour O_3 standard, based on single-city versus multi-city models across all locations for which both types of model were available. The results followed the same patterns as were observed in the analysis of effects associated with "as is" O_3 concentrations above PRB levels, discussed in Section 4.2.1 above (see also Figures 4-5a and b). Similarly, the results seen in Figures 4-12a and b, for cardiorespiratory mortality, followed the same patterns as are evident in the corresponding analysis of "as is" O_3 concentrations (see Figures 4-5a and b).

The effect of O_3 lag structure on O_3-related unscheduled hospital admissions in Detroit (Ito 2003), shown in Figures 4-13a and b, followed the same patterns as were evident in the analysis of risks associated with "as is" O_3 concentrations. Estimated pneumonia hospital admissions associated with O_3 concentrations that just meet the current 8-hour O_3 standard increased monotonically with increasing lag, with the greatest estimate predicted by a 3-day lag model. None of the estimates of O_3-related unscheduled hospital admissions in Detroit were statistically significant.

Figures 4-14a and b and 4-15a and b show the estimated annual percent of non-accidental mortality and cardiorespiratory mortality, respectively, associated with short-term exposure to O_3 concentrations that just meet the current 8-hour daily maximum standard that fall within specified ranges. The pattern of results was similar to the pattern seen for "as is" O_3 concentrations. Using simulated O_3 concentrations that just meet the current 8-hour standard based on 2004 air quality data, all O_3-related non-accidental mortality was associated with 24-hr average O_3 concentrations less than 0.06 ppm, and most of that was associated with 24-hr average O_3 concentrations less than 0.04 ppm. Using simulated O_3 concentrations that just meet the current 8-hour standard based on 2002 air quality data, all O_3-related non-accidental mortality was associated with 24-hr average O_3 concentrations less than 0.08 ppm, and the great majority was associated with 24-hr average O_3 concentrations less than 0.06 ppm. The results for cardiorespiratory mortality follow a similar pattern.

Comparisons of alternative 8-hour daily maximum standards to the current standard are shown in Figures 4-16a and b and 4-17a and b for non-accidental and cardiorespiratory mortality, respectively. At the most stringent standard shown (0.064 ppm 4^{th} daily maximum), the aggregate O_3-related non-accidental mortality is estimated to be 55 percent of what it would be at the current standard, using simulated O_3 concentrations that just meet the current and alternative 8-hour standards based on 2004 air quality data. Using 2002 air quality data, the corresponding result is 40 percent. The patterns for cardiorespiratory mortality are similar. The aggregate O_3-related cardiorespiratory mortality at the most stringent standard shown is estimated to be about 57 percent of what it would be at the current standard, using simulated O_3 concentrations that just meet the current and alternative 8-hour standards based on 2004 air quality data. Using 2002 air quality data, the corresponding result is about 42 percent.

4.2.2.2 Results for five locations for the current standard and two alternative standards, based on 2002, 2003, and 2004 air quality data

As an alternative to the original seven 8-hour daily maximum standards, we considered a smaller set of three 8-hour daily maximum standards, including the current standard (0.084 ppm, 4^{th} daily maximum) and two alternative standards from the original set of seven (0.074 ppm, 4^{th} daily maximum and 0.064 ppm. 4^{th} daily maximum). Non-accidental and cardiorespiratory mortality risk results for these alternative standards, as well as for a year of recent air quality, are shown for a subset of locations – Atlanta, Chicago, Houston, Los Angeles, and New York – using 2002 air quality data in Tables 4-34 through 4-36 for non-accidental mortality and Tables 4-37 through 4-39 for cardiorespiratory mortality. Tables showing the corresponding results based on 2003 and 2004 air quality are given in Appendix H. The results are shown in terms of percent reductions in O_3-related mortality when O_3 concentrations are changed from those that just meet the current standard to a recent year of air quality as well as to the two alternative 8-hour standards in Figures 4-18a, b, and c, based on 2004, 2003, and 2002 air quality data respectively.

Figures 4-18a, b, and c show that, based on adjusting air quality data from all three years, the greatest reductions in mortality risk (relative to the mortality risks at the current standard) occur for standards which specify 0.064 ppm as the target concentration, and the next greatest risk reductions occur at standards which specify 0.074 as the target concentration. Based on adjusting 2004 air quality, mortality risk reductions (from risks at the current standard) at a standard of 0.064 ppm, 4^{th} daily maximum ranged from 44% in New York to 70% in Los Angeles. The corresponding ranges of percent decreases in mortality risk were from 22% (in Atlanta) to 34% (in Los Angeles) for a standard of 0.074, 4^{th} daily maximum. In all five locations, the percent decreases in mortality risk (from risk at the current standard) were higher at the two 0.064 ppm standard than at the 0.074 ppm standard. The same patterns are observed when just meeting standards is based on adjusting 2003 and 2002 air quality data.

Table 4-34. Estimated Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2002 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with 2002 O_3 Concentrations and O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
				2002 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	9 (-37 - 54)	7 (-30 - 43)	6 (-24 - 35)	4 (-19 - 27)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 29)	14 (5 - 23)	11 (4 - 19)	9 (3 - 14)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	69 (23 - 115)	55 (18 - 91)	44 (15 - 74)	34 (11 - 57)
	Schwartz (2004)	0-day lag	1 hr max.	505 (161 - 840)	427 (136 - 712)	361 (115 - 603)	294 (93 - 493)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	191 (60 - 321)	161 (51 - 271)	136 (43 - 229)	111 (35 - 187)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	29 (2 - 57)	18 (1 - 34)	13 (1 - 25)	7 (0 - 13)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	14 (5 - 24)	9 (3 - 15)	6 (2 - 10)	3 (1 - 5)
	Schwartz (2004)	0-day lag	1 hr max.	85 (8 - 161)	63 (6 - 119)	51 (5 - 97)	36 (3 - 69)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	71 (22 - 119)	53 (16 - 88)	43 (13 - 72)	30 (9 - 51)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	51 (-124 - 224)	24 (-58 - 105)	15 (-35 - 64)	7 (-16 - 29)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	110 (37 - 184)	52 (17 - 86)	32 (11 - 53)	14 (5 - 23)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	105 (35 - 174)	84 (28 - 139)	70 (23 - 116)	57 (19 - 95)

*All results are for mortality (among all ages) associated with short-term exposures to O3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-35. Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2002 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with 2002 O_3 Concentrations and O_3 Concentration that Just Meet the Current and Alternative O_3 Standards**			
				2002 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.6 (-2.5 - 3.6)	0.5 (-2 - 2.9)	0.4 (-1.6 - 2.4)	0.3 (-1.3 - 1.8)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.2 (0.4 - 1.9)	0.9 (0.3 - 1.6)	0.8 (0.3 - 1.3)	0.6 (0.2 - 1)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.3 (0.4 - 2.1)	1 (0.3 - 1.7)	0.8 (0.3 - 1.4)	0.6 (0.2 - 1.1)
	Schwartz (2004)	0-day lag	1 hr max.	9.4 (3 - 15.6)	7.9 (2.5 - 13.2)	6.7 (2.1 - 11.2)	5.5 (1.7 - 9.2)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	3.6 (1.1 - 6)	3 (0.9 - 5)	2.5 (0.8 - 4.3)	2.1 (0.6 - 3.5)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.9 (0.1 - 1.7)	0.5 (0 - 1)	0.4 (0 - 0.7)	0.2 (0 - 0.4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.1 (0 - 0.2)
	Schwartz (2004)	0-day lag	1 hr max.	2.5 (0.2 - 4.7)	1.8 (0.2 - 3.5)	1.5 (0.1 - 2.9)	1.1 (0.1 - 2)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.1 (0.7 - 3.5)	1.5 (0.5 - 2.6)	1.3 (0.4 - 2.1)	0.9 (0.3 - 1.5)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.5 (-1.3 - 2.4)	0.3 (-0.6 - 1.1)	0.2 (-0.4 - 0.7)	0.1 (-0.2 - 0.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.2 (0.4 - 1.9)	0.5 (0.2 - 0.9)	0.3 (0.1 - 0.6)	0.1 (0 - 0.2)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.2 (0.4 - 2)	0.9 (0.3 - 1.6)	0.8 (0.3 - 1.3)	0.6 (0.2 - 1.1)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-36. Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2002 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with 2002 O_3 Concentrations and O_3 Concentration that Just Meet the Current and Alternative O_3 Standards**			
				2002 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.8% - 1.2%)	0.2% (-0.7% - 0.9%)	0.1% (-0.5% - 0.8%)	0.1% (-0.4% - 0.6%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)
	Schwartz (2004)	0-day lag	1 hr max.	2.4% (0.8% - 4%)	2% (0.6% - 3.4%)	1.7% (0.5% - 2.9%)	1.4% (0.4% - 2.3%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.9% (0.3% - 1.5%)	0.8% (0.2% - 1.3%)	0.6% (0.2% - 1.1%)	0.5% (0.2% - 0.9%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.3% (0% - 0.6%)	0.2% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	0.9% (0.1% - 1.8%)	0.7% (0.1% - 1.3%)	0.6% (0.1% - 1.1%)	0.4% (0% - 0.8%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.8% (0.2% - 1.3%)	0.6% (0.2% - 1%)	0.5% (0.1% - 0.8%)	0.3% (0.1% - 0.6%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.5% - 0.8%)	0.1% (-0.2% - 0.4%)	0.1% (-0.1% - 0.2%)	0% (-0.1% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.7%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-37. Estimated Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2002 O_3 Concentrations*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
		2002 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Atlanta	11 (-4 - 25)	9 (-3 - 20)	7 (-2 - 17)	6 (-2 - 13)
	19 U.S. Cities	11 (4 - 18)	9 (4 - 15)	8 (3 - 12)	6 (2 - 9)
Chicago	Chicago	32 (-29 - 93)	26 (-23 - 73)	21 (-19 - 60)	16 (-14 - 46)
	19 U.S. Cities	53 (20 - 86)	42 (16 - 68)	34 (13 - 55)	26 (10 - 43)
Houston	Houston	10 (-1 - 22)	6 (-1 - 13)	5 (-1 - 10)	2 (0 - 5)
	19 U.S. Cities	11 (4 - 17)	6 (2 - 10)	5 (2 - 7)	2 (1 - 4)
Los Angeles	Los Angeles	82 (1 - 162)	38 (0 - 76)	24 (0 - 47)	11 (0 - 21)
	19 U.S. Cities	95 (36 - 153)	45 (17 - 72)	27 (10 - 44)	12 (5 - 20)
New York	New York	128 (41 - 213)	102 (33 - 170)	86 (27 - 143)	70 (22 - 116)
	19 U.S. Cities	94 (36 - 151)	75 (29 - 120)	63 (24 - 101)	51 (19 - 82)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O_3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-38. Estimated Cardiorespiratory Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2002 O_3 Concentrations*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
		2002 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Atlanta	0.7 (-0.2 - 1.7)	0.6 (-0.2 - 1.4)	0.5 (-0.2 - 1.1)	0.4 (-0.1 - 0.9)
	19 U.S. Cities	0.8 (0.3 - 1.2)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.6)
Chicago	Chicago	0.6 (-0.5 - 1.7)	0.5 (-0.4 - 1.4)	0.4 (-0.3 - 1.1)	0.3 (-0.3 - 0.9)
	19 U.S. Cities	1 (0.4 - 1.6)	0.8 (0.3 - 1.3)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)
Houston	Houston	0.3 (0 - 0.6)	0.2 (0 - 0.4)	0.1 (0 - 0.3)	0.1 (0 - 0.1)
	19 U.S. Cities	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.3)	0.1 (0.1 - 0.2)	0.1 (0 - 0.1)
Los Angeles	Los Angeles	0.9 (0 - 1.7)	0.4 (0 - 0.8)	0.2 (0 - 0.5)	0.1 (0 - 0.2)
	19 U.S. Cities	1 (0.4 - 1.6)	0.5 (0.2 - 0.8)	0.3 (0.1 - 0.5)	0.1 (0 - 0.2)
New York	New York	1.4 (0.5 - 2.4)	1.1 (0.4 - 1.9)	1 (0.3 - 1.6)	0.8 (0.2 - 1.3)
	19 U.S. Cities	1.1 (0.4 - 1.7)	0.8 (0.3 - 1.3)	0.7 (0.3 - 1.1)	0.6 (0.2 - 0.9)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O_3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-39. Estimated Percent of Total Incidence of Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2002 O_3 Concentrations*

Risk Assessment Location	Study Location	Percent of Total Incidence of Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
		2002 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Atlanta	1.1% (-0.4% - 2.6%)	0.9% (-0.3% - 2.1%)	0.7% (-0.2% - 1.7%)	0.6% (-0.2% - 1.3%)
	19 U.S. Cities	1.2% (0.5% - 1.9%)	0.9% (0.4% - 1.5%)	0.8% (0.3% - 1.2%)	0.6% (0.2% - 1%)
Chicago	Chicago	0.6% (-0.6% - 1.8%)	0.5% (-0.5% - 1.4%)	0.4% (-0.4% - 1.2%)	0.3% (-0.3% - 0.9%)
	19 U.S. Cities	1% (0.4% - 1.7%)	0.8% (0.3% - 1.3%)	0.7% (0.3% - 1.1%)	0.5% (0.2% - 0.8%)
Houston	Houston	0.5% (-0.1% - 1%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)	0.1% (0% - 0.2%)
	19 U.S. Cities	0.5% (0.2% - 0.8%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.1% (0% - 0.2%)
Los Angeles	Los Angeles	1.1% (0% - 2.2%)	0.5% (0% - 1%)	0.3% (0% - 0.6%)	0.1% (0% - 0.3%)
	19 U.S. Cities	1.3% (0.5% - 2.1%)	0.6% (0.2% - 1%)	0.4% (0.1% - 0.6%)	0.2% (0.1% - 0.3%)
New York	New York	1.4% (0.5% - 2.4%)	1.1% (0.4% - 1.9%)	1% (0.3% - 1.6%)	0.8% (0.2% - 1.3%)
	19 U.S. Cities	1.1% (0.4% - 1.7%)	0.8% (0.3% - 1.4%)	0.7% (0.3% - 1.1%)	0.6% (0.2% - 0.9%)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O_3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

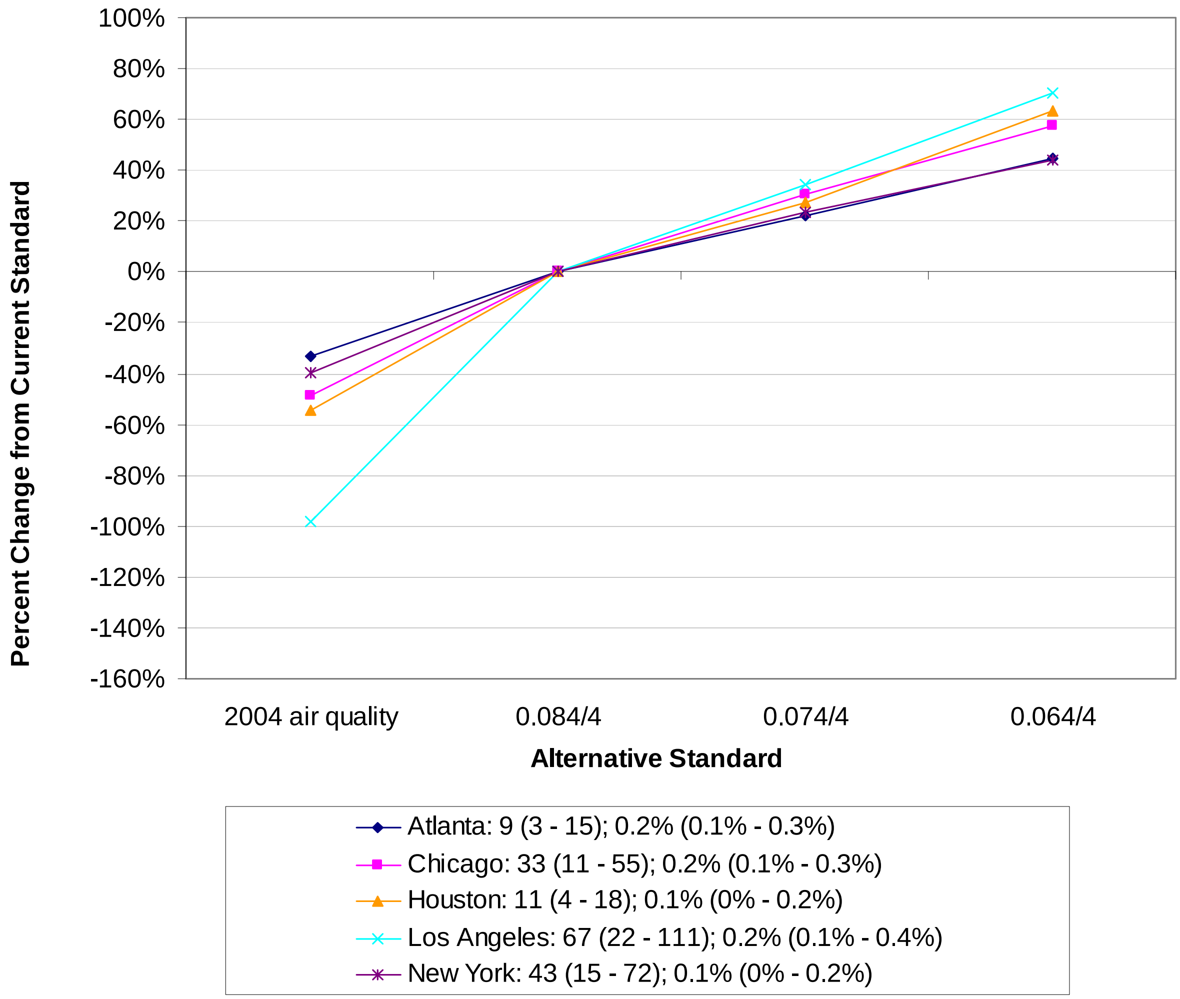
**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Figure 4-18. Estimated Percent Reductions From the Current Standard to Two Alternative Standards in O_3-Related Non-Accidental Mortality, Separately for Each Location (Based on Bell et al., 2004 -- 95 U.S. Cities)*

Figure 4-18a. Based on 2004 Air Quality



* An 8-hr average standard, denoted m/n is characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 – 0.084 ppm, 4th daily maximum 8-hr average. The 4th daily maximum standards, denoted m/4, require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm). The incidence (and 95% credible interval) and percent of total incidence (and 95% credible interval) when O_3 concentrations just meet the current standard are shown for each location in the box below each figure.

Figure 4-18b. Based on 2003 Air Quality

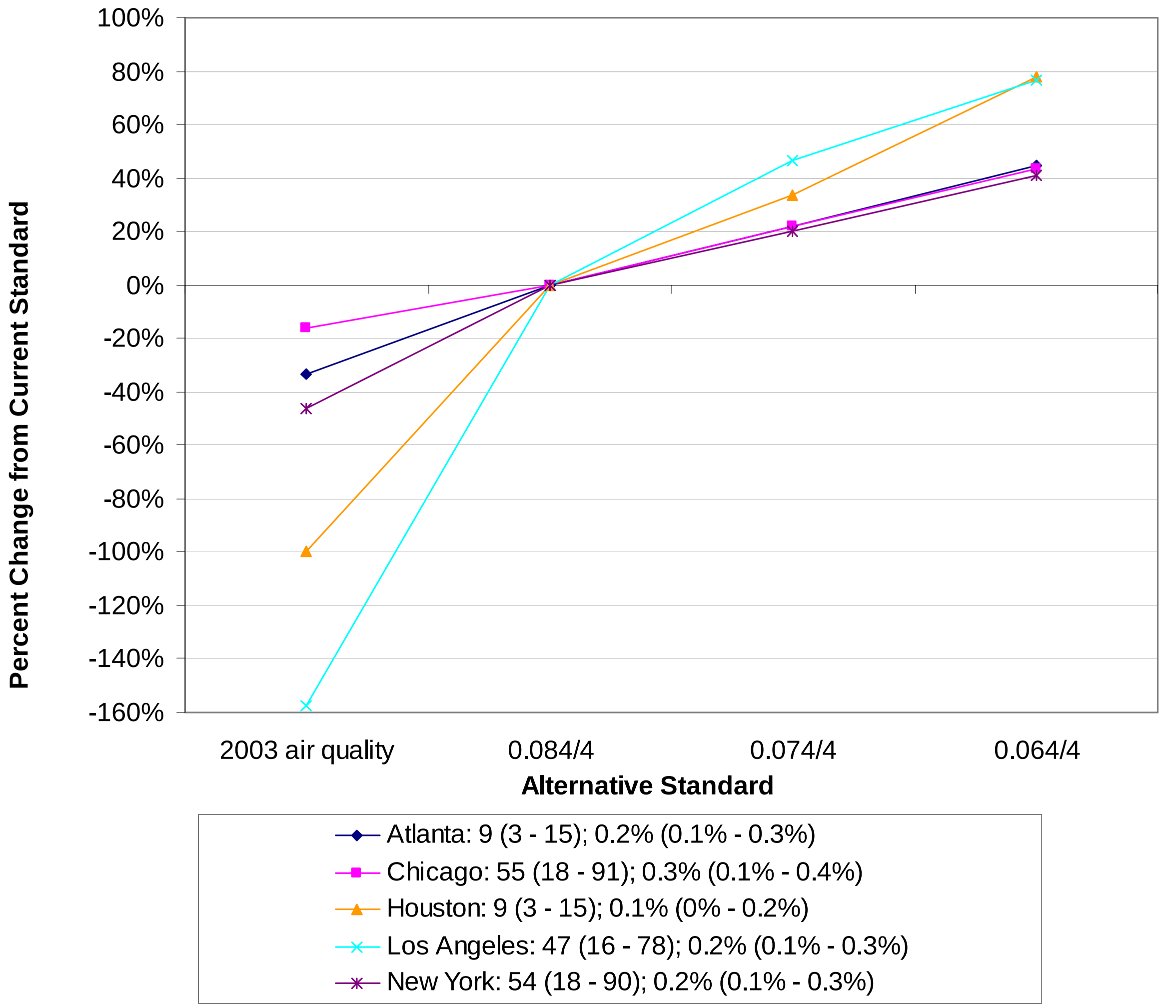
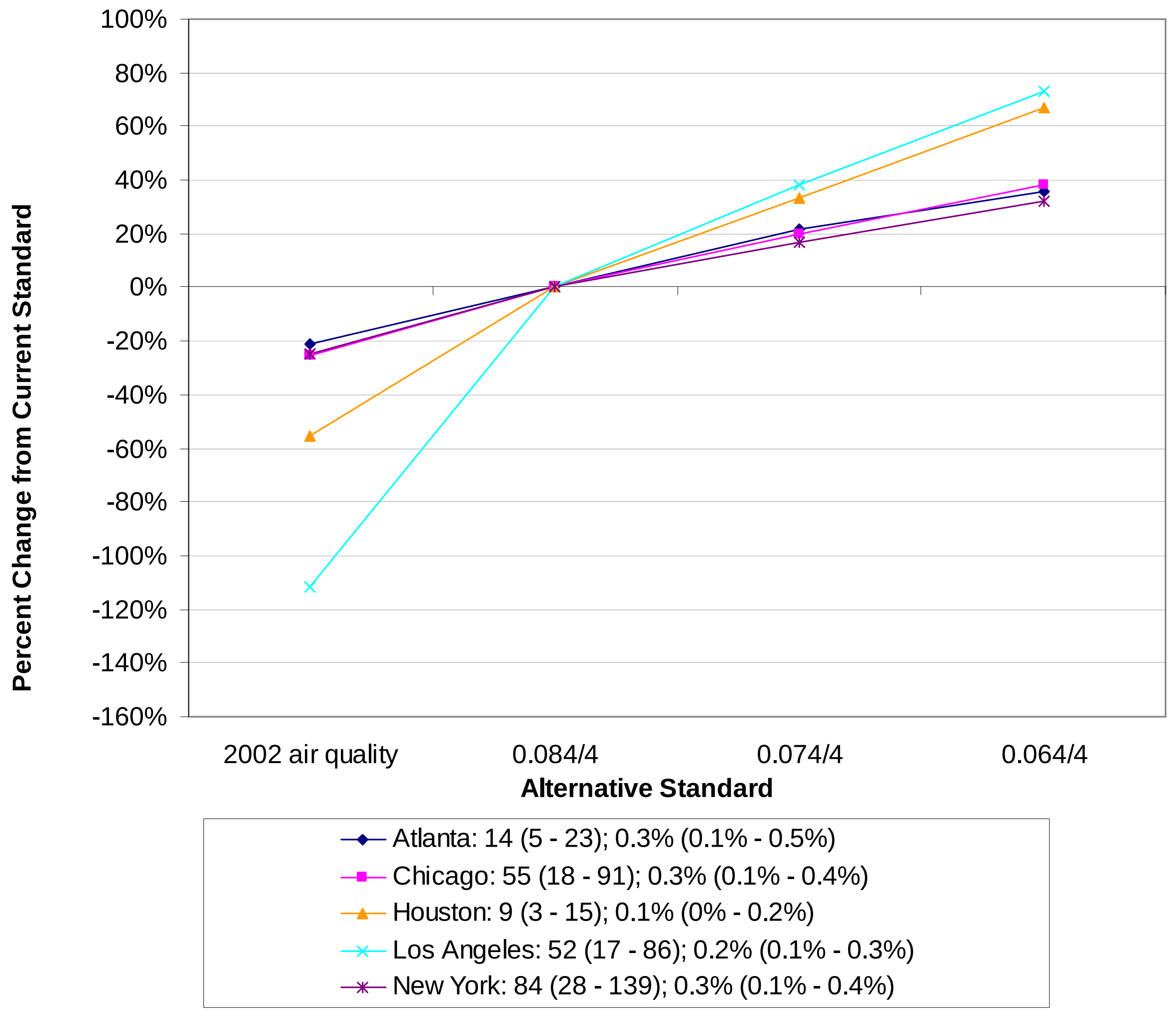


Figure 4-18c. Based on 2002 Air Quality



4.3 Sensitivity Analyses

Because of the uncertainty surrounding estimates of PRB, we ran two sets of sensitivity analyses addressing this concern. First, we considered the impact of altering the estimates of PRB on our estimates of non-accidental mortality risk. Estimates of the percent of total incidence of non-accidental mortality associated with “as is” O_3 concentrations above PRB, based on (1) the original PRB estimates, (2) lower PRB estimates (the original estimates minus 5 ppb in all locations except Atlanta; the original estimates minus 10 ppb in Atlanta), and (3) higher PRB estimates (the original estimates plus 5 ppb in all locations) are shown together in Tables 4-40 and 4-41, based on 2004 air quality data and 2002 air quality data, respectively. The corresponding results using incidence and incidence per 100,000 relevant population as the measures of mortality risk are given in Appendix I, in Tables I-1 through I-4.

Corresponding estimates of the percent of total incidence of non-accidental mortality associated with O_3 concentrations that just meet the current (0.084 ppm, 4^{th} daily maximum) 8-hour O_3 standard, and each of two alternative 8-hour O_3 standards (0.074 ppm, 4^{th} daily maximum and 0.064 ppm, 4^{th} daily maximum) based on each of the three alternative sets of PRB estimates (original, lower, and higher) are shown in Tables 4-42 through 4-47. Tables 4-42 and 4-43 show estimates for the current standard, based on adjusting 2004 and 2002 air quality data, respectively. Tables 4-44, and 4-45 are the corresponding tables for the 0.074 ppm, 4^{th} daily maximum standard, and Tables 4-46, and 4-47 are the corresponding tables for the 0.064 ppm, 4^{th} daily maximum standard. The corresponding results using incidence and incidence per 100,000 relevant population as the measures of mortality risk are given in Appendix I.

Finally, location-specific graphs showing the impact of the alternative PRB estimates on the estimated percent change from the current standard to alternative standards are given in Figures 4-19a and 4-19b, based on 2004 and 2002 air quality data, respectively.

In addition, we estimated mortality risk associated with “as is” O_3 concentrations above 0 ppb. The results are shown in Tables 4-48 and 4-49, based on 2004 and 2002 air quality data, respectively.

Table 4-40. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with "As Is" O_3 Concentrations: April - September, 2004*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.6% - 0.8%)	0.3% (-1.3% - 1.9%)	0.1% (-0.3% - 0.4%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.6% (0.2% - 1%)	0.1% (0% - 0.2%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.4% (0.1% - 0.7%)	0.2% (0.1% - 0.3%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.4% (0.1% - 0.7%)	0.1% (0% - 0.2%)
	Schwartz (2004)	0-day lag	1 hr max.	1.9% (0.6% - 3.1%)	2.3% (0.7% - 3.9%)	1.4% (0.4% - 2.4%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.7% (0.2% - 1.2%)	0.9% (0.3% - 1.5%)	0.5% (0.2% - 0.9%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	0.4% (-0.2% - 0.9%)	0.6% (-0.4% - 1.6%)	0.2% (-0.1% - 0.5%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.4% (0.1% - 0.6%)	0.1% (0% - 0.2%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	0.4% (-0.1% - 0.8%)	0.6% (-0.2% - 1.5%)	0.2% (-0.1% - 0.4%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	1.4% (-0.2% - 2.9%)	1.7% (-0.3% - 3.6%)	1% (-0.2% - 2.2%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.7% (0.2% - 1.2%)	0.9% (0.3% - 1.5%)	0.6% (0.2% - 1%)
	Ito (2003)	0-day lag	24 hr avg.	0.4% (-0.4% - 1.2%)	0.8% (-0.7% - 2.3%)	0.2% (-0.2% - 0.6%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.4% (0% - 0.7%)	0.6% (0% - 1.1%)	0.2% (0% - 0.4%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.2%)
	Schwartz (2004)	0-day lag	1 hr max.	1% (0.1% - 1.9%)	1.2% (0.1% - 2.3%)	0.9% (0.1% - 1.6%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.9% (0.3% - 1.4%)	1% (0.3% - 1.7%)	0.7% (0.2% - 1.2%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.5% - 1%)	0.3% (-0.8% - 1.4%)	0.1% (-0.4% - 0.7%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5% (0.2% - 0.8%)	0.7% (0.2% - 1.1%)	0.3% (0.1% - 0.5%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.6%)	0.1% (0% - 0.2%)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.4% (0.2% - 0.7%)	0.2% (0.1% - 0.3%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	1% (0.6% - 1.4%)	1.6% (1% - 2.2%)	0.6% (0.3% - 0.8%)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.3% (-0.9% - 1.4%)	0.4% (-1.2% - 2%)	0.2% (-0.5% - 0.9%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.7%)	0.6% (0.2% - 1%)	0.3% (0.1% - 0.4%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.3% - 0.6%)	0.3% (-0.6% - 1.2%)	0.1% (-0.1% - 0.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.1%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.3%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-41. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with "As Is" O_3 Concentrations: April - September, 2002*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.8% - 1.2%)	0.4% (-1.6% - 2.2%)	0.1% (-0.5% - 0.8%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.6%)	0.7% (0.2% - 1.2%)	0.2% (0.1% - 0.4%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.7%)	0.6% (0.2% - 1%)	0.3% (0.1% - 0.5%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.3%)
	Schwartz (2004)	0-day lag	1 hr max.	2.4% (0.8% - 4%)	2.9% (0.9% - 4.8%)	1.9% (0.6% - 3.2%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.9% (0.3% - 1.5%)	1.1% (0.3% - 1.8%)	0.7% (0.2% - 1.2%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	0.8% (-0.5% - 2.1%)	1.1% (-0.7% - 2.8%)	0.6% (-0.4% - 1.5%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5% (0.2% - 0.9%)	0.7% (0.2% - 1.2%)	0.4% (0.1% - 0.6%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	0.6% (-0.2% - 1.4%)	0.9% (-0.3% - 2.1%)	0.4% (-0.1% - 0.9%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.3%)
	Schwartz (2004)	0-day lag	1 hr max.	1.9% (-0.3% - 4.1%)	2.3% (-0.4% - 4.8%)	1.6% (-0.3% - 3.4%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	1% (0.3% - 1.8%)	1.2% (0.4% - 2.1%)	0.9% (0.3% - 1.5%)
	Ito (2003)	0-day lag	24 hr avg.	0.7% (-0.7% - 2.1%)	1.1% (-1% - 3.2%)	0.5% (-0.4% - 1.3%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.3% (0% - 0.6%)	0.5% (0% - 1%)	0.2% (0% - 0.4%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.4%)	0.1% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	0.9% (0.1% - 1.8%)	1.1% (0.1% - 2.1%)	0.8% (0.1% - 1.4%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.8% (0.2% - 1.3%)	0.9% (0.3% - 1.6%)	0.6% (0.2% - 1.1%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.5% - 0.8%)	0.3% (-0.7% - 1.2%)	0.1% (-0.3% - 0.5%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.7%)	0.6% (0.2% - 1%)	0.3% (0.1% - 0.4%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.6%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.4%)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5% (0.2% - 0.8%)	0.6% (0.2% - 1.1%)	0.3% (0.1% - 0.5%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	1.6% (1% - 2.2%)	2.2% (1.4% - 3.1%)	1.1% (0.7% - 1.5%)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.4% (-1.1% - 1.9%)	0.5% (-1.5% - 2.4%)	0.3% (-0.8% - 1.3%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6% (0.2% - 0.9%)	0.7% (0.2% - 1.2%)	0.4% (0.1% - 0.7%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.3% (-0.5% - 1.2%)	0.5% (-0.8% - 1.8%)	0.2% (-0.3% - 0.7%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.4% (0.1% - 0.7%)	0.2% (0.1% - 0.3%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6% (0.2% - 0.9%)	0.7% (0.2% - 1.2%)	0.4% (0.1% - 0.7%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-42. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current Standard (0.084 ppm, 4th Daily Maximum): April - September, 2004*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.4% - 0.6%)	0.3% (-1.1% - 1.6%)	0% (-0.2% - 0.3%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.5% (0.2% - 0.9%)	0.1% (0% - 0.2%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.4% (0.1% - 0.6%)	0.1% (0% - 0.2%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	1.5% (0.5% - 2.5%)	2% (0.6% - 3.3%)	1% (0.3% - 1.7%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.6% (0.2% - 0.9%)	0.7% (0.2% - 1.2%)	0.4% (0.1% - 0.7%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	0.3% (-0.2% - 0.7%)	0.5% (-0.3% - 1.3%)	0.1% (-0.1% - 0.3%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.1%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.1% - 0.6%)	0.5% (-0.2% - 1.2%)	0.1% (0% - 0.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.3% (0.1% - 0.4%)	0.1% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	1.1% (-0.2% - 2.4%)	1.5% (-0.2% - 3.1%)	0.8% (-0.1% - 1.8%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.6% (0.2% - 1%)	0.8% (0.2% - 1.3%)	0.4% (0.1% - 0.8%)
	Ito (2003)	0-day lag	24 hr avg.	0.3% (-0.3% - 0.9%)	0.6% (-0.6% - 1.8%)	0.1% (-0.1% - 0.4%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (0% - 0.5%)	0.4% (0% - 0.8%)	0.1% (0% - 0.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.2% (0.1% - 0.4%)	0.1% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	0.8% (0.1% - 1.5%)	0.9% (0.1% - 1.8%)	0.6% (0.1% - 1.2%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.6% (0.2% - 1.1%)	0.8% (0.2% - 1.3%)	0.5% (0.2% - 0.9%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.3% - 0.5%)	0.2% (-0.5% - 0.8%)	0% (-0.1% - 0.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.4% (0.1% - 0.7%)	0.1% (0% - 0.2%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.2% (0.1% - 0.4%)	0% (0% - 0.1%)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.4% (0.1% - 0.6%)	0.1% (0% - 0.2%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	0.8% (0.5% - 1%)	1.3% (0.8% - 1.7%)	0.3% (0.2% - 0.5%)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.6% - 1%)	0.3% (-1% - 1.6%)	0.1% (-0.3% - 0.5%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.3%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.2% - 0.5%)	0.3% (-0.5% - 1%)	0% (-0.1% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.2% (0.1% - 0.4%)	0% (0% - 0.1%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.4% (0.1% - 0.6%)	0.1% (0% - 0.2%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-43. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current Standard (0.084 ppm, 4th Daily Maximum): April - September, 2002*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.7% - 0.9%)	0.3% (-1.4% - 2%)	0.1% (-0.4% - 0.6%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.6% (0.2% - 1%)	0.2% (0.1% - 0.3%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.6%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.4%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.4% (0.1% - 0.7%)	0.1% (0% - 0.2%)
	Schwartz (2004)	0-day lag	1 hr max.	2% (0.6% - 3.4%)	2.5% (0.8% - 4.2%)	1.6% (0.5% - 2.6%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.8% (0.2% - 1.3%)	0.9% (0.3% - 1.6%)	0.6% (0.2% - 1%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	0.7% (-0.4% - 1.7%)	0.9% (-0.6% - 2.4%)	0.5% (-0.3% - 1.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.7%)	0.6% (0.2% - 1%)	0.3% (0.1% - 0.5%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	0.5% (-0.2% - 1.1%)	0.8% (-0.3% - 1.8%)	0.3% (-0.1% - 0.7%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.4% (0.1% - 0.7%)	0.1% (0% - 0.2%)
	Schwartz (2004)	0-day lag	1 hr max.	1.7% (-0.3% - 3.6%)	2% (-0.3% - 4.3%)	1.4% (-0.2% - 2.9%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.9% (0.3% - 1.5%)	1.1% (0.3% - 1.8%)	0.7% (0.2% - 1.2%)
	Ito (2003)	0-day lag	24 hr avg.	0.6% (-0.6% - 1.7%)	0.9% (-0.9% - 2.7%)	0.4% (-0.3% - 1%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (0% - 0.4%)	0.4% (0% - 0.7%)	0.1% (0% - 0.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.2% (0.1% - 0.3%)	0% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	0.7% (0.1% - 1.3%)	0.9% (0.1% - 1.7%)	0.5% (0% - 1%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.6% (0.2% - 1%)	0.7% (0.2% - 1.2%)	0.4% (0.1% - 0.7%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.2% - 0.4%)	0.2% (-0.4% - 0.7%)	0% (-0.1% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.6%)	0.1% (0% - 0.1%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.4% (0.1% - 0.6%)	0.1% (0% - 0.2%)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.6%)	0.5% (0.2% - 0.9%)	0.2% (0.1% - 0.4%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	1.3% (0.8% - 1.8%)	1.9% (1.2% - 2.6%)	0.9% (0.5% - 1.2%)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.3% (-0.9% - 1.4%)	0.4% (-1.2% - 2%)	0.2% (-0.6% - 0.9%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.7%)	0.6% (0.2% - 1%)	0.3% (0.1% - 0.5%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.3% (-0.5% - 1%)	0.4% (-0.7% - 1.6%)	0.1% (-0.2% - 0.5%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.4% (0.1% - 0.6%)	0.1% (0% - 0.2%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5% (0.2% - 0.8%)	0.6% (0.2% - 1%)	0.3% (0.1% - 0.5%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-44. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet An Alternative Standard of 0.074 ppm, 4th Daily Maximum: April - September, 2004*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.3% - 0.5%)	0.2% (-1% - 1.5%)	0% (-0.1% - 0.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.5% (0.2% - 0.8%)	0.1% (0% - 0.1%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.1%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.3% (0.1% - 0.4%)	0% (0% - 0%)
	Schwartz (2004)	0-day lag	1 hr max.	1.2% (0.4% - 2%)	1.6% (0.5% - 2.8%)	0.7% (0.2% - 1.2%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.4% (0.1% - 0.7%)	0.6% (0.2% - 1%)	0.3% (0.1% - 0.5%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.1% - 0.5%)	0.4% (-0.3% - 1.1%)	0.1% (0% - 0.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.3% (0.1% - 0.4%)	0% (0% - 0.1%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.1% - 0.4%)	0.4% (-0.1% - 1%)	0.1% (0% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.2% (0.1% - 0.4%)	0% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	0.9% (-0.1% - 2%)	1.2% (-0.2% - 2.7%)	0.6% (-0.1% - 1.3%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.5% (0.2% - 0.8%)	0.7% (0.2% - 1.1%)	0.3% (0.1% - 0.6%)
	Ito (2003)	0-day lag	24 hr avg.	0.2% (-0.2% - 0.7%)	0.5% (-0.5% - 1.5%)	0.1% (-0.1% - 0.2%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (0% - 0.3%)	0.4% (0% - 0.7%)	0.1% (0% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.1%)	0.2% (0.1% - 0.3%)	0% (0% - 0%)
	Schwartz (2004)	0-day lag	1 hr max.	0.6% (0.1% - 1.2%)	0.8% (0.1% - 1.5%)	0.5% (0% - 0.9%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.5% (0.2% - 0.9%)	0.7% (0.2% - 1.1%)	0.4% (0.1% - 0.7%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.2% - 0.3%)	0.1% (-0.4% - 0.7%)	0% (-0.1% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.5%)	0% (0% - 0.1%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.2% (0.1% - 0.3%)	0% (0% - 0%)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.1%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	0.6% (0.4% - 0.8%)	1.1% (0.7% - 1.5%)	0.2% (0.1% - 0.3%)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.5% - 0.8%)	0.3% (-0.8% - 1.4%)	0.1% (-0.2% - 0.4%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.4% (0.1% - 0.7%)	0.1% (0% - 0.2%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.1% - 0.3%)	0.2% (-0.4% - 0.8%)	0% (0% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.1%)	0.2% (0.1% - 0.3%)	0% (0% - 0%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.1%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-45. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet An Alternative Standard of 0.074 ppm, 4th Daily Maximum: April - September, 2002*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.5% - 0.8%)	0.3% (-1.2% - 1.8%)	0.1% (-0.3% - 0.4%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.6% (0.2% - 0.9%)	0.1% (0% - 0.2%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.3%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.4% (0.1% - 0.6%)	0.1% (0% - 0.2%)
	Schwartz (2004)	0-day lag	1 hr max.	1.7% (0.5% - 2.9%)	2.2% (0.7% - 3.6%)	1.3% (0.4% - 2.1%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.6% (0.2% - 1.1%)	0.8% (0.3% - 1.4%)	0.5% (0.2% - 0.8%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	0.6% (-0.4% - 1.5%)	0.8% (-0.5% - 2.2%)	0.4% (-0.2% - 1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.6%)	0.5% (0.2% - 0.9%)	0.2% (0.1% - 0.4%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	0.4% (-0.1% - 0.9%)	0.7% (-0.2% - 1.6%)	0.2% (-0.1% - 0.5%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.6%)	0.1% (0% - 0.2%)
	Schwartz (2004)	0-day lag	1 hr max.	1.4% (-0.2% - 3%)	1.8% (-0.3% - 3.7%)	1.1% (-0.2% - 2.4%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.8% (0.2% - 1.3%)	1% (0.3% - 1.6%)	0.6% (0.2% - 1%)
	Ito (2003)	0-day lag	24 hr avg.	0.5% (-0.5% - 1.4%)	0.8% (-0.8% - 2.4%)	0.3% (-0.2% - 0.8%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.3%)	0.3% (0% - 0.6%)	0.1% (0% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.1%)	0.1% (0% - 0.2%)	0% (0% - 0%)
	Schwartz (2004)	0-day lag	1 hr max.	0.6% (0.1% - 1.1%)	0.7% (0.1% - 1.4%)	0.4% (0% - 0.8%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.5% (0.1% - 0.8%)	0.6% (0.2% - 1%)	0.3% (0.1% - 0.6%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.1% - 0.2%)	0.1% (-0.3% - 0.5%)	0% (0% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.3% (0.1% - 0.4%)	0% (0% - 0.1%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.3% (0.1% - 0.6%)	0.1% (0% - 0.2%)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.3%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	1.1% (0.7% - 1.5%)	1.7% (1.1% - 2.3%)	0.7% (0.4% - 0.9%)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.8% - 1.2%)	0.4% (-1.1% - 1.8%)	0.2% (-0.5% - 0.8%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.6%)	0.5% (0.2% - 0.9%)	0.2% (0.1% - 0.4%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.4% - 0.8%)	0.4% (-0.6% - 1.3%)	0.1% (-0.2% - 0.4%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.2%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.7%)	0.6% (0.2% - 0.9%)	0.3% (0.1% - 0.4%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-46. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet An Alternative Standard of 0.064 ppm, 4th Daily Maximum: April - September, 2004*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.2% - 0.3%)	0.2% (-0.9% - 1.3%)	0% (-0.1% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.4% (0.1% - 0.7%)	0% (0% - 0.1%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.3% (0.1% - 0.4%)	0.1% (0% - 0.1%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.1%)	0.2% (0.1% - 0.3%)	0% (0% - 0%)
	Schwartz (2004)	0-day lag	1 hr max.	0.9% (0.3% - 1.5%)	1.3% (0.4% - 2.2%)	0.5% (0.1% - 0.8%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.3% (0.1% - 0.6%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.3%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.1% - 0.4%)	0.3% (-0.2% - 0.9%)	0% (0% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.1%)	0.2% (0.1% - 0.3%)	0% (0% - 0%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.3%)	0.3% (-0.1% - 0.8%)	0% (0% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.1%)	0.2% (0.1% - 0.3%)	0% (0% - 0%)
	Schwartz (2004)	0-day lag	1 hr max.	0.7% (-0.1% - 1.5%)	1% (-0.2% - 2.2%)	0.4% (-0.1% - 0.9%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.4% (0.1% - 0.6%)	0.6% (0.2% - 0.9%)	0.2% (0.1% - 0.4%)
	Ito (2003)	0-day lag	24 hr avg.	0.1% (-0.1% - 0.4%)	0.4% (-0.4% - 1.2%)	0% (0% - 0.1%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.2% (0% - 0.5%)	0% (0% - 0%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0% (0% - 0.1%)	0.1% (0% - 0.2%)	0% (0% - 0%)
	Schwartz (2004)	0-day lag	1 hr max.	0.5% (0% - 0.9%)	0.6% (0.1% - 1.2%)	0.3% (0% - 0.6%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.4% (0.1% - 0.7%)	0.5% (0.2% - 0.9%)	0.3% (0.1% - 0.5%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0% (-0.1% - 0.2%)	0.1% (-0.2% - 0.4%)	0% (0% - 0%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.1%)	0.2% (0.1% - 0.4%)	0% (0% - 0%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.1%)	0.2% (0.1% - 0.3%)	0% (0% - 0%)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.3% (0.1% - 0.4%)	0% (0% - 0.1%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	0.4% (0.3% - 0.6%)	0.9% (0.6% - 1.2%)	0.1% (0.1% - 0.2%)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.4% - 0.6%)	0.2% (-0.7% - 1.1%)	0% (-0.1% - 0.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.6%)	0.1% (0% - 0.1%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0% (-0.1% - 0.1%)	0.2% (-0.3% - 0.6%)	0% (0% - 0%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0% (0% - 0.1%)	0.1% (0% - 0.2%)	0% (0% - 0%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.4%)	0% (0% - 0.1%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-47. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet An Alternative Standard of 0.064 ppm, 4th Daily Maximum: April - September, 2002*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.4% - 0.6%)	0.2% (-1.1% - 1.6%)	0% (-0.2% - 0.3%)
Atlanta	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.5% (0.2% - 0.8%)	0.1% (0% - 0.1%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.4% (0.1% - 0.7%)	0.1% (0% - 0.2%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.1%)
Chicago	Schwartz (2004)	0-day lag	1 hr max.	1.4% (0.4% - 2.3%)	1.9% (0.6% - 3.1%)	1% (0.3% - 1.6%)
Chicago	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.5% (0.2% - 0.9%)	0.7% (0.2% - 1.2%)	0.4% (0.1% - 0.6%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	0.5% (-0.3% - 1.2%)	0.7% (-0.5% - 1.9%)	0.3% (-0.2% - 0.7%)
Cleveland	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.3%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	0.3% (-0.1% - 0.7%)	0.6% (-0.2% - 1.3%)	0.1% (0% - 0.3%)
Detroit	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.1%)
Detroit	Schwartz (2004)	0-day lag	1 hr max.	1.2% (-0.2% - 2.5%)	1.5% (-0.2% - 3.2%)	0.9% (-0.1% - 1.9%)
Detroit	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.6% (0.2% - 1.1%)	0.8% (0.3% - 1.4%)	0.5% (0.1% - 0.8%)
Detroit	Ito (2003)	0-day lag	24 hr avg.	0.4% (-0.3% - 1.1%)	0.7% (-0.6% - 2%)	0.2% (-0.2% - 0.5%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.1%)	0.2% (0% - 0.4%)	0% (0% - 0%)
Houston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0% (0% - 0.1%)	0.1% (0% - 0.2%)	0% (0% - 0%)
Houston	Schwartz (2004)	0-day lag	1 hr max.	0.4% (0% - 0.8%)	0.6% (0.1% - 1.1%)	0.3% (0% - 0.5%)
Houston	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.3% (0.1% - 0.6%)	0.5% (0.1% - 0.8%)	0.2% (0.1% - 0.4%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0% (-0.1% - 0.1%)	0.1% (-0.2% - 0.3%)	0% (0% - 0%)
Los Angeles	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.1%)	0.2% (0.1% - 0.3%)	0% (0% - 0%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.1%)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.4% (0.1% - 0.7%)	0.1% (0.1% - 0.2%)
Philadelphia	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	0.9% (0.6% - 1.3%)	1.5% (0.9% - 2%)	0.5% (0.3% - 0.7%)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.6% - 1%)	0.3% (-1% - 1.6%)	0.1% (-0.4% - 0.6%)
Sacramento	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.3%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.3% - 0.6%)	0.3% (-0.5% - 1.1%)	0.1% (-0.1% - 0.2%)
St Louis	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1% (0% - 0.2%)	0.3% (0.1% - 0.5%)	0.1% (0% - 0.1%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.6%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.3%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-48. Sensitivity Analysis: Estimated Non-Accidental Mortality Associated with "As Is" O_3 Concentrations Down to Policy Relevant Background (PRB) Versus 0 ppb: April - September, 2004*

Location	Study	Lag	Exposure Metric	Non-Accidental Mortality Associated with O_3 Above PRB levels vs. 0 ppb**					
				Incidence		Incidence per 100,000 Relevant Population		Percent of Total Incidence	
				Above PRB	Above 0 ppb	Above PRB	Above 0 ppb	Above PRB	Above 0 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	6 (-26 - 38)	25 (-110 - 156)	0.4 (-1.8 - 2.6)	1.7 (-7.4 - 10.5)	0.1% (-0.6% - 0.8%)	0.5% (-2.4% - 3.4%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 20)	50 (17 - 83)	0.8 (0.3 - 1.4)	3.4 (1.1 - 5.6)	0.3% (0.1% - 0.4%)	1.1% (0.4% - 1.8%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	7 (2 - 12)	27 (9 - 45)	1.0 (0.3 - 1.7)	3.9 (1.3 - 6.5)	0.3% (0.1% - 0.5%)	1.1% (0.4% - 1.8%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	49 (16 - 81)	220 (74 - 365)	0.9 (0.3 - 1.5)	4.1 (1.4 - 6.8)	0.2% (0.1% - 0.4%)	1% (0.4% - 1.7%)
	Schwartz (2004)	0-day lag	1 hr max.	394 (125 - 658)	877 (280 - 1456)	7.3 (2.3 - 12.2)	16.3 (5.2 - 27.1)	1.9% (0.6% - 3.1%)	4.2% (1.3% - 6.9%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	148 (46 - 250)	333 (104 - 559)	2.8 (0.9 - 4.6)	6.2 (1.9 - 10.4)	0.7% (0.2% - 1.2%)	1.6% (0.5% - 2.7%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	27 (-17 - 69)	116 (-73 - 300)	1.9 (-1.2 - 5)	8.3 (-5.3 - 21.5)	0.4% (-0.2% - 0.9%)	1.6% (-1% - 4.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 28)	74 (25 - 122)	1.2 (0.4 - 2)	5.3 (1.8 - 8.8)	0.2% (0.1% - 0.4%)	1% (0.3% - 1.7%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	33 (-11 - 76)	170 (-55 - 390)	1.6 (-0.5 - 3.7)	8.3 (-2.7 - 18.9)	0.4% (-0.1% - 0.8%)	1.8% (-0.6% - 4.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 28)	87 (29 - 145)	0.8 (0.3 - 1.4)	4.2 (1.4 - 7)	0.2% (0.1% - 0.3%)	0.9% (0.3% - 1.5%)
	Schwartz (2004)	0-day lag	1 hr max.	128 (-21 - 274)	273 (-45 - 578)	6.2 (-1 - 13.3)	13.2 (-2.2 - 28.1)	1.4% (-0.2% - 2.9%)	2.9% (-0.5% - 6.1%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	70 (22 - 117)	149 (47 - 249)	3.4 (1.1 - 5.7)	7.2 (2.3 - 12.1)	0.7% (0.2% - 1.2%)	1.6% (0.5% - 2.6%)
	Ito (2003)	0-day lag	24 hr avg.	40 (-37 - 116)	207 (-195 - 591)	2.0 (-1.8 - 5.6)	10.1 (-9.4 - 28.7)	0.4% (-0.4% - 1.2%)	2.2% (-2.1% - 6.3%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	35 (2 - 67)	187 (12 - 359)	1.0 (0.1 - 2)	5.5 (0.3 - 10.5)	0.4% (0% - 0.7%)	2.1% (0.1% - 3.9%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 28)	92 (31 - 153)	0.5 (0.2 - 0.8)	2.7 (0.9 - 4.5)	0.2% (0.1% - 0.3%)	1% (0.3% - 1.7%)
	Schwartz (2004)	0-day lag	1 hr max.	93 (9 - 176)	202 (19 - 382)	2.7 (0.3 - 5.2)	6.0 (0.6 - 11.2)	1% (0.1% - 1.9%)	2.2% (0.2% - 4.2%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	78 (24 - 130)	169 (53 - 284)	2.3 (0.7 - 3.8)	5.0 (1.6 - 8.3)	0.9% (0.3% - 1.4%)	1.9% (0.6% - 3.1%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	62 (-149 - 271)	165 (-401 - 719)	0.6 (-1.6 - 2.8)	1.7 (-4.2 - 7.6)	0.2% (-0.5% - 1%)	0.6% (-1.5% - 2.6%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	133 (45 - 221)	355 (119 - 589)	1.4 (0.5 - 2.3)	3.7 (1.3 - 6.2)	0.5% (0.2% - 0.8%)	1.3% (0.4% - 2.2%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	60 (20 - 100)	295 (99 - 489)	0.7 (0.2 - 1.1)	3.3 (1.1 - 5.5)	0.2% (0.1% - 0.3%)	0.9% (0.3% - 1.6%)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	23 (8 - 38)	85 (28 - 141)	1.5 (0.5 - 2.5)	5.6 (1.9 - 9.3)	0.3% (0.1% - 0.5%)	1.1% (0.4% - 1.8%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	82 (52 - 112)	300 (189 - 409)	5.4 (3.4 - 7.4)	19.8 (12.5 - 27)	1% (0.6% - 1.4%)	3.7% (2.4% - 5.1%)

Location	Study	Lag	Exposure Metric	Non-Accidental Mortality Associated with O_3 Above PRB levels vs. 0 ppb**					
				Incidence		Incidence per 100,000 Relevant Population		Percent of Total Incidence	
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	12 (-36 - 59)	35 (-109 - 175)	1.0 (-3 - 4.8)	2.9 (-8.9 - 14.3)	0.3% (-0.9% - 1.4%)	0.8% (-2.6% - 4.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	18 (6 - 29)	53 (18 - 87)	1.4 (0.5 - 2.4)	4.3 (1.4 - 7.1)	0.4% (0.1% - 0.7%)	1.3% (0.4% - 2.1%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	3 (-6 - 13)	21 (-36 - 77)	1.0 (-1.7 - 3.6)	6.2 (-10.4 - 22.2)	0.2% (-0.3% - 0.6%)	1.1% (-1.8% - 3.9%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	3 (1 - 5)	19 (6 - 32)	0.9 (0.3 - 1.5)	5.5 (1.9 - 9.2)	0.2% (0.1% - 0.3%)	1% (0.3% - 1.6%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	8 (3 - 14)	30 (10 - 49)	1.5 (0.5 - 2.4)	5.2 (1.7 - 8.6)	0.3% (0.1% - 0.5%)	1.1% (0.4% - 1.8%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table 4-49. Sensitivity Analysis: Estimated Non-Accidental Mortality Associated with "As Is" O_3 Concentrations Down to Policy Relevant Background (PRB) Versus 0 ppb: April - September, 2002*

Location	Study	Lag	Exposure Metric	Non-Accidental Mortality Associated with O_3 Above PRB levels vs. 0 ppb**					
				Incidence		Incidence per 100,000 Relevant Population		Percent of Total Incidence	
				Above PRB	Above 0 ppb	Above PRB	Above 0 ppb	Above PRB	Above 0 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	9 (-37 - 54)	28 (-121 - 172)	0.6 (-2.5 - 3.6)	1.9 (-8.2 - 11.6)	0.2% (-0.8% - 1.2%)	0.6% (-2.6% - 3.7%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 29)	55 (19 - 91)	1.2 (0.4 - 1.9)	3.7 (1.3 - 6.2)	0.4% (0.1% - 0.6%)	1.2% (0.4% - 2%)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	10 (3 - 17)	31 (10 - 51)	1.5 (0.5 - 2.5)	4.5 (1.5 - 7.4)	0.4% (0.1% - 0.7%)	1.2% (0.4% - 2%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	69 (23 - 115)	240 (81 - 398)	1.3 (0.4 - 2.1)	4.5 (1.5 - 7.4)	0.3% (0.1% - 0.5%)	1.1% (0.4% - 1.9%)
	Schwartz (2004)	0-day lag	1 hr max.	505 (161 - 840)	988 (317 - 1635)	9.4 (3 - 15.6)	18.4 (5.9 - 30.4)	2.4% (0.8% - 4%)	4.7% (1.5% - 7.8%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	191 (60 - 321)	376 (118 - 630)	3.6 (1.1 - 6)	7.0 (2.2 - 11.7)	0.9% (0.3% - 1.5%)	1.8% (0.6% - 3%)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	61 (-38 - 157)	152 (-96 - 390)	4.3 (-2.7 - 11.3)	10.9 (-6.9 - 28)	0.8% (-0.5% - 2.1%)	2% (-1.3% - 5.3%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	38 (13 - 64)	96 (32 - 160)	2.8 (0.9 - 4.6)	6.9 (2.3 - 11.5)	0.5% (0.2% - 0.9%)	1.3% (0.4% - 2.2%)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	57 (-18 - 131)	197 (-64 - 450)	2.8 (-0.9 - 6.3)	9.6 (-3.1 - 21.8)	0.6% (-0.2% - 1.4%)	2.1% (-0.7% - 4.8%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	29 (10 - 48)	101 (34 - 168)	1.4 (0.5 - 2.3)	4.9 (1.6 - 8.1)	0.3% (0.1% - 0.5%)	1.1% (0.4% - 1.8%)
	Schwartz (2004)	0-day lag	1 hr max.	181 (-30 - 385)	325 (-54 - 688)	8.8 (-1.4 - 18.7)	15.8 (-2.6 - 33.4)	1.9% (-0.3% - 4.1%)	3.5% (-0.6% - 7.3%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	99 (31 - 165)	178 (56 - 298)	4.8 (1.5 - 8)	8.6 (2.7 - 14.4)	1% (0.3% - 1.8%)	1.9% (0.6% - 3.2%)
	Ito (2003)	0-day lag	24 hr avg.	69 (-64 - 198)	240 (-226 - 680)	3.4 (-3.1 - 9.6)	11.6 (-11 - 33)	0.7% (-0.7% - 2.1%)	2.5% (-2.4% - 7.2%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	29 (2 - 57)	184 (12 - 353)	0.9 (0.1 - 1.7)	5.4 (0.3 - 10.4)	0.3% (0% - 0.6%)	2% (0.1% - 3.9%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	14 (5 - 24)	91 (31 - 151)	0.4 (0.1 - 0.7)	2.7 (0.9 - 4.4)	0.2% (0.1% - 0.3%)	1% (0.3% - 1.7%)
	Schwartz (2004)	0-day lag	1 hr max.	85 (8 - 161)	196 (18 - 369)	2.5 (0.2 - 4.7)	5.7 (0.5 - 10.8)	0.9% (0.1% - 1.8%)	2.2% (0.2% - 4.1%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	71 (22 - 119)	163 (51 - 274)	2.1 (0.7 - 3.5)	4.8 (1.5 - 8.1)	0.8% (0.2% - 1.3%)	1.8% (0.6% - 3%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	51 (-124 - 224)	152 (-371 - 665)	0.5 (-1.3 - 2.4)	1.6 (-3.9 - 7)	0.2% (-0.5% - 0.8%)	0.6% (-1.4% - 2.4%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	110 (37 - 184)	329 (110 - 545)	1.2 (0.4 - 1.9)	3.5 (1.2 - 5.7)	0.4% (0.1% - 0.7%)	1.2% (0.4% - 2%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	105 (35 - 174)	349 (117 - 579)	1.2 (0.4 - 2)	3.9 (1.3 - 6.5)	0.3% (0.1% - 0.6%)	1.1% (0.4% - 1.8%)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	37 (12 - 62)	100 (34 - 166)	2.4 (0.8 - 4.1)	6.6 (2.2 - 11)	0.5% (0.2% - 0.8%)	1.2% (0.4% - 2.1%)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	132 (83 - 180)	354 (224 - 481)	8.7 (5.5 - 11.9)	23.3 (14.7 - 31.7)	1.6% (1% - 2.2%)	4.4% (2.8% - 6%)

Location	Study	Lag	Exposure Metric	Non-Accidental Mortality Associated with O_3 Above PRB levels vs. 0 ppb**					
				Incidence		Incidence per 100,000 Relevant Population		Percent of Total Incidence	
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	16 (-48 - 78)	39 (-119 - 191)	1.3 (-3.9 - 6.4)	3.2 (-9.8 - 15.6)	0.4% (-1.1% - 1.9%)	0.9% (-2.8% - 4.5%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	23 (8 - 39)	57 (19 - 95)	1.9 (0.6 - 3.2)	4.7 (1.6 - 7.8)	0.6% (0.2% - 0.9%)	1.4% (0.5% - 2.3%)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	6 (-11 - 23)	25 (-42 - 90)	1.9 (-3.1 - 6.7)	7.2 (-12.1 - 25.8)	0.3% (-0.5% - 1.2%)	1.2% (-2.1% - 4.5%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	6 (2 - 10)	22 (8 - 37)	1.7 (0.6 - 2.8)	6.4 (2.2 - 10.6)	0.3% (0.1% - 0.5%)	1.1% (0.4% - 1.9%)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	15 (5 - 25)	37 (13 - 62)	2.6 (0.9 - 4.4)	6.5 (2.2 - 10.8)	0.6% (0.2% - 0.9%)	1.4% (0.5% - 2.3%)

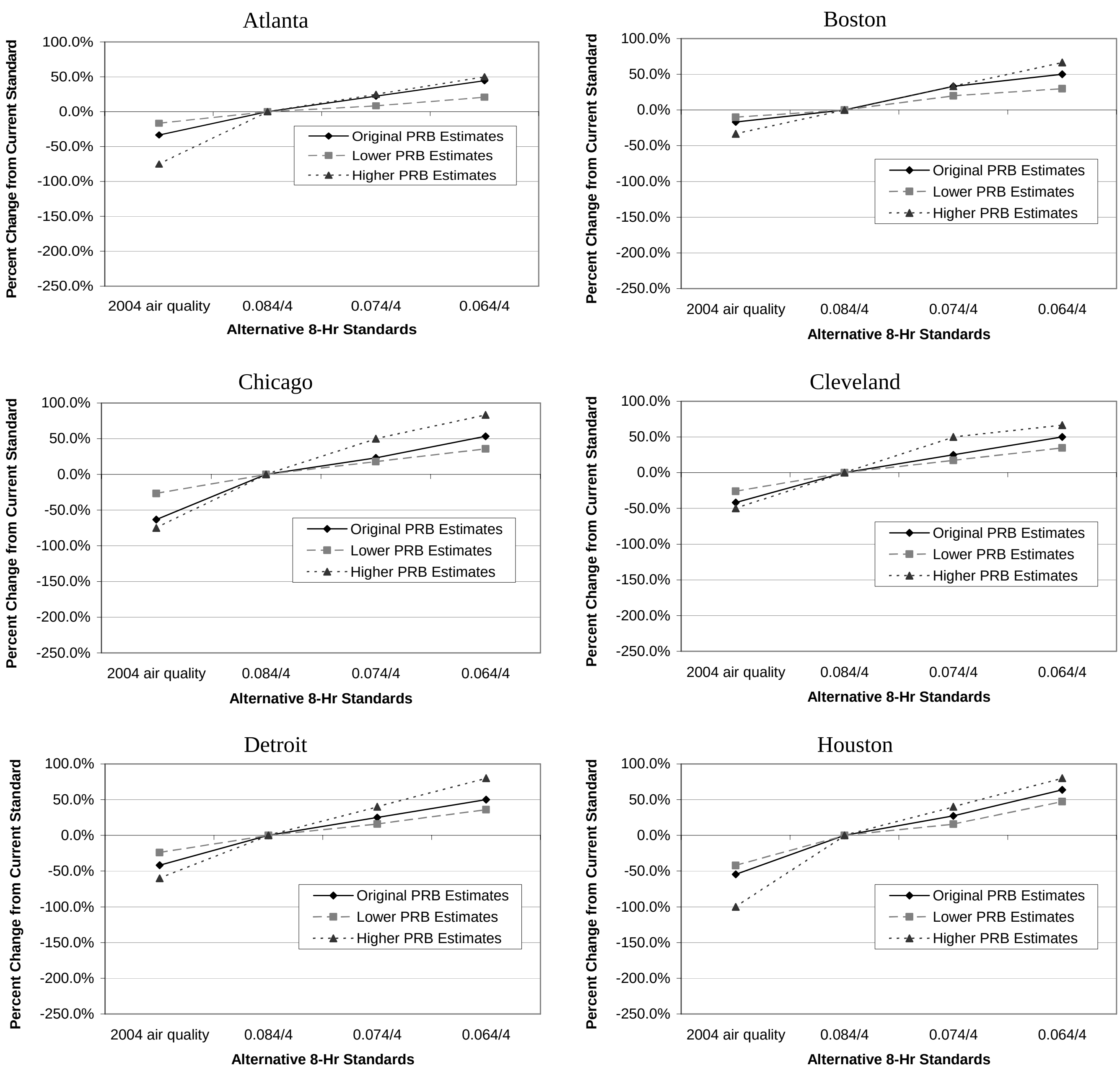
*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

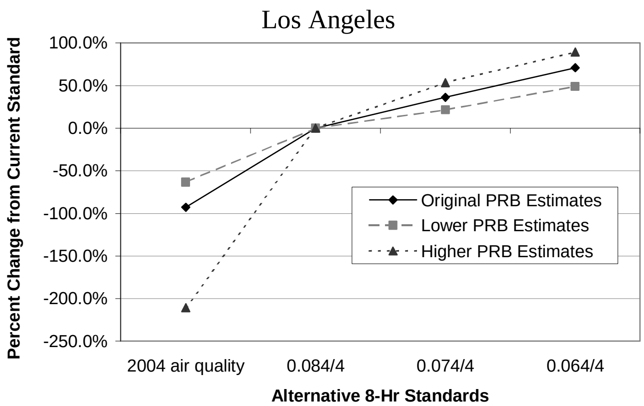
**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

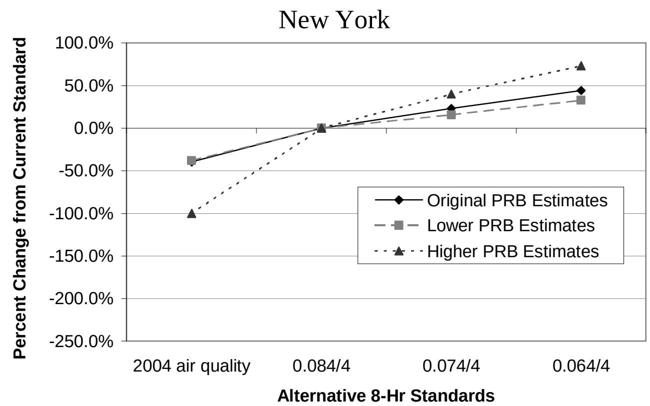
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

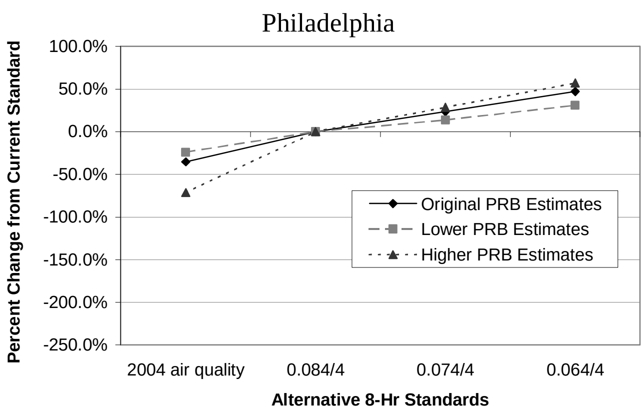
Figure 4-19. Sensitivity Analysis of Estimated Percent Reduction in O_3-Related Non-Accidental Mortality (Using Bell et al., 2004 -- 95 U.S. Cities) From the Current Standard to Alternative 8-hr Standards and a Recent Year of Air Quality, Using Base Case, Higher, and Lower PRB Estimates*

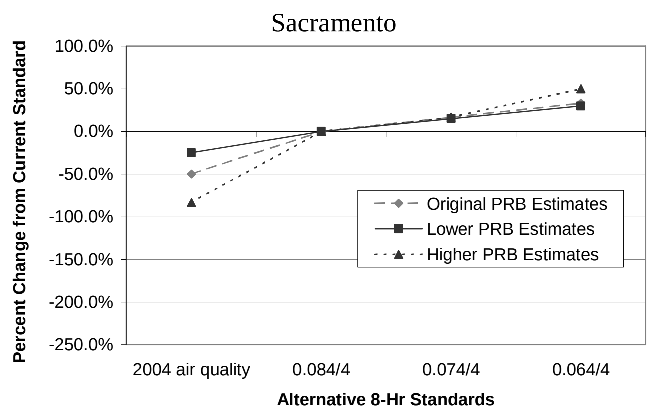
Figure 4-19a. Based on 2004 O_3 Concentrations

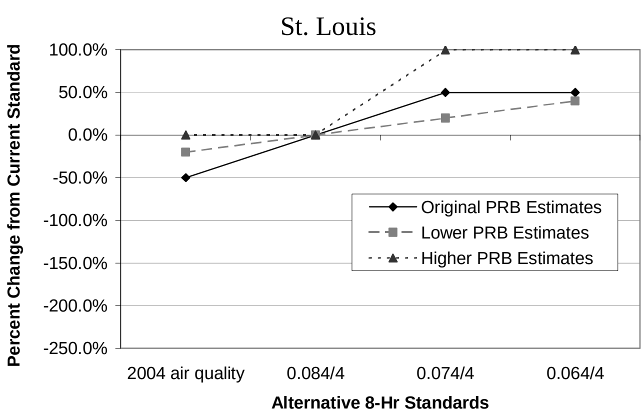


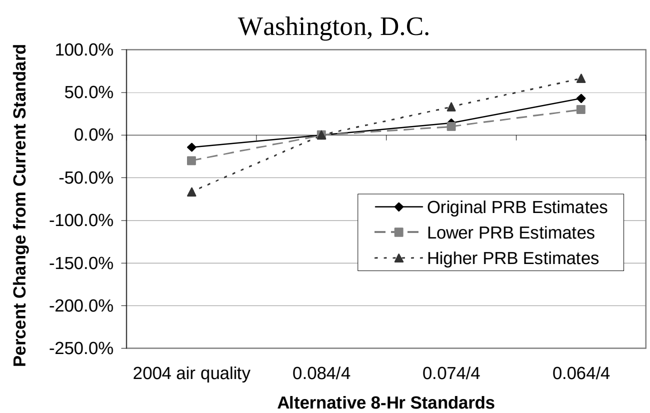






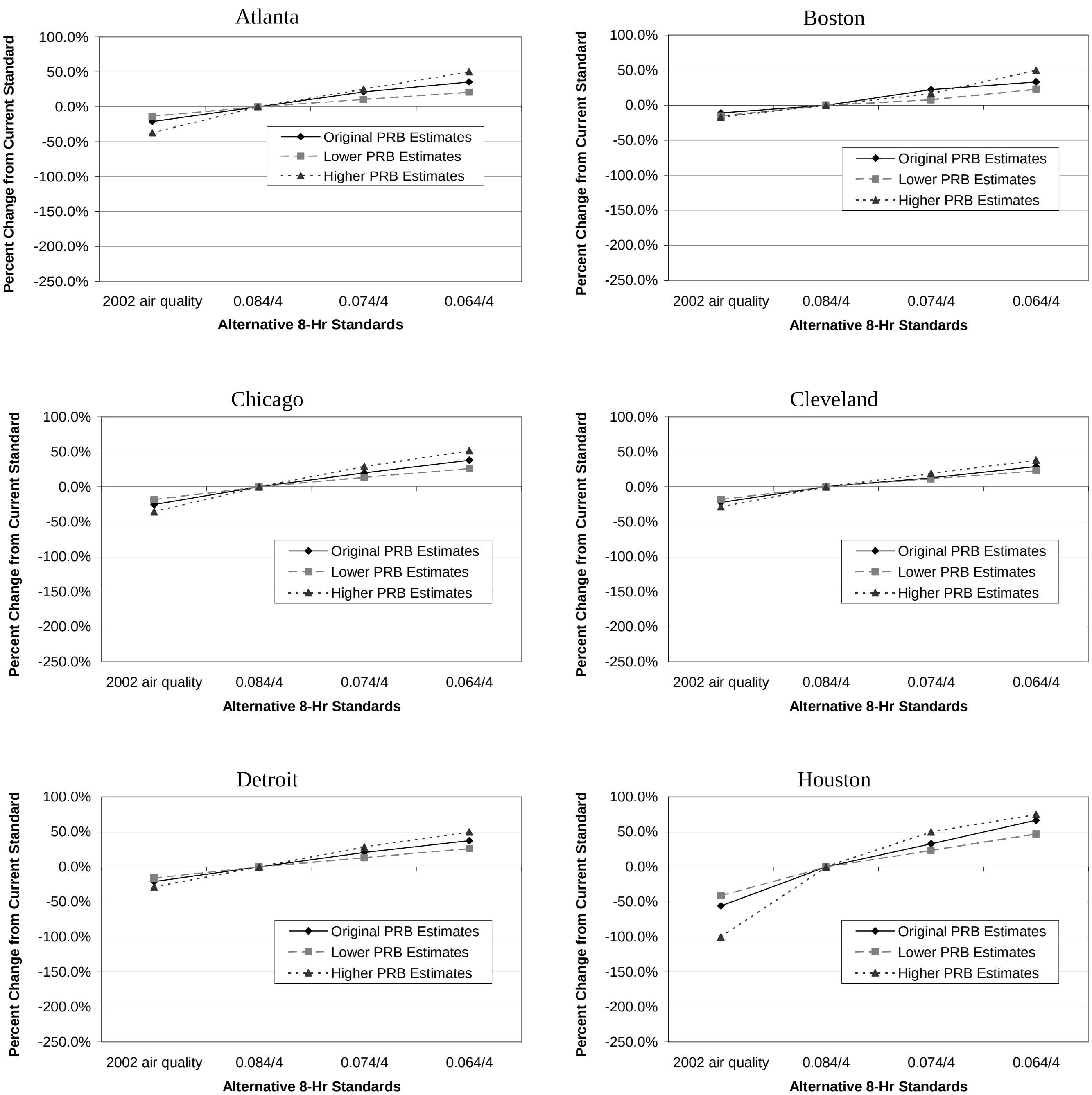


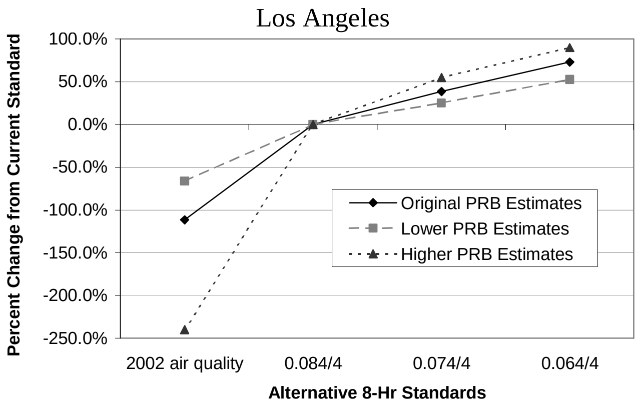


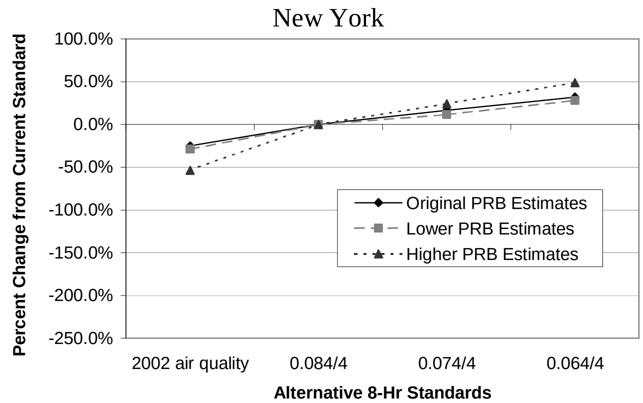


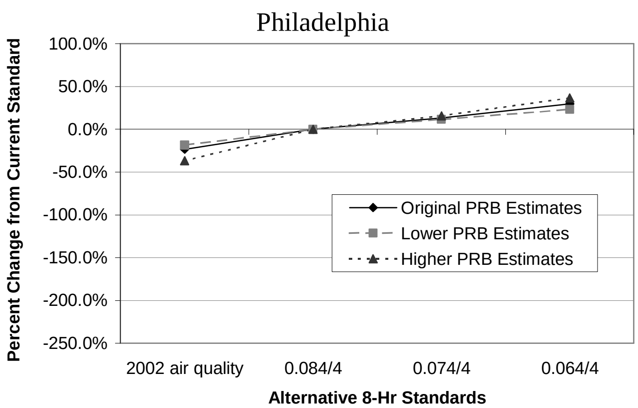
* The 8-hr average standards shown in these figures, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. The figure also compares the current standard to a recent year of air quality.

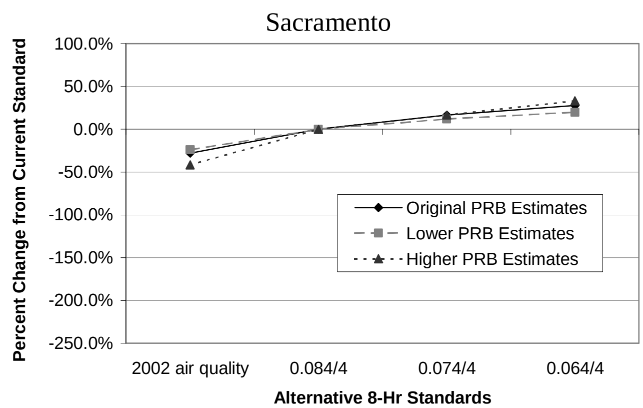
Figure 4-19b. Based on 2002 O_3 Concentrations

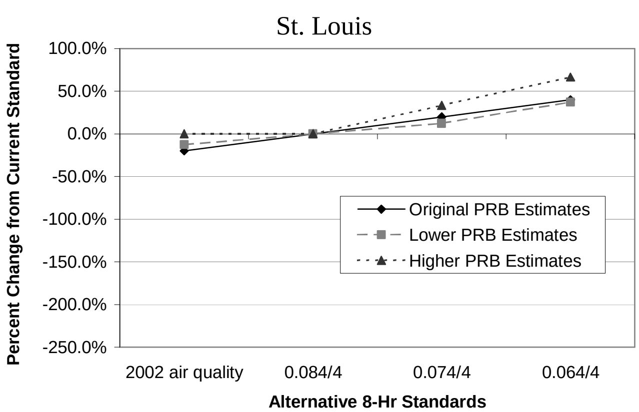


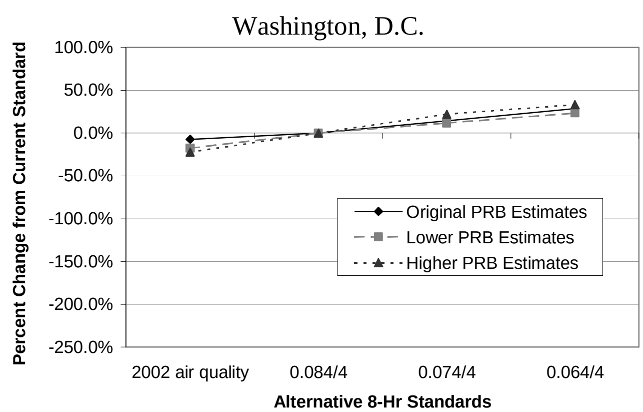

Los Angeles
Percent Change from Current Standard
100.0%
50.0%
0.0%
-50.0%
-100.0%
-150.0%
-200.0%
-250.0%
2002 air quality
0.084/4
0.074/4
0.064/4
Alternative 8-Hr Standards
Original PRB Estimates
Lower PRB Estimates
Higher PRB Estimates


New York
Percent Change from Current Standard
100.0%
50.0%
0.0%
-50.0%
-100.0%
-150.0%
-200.0%
-250.0%
2002 air quality
0.084/4
0.074/4
0.064/4
Alternative 8-Hr Standards
Original PRB Estimates
Lower PRB Estimates
Higher PRB Estimates


Philadelphia
Percent Change from Current Standard
100.0%
50.0%
0.0%
-50.0%
-100.0%
-150.0%
-200.0%
-250.0%
2002 air quality
0.084/4
0.074/4
0.064/4
Alternative 8-Hr Standards
Original PRB Estimates
Lower PRB Estimates
Higher PRB Estimates


Sacramento
Percent Change from Current Standard
100.0%
50.0%
0.0%
-50.0%
-100.0%
-150.0%
-200.0%
-250.0%
2002 air quality
0.084/4
0.074/4
0.064/4
Alternative 8-Hr Standards
Original PRB Estimates
Lower PRB Estimates
Higher PRB Estimates


St. Louis
Percent Change from Current Standard
100.0%
50.0%
0.0%
-50.0%
-100.0%
-150.0%
-200.0%
-250.0%
2002 air quality
0.084/4
0.074/4
0.064/4
Alternative 8-Hr Standards
Original PRB Estimates
Lower PRB Estimates
Higher PRB Estimates


Washington, D.C.
Percent Change from Current Standard
100.0%
50.0%
0.0%
-50.0%
-100.0%
-150.0%
-200.0%
-250.0%
2002 air quality
0.084/4
0.074/4
0.064/4
Alternative 8-Hr Standards
Original PRB Estimates
Lower PRB Estimates
Higher PRB Estimates

As would be expected, increasing PRB estimates decreased the estimates of mortality risk associated with "as is" O_3 concentrations above PRB levels, and decreasing PRB estimates increased these estimates. Measured as percent of total incidence, estimates of O_3-related mortality changed by only a few tenths of a percent, which is not surprising since most base case estimates were themselves less than 1%. In Chicago, for example, the estimate of O_3-related mortality changed from 0.2% to 0.4% of total incidence when 5 ppb was subtracted from PRB levels and to 0.1% when 5 ppb was added to PRB levels, based on Bell et al. – 95 U.S. Cities (2004). The largest increase in mortality measured as percent of total incidence when PRB levels were reduced was 0.6% (from 1% to 1.6%), in Philadelphia, based on Moolgavkar et al. (1995). The largest decrease in mortality measured as a percent of total incidence when PRB levels were increased was 0.5% (from 1.9% to 1.4%), in Chicago, based on Schwartz (2004).

The results for estimates of mortality incidence associated with 2002 "as is" O_3 concentrations above PRB levels were similar. The largest increase in mortality measured as percent of total incidence when PRB levels were reduced was 0.6% (from 1.6% to 2.2%), in Philadelphia, based on Moolgavkar et al. (1995). The largest decrease in mortality measured as percent of total incidence when PRB levels were increased was 0.5% (from 1.6% to 1.1%) in Philadelphia, based on Moolgavkar et al. (1995) and 0.5% (from 2.4% to 1.9%) in Chicago, based on Schwartz (2004).

The impact of changing the assumed PRB levels was often substantial when measured as the percent change in estimated number of O_3-related deaths, because O_3-related mortality was generally low under the base case PRB assumptions. A change from an estimated 3 deaths to 4 deaths, for example, is a 33% increase in the estimated number of deaths but only one additional death. When PRB estimates were decreased, estimates of mortality incidence associated with 2004 "as is" O_3 concentrations above PRB levels increased from 18% in Houston (from 78 to 92), based on Schwartz – 14 U.S. Cities (2004), to 133% in Atlanta and St. Louis (from 6 to 14, based on Bell et al. (2004), and from 12 to 28, based on Bell et al. – 95 U.S. Cities (2004), in Atlanta; and from 3 to 7, based on Bell et al. (2004), in St. Louis). When PRB estimates were increased, estimates of mortality incidence associated with 2004 "as is" O_3 concentrations above PRB levels decreased from 16% in Houston (from 93 to 78), based on Schwartz (2004), to 67% in St. Louis (from 3 to 1), based on Bell et al. (2004).

The results for estimates of mortality incidence associated with 2002 "as is" O_3 concentrations above PRB levels were similar. When PRB estimates were decreased, estimates of mortality incidence associated with 2002 "as is" O_3 concentrations above PRB levels increased from 17% in Detroit (from 181 to 212), based on Schwartz (2004), to 94% in Atlanta (from 17 to 33), based on Bell et al. – 95 U.S. Cities (2004). When PRB estimates were increased, estimates of mortality incidence associated with 2004 "as is" O_3 concentrations above PRB levels decreased from 17% in Detroit (from 181 to 150), based on Schwartz (2004), to 50% in St. Louis (from 6 to 3), based on Bell et al. – 95 U.S. Cities (2004).

Because O_3 concentrations just meeting the current standard are substantially lower than "as is" O_3 concentrations, a change in the assumed PRB levels had a greater impact on the estimates of mortality associated with O_3 concentrations just meeting the current standard, when measured as percent change in the estimate. Similarly, changing the estimates of PRB tended to have progressively greater impacts on the estimates of mortality risk associated with O_3 concentrations just meeting progressively more stringent standards. For example, decreasing the estimates of PRB in Boston induced a 57% increase in the estimate of mortality incidence (from 7 to 11) associated with 2004 "as is" O_3 concentrations above PRB levels, based on Bell et al. – 95 U.S. Cities (2004). The same change in PRB estimates induced a 67% increase (from 6 to 10) for O_3 concentrations just meeting the current standard (0.084, 4th daily maximum), a 100% increase (from 4 to 8) for O_3 concentrations just meeting the 0.074, 4th daily maximum standard, and a 133% increase (from 3 to 7) for O_3 concentrations just meeting the 0.064, 4th daily maximum standard.

When measured as percent of total incidence, however, these changes usually were not sufficient to be detectable after rounding to one decimal place. Using 2004 air quality, for example, there was no difference in estimated percent of total incidence (after rounding) when PRB levels were reduced by 5 ppb when considering

- mortality associated with "as is" O_3 concentrations above PRB versus mortality associated with O_3 concentrations just meeting the current standard above PRB in 70 percent of estimates (compare Tables 4-40 and 4-42);
- mortality associated with O_3 concentrations just meeting the current standard above PRB versus mortality associated with O_3 concentrations just meeting the 0.074, 4th daily maximum standard in 68 percent of estimates (compare Tables 4-42 and 4-44);
- mortality associated with O_3 concentrations just meeting the 0.074, 4th daily maximum standard above PRB versus mortality associated with O_3 concentrations just meeting the 0.064, 4th daily maximum standard in 79 percent of estimates (compare Tables 4-44 and 4-46).

The corresponding percentages when using 2002 air quality data are 64 percent, 79 percent, and 64 percent, respectively.

Finally, our estimates of non-accidental mortality risk associated with "as is" O_3 concentrations above 0 ppb, rather than above estimated PRB levels, suggest that, on average across the days in the ozone season, the differences between PRB O_3 concentrations and 0 ppb are substantially greater than the differences between O_3 concentrations to which people are exposed ("as is" O_3 concentrations) and estimated PRB levels – i.e., the bulk of the ambient O_3 is PRB O_3. The estimated incidence of non-accidental mortality associated with 2004 "as is" O_3 concentrations above 0 ppb versus above PRB levels were from 113% higher in Detroit (273 versus 128, using Schwartz (2004), and 149 versus 70, using Schwartz – 14 U.S. Cities (2004)) to 600% higher in St. Louis (21 versus 3, using Bell et al. (2004)). The estimated incidence of non-accidental mortality associated with 2002 "as is" O_3 concentrations above 0 ppb versus above PRB levels were from 80% higher in Detroit (325 versus 181, using Schwartz (2004), and 178 versus 99, using Schwartz – 14 U.S. Cities (2004)) to 550% higher in Houston (91 versus 14, using Bell et al. – 95 U.S. Cities (2004)). We note, however, that because the ranges of O_3 concentrations over which O_3-mortality concentration-response functions have been estimated do not go down to 0 ppb, there is substantially less information about the relationship between mortality and exposure to O_3 concentrations in the range between 0 ppb and PRB levels. There is therefore increased uncertainty about whether any mortality can be attributed to exposure to these very low O_3 concentrations above 0 ppb versus above PRB levels.

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Ozone Health Risk Assessment for Selected Urban Areas: Appendices

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Appendix A: Air Quality

Table A-1. Monitor-Specific O_3 Air Quality Information: Atlanta, GA

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
1305700011	0.089			
1306700031	0.100	0.084	0.073	0.085
1307700021	0.099	0.077	0.083	0.086
1308500012	0.088	0.077	0.068	0.077
1308900021	0.095	0.080	0.084	0.086
1308930011	0.090	0.091	0.088	0.089
1309700041	0.098	0.085	0.080	0.087
1311300011	0.088	0.077	0.084	0.083
1312100551	0.100	0.091	0.089	0.093
1313500021	0.089	0.088	0.092	0.089
1315100021	0.099	0.082	0.085	0.088
1322300031	0.099	0.083	0.073	0.085
1324700011	0.099	0.078	0.087	0.088
Average:	0.095	0.083	0.082	
			Design Value*:	0.093

*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

Table A-2. Monitor-Specific O_3 Air Quality Information: Boston, MA

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
2500900051	0.088			
2500920061	0.100	0.079	0.081	0.086
2500940041	0.094	0.080	0.077	0.083
2501711021	0.096	0.073	0.070	0.079
2502130031	0.107	0.088	0.078	0.091
2502500411	0.102	0.078	0.079	0.086
2502500421	0.074	0.074	0.064	0.07
2502700151	0.091	0.080	0.074	0.081
Average:	0.094	0.079	0.075	
			Design Value*:	0.091

*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

Table A-3. Monitor-Specific O_3 Air Quality Information: Chicago, IL

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
1703100011	0.094	0.077	0.065	0.078
1703100321	0.096	0.080	0.067	0.081
1703100422	0.103			
1703100501	0.084	0.069		
1703100641	0.085	0.067	0.054	0.068
1703100721	0.085	0.075	0.060	0.073
1703100761			0.068	
1703110032	0.092	0.071	0.067	0.076
1703116011	0.081	0.075	0.067	0.074
1703140021	0.084	0.070	0.059	0.071
1703140071	0.093	0.073	0.064	0.076
1703142011	0.087	0.080	0.067	0.078
1703142012	0.067		0.051	
1703170021	0.091	0.082	0.071	0.081
1703180031	0.074			
1704360011	0.084	0.066	0.065	0.071
1708900051	0.082	0.076	0.069	0.075
1709710021	0.090	0.074	0.068	0.077
1709710071	0.100	0.078	0.071	0.083
1709730011	0.087			
1711100011	0.090	0.079	0.068	0.079
1719710081	0.086	0.077	0.063	0.075
1719710111	0.087	0.073	0.068	0.076
1808900221	0.094	0.076	0.064	0.078
1808900241	0.086	0.081		
1808900301			0.064	
1808920081	0.101	0.081	0.067	0.083
1809100051	0.107	0.082	0.070	0.086
1809100101	0.100	0.084		
1812700202	0.097	0.079		
1812700241	0.101	0.077	0.069	0.082
1812700261	0.100	0.082	0.072	0.084
5505900021	0.110	0.085		
5505900191	0.116	0.088	0.078	0.094
5505900221	0.096	0.088		
Average:	0.092	0.077	0.066	
			Design Value*:	0.094

*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

Table A-4. Monitor-Specific O_3 Air Quality Information: Cleveland, OH

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
3900710011	0.103	0.099	0.081	0.094
3903500341	0.090	0.076	0.057	0.074
3903500641	0.090	0.079	0.063	0.077
3903550021	0.098	0.089	0.077	0.088
3905500041	0.115	0.097	0.075	0.095
3908500031	0.104	0.092	0.079	0.091
3908530021	0.088	0.080	0.076	0.081
3909300171	0.099	0.085	0.074	0.086
3910300031	0.091	0.086	0.077	0.084
3913310011	0.097	0.091	0.081	0.089
3915300201	0.103	0.089	0.077	0.089
Average:	0.098	0.088	0.074	
			Design Value*:	0.095

*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

Table A-5. Monitor-Specific O_3 Air Quality Information: Detroit, MI

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
2604900211	0.088	0.087	0.075	0.083
2604920011	0.089	0.091	0.077	0.085
2609900091	0.095	0.102	0.081	0.092
2609910031	0.092	0.101	0.071	0.088
2612500012	0.093	0.090	0.075	0.086
2614700051	0.100	0.086	0.074	0.086
2616100081	0.091	0.091	0.071	0.084
2616300012	0.088	0.085	0.065	0.079
2616300161	0.092	0.084	0.066	0.08
2616300192	0.083	0.098	0.066	0.082
Average:	0.091	0.092	0.072	
			Design Value*:	0.092

*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

Table A-6. Monitor-Specific O_3 Air Quality Information: Houston, TX

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
4803910032	0.095			
4803910041	0.092	0.097	0.103	0.097
4803910161			0.081	
4816700141	0.093	0.092	0.088	0.091
4816710022	0.083	0.082		
4820100242	0.096	0.095	0.096	0.095
4820100263	0.088	0.098	0.085	0.09
4820100292	0.098	0.096	0.090	0.094
4820100461	0.078	0.093	0.084	0.085
4820100472	0.072	0.082	0.083	0.079
4820100512	0.101	0.103	0.095	0.099
4820100551	0.094	0.107	0.104	0.101
4820100621	0.095	0.094	0.097	0.095
4820100661	0.084	0.081	0.097	0.087
4820100701	0.088	0.100	0.078	0.088
4820100751	0.078	0.096	0.093	0.089
4820110151		0.108	0.093	
4820110342	0.093	0.102	0.091	0.095
4820110353	0.092	0.105	0.092	0.096
4820110391	0.095	0.113	0.097	0.101
4820110411	0.090			
4820110501	0.094	0.092	0.097	0.094
4833900781	0.082	0.094	0.080	0.085
Average:	0.090	0.097	0.091	
			Design Value*:	0.101

*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

Table A-7. Monitor-Specific O_3 Air Quality Information: Los Angeles, CA

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
0603700021	0.097	0.104	0.092	0.097
0603700161	0.111	0.123	0.095	0.109
0603701131	0.073	0.083	0.076	0.077
0603710021	0.091	0.096	0.089	0.092
0603711031	0.077	0.082	0.078	0.079
0603712011	0.111	0.119	0.101	0.11
0603713011	0.049	0.057	0.065	0.057
0603716011	0.074	0.082	0.079	0.078
0603717011	0.099	0.109	0.095	0.101
0603720051	0.095	0.101	0.093	0.096
0603740021	0.059	0.063	0.070	0.064
0603750011	0.064	0.070		
0603750051			0.085	
0603760121	0.131	0.137	0.107	0.125
0603790331	0.102	0.103	0.095	0.1
0605900071	0.069	0.080	0.088	0.079
0605910031	0.066	0.079	0.076	0.073
0605920221	0.081	0.095	0.085	0.087
0605950011	0.071	0.080	0.075	0.075
0606500121	0.113	0.127	0.112	0.117
0606520021	0.097	0.100	0.094	0.097
0606550011	0.109	0.105	0.099	0.104
0606560011	0.107	0.116	0.095	0.106
0606580011	0.109	0.120	0.111	0.113
0606590011	0.104	0.112	0.100	0.105
0606590031			0.060	
0607100011	0.092	0.088	0.082	0.087
0607100051	0.131	0.130	0.122	0.127
0607100121	0.115	0.103	0.097	0.105
0607100171	0.087	0.084	0.087	0.086
0607103061	0.106	0.104	0.085	0.098
0607110042	0.105	0.114	0.102	0.107
0607112341	0.089	0.087	0.082	0.086
0607120021	0.114	0.132	0.111	0.119
0607140011	0.113	0.110	0.099	0.107
0607140031	0.117	0.137	0.119	0.124
0607190021	0.101	0.111	0.102	0.104
0607190041	0.105	0.123	0.112	0.113
0611100051	0.076			
0611100071	0.080	0.087	0.086	0.084
0611100091	0.087	0.093	0.086	0.088
0611110041	0.097	0.093	0.092	0.094
0611120021	0.092	0.093	0.092	0.092
0611120031	0.064	0.074	0.069	0.069
0611130011	0.064	0.069	0.065	0.066
Average:	0.093	0.099	0.091	
			Design Value*:	0.127

*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

Table A-8. Monitor-Specific O_3 Air Quality Information: New York, NY

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
3600500831	0.096	0.079	0.074	0.083
3600501101	0.089	0.082	0.069	0.08
3602700071	0.111	0.081	0.076	0.089
3607150011	0.082	0.087	0.078	0.082
3607900051	0.102	0.082	0.082	0.088
3608100981	0.082	0.072	0.064	0.072
3608101241	0.089	0.086	0.075	0.083
3608500671	0.099	0.086	0.083	0.089
3610300021	0.108	0.094	0.081	0.094
3610300041	0.090	0.082		
3610300092	0.103	0.102	0.079	0.094
3611110051	0.084	0.082	0.076	0.08
3611920041	0.102	0.091	0.078	0.09
Average:	0.095	0.085	0.076	
			Design Value*:	0.094

*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

Table A-9. Monitor-Specific O_3 Air Quality Information: Philadelphia, PA

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
4201700121	0.111	0.087	0.082	0.093
4202900501	0.104	0.085		
4202901001	0.112	0.085	0.085	0.094
4204500021	0.106	0.080	0.081	0.089
4209100131	0.101	0.085	0.083	0.089
4210100041	0.082	0.069	0.054	0.068
4210100141	0.098	0.083	0.077	0.086
4210100241	0.110	0.082	0.091	0.094
4210101361	0.094	0.070	0.073	0.079
Average:	0.102	0.081	0.078	
			Design Value*:	0.094

*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

Table A-10. Monitor-Specific O_3 Air Quality Information: Sacramento, CA

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
0601700101	0.098	0.096	0.089	0.094
0601700111	0.067	0.065		
0601700121	0.077	0.075	0.073	0.075
0601700201	0.111	0.106	0.089	0.102
0605700051	0.099	0.098	0.093	0.096
0605700071	0.093	0.090	0.085	0.089
0605710011	0.065			
0606100021	0.101	0.094	0.092	0.095
0606100041	0.101	0.089	0.087	0.092
0606100061	0.095	0.085	0.082	0.087
0606100071		0.068		
0606130011	0.097			
0606700021	0.095	0.086	0.076	0.085
0606700061	0.105	0.097	0.083	0.095
0606700101	0.083	0.076	0.067	0.075
0606700111	0.069	0.087	0.077	0.077
0606700121	0.104	0.098	0.087	0.096
0606700131	0.079	0.075	0.067	0.073
0606750031	0.097	0.097	0.089	0.094
0611300041	0.076	0.077	0.071	0.074
0611310031	0.088	0.082	0.069	0.079
Average:	0.090	0.086	0.081	
			Design Value*:	0.102

*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

Table A-11. Monitor-Specific O_3 Air Quality Information: St. Louis, MO

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
1708310011	0.100	0.083	0.073	0.085
1711700021	0.085	0.077	0.068	0.076
1711900081	0.094	0.089	0.074	0.085
1711910091	0.090	0.088	0.078	0.085
1711920072	0.090	0.082	0.068	0.08
1711930071	0.084	0.083	0.073	0.08
1716300102	0.093	0.079	0.073	0.081
2909900121	0.093	0.082	0.070	0.081
2918310021	0.099	0.091	0.077	0.089
2918310041	0.098	0.090	0.076	0.088
2918900041	0.098	0.088	0.070	0.085
2918900061	0.094	0.086	0.067	0.082
2918930011	0.094	0.082	0.067	0.081
2918950011	0.095	0.088	0.068	0.083
2918970031	0.093	0.088	0.069	0.083
2951000071	0.090	0.084		
2951000721	0.081	0.071	0.058	0.07
2951000861	0.098	0.090	0.072	0.086
Average:	0.093	0.085	0.071	
			Design Value*:	0.089

*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

Table A-12. Monitor-Specific O_3 Air Quality Information: Washington, D.C.

AIRS Monitor ID	Fourth Daily Maximum 8-Hour Average (ppm)			Average of the 3 Year-Specific Values (ppm)
	2002	2003	2004	
1100100251	0.097	0.079	0.080	0.085
1100100411	0.102	0.082	0.070	0.084
1100100431	0.106	0.081	0.081	0.089
Average:	0.102	0.081	0.077	
			Design Value*:	0.089

*The design value is the maximum of the monitor-specific averages of the annual fourth daily maximum 8-hour average over the 3 year period.

Table A-13. Composite Monitor Statistics: 2004

Urban Area	24-Hour Average (ppm)			1-Hour Maximum (ppm)			8-Hour Maximum (ppm)		
	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum
Atlanta	0.0091	0.0279	0.0504	0.0170	0.0578	0.1267	0.0146	0.0499	0.1103
Boston 1*	0.0060	0.0276	0.0571	0.0185	0.0433	0.1060	0.0128	0.0379	0.0904
Boston 2*	0.0114	0.0310	0.0603	0.0218	0.0450	0.0956	0.0194	0.0411	0.0842
Chicago	0.0110	0.0270	0.0453	0.0152	0.0432	0.0758	0.0119	0.0389	0.0679
Cleveland	0.0080	0.0257	0.0445	0.0123	0.0404	0.0743	0.0090	0.0360	0.0676
Detroit	0.0074	0.0239	0.0459	0.0140	0.0430	0.0793	0.0094	0.0375	0.0730
Houston	0.0075	0.0262	0.0572	0.0155	0.0510	0.1243	0.0137	0.0443	0.1082
Los Angeles 1**	0.0204	0.0338	0.0491	0.0351	0.0634	0.1005	0.0319	0.0555	0.0867
Los Angeles 2**	0.0249	0.0398	0.0568	0.0410	0.0656	0.0992	0.0387	0.0597	0.0888
New York 1***	0.0055	0.0242	0.0494	0.0128	0.0449	0.0920	0.0085	0.0378	0.0811
New York 2***	0.0052	0.0241	0.0491	0.0115	0.0447	0.0883	0.0076	0.0378	0.0806
Philadelphia	0.0037	0.0272	0.0486	0.0090	0.0492	0.0915	0.0057	0.0426	0.0775
Sacramento	0.0164	0.0323	0.0462	0.0307	0.0593	0.0953	0.0241	0.0520	0.0806
St. Louis	0.0078	0.0248	0.0425	0.0175	0.0468	0.0890	0.0114	0.0409	0.0688
Washington, D.C.	0.0055	0.0283	0.0526	0.0140	0.0521	0.1020	0.0103	0.0450	0.0916

*"Boston 1" denotes Suffolk County; "Boston 2" denotes Essex, Middlesex, Norfolk, Suffolk, and Worcester Counties.

**"Los Angeles 1" denotes Los Angeles County; "Los Angeles 2" denotes Los Angeles, Riverside, San Bernardino, and Orange Counties.

***"New York 1" denotes the 5 boroughs of New York City -- Brooklyn, Queens, Manhattan, Bronx, and Staten Island. "New York 2" denotes the 5 boroughs plus Westchester County.

Table A-14. Composite Monitor Statistics: 2003

Urban Area	24-Hour Average (ppm)			1-Hour Maximum (ppm)			8-Hour Maximum (ppm)		
	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum
Atlanta	0.0035	0.0265	0.0513	0.0083	0.0574	0.1133	0.0042	0.0492	0.1003
Boston 1*	0.0106	0.0305	0.0693	0.0190	0.0469	0.1110	0.0143	0.0407	0.0955
Boston 2*	0.0104	0.0339	0.0693	0.0190	0.0482	0.1089	0.0145	0.0439	0.0958
Chicago	0.0084	0.0287	0.0554	0.0158	0.0458	0.0819	0.0111	0.0410	0.0793
Cleveland	0.0073	0.0298	0.0676	0.0143	0.0483	0.1013	0.0102	0.0427	0.0919
Detroit	0.0074	0.0279	0.0550	0.0163	0.0503	0.1010	0.0150	0.0442	0.0945
Houston	0.0065	0.0270	0.0612	0.0181	0.0534	0.1161	0.0119	0.0455	0.1008
Los Angeles 1**	0.0155	0.0326	0.0537	0.0274	0.0650	0.1099	0.0245	0.0557	0.0952
Los Angeles 2**	0.0266	0.0396	0.0612	0.0390	0.0670	0.1044	0.0361	0.0605	0.0954
New York 1***	0.0054	0.0251	0.0598	0.0146	0.0458	0.1078	0.0095	0.0386	0.0991
New York 2***	0.0061	0.0259	0.0593	0.0140	0.0462	0.1057	0.0088	0.0395	0.0985
Philadelphia	0.0052	0.0285	0.0725	0.0155	0.0495	0.1074	0.0085	0.0430	0.0988
Sacramento	0.0217	0.0352	0.0554	0.0343	0.0640	0.1069	0.0319	0.0563	0.0950
St. Louis	0.0050	0.0285	0.0534	0.0117	0.0519	0.1200	0.0093	0.0462	0.1064
Washington, D.C.	0.0053	0.0276	0.0661	0.0110	0.0516	0.1153	0.0078	0.0441	0.1092

*"Boston 1" denotes Suffolk County; "Boston 2" denotes Essex, Middlesex, Norfolk, Suffolk, and Worcester Counties.

**"Los Angeles 1" denotes Los Angeles County; "Los Angeles 2" denotes Los Angeles, Riverside, San Bernardino, and Orange Counties.

***"New York 1" denotes the 5 boroughs of New York City -- Brooklyn, Queens, Manhattan, Bronx, and Staten Island. "New York 2" denotes the 5 boroughs plus Westchester County.

Table A-15. Composite Monitor Statistics: 2002

Urban Area	24-Hour Average (ppm)			1-Hour Maximum (ppm)			8-Hour Maximum (ppm)		
	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum
Atlanta	0.0102	0.0308	0.0559	0.0193	0.0623	0.1307	0.0157	0.0540	0.1166
Boston 1*	0.0133	0.0314	0.0783	0.0210	0.0503	0.1185	0.0178	0.0434	0.1128
Boston 2*	0.0132	0.0359	0.0852	0.0213	0.0526	0.1213	0.0169	0.0479	0.1162
Chicago	0.0101	0.0295	0.0545	0.0206	0.0488	0.0986	0.0137	0.0437	0.0899
Cleveland	0.0103	0.0338	0.0685	0.0177	0.0548	0.1070	0.0138	0.0488	0.1044
Detroit	0.0085	0.0277	0.0572	0.0170	0.0516	0.0987	0.0151	0.0450	0.0923
Houston	0.0089	0.0258	0.0568	0.0163	0.0492	0.1167	0.0131	0.0427	0.1017
Los Angeles 1**	0.0158	0.0313	0.0492	0.0283	0.0613	0.1009	0.0252	0.0525	0.0842
Los Angeles 2**	0.0192	0.0385	0.0586	0.0292	0.0652	0.0967	0.0247	0.0587	0.0881
New York 1***	0.0062	0.0280	0.0565	0.0130	0.0529	0.1294	0.0088	0.0448	0.0999
New York 2***	0.0075	0.0286	0.0576	0.0133	0.0537	0.1333	0.0088	0.0458	0.1032
Philadelphia	0.0069	0.0322	0.0619	0.0133	0.0573	0.1235	0.0091	0.0501	0.0999
Sacramento	0.0182	0.0353	0.0604	0.0242	0.0647	0.1090	0.0212	0.0564	0.0954
St. Louis	0.0058	0.0289	0.0585	0.0157	0.0556	0.1127	0.0087	0.0484	0.1000
Washington, D.C.	0.0095	0.0357	0.0708	0.0193	0.0627	0.1430	0.0164	0.0548	0.1210

*"Boston 1" denotes Suffolk County; "Boston 2" denotes Essex, Middlesex, Norfolk, Suffolk, and Worcester Counties.

**"Los Angeles 1" denotes Los Angeles County; "Los Angeles 2" denotes Los Angeles, Riverside, San Bernardino, and Orange Counties.

***"New York 1" denotes the 5 boroughs of New York City -- Brooklyn, Queens, Manhattan, Bronx, and Staten Island. "New York 2" denotes the 5 boroughs plus Westchester County.

Appendix B: Information on Concentration-Response Functions

B.1 Tables of Study-Specific Information

Table B-1. Study-Specific Information for O_3 Studies in Atlanta, GA

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O_3 Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	0	71	0.00020	-0.00084	0.00123
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Huang et al. (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	0	71	0.00120	-0.00039	0.00279
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117

*Health effects are associated with short-term exposures to O_3.
**Rounded to the nearest ppb.
NA denotes "not available."

Table B-2. Study-Specific Information for O_3 Studies in Boston, MA

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O_3 Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Gent et al. (2003)	Respiratory symptoms -- chest tightness	---	0 - 12	1-day lag	1 hr max.	logistic	none	27	126	0.00462	0.00000	0.00784
Gent et al. (2003)	Respiratory symptoms -- chest tightness	---	0 - 12	0-day lag	1 hr max.	logistic	PM2.5	27	126	0.00771	0.00331	0.01220
Gent et al. (2003)	Respiratory symptoms -- chest tightness	---	0 - 12	1-day lag	1 hr max.	logistic	PM2.5	27	126	0.00701	0.00262	0.01153
Gent et al. (2003)	Respiratory symptoms -- chest tightness	---	0 - 12	1-day lag	8 hr max.	logistic	none	21	100	0.00570	0.00172	0.00965
Gent et al. (2003)	Respiratory symptoms -- shortness of breath	---	0 - 12	1-day lag	1 hr max.	logistic	none	27	126	0.00398	0.00040	0.00743
Gent et al. (2003)	Respiratory symptoms -- shortness of breath	---	0 - 12	1-day lag	8 hr max.	logistic	none	21	100	0.00525	0.00098	0.00952
Gent et al. (2003)	Respiratory symptoms -- wheeze	---	0 - 12	0-day lag	1 hr max.	logistic	PM2.5	21	100	0.00600	0.00209	0.01002

*Health effects are associated with short-term exposures to O_3.
**Rounded to the nearest ppb.

Table B-3. Study-Specific Information for O_3 Studies in Chicago, IL

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O_3 Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Schwartz (2004)	Mortality, non-accidental	< 800	all	0-day lag	1 hr max.	logistic	none	NA	NA	0.00099	0.00031	0.00166
Schwartz -- 14 US Cities (2004)	Mortality, non-accidental	< 800	all	0-day lag	1 hr max.	logistic	none	NA	NA	0.00037	0.00012	0.00062
Huang et al. (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	0	65	0.00075	-0.00067	0.00218
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117

*Health effects are associated with short-term exposures to O_3.
**Rounded to the nearest ppb.
NA denotes "not available."

Table B-4. Study-Specific Information for O_3 Studies in Cleveland, OH

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O_3 Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	2	75	0.00061	-0.00038	0.00161
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Huang et al. (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	2	75	0.00148	-0.00004	0.00299
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117
Schwartz et al. (1996)	Hospital admissions, respiratory illness	460-519	65+	avg of 1-day and 2-day lags	1 hr max.	log-linear	none	NA	NA	0.00169	0.00039	0.00291

*Health effects are associated with short-term exposures to O_3.
**Rounded to the nearest ppb.
NA denotes "not available."

Table B-5. Study-Specific Information for O_3 Studies in Detroit, MI

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O_3 Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	2	75	0.00076	-0.00024	0.00177
Bell et al. -- 95 US Cities	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Schwartz (2004)	Mortality, non-accidental	< 800	all	0-day lag	1 hr max.	logistic	none	NA	NA	0.00068	-0.00011	0.00148
Schwartz -- 14 US Cities (2004)	Mortality, non-accidental	< 800	all	0-day lag	1 hr max.	logistic	none	NA	NA	0.00037	0.00012	0.00062
Ito (2003)	Mortality, non-accidental	< 800	all	0-day lag	24 hr avg.	log-linear (GAM str.	none	NA	55	0.00093	-0.00085	0.00271
Ito (2003)	Mortality, respiratory	460-519	all	0-day lag	24 hr avg.	log-linear	none	NA	55	0.00359	-0.00276	0.00993
Huang et al. (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	2	75	0.00135	-0.00015	0.00286
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117
Ito (2003)	Hospital admissions (unscheduled), pneumonia	480-486	65+	0-day lag	24 hr avg.	log-linear (GAM str. estimation)**	none	NA	55	-0.00218	-0.00621	0.00186
Ito (2003)	Hospital admissions (unscheduled), pneumonia	480-486	65+	1-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	-0.00054	-0.00459	0.00352
Ito (2003)	Hospital admissions (unscheduled), pneumonia	480-486	65+	2-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	0.00066	-0.00342	0.00473
Ito (2003)	Hospital admissions (unscheduled), pneumonia	480-486	65+	3-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	0.00190	-0.00216	0.00595
Ito (2003)	Hospital admissions (unscheduled), COPD	490-496	65+	0-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	-0.00191	-0.00667	0.00286
Ito (2003)	Hospital admissions (unscheduled), COPD	490-496	65+	1-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	0.00187	-0.00293	0.00667
Ito (2003)	Hospital admissions (unscheduled), COPD	490-496	65+	2-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	-0.00027	-0.00513	0.00459
Ito (2003)	Hospital admissions (unscheduled), COPD	490-496	65+	3-day lag	24 hr avg.	log-linear (GAM str. estimation)	none	NA	55	0.00011	-0.00475	0.00497

*Health effects are associated with short-term exposures to O_3.

**Rounded to the nearest ppb.

***"GAM str. estimation" denotes that estimation of the log-linear C-R function used a generalized additive model with a stringent convergence criterion. This study also estimated log-linear C-R functions using generalized linear models (GLM).

NA denotes "not available."

Table B-6. Study-Specific Information for O_3 Studies in Houston, TX

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O_3 Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	1	76	0.00079	0.00005	0.00154
Bell et al. -- 95 US Cities	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Schwartz (2004)	Mortality, non-accidental	< 800	all	0-day lag	1 hr max.	logistic	none	NA	NA	0.00044	0.00004	0.00084
Schwartz -- 14 US Cities (2004)	Mortality, non-accidental	< 800	all	0-day lag	1 hr max.	logistic	none	NA	NA	0.00037	0.00012	0.00062
Huang et al. (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	1	76	0.00122	-0.00016	0.00261
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117

*Health effects are associated with short-term exposures to O_3.
**Rounded to the nearest ppb.
NA denotes "not available."

Table B-7. Study-Specific Information for O_3 Studies in Los Angeles, CA

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O_3 Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)***	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	0	68	0.00018	-0.00043	0.00079
Bell et al. -- 95 US Cities (2004)***	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Huang et al. (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	0	68	0.00107	0.00001	0.00213
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117
Linn et al. (2000)****	Hospital admissions (unscheduled), pulmonary illness --	75-101*****	30+	0-day lag	24 hr avg.	log-linear	none	1	70	0.00110	-0.00047	0.00267
Linn et al. (2000)****	Hospital admissions (unscheduled), pulmonary illness --	75-101*****	30+	0-day lag	24 hr avg.	log-linear	none	1	70	0.00060	-0.00077	0.00197

*Health effects are associated with short-term exposures to O_3.

**Rounded to the nearest ppb.

***Los Angeles is defined in this study as Los Angeles County.

****Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties.

*****Linn et al. (2000) used DRG codes instead of ICD codes.

Table B-8. Study-Specific Information for O_3 Studies in New York, NY

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb) min.	Observed Concentrations** (ppb) max.	O_3 Coefficient	Lower Bound	Upper Bound
Bell et al. -- 95 US Cities (2004)***	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Huang et al. (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	-2	81	0.00170	0.00054	0.00286
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)***	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117
Thurston et al. (1992)****	Hospital admissions (unscheduled),	466, 480-486, 490, 491, 492, 493	all	3-day lag	1 hr max.	linear	none	NA	206	1.370E-08	3.312E-09	2.409E-08
Thurston et al. (1992)****	Hospital admissions (unscheduled), asthma	493	all	1-day lag	1 hr max.	linear	none	NA	206	1.170E-08	2.488E-09	2.091E-08

*Health effects are associated with short-term exposures to O_3.

**Rounded to the nearest ppb.

***New York in this study is defined as the five boroughs of New York City plus Westchester County.

****New York in this study is defined as the five boroughs of New York City.

NA denotes "not available."

Table B-9. Study-Specific Information for O_3 Studies in Philadelphia, PA

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb) min.	Observed Concentrations** (ppb) max.	O_3 Coefficient	Lower Bound	Upper Bound
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065
Moolgavkar et al. (1995)	Mortality, non-accidental	< 800	all	1-day lag	24 hr avg.	log-linear	none	1	159	0.00140	0.00086	0.00191
Moolgavkar et al. (1995)	Mortality, non-accidental	< 800	all	1-day lag	24 hr avg.	log-linear	TSP, SO2	1	159	0.00139	0.00066	0.00212
Huang et al. (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	-3	84	0.00151	0.00007	0.00296
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00124	0.00047	0.00201
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	PM10	NA	NA	0.00074	-0.00033	0.00171
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	NO2	NA	NA	0.00060	0.00011	0.00109
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	SO2	NA	NA	0.00051	0.00001	0.00102
Huang et al. -- 19 US Cities (2004)	Mortality, cardiorespiratory	390-448; 490-496; 487; 480-486; 507.	all	0-day lag	24 hr avg.	log-linear	CO	NA	NA	0.00069	0.00020	0.00117

*Health effects are associated with short-term exposures to O_3.

**Rounded to the nearest ppb.

NA denotes "not available."

Table B-10. Study-Specific Information for O_3 Studies in Sacramento, CA

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O_3 Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	0	71	0.00026	-0.00079	0.00131
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065

*Health effects are associated with short-term exposures to O_3.
**Rounded to the nearest ppb.
NA denotes "not available."

Table B-11. Study-Specific Information for O_3 Studies in St. Louis, MO

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O_3 Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	0	118	0.00044	-0.00072	0.00159
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065

*Health effects are associated with short-term exposures to O_3.
**Rounded to the nearest ppb.
NA denotes "not available."

Table B-12. Study-Specific Information for O_3 Studies in Washington, D.C.

Study	Health Effects*	ICD-9 Codes	Ages	Lag	Exposure Metric	Model	Other Pollutants in Model	Observed Concentrations** (ppb)		O_3 Coefficient	Lower Bound	Upper Bound
								min.	max.			
Bell et al. -- 95 US Cities (2004)	Mortality, non-accidental	< 800	all	distributed lag	24 hr avg.	log-linear	none	NA	NA	0.00039	0.00013	0.00065

*Health effects are associated with short-term exposures to O_3.
**Rounded to the nearest ppb.
NA denotes "not available."

B.2 Concentration-Response Functions and Health Impact Functions

Notation:

y_0 = *Incidence under baseline conditions*
y_c = *Incidence under control conditions*
$\Delta y = y_0 - y_c$
$x_0 = O_3$ *levels under baseline conditions*
$x_c = O_3$ *levels under control conditions*
$\Delta x = x_0 - x_c$

B.2.1 Log-linear

The log-linear concentration-response function is: $y = Be^{\beta x}$

The derivation of the corresponding health impact function is as follows:

$$y = Be^{\beta x}$$

$$y_0 = Be^{\beta x_0}$$

$$y_c = Be^{\beta x_c}$$

$$\Delta y = Be^{\beta x_0} - Be^{\beta x_c}$$

$$\Delta y = Be^{\beta x_0} \cdot \left(1 - \frac{Be^{\beta x_c}}{Be^{\beta x_0}}\right)$$

$$\Delta y = Be^{\beta x_0} \cdot \left(1 - e^{\beta \cdot (x_c - x_0)}\right)$$

$$\Delta y = Be^{\beta x_0} \cdot \left(1 - e^{-\beta \Delta x}\right)$$
$$\Delta y = y_0 \cdot \left(1 - e^{-\beta \Delta x}\right)$$

B.2.2 Linear

The linear concentration-response function is: $y = \alpha + \beta x$

The derivation of the corresponding health impact function is as follows:

$$y = \alpha + \beta x$$
$$y_0 = \alpha + \beta x_0$$
$$y_c = \alpha + \beta x_c$$
$$\Delta y = y_0 - y_c = \beta x_0 - \beta x_c$$
$$\Delta y = \beta(x_0 - x_c) = \beta \Delta x$$

B.2.3 Logistic

The logistic concentration-response function is: $y = \left(\frac{e^{\beta x}}{1+e^{\beta x}}\right) = \frac{1}{1+e^{-\beta x}}$

The derivation of the corresponding health impact function is as follows:

$$y = \frac{1}{1+e^{-\beta x}}$$

$$odds = \frac{y}{1-y} = \frac{\left(\frac{1}{1+e^{-\beta x}}\right)}{1-\left(\frac{1}{1+e^{-\beta x}}\right)}$$

$$odds = \frac{\left(\frac{1}{1+e^{-\beta x}}\right)}{\left(\frac{e^{-\beta x}}{1+e^{-\beta x}}\right)} = \frac{1}{e^{-\beta x}} = e^{\beta x}$$

$$odds\ ratio = \frac{e^{\beta x_0}}{e^{\beta x_c}} = e^{\beta \Delta x}$$

$$\frac{\left(\frac{y_c}{1-y_c}\right)}{\left(\frac{y_0}{1-y_0}\right)} = e^{-\beta \Delta x}$$

$$\frac{y_c}{1-y_c} = \left(\frac{y_0}{1-y_0}\right) \cdot e^{-\beta \Delta x}$$

$$y_c = (1-y_c) \cdot \left(\frac{y_0}{1-y_0}\right) \cdot e^{-\beta \Delta x}$$

$$y_c + y_c \cdot \left(\frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x} = \left(\frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x}$$

$$y_c \cdot \left[1 + \left(\frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x} \right] = \left(\frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x}$$

$$y_c = \frac{\left(\frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x}}{1 + \left(\frac{y_0}{1 - y_0} \right) \cdot e^{-\beta \Delta x}}$$

$$y_c = \frac{y_0 \cdot e^{-\beta \Delta x}}{1 - y_0 + y_0 \cdot e^{-\beta \Delta x}}$$

$$y_c = \frac{y_0}{(1 - y_0) \cdot e^{\beta \Delta x} + y_0}$$

$$y_0 - y_c = y_0 - \frac{y_0}{(1 - y_0) \cdot e^{\beta \Delta x} + y_0}$$

$$\Delta y = y_0 \cdot \left(1 - \frac{1}{(1 - y_0) \cdot e^{\beta \Delta x} + y_0} \right)$$

B.3 The Calculation of "Shrinkage" Estimates from the Location-Specific Estimates Reported in Huang et al. (2004)

"Shrinkage" estimates were calculated from the location-specific estimates reported in Table 1 of Huang et al. (2004), using the method described in DuMouchel (1994). Both Huang et al. (2004) and DuMouchel (1994) consider a Bayesian hierarchical model. Although they use different notation, the models are the same. The notation comparison is given in Table B-13 below.

Given a posterior distribution for τ, $\pi(\tau \mid y)$, a shrinkage estimate for the ith location is calculated as:

$$\theta_i^* \equiv E[\theta_i \mid y] = \int \theta_i^*(\tau)\pi(\tau \mid y)d\tau$$

where $\theta_i^*(\tau) \equiv E[\theta_i \mid y, \tau] = \mu^*(\tau) + [y_i - \mu^*(\tau)]\tau^2/(\tau^2 + s_i^2)$,

where $\mu^*(\tau) \equiv E[\mu \mid y, \tau] = \sum_i w_i(\tau) y_i$,

where $w_i(\tau) = (\tau^2 + s_i^2)^{-1} / \sum_j (\tau^2 + s_j^2)^{-1}$.

A shrinkage estimate for the ith location is thus defined to be the expected value of the ith location-specific parameter, given all the location-specific estimates (see Table 1 for notation explanations). The posterior variance of the true ith location-specific parameter, given all the location-specific estimates, is given by:

$$\theta_i^{**} \equiv V[\theta_i \mid y] = \int \{V[\theta_i \mid y, \tau] + [\theta_i^*(\tau) - \theta_i^*]^2\}\pi(\tau \mid y)\, d\tau ,$$

where $V[\theta_i \mid y, \tau] = [s_i^2/(\tau^2 + s_i^2)]^2 / \sum_j (\tau^2 + s_j^2)^{-1} + \tau^2 s_i^2/(\tau^2 + s_i^2)$.

A 95 percent credible interval around the ith shrinkage estimate was calculated as $\theta_i^* \pm 1.96 * (\sqrt{\theta_i^{**}})$.

Table B-13. Notation

	Huang et al. (2004)	DuMouchel (1994)
Location indicator	c	i
parameter being estimated for location c (or i)	θ^c	θ_i
Estimate of parameter for location c (or i)*	$\hat{\theta}^c$	y_i
variance in the overall distribution of true θs.	τ^2	τ^2
variance of the estimate of θ^c or (θ_i)**	v^c	s_i^2
The mean of the overall distribution of true θs	μ	μ
The model:	$\hat{\theta}^c \sim N(\theta^c, v^c)$ (1) $\theta^c \sim N(\mu, \tau^2)$ (2) $(1)\&(2) \Rightarrow \hat{\theta}^c \sim N(\mu, v^c + \tau^2)$	$y_i = \mu + \delta_i + \varepsilon_i$ (1) $\theta_i = \mu + \delta_i$ (2) $\delta_i \sim N(0, \tau^2)$ (3) $\varepsilon_i \sim N(0, s_i^2)$ (4) $(2)\ and\ (3) \Rightarrow \theta_i \sim N(\mu, \tau^2)$ $(1),(2),(3)\&(4) \Rightarrow y_i \sim N(\mu, \tau^2 + s_i^2)$

*Given in Table 1 of Huang et al. (2004)

**Estimated by taking the square of the location-specific standard error, reported in Huang et al. (2004) for each location.

APPENDIX C: Additional Lung Function Results

C.1 Lung Function Response Among Active Children Associated with Exposure to "As Is" O3 Concentrations Over Background O3 Concentrations

Table C-1. Estimated Number and Percent of Occurrences of Lung Function Response Associated with Exposure to "As Is" O_3 Concentrations Over Background O_3 Concentrations Among Active Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: 2004 O_3 Concentrations*

Location	Response = Decrease in FEV_1 Greater Than or Equal to:					
	10%		15%		20%	
	Number (1000s)	Percent	Number (1000s)	Percent	Number (1000s)	Percent
Atlanta	384 (133 - 689)	1% (0.3% - 1.7%)	91 (13 - 219)	0.2% (0% - 0.6%)	13 (1 - 56)	0% (0% - 0.1%)
Boston	237 (68 - 437)	0.8% (0.2% - 1.5%)	53 (6 - 137)	0.2% (0% - 0.5%)	6 (1 - 33)	0% (0% - 0.1%)
Chicago	383 (92 - 713)	0.7% (0.2% - 1.3%)	81 (3 - 221)	0.1% (0% - 0.4%)	8 (0 - 51)	0% (0% - 0.1%)
Cleveland	143 (41 - 263)	0.8% (0.2% - 1.4%)	32 (3 - 82)	0.2% (0% - 0.4%)	4 (0 - 20)	0% (0% - 0.1%)
Detroit	248 (67 - 459)	0.8% (0.2% - 1.4%)	54 (4 - 143)	0.2% (0% - 0.4%)	6 (0 - 34)	0% (0% - 0.1%)
Houston	386 (179 - 638)	0.6% (0.3% - 1%)	106 (27 - 217)	0.2% (0% - 0.4%)	20 (5 - 64)	0% (0% - 0.1%)
Los Angeles	2725 (1259 - 4587)	1.3% (0.6% - 2.2%)	735 (190 - 1532)	0.3% (0.1% - 0.7%)	133 (27 - 443)	0.1% (0% - 0.2%)
New York	1112 (349 - 2012)	0.9% (0.3% - 1.7%)	255 (30 - 636)	0.2% (0% - 0.5%)	33 (3 - 157)	0% (0% - 0.1%)
Philadelphia	415 (149 - 735)	1.1% (0.4% - 1.9%)	99 (14 - 235)	0.3% (0% - 0.6%)	13 (1 - 60)	0% (0% - 0.2%)
Sacramento	143 (52 - 252)	0.8% (0.3% - 1.4%)	33 (4 - 80)	0.2% (0% - 0.5%)	4 (0 - 20)	0% (0% - 0.1%)
St. Louis	157 (46 - 286)	0.8% (0.2% - 1.4%)	34 (2 - 89)	0.2% (0% - 0.4%)	4 (0 - 21)	0% (0% - 0.1%)
Washington, DC	493 (176 - 878)	1% (0.3% - 1.7%)	119 (20 - 282)	0.2% (0% - 0.6%)	18 (3 - 73)	0% (0% - 0.1%)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient. Numbers are rounded to the nearest 1000. Percents are rounded to the nearest tenth.

Table C-2. Estimated Number and Percent of Occurrences of Lung Function Response Associated with Exposure to "As Is" O_3 Concentrations Over Background O_3 Concentrations Among Active Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: 2002 O_3 Concentrations*

Location	Response = Decrease in FEV_1 Greater Than or Equal to:					
	10%		15%		20%	
	Number (1000s)	Percent	Number (1000s)	Percent	Number (1000s)	Percent
Atlanta	471 (213 - 801)	1.2% (0.5% - 2%)	128 (36 - 268)	0.3% (0.1% - 0.7%)	24 (6 - 78)	0.1% (0% - 0.2%)
Boston	442 (206 - 739)	1.5% (0.7% - 2.5%)	129 (45 - 258)	0.4% (0.2% - 0.9%)	30 (11 - 82)	0.1% (0% - 0.3%)
Chicago	799 (387 - 1327)	1.5% (0.7% - 2.5%)	230 (77 - 457)	0.4% (0.1% - 0.9%)	48 (14 - 140)	0.1% (0% - 0.3%)
Cleveland	324 (171 - 523)	1.9% (1% - 3%)	101 (41 - 188)	0.6% (0.2% - 1.1%)	25 (9 - 63)	0.1% (0.1% - 0.4%)
Detroit	505 (251 - 834)	1.7% (0.8% - 2.8%)	148 (52 - 289)	0.5% (0.2% - 1%)	32 (9 - 89)	0.1% (0% - 0.3%)
Houston	335 (159 - 548)	0.6% (0.3% - 0.9%)	94 (27 - 188)	0.2% (0% - 0.3%)	19 (5 - 57)	0% (0% - 0.1%)
Los Angeles	2473 (1134 - 4144)	1.1% (0.5% - 1.9%)	678 (187 - 1401)	0.3% (0.1% - 0.6%)	131 (34 - 415)	0.1% (0% - 0.2%)
New York	2258 (1157 - 3691)	1.9% (1% - 3.1%)	679 (253 - 1300)	0.6% (0.2% - 1.1%)	158 (52 - 421)	0.1% (0% - 0.4%)
Philadelphia	822 (447 - 1315)	2.1% (1.1% - 3.3%)	260 (106 - 476)	0.7% (0.3% - 1.2%)	66 (24 - 163)	0.2% (0.1% - 0.4%)
Sacramento	204 (92 - 345)	1.2% (0.5% - 2%)	55 (14 - 115)	0.3% (0.1% - 0.7%)	10 (2 - 33)	0.1% (0% - 0.2%)
St. Louis	304 (155 - 496)	1.6% (0.8% - 2.5%)	91 (33 - 174)	0.5% (0.2% - 0.9%)	20 (6 - 55)	0.1% (0% - 0.3%)
Washington, DC	895 (456 - 1468)	1.8% (0.9% - 2.9%)	268 (98 - 516)	0.5% (0.2% - 1%)	62 (21 - 167)	0.1% (0% - 0.3%)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient. Numbers are rounded to the nearest 1000. Percents are rounded to the nearest tenth.

Table C-3. Number and Percent of Active Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response Associated with Exposure to "As Is" O_3 Concentrations Over Background O_3 Concentrations, for Location-Specific O_3 Seasons: 2004 O_3 Concentrations*

Location	Response = Decrease in FEV_1 Greater Than or Equal to:					
	10%		15%		20%	
	Number (1000s)	Percent	Number (1000s)	Percent	Number (1000s)	Percent
Atlanta	43 (32 - 62)	9.5% (7% - 13.8%)	16 (9 - 24)	3.5% (1.9% - 5.3%)	4 (1 - 9)	0.9% (0.3% - 2%)
Boston	31 (22 - 48)	6.5% (4.5% - 10%)	10 (4 - 17)	2.2% (0.9% - 3.6%)	2 (0 - 6)	0.5% (0.1% - 1.2%)
Chicago	43 (28 - 70)	4.9% (3.1% - 7.9%)	12 (3 - 23)	1.4% (0.3% - 2.6%)	2 (0 - 7)	0.2% (0% - 0.8%)
Cleveland	16 (11 - 25)	6.4% (4.4% - 9.9%)	5 (2 - 9)	2.1% (0.8% - 3.4%)	1 (0 - 3)	0.4% (0.1% - 1.1%)
Detroit	31 (21 - 48)	6.1% (4.2% - 9.6%)	10 (4 - 16)	1.9% (0.7% - 3.3%)	2 (0 - 5)	0.4% (0% - 1.1%)
Houston	59 (47 - 80)	12.1% (9.6% - 16.4%)	25 (16 - 36)	5.2% (3.4% - 7.3%)	9 (4 - 16)	1.8% (0.8% - 3.3%)
Los Angeles	227 (191 - 296)	14% (11.8% - 18.3%)	103 (71 - 140)	6.4% (4.4% - 8.6%)	37 (17 - 65)	2.3% (1.1% - 4%)
New York	140 (99 - 210)	7.6% (5.4% - 11.5%)	48 (23 - 77)	2.6% (1.2% - 4.2%)	12 (3 - 28)	0.6% (0.2% - 1.5%)
Philadelphia	47 (34 - 69)	8.8% (6.4% - 13%)	17 (9 - 26)	3.2% (1.7% - 4.9%)	4 (1 - 10)	0.8% (0.2% - 1.8%)
Sacramento	12 (9 - 17)	7.8% (6.2% - 11.5%)	4 (2 - 6)	2.9% (1.5% - 4.3%)	1 (0 - 2)	0.7% (0.1% - 1.6%)
St. Louis	17 (11 - 27)	6% (4% - 9.6%)	5 (2 - 9)	1.8% (0.6% - 3.2%)	1 (0 - 3)	0.3% (0% - 1%)
Washington, DC	65 (49 - 94)	9.6% (7.2% - 13.7%)	25 (14 - 38)	3.7% (2.1% - 5.5%)	7 (3 - 15)	1.1% (0.4% - 2.2%)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient. Numbers are rounded to the nearest 1000. Percents are rounded to the nearest tenth.

Table C-4. Number and Percent of Active Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response Associated with Exposure to "As Is" O_3 Concentrations Over Background O_3 Concentrations, for Location-Specific O_3 Seasons: 2002 O_3 Concentrations*

Location	Response = Decrease in FEV_1 Greater Than or Equal to:					
	10%		15%		20%	
	Number (1000s)	Percent	Number (1000s)	Percent	Number (1000s)	Percent
Atlanta	62 (49 - 82)	13.8% (11% - 18.3%)	27 (18 - 37)	6% (4% - 8.4%)	9 (4 - 17)	2.1% (1% - 3.8%)
Boston	73 (59 - 93)	15.4% (12.4% - 19.7%)	35 (24 - 47)	7.4% (5.1% - 10%)	15 (8 - 25)	3.1% (1.7% - 5.2%)
Chicago	127 (102 - 164)	14.9% (12% - 19.3%)	58 (39 - 79)	6.8% (4.6% - 9.3%)	21 (11 - 38)	2.5% (1.2% - 4.4%)
Cleveland	46 (38 - 57)	18.9% (15.6% - 23.2%)	23 (16 - 30)	9.4% (6.7% - 12.4%)	10 (6 - 17)	4% (2.3% - 6.8%)
Detroit	75 (61 - 96)	15.7% (12.7% - 20%)	34 (23 - 47)	7.2% (4.9% - 9.7%)	13 (6 - 22)	2.6% (1.3% - 4.6%)
Houston	58 (46 - 78)	12.2% (9.7% - 16.4%)	25 (17 - 35)	5.3% (3.5% - 7.4%)	9 (4 - 16)	1.9% (0.9% - 3.4%)
Los Angeles	230 (193 - 296)	14.1% (11.9% - 18.2%)	108 (74 - 144)	6.6% (4.5% - 8.8%)	41 (21 - 71)	2.5% (1.3% - 4.4%)
New York	319 (261 - 401)	17.6% (14.4% - 22.2%)	154 (109 - 206)	8.5% (6% - 11.4%)	64 (35 - 107)	3.5% (1.9% - 5.9%)
Philadelphia	107 (89 - 131)	20.1% (16.7% - 24.6%)	55 (39 - 72)	10.3% (7.4% - 13.5%)	24 (14 - 40)	4.6% (2.6% - 7.5%)
Sacramento	20 (17 - 26)	13.5% (11.4% - 17.4%)	9 (6 - 13)	6.2% (4.2% - 8.3%)	3 (2 - 6)	2.2% (1% - 3.9%)
St. Louis	44 (36 - 56)	16.6% (13.5% - 20.9%)	21 (15 - 28)	7.8% (5.4% - 10.5%)	8 (4 - 14)	3% (1.6% - 5.2%)
Washington, DC	124 (102 - 155)	18.2% (15% - 22.8%)	61 (43 - 81)	8.9% (6.3% - 11.9%)	26 (14 - 43)	3.8% (2.1% - 6.3%)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient. Numbers are rounded to the nearest 1000. Percents are rounded to the nearest tenth.

C.2 Lung Function Response Among Active Children Associated with Exposure to O3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards

Table C-5. Estimated Number of Occurrences of Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards Among Active Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: Based on Adjusting 2004 O_3 Concentrations*

Location	Number of Occurrences (in 1000s) of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	288 (79 - 533)	283 (77 - 524)	257 (63 - 480)	227 (49 - 430)	213 (42 - 406)	211 (41 - 402)	188 (32 - 362)	154 (19 - 302)
Boston	177 (38 - 337)	160 (30 - 308)	158 (29 - 305)	152 (27 - 294)	132 (19 - 260)	122 (15 - 242)	117 (13 - 232)	95 (7 - 194)
Chicago	267 (41 - 514)	249 (35 - 482)	235 (30 - 457)	211 (22 - 414)	191 (17 - 379)	179 (14 - 357)	163 (10 - 328)	126 (3 - 259)
Cleveland	98 (19 - 186)	90 (16 - 173)	87 (14 - 167)	75 (10 - 146)	72 (9 - 141)	67 (7 - 132)	63 (6 - 125)	50 (3 - 102)
Detroit	187 (37 - 356)	171 (31 - 329)	166 (29 - 321)	161 (26 - 311)	138 (18 - 271)	127 (14 - 252)	121 (12 - 240)	97 (6 - 196)
Houston	216 (79 - 366)	194 (67 - 330)	186 (63 - 317)	151 (46 - 257)	144 (43 - 246)	130 (37 - 220)	116 (32 - 196)	66 (18 - 102)
Los Angeles	915 (196 - 1694)	874 (180 - 1623)	795 (149 - 1485)	592 (89 - 1119)	567 (82 - 1074)	521 (71 - 988)	414 (48 - 788)	204 (14 - 383)
New York	674 (122 - 1289)	638 (107 - 1228)	601 (91 - 1163)	492 (51 - 973)	504 (55 - 995)	482 (47 - 955)	445 (37 - 890)	350 (16 - 714)
Philadelphia	279 (70 - 516)	258 (60 - 481)	248 (55 - 464)	212 (38 - 403)	206 (36 - 393)	193 (30 - 370)	181 (26 - 349)	147 (14 - 290)
Sacramento	79 (18 - 146)	74 (16 - 138)	69 (14 - 129)	58 (10 - 109)	55 (9 - 104)	52 (8 - 100)	46 (6 - 89)	34 (3 - 67)
St. Louis	128 (32 - 237)	118 (27 - 220)	112 (24 - 209)	95 (17 - 180)	90 (15 - 173)	84 (13 - 161)	78 (11 - 150)	60 (5 - 119)
Washington, DC	340 (88 - 632)	306 (71 - 576)	304 (70 - 571)	268 (53 - 512)	253 (46 - 485)	230 (37 - 446)	222 (34 - 432)	180 (19 - 357)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	63 (4 - 166)	62 (4 - 163)	54 (2 - 149)	47 (1 - 133)	43 (1 - 125)	43 (1 - 123)	37 (0 - 111)	30 (0 - 92)
Boston	37 (2 - 104)	33 (1 - 94)	32 (1 - 93)	30 (1 - 90)	26 (0 - 79)	24 (0 - 73)	22 (0 - 70)	18 (0 - 58)
Chicago	53 (0 - 158)	49 (0 - 148)	46 (0 - 140)	41 (0 - 126)	37 (0 - 115)	34 (0 - 108)	31 (0 - 99)	23 (0 - 78)
Cleveland	20 (0 - 57)	18 (0 - 53)	17 (0 - 51)	15 (0 - 44)	14 (0 - 43)	13 (0 - 40)	12 (0 - 38)	9 (0 - 31)
Detroit	38 (1 - 109)	35 (1 - 101)	33 (0 - 98)	32 (0 - 95)	27 (0 - 82)	24 (0 - 76)	23 (0 - 73)	18 (0 - 59)
Houston	51 (5 - 119)	45 (4 - 107)	43 (3 - 103)	34 (1 - 83)	33 (1 - 80)	29 (1 - 72)	26 (1 - 64)	15 (0 - 35)

Location	Number of Occurrences (in 1000s) of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4* **	**0.084/3**	**0.080/4******	**0.074/5**	**0.074/4**	**0.074/3**	**0.070/4******	**0.064/4**
Los Angeles	189 (3 - 528)	180 (2 - 506)	161 (1 - 462)	118 (0 - 347)	113 (0 - 333)	103 (0 - 307)	82 (0 - 244)	41 (0 - 120)
New York	136 (3 - 396)	128 (2 - 376)	119 (1 - 356)	94 (0 - 296)	97 (0 - 303)	92 (0 - 290)	84 (0 - 269)	65 (0 - 214)
Philadelphia	60 (2 - 160)	54 (1 - 149)	52 (1 - 144)	43 (0 - 124)	42 (0 - 121)	38 (0 - 114)	36 (0 - 107)	28 (0 - 88)
Sacramento	16 (0 - 45)	15 (0 - 43)	14 (0 - 40)	12 (0 - 34)	11 (0 - 32)	10 (0 - 31)	9 (0 - 27)	7 (0 - 20)
St. Louis	27 (1 - 73)	24 (0 - 68)	23 (0 - 65)	19 (0 - 56)	18 (0 - 53)	17 (0 - 50)	15 (0 - 46)	12 (0 - 36)
Washington, DC	73 (5 - 197)	65 (3 - 178)	64 (3 - 177)	55 (1 - 157)	51 (1 - 149)	46 (1 - 136)	44 (0 - 132)	34 (0 - 108)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	7 (0 - 39)	7 (0 - 38)	6 (0 - 34)	4 (0 - 30)	4 (0 - 28)	4 (0 - 27)	3 (0 - 24)	2 (0 - 19)
Boston	4 (0 - 23)	3 (0 - 21)	3 (0 - 21)	3 (0 - 20)	2 (0 - 17)	2 (0 - 15)	2 (0 - 15)	1 (0 - 12)
Chicago	5 (0 - 34)	4 (0 - 32)	4 (0 - 30)	3 (0 - 27)	3 (0 - 24)	3 (0 - 22)	2 (0 - 20)	2 (0 - 16)
Cleveland	2 (0 - 13)	2 (0 - 12)	2 (0 - 11)	1 (0 - 9)	1 (0 - 9)	1 (0 - 8)	1 (0 - 8)	1 (0 - 6)
Detroit	4 (0 - 24)	3 (0 - 22)	3 (0 - 21)	3 (0 - 21)	2 (0 - 17)	2 (0 - 16)	2 (0 - 15)	1 (0 - 12)
Houston	7 (0 - 31)	6 (0 - 28)	5 (0 - 26)	4 (0 - 21)	4 (0 - 20)	3 (0 - 18)	3 (0 - 16)	2 (0 - 9)
Los Angeles	18 (0 - 120)	17 (0 - 114)	14 (0 - 103)	10 (0 - 76)	9 (0 - 73)	9 (0 - 67)	7 (0 - 53)	3 (0 - 26)
New York	12 (0 - 87)	11 (0 - 82)	10 (0 - 77)	7 (0 - 62)	8 (0 - 64)	7 (0 - 61)	6 (0 - 56)	5 (0 - 43)
Philadelphia	6 (0 - 37)	5 (0 - 34)	5 (0 - 33)	4 (0 - 27)	4 (0 - 27)	3 (0 - 25)	3 (0 - 23)	2 (0 - 19)
Sacramento	2 (0 - 10)	1 (0 - 10)	1 (0 - 9)	1 (0 - 7)	1 (0 - 7)	1 (0 - 7)	1 (0 - 6)	0 (0 - 4)
St. Louis	3 (0 - 17)	2 (0 - 15)	2 (0 - 15)	2 (0 - 12)	2 (0 - 12)	1 (0 - 11)	1 (0 - 10)	1 (0 - 8)
Washington, DC	8 (0 - 46)	7 (0 - 41)	6 (0 - 40)	5 (0 - 35)	5 (0 - 33)	4 (0 - 30)	4 (0 - 28)	3 (0 - 23)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table C-6. Estimated Number of Occurrences of Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards Among Active Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: Based on Adjusting 2002 O_3 Concentrations*

Location	Number of Occurrences (in 1000s) of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	354 (135 - 624)	349 (132 - 617)	315 (111 - 564)	283 (91 - 511)	264 (81 - 482)	263 (80 - 480)	232 (63 - 429)	191 (42 - 358)
Boston	336 (133 - 587)	304 (111 - 539)	301 (109 - 534)	287 (100 - 514)	253 (78 - 461)	234 (67 - 431)	224 (62 - 416)	185 (40 - 352)
Chicago	580 (235 - 1009)	543 (210 - 952)	514 (191 - 909)	467 (161 - 836)	427 (137 - 772)	405 (124 - 737)	375 (107 - 688)	304 (68 - 569)
Cleveland	226 (99 - 387)	206 (84 - 358)	201 (81 - 351)	175 (63 - 311)	168 (59 - 301)	154 (50 - 279)	147 (46 - 269)	121 (31 - 226)
Detroit	385 (166 - 664)	349 (141 - 610)	341 (135 - 598)	332 (129 - 585)	282 (96 - 508)	258 (82 - 470)	247 (75 - 452)	201 (49 - 376)
Houston	183 (70 - 306)	164 (60 - 275)	157 (57 - 263)	126 (42 - 211)	120 (39 - 201)	109 (34 - 180)	95 (30 - 155)	49 (16 - 68)
Los Angeles	818 (186 - 1505)	792 (176 - 1459)	696 (142 - 1288)	483 (81 - 899)	477 (80 - 886)	450 (73 - 837)	334 (48 - 616)	141 (18 - 241)
New York	1386 (529 - 2443)	1310 (478 - 2326)	1244 (434 - 2225)	1025 (299 - 1876)	1054 (316 - 1922)	1004 (286 - 1842)	937 (247 - 1733)	757 (156 - 1430)
Philadelphia	567 (256 - 962)	523 (224 - 898)	508 (214 - 875)	443 (168 - 778)	427 (158 - 754)	398 (139 - 710)	379 (127 - 680)	314 (87 - 575)
Sacramento	121 (40 - 217)	114 (36 - 205)	107 (32 - 194)	92 (24 - 170)	89 (23 - 164)	84 (20 - 156)	77 (17 - 145)	61 (11 - 117)
St. Louis	251 (118 - 422)	233 (105 - 396)	222 (97 - 380)	194 (78 - 338)	183 (71 - 321)	171 (63 - 303)	159 (56 - 284)	128 (37 - 234)
Washington, DC	632 (266 - 1092)	568 (223 - 998)	564 (220 - 992)	505 (181 - 900)	475 (162 - 854)	434 (137 - 789)	421 (129 - 769)	348 (88 - 649)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	87 (16 - 200)	85 (15 - 198)	74 (10 - 179)	64 (7 - 161)	59 (5 - 151)	59 (5 - 150)	50 (2 - 133)	39 (0 - 111)
Boston	87 (22 - 194)	76 (16 - 175)	75 (15 - 173)	70 (13 - 165)	58 (8 - 145)	52 (6 - 135)	50 (5 - 130)	39 (2 - 108)
Chicago	148 (32 - 328)	135 (25 - 307)	125 (21 - 291)	110 (14 - 265)	97 (10 - 243)	91 (8 - 231)	82 (5 - 214)	63 (1 - 176)
Cleveland	60 (16 - 128)	53 (12 - 117)	51 (11 - 114)	42 (7 - 99)	40 (6 - 95)	35 (4 - 88)	33 (3 - 84)	26 (1 - 70)
Detroit	101 (25 - 218)	88 (18 - 197)	85 (17 - 193)	82 (15 - 188)	65 (8 - 160)	58 (5 - 147)	55 (4 - 141)	42 (1 - 116)
Houston	45 (6 - 101)	39 (4 - 90)	37 (3 - 86)	29 (2 - 69)	28 (1 - 66)	25 (1 - 59)	22 (1 - 52)	12 (0 - 25)
Los Angeles	172 (4 - 471)	166 (4 - 456)	144 (3 - 403)	98 (1 - 281)	97 (1 - 277)	91 (1 - 262)	68 (0 - 194)	30 (0 - 80)

Location	Number of Occurrences (in 1000s) of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
New York	339 (59 - 784)	314 (48 - 741)	292 (38 - 705)	226 (16 - 586)	234 (18 - 601)	220 (14 - 574)	201 (9 - 538)	155 (2 - 441)
Philadelphia	153 (40 - 320)	136 (31 - 295)	130 (28 - 286)	107 (17 - 249)	102 (15 - 240)	93 (11 - 225)	87 (9 - 214)	68 (3 - 179)
Sacramento	28 (3 - 69)	25 (2 - 65)	24 (2 - 61)	20 (1 - 53)	19 (1 - 51)	18 (0 - 48)	16 (0 - 45)	12 (0 - 36)
St. Louis	70 (21 - 142)	63 (17 - 132)	59 (15 - 125)	48 (10 - 109)	45 (8 - 103)	41 (6 - 97)	37 (5 - 90)	28 (1 - 73)
Washington, DC	164 (38 - 358)	141 (27 - 322)	140 (26 - 319)	120 (18 - 286)	110 (14 - 270)	98 (9 - 247)	94 (8 - 240)	74 (2 - 201)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	13 (2 - 53)	12 (1 - 52)	10 (1 - 45)	8 (0 - 40)	7 (0 - 36)	7 (0 - 36)	5 (0 - 31)	4 (0 - 25)
Boston	16 (4 - 54)	12 (2 - 47)	12 (2 - 46)	11 (2 - 43)	8 (1 - 36)	6 (0 - 32)	6 (0 - 31)	4 (0 - 24)
Chicago	23 (3 - 89)	20 (2 - 81)	17 (2 - 75)	14 (1 - 67)	12 (0 - 60)	11 (0 - 56)	9 (0 - 51)	6 (0 - 40)
Cleveland	11 (2 - 36)	8 (1 - 31)	8 (1 - 30)	6 (0 - 25)	5 (0 - 24)	4 (0 - 22)	4 (0 - 20)	3 (0 - 16)
Detroit	17 (3 - 60)	13 (1 - 52)	13 (1 - 51)	12 (1 - 49)	8 (0 - 40)	7 (0 - 36)	6 (0 - 34)	4 (0 - 27)
Houston	6 (1 - 27)	5 (0 - 24)	5 (0 - 22)	3 (0 - 18)	3 (0 - 17)	3 (0 - 15)	2 (0 - 13)	1 (0 - 7)
Los Angeles	17 (0 - 108)	16 (0 - 105)	14 (0 - 91)	9 (0 - 63)	8 (0 - 62)	8 (0 - 58)	6 (0 - 43)	3 (0 - 19)
New York	50 (6 - 205)	43 (4 - 190)	38 (2 - 178)	25 (0 - 140)	27 (1 - 145)	24 (0 - 136)	21 (0 - 126)	14 (0 - 99)
Philadelphia	27 (6 - 92)	22 (4 - 81)	21 (3 - 78)	15 (1 - 65)	14 (1 - 62)	12 (1 - 56)	11 (0 - 53)	7 (0 - 42)
Sacramento	3 (0 - 17)	3 (0 - 16)	3 (0 - 15)	2 (0 - 12)	2 (0 - 12)	2 (0 - 11)	2 (0 - 10)	1 (0 - 8)
St. Louis	13 (3 - 42)	11 (2 - 37)	10 (2 - 35)	7 (1 - 29)	6 (0 - 27)	5 (0 - 25)	5 (0 - 23)	3 (0 - 17)
Washington, DC	28 (5 - 99)	21 (3 - 85)	21 (3 - 84)	16 (1 - 73)	14 (1 - 67)	12 (0 - 60)	11 (0 - 58)	7 (0 - 46)

*Numbers are median (0.5 fractile) numbers of occurrences. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table C-7. Estimated Percent of Occurrences of Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards Among Active Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: Based on Adjusting 2004 O_3 Concentrations*

Location	Percent of Occurrences of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	0.7% (0.2% - 1.3%)	0.7% (0.2% - 1.3%)	0.6% (0.2% - 1.2%)	0.6% (0.1% - 1.1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.4% (0% - 0.8%)
Boston	0.6% (0.1% - 1.1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.4% (0.1% - 0.9%)	0.4% (0.1% - 0.8%)	0.4% (0% - 0.8%)	0.3% (0% - 0.6%)
Chicago	0.5% (0.1% - 0.9%)	0.5% (0.1% - 0.9%)	0.4% (0.1% - 0.8%)	0.4% (0% - 0.7%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)
Cleveland	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.5% (0.1% - 0.9%)	0.4% (0.1% - 0.8%)	0.4% (0% - 0.8%)	0.4% (0% - 0.7%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)
Detroit	0.6% (0.1% - 1.1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.4% (0.1% - 0.9%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.3% (0% - 0.6%)
Houston	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)
Los Angeles	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.3% (0% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.1% (0% - 0.2%)
New York	0.6% (0.1% - 1.1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.3% (0% - 0.6%)
Philadelphia	0.7% (0.2% - 1.3%)	0.7% (0.2% - 1.2%)	0.6% (0.1% - 1.2%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.5% (0.1% - 0.9%)	0.4% (0% - 0.7%)
Sacramento	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.5%)	0.2% (0% - 0.4%)
St. Louis	0.6% (0.2% - 1.1%)	0.6% (0.1% - 1.1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.3% (0% - 0.6%)
Washington, DC	0.7% (0.2% - 1.2%)	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1.1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.4% (0.1% - 0.9%)	0.4% (0% - 0.7%)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Boston	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Chicago	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)
Cleveland	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Detroit	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Houston	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Los Angeles	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)

Location	Percent of Occurrences of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4* **	**0.084/3**	**0.080/4**	**0.074/5**	**0.074/4**	**0.074/3**	**0.070/4**	**0.064/4**
New York	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Philadelphia	0.2% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Sacramento	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)
St. Louis	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Washington, DC	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)
Boston	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)
Chicago	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
Cleveland	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
Detroit	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)
Houston	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
Los Angeles	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
New York	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)
Philadelphia	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)
Sacramento	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
St. Louis	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)
Washington, DC	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)

*Percents are median (0.5 fractile) percents of occurrences. Percents in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table C-8. Estimated Percent of Occurrences of Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards Among Active Children (Ages 5-18) Engaged in Moderate Exertion, for Location-Specific O_3 Seasons: Based on Adjusting 2002 O_3 Concentrations*

Location	Percent of Occurrences of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	0.9% (0.3% - 1.6%)	0.9% (0.3% - 1.6%)	0.8% (0.3% - 1.4%)	0.7% (0.2% - 1.3%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.2%)	0.6% (0.2% - 1.1%)	0.5% (0.1% - 0.9%)
Boston	1.1% (0.4% - 2%)	1% (0.4% - 1.8%)	1% (0.4% - 1.8%)	1% (0.3% - 1.7%)	0.9% (0.3% - 1.6%)	0.8% (0.2% - 1.5%)	0.8% (0.2% - 1.4%)	0.6% (0.1% - 1.2%)
Chicago	1.1% (0.4% - 1.9%)	1% (0.4% - 1.8%)	1% (0.4% - 1.7%)	0.9% (0.3% - 1.6%)	0.8% (0.3% - 1.5%)	0.8% (0.2% - 1.4%)	0.7% (0.2% - 1.3%)	0.6% (0.1% - 1.1%)
Cleveland	1.3% (0.6% - 2.2%)	1.2% (0.5% - 2.1%)	1.2% (0.5% - 2%)	1% (0.4% - 1.8%)	1% (0.3% - 1.7%)	0.9% (0.3% - 1.6%)	0.9% (0.3% - 1.6%)	0.7% (0.2% - 1.3%)
Detroit	1.3% (0.5% - 2.2%)	1.2% (0.5% - 2%)	1.1% (0.4% - 2%)	1.1% (0.4% - 1.9%)	0.9% (0.3% - 1.7%)	0.9% (0.3% - 1.6%)	0.8% (0.2% - 1.5%)	0.7% (0.2% - 1.2%)
Houston	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.1%)
Los Angeles	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.1% (0% - 0.1%)
New York	1.2% (0.5% - 2.1%)	1.1% (0.4% - 2%)	1.1% (0.4% - 1.9%)	0.9% (0.3% - 1.6%)	0.9% (0.3% - 1.6%)	0.9% (0.2% - 1.6%)	0.8% (0.2% - 1.5%)	0.6% (0.1% - 1.2%)
Philadelphia	1.4% (0.6% - 2.4%)	1.3% (0.6% - 2.3%)	1.3% (0.5% - 2.2%)	1.1% (0.4% - 2%)	1.1% (0.4% - 1.9%)	1% (0.4% - 1.8%)	1% (0.3% - 1.7%)	0.8% (0.2% - 1.4%)
Sacramento	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.2%)	0.6% (0.2% - 1.1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.5% (0.1% - 0.9%)	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)
St. Louis	1.3% (0.6% - 2.2%)	1.2% (0.5% - 2%)	1.1% (0.5% - 1.9%)	1% (0.4% - 1.7%)	0.9% (0.4% - 1.6%)	0.9% (0.3% - 1.5%)	0.8% (0.3% - 1.5%)	0.7% (0.2% - 1.2%)
Washington, DC	1.2% (0.5% - 2.1%)	1.1% (0.4% - 2%)	1.1% (0.4% - 1.9%)	1% (0.4% - 1.8%)	0.9% (0.3% - 1.7%)	0.9% (0.3% - 1.6%)	0.8% (0.3% - 1.5%)	0.7% (0.2% - 1.3%)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)
Boston	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.1% (0% - 0.4%)
Chicago	0.3% (0.1% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.1% (0% - 0.3%)
Cleveland	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.7%)	0.2% (0% - 0.6%)	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.1% (0% - 0.4%)
Detroit	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.1% (0% - 0.4%)
Houston	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)
Los Angeles	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)

Location	Percent of Occurrences of Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
New York	0.3% (0.1% - 0.7%)	0.3% (0% - 0.6%)	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.1% (0% - 0.4%)
Philadelphia	0.4% (0.1% - 0.8%)	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)
Sacramento	0.2% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
St. Louis	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.1% (0% - 0.4%)
Washington, DC	0.3% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.1% (0% - 0.4%)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Boston	0.1% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Chicago	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Cleveland	0.1% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Detroit	0.1% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Houston	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
Los Angeles	0% (0% - 0.1%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)	0% (0% - 0%)
New York	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Philadelphia	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Sacramento	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0%)
St. Louis	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)
Washington, DC	0.1% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.2%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)	0% (0% - 0.1%)

*Percents are median (0.5 fractile) percents of occurrences. Percents in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table C-9. Number of Active Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons: Based on Adjusting 2004 O_3 Concentrations*

Location	Number of Active Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	30 (21 - 47)	29 (20 - 46)	26 (17 - 41)	22 (14 - 35)	20 (13 - 33)	20 (12 - 32)	17 (10 - 27)	13 (7 - 21)
Boston	22 (14 - 35)	19 (11 - 30)	19 (11 - 30)	18 (10 - 29)	14 (8 - 23)	13 (7 - 21)	12 (6 - 20)	9 (4 - 15)
Chicago	28 (16 - 46)	26 (14 - 42)	24 (13 - 39)	21 (11 - 34)	19 (9 - 30)	17 (8 - 28)	15 (6 - 25)	11 (3 - 18)
Cleveland	10 (6 - 16)	9 (5 - 15)	9 (5 - 14)	7 (4 - 11)	7 (4 - 11)	6 (3 - 10)	6 (3 - 9)	4 (2 - 7)
Detroit	22 (13 - 35)	19 (12 - 31)	19 (11 - 30)	18 (10 - 29)	14 (8 - 23)	13 (7 - 21)	12 (6 - 19)	9 (4 - 14)
Houston	32 (23 - 48)	28 (20 - 44)	27 (19 - 42)	22 (15 - 35)	21 (14 - 34)	19 (12 - 31)	18 (11 - 28)	13 (7 - 20)
Los Angeles	58 (43 - 91)	54 (40 - 85)	47 (35 - 73)	35 (25 - 52)	33 (24 - 51)	31 (23 - 47)	26 (19 - 39)	12 (8 - 19)
New York	72 (44 - 117)	67 (39 - 108)	62 (35 - 99)	46 (24 - 74)	48 (25 - 77)	45 (23 - 72)	41 (19 - 65)	30 (11 - 49)
Philadelphia	29 (19 - 46)	26 (17 - 42)	25 (16 - 40)	20 (12 - 33)	19 (11 - 32)	18 (10 - 29)	16 (9 - 26)	12 (6 - 20)
Sacramento	6 (4 - 9)	5 (4 - 8)	5 (4 - 8)	4 (3 - 6)	4 (3 - 5)	3 (2 - 5)	3 (2 - 4)	2 (1 - 3)
St. Louis	13 (9 - 22)	12 (8 - 20)	12 (7 - 19)	9 (5 - 15)	9 (5 - 14)	8 (5 - 13)	7 (4 - 12)	6 (3 - 9)
Washington, DC	41 (27 - 63)	36 (23 - 56)	35 (23 - 56)	29 (18 - 47)	27 (16 - 44)	24 (14 - 39)	23 (13 - 37)	17 (9 - 27)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	10 (4 - 16)	9 (3 - 16)	8 (2 - 14)	6 (1 - 11)	6 (1 - 11)	5 (1 - 10)	4 (0 - 9)	3 (0 - 7)
Boston	6 (1 - 11)	5 (1 - 10)	5 (1 - 10)	5 (1 - 9)	4 (0 - 8)	3 (0 - 7)	3 (0 - 6)	2 (0 - 5)
Chicago	7 (0 - 15)	6 (0 - 14)	6 (0 - 13)	5 (0 - 11)	4 (0 - 10)	4 (0 - 9)	3 (0 - 8)	2 (0 - 6)
Cleveland	3 (0 - 5)	2 (0 - 5)	2 (0 - 5)	2 (0 - 4)	2 (0 - 3)	1 (0 - 3)	1 (0 - 3)	1 (0 - 2)
Detroit	6 (1 - 11)	5 (1 - 10)	5 (0 - 10)	5 (0 - 9)	3 (0 - 7)	3 (0 - 7)	3 (0 - 6)	2 (0 - 5)
Houston	11 (4 - 17)	9 (3 - 15)	8 (3 - 14)	6 (1 - 12)	6 (1 - 11)	5 (1 - 10)	5 (1 - 9)	3 (0 - 7)
Los Angeles	16 (2 - 29)	15 (2 - 27)	12 (1 - 24)	8 (0 - 17)	8 (0 - 17)	8 (0 - 15)	6 (0 - 13)	3 (0 - 6)

Location	Number of Active Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
New York	19 (2 - 38)	17 (2 - 35)	16 (1 - 32)	11 (0 - 24)	11 (0 - 25)	10 (0 - 24)	9 (0 - 21)	7 (0 - 16)
Philadelphia	8 (2 - 15)	7 (1 - 14)	7 (1 - 13)	5 (0 - 10)	5 (0 - 10)	4 (0 - 9)	4 (0 - 8)	3 (0 - 6)
Sacramento	2 (0 - 3)	1 (0 - 3)	1 (0 - 2)	1 (0 - 2)	1 (0 - 2)	1 (0 - 2)	1 (0 - 1)	0 (0 - 1)
St. Louis	4 (1 - 7)	3 (0 - 6)	3 (0 - 6)	2 (0 - 5)	2 (0 - 5)	2 (0 - 4)	2 (0 - 4)	1 (0 - 3)
Washington, DC	13 (4 - 22)	11 (3 - 19)	10 (3 - 19)	8 (1 - 15)	7 (1 - 14)	6 (1 - 13)	6 (0 - 12)	4 (0 - 9)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	2 (0 - 5)	2 (0 - 5)	1 (0 - 4)	1 (0 - 4)	1 (0 - 3)	1 (0 - 3)	1 (0 - 3)	0 (0 - 2)
Boston	1 (0 - 4)	1 (0 - 3)	1 (0 - 3)	1 (0 - 3)	0 (0 - 2)	0 (0 - 2)	0 (0 - 2)	0 (0 - 1)
Chicago	1 (0 - 4)	1 (0 - 4)	1 (0 - 3)	1 (0 - 3)	0 (0 - 3)	0 (0 - 2)	0 (0 - 2)	0 (0 - 1)
Cleveland	0 (0 - 2)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)
Detroit	1 (0 - 3)	1 (0 - 3)	1 (0 - 3)	1 (0 - 3)	0 (0 - 2)	0 (0 - 2)	0 (0 - 2)	0 (0 - 1)
Houston	2 (0 - 6)	2 (0 - 5)	2 (0 - 5)	1 (0 - 4)	1 (0 - 3)	1 (0 - 3)	1 (0 - 3)	0 (0 - 2)
Los Angeles	3 (0 - 9)	2 (0 - 8)	2 (0 - 7)	1 (0 - 5)	1 (0 - 5)	1 (0 - 4)	1 (0 - 4)	0 (0 - 2)
New York	3 (0 - 11)	2 (0 - 10)	2 (0 - 9)	1 (0 - 6)	1 (0 - 7)	1 (0 - 6)	1 (0 - 6)	1 (0 - 4)
Philadelphia	1 (0 - 5)	1 (0 - 4)	1 (0 - 4)	1 (0 - 3)	1 (0 - 3)	1 (0 - 3)	0 (0 - 2)	0 (0 - 2)
Sacramento	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
St. Louis	1 (0 - 2)	1 (0 - 2)	0 (0 - 2)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)
Washington, DC	3 (0 - 7)	2 (0 - 6)	2 (0 - 6)	1 (0 - 5)	1 (0 - 4)	1 (0 - 4)	1 (0 - 3)	0 (0 - 2)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table C-10. Number of Active Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons: Based on Adjusting 2002 O_3 Concentrations*

Location	Number of Active Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4* **	**0.084/3**	**0.080/4**	**0.074/5**	**0.074/4**	**0.074/3**	**0.070/4**	**0.064/4**
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	44 (33 - 63)	43 (32 - 62)	38 (27 - 56)	33 (23 - 50)	30 (21 - 47)	30 (21 - 47)	25 (17 - 41)	20 (12 - 32)
Boston	52 (40 - 71)	45 (34 - 64)	45 (34 - 63)	42 (31 - 60)	34 (24 - 52)	31 (21 - 47)	29 (20 - 45)	22 (14 - 35)
Chicago	87 (66 - 123)	80 (60 - 116)	74 (54 - 109)	65 (46 - 99)	58 (40 - 91)	54 (37 - 85)	49 (32 - 78)	36 (22 - 59)
Cleveland	30 (24 - 41)	26 (20 - 37)	26 (19 - 36)	21 (16 - 32)	20 (15 - 30)	18 (12 - 27)	17 (11 - 26)	13 (8 - 21)
Detroit	55 (42 - 76)	48 (36 - 69)	47 (35 - 68)	45 (34 - 66)	36 (25 - 56)	32 (22 - 51)	31 (21 - 48)	23 (14 - 37)
Houston	32 (23 - 48)	28 (20 - 44)	27 (19 - 42)	22 (15 - 35)	21 (14 - 34)	19 (13 - 31)	18 (11 - 28)	12 (7 - 20)
Los Angeles	59 (44 - 92)	57 (42 - 89)	49 (37 - 76)	34 (25 - 53)	34 (25 - 52)	33 (24 - 50)	26 (19 - 40)	14 (9 - 21)
New York	172 (128 - 250)	159 (116 - 236)	148 (106 - 223)	113 (77 - 179)	118 (80 - 185)	110 (74 - 175)	100 (65 - 161)	75 (46 - 123)
Philadelphia	69 (55 - 93)	63 (48 - 86)	60 (46 - 84)	49 (36 - 72)	47 (34 - 69)	43 (31 - 65)	40 (28 - 62)	30 (20 - 49)
Sacramento	11 (8 - 16)	10 (7 - 15)	9 (7 - 14)	7 (5 - 11)	7 (5 - 11)	6 (5 - 10)	6 (4 - 9)	4 (3 - 6)
St. Louis	36 (29 - 48)	33 (26 - 45)	31 (24 - 43)	26 (19 - 37)	24 (18 - 35)	22 (16 - 33)	20 (14 - 31)	15 (10 - 24)
Washington, DC	81 (63 - 112)	70 (53 - 100)	70 (52 - 100)	60 (44 - 89)	55 (40 - 83)	49 (34 - 76)	46 (32 - 73)	36 (23 - 58)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	17 (10 - 25)	16 (9 - 24)	13 (7 - 21)	11 (5 - 18)	10 (4 - 16)	10 (4 - 16)	8 (2 - 13)	5 (0 - 10)
Boston	22 (13 - 31)	18 (10 - 26)	18 (10 - 26)	16 (9 - 24)	12 (6 - 19)	10 (4 - 17)	9 (4 - 16)	6 (1 - 11)
Chicago	34 (20 - 50)	30 (17 - 45)	27 (14 - 41)	22 (10 - 35)	19 (8 - 31)	17 (6 - 29)	15 (4 - 26)	10 (1 - 19)
Cleveland	13 (8 - 18)	10 (6 - 15)	10 (6 - 15)	8 (4 - 12)	7 (4 - 11)	6 (3 - 10)	5 (2 - 9)	4 (1 - 7)
Detroit	22 (13 - 32)	18 (11 - 27)	18 (10 - 26)	17 (9 - 25)	12 (6 - 20)	10 (4 - 17)	9 (3 - 16)	6 (1 - 12)
Houston	11 (5 - 17)	9 (3 - 15)	8 (3 - 14)	6 (1 - 11)	6 (1 - 11)	5 (1 - 10)	5 (1 - 9)	3 (0 - 6)
Los Angeles	17 (3 - 30)	16 (3 - 29)	14 (2 - 25)	9 (1 - 17)	9 (1 - 17)	8 (1 - 16)	6 (0 - 13)	3 (0 - 7)

Location	Number of Active Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
New York	64 (36 - 97)	57 (30 - 89)	51 (25 - 81)	35 (12 - 60)	37 (14 - 63)	34 (11 - 58)	29 (7 - 52)	20 (2 - 39)
Philadelphia	29 (19 - 41)	25 (16 - 36)	24 (15 - 35)	18 (10 - 27)	17 (9 - 26)	15 (7 - 23)	13 (6 - 22)	9 (2 - 16)
Sacramento	4 (2 - 6)	3 (1 - 5)	3 (1 - 5)	2 (1 - 4)	2 (1 - 4)	2 (0 - 3)	2 (0 - 3)	1 (0 - 2)
St. Louis	16 (10 - 22)	14 (9 - 19)	12 (8 - 18)	10 (6 - 15)	9 (5 - 13)	8 (4 - 12)	7 (3 - 11)	4 (1 - 8)
Washington, DC	33 (21 - 48)	27 (16 - 40)	27 (15 - 40)	22 (11 - 33)	19 (9 - 30)	16 (7 - 26)	15 (6 - 25)	10 (2 - 19)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	4 (1 - 10)	4 (1 - 9)	3 (1 - 7)	2 (0 - 6)	2 (0 - 5)	2 (0 - 5)	1 (0 - 4)	1 (0 - 3)
Boston	7 (3 - 14)	5 (2 - 11)	5 (2 - 11)	5 (2 - 9)	3 (1 - 7)	2 (0 - 6)	2 (0 - 5)	1 (0 - 3)
Chicago	9 (3 - 19)	8 (2 - 17)	6 (1 - 15)	5 (1 - 12)	4 (0 - 10)	3 (0 - 9)	3 (0 - 8)	1 (0 - 6)
Cleveland	4 (2 - 7)	3 (1 - 6)	3 (1 - 5)	2 (0 - 4)	2 (0 - 4)	1 (0 - 3)	1 (0 - 3)	1 (0 - 2)
Detroit	6 (2 - 12)	5 (1 - 10)	4 (1 - 10)	4 (1 - 9)	2 (0 - 7)	2 (0 - 6)	2 (0 - 5)	1 (0 - 4)
Houston	2 (1 - 6)	2 (0 - 5)	2 (0 - 5)	1 (0 - 4)	1 (0 - 3)	1 (0 - 3)	1 (0 - 3)	0 (0 - 2)
Los Angeles	3 (0 - 10)	3 (0 - 9)	2 (0 - 8)	1 (0 - 5)	1 (0 - 5)	1 (0 - 5)	1 (0 - 4)	0 (0 - 2)
New York	17 (5 - 37)	14 (3 - 32)	12 (2 - 28)	7 (0 - 20)	7 (1 - 21)	6 (0 - 19)	5 (0 - 16)	3 (0 - 12)
Philadelphia	10 (4 - 18)	8 (3 - 15)	7 (2 - 14)	4 (1 - 10)	4 (1 - 9)	3 (0 - 8)	3 (0 - 7)	2 (0 - 5)
Sacramento	1 (0 - 2)	1 (0 - 2)	1 (0 - 2)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)	0 (0 - 1)
St. Louis	5 (2 - 9)	4 (2 - 8)	4 (1 - 7)	2 (1 - 5)	2 (0 - 5)	2 (0 - 4)	1 (0 - 4)	1 (0 - 2)
Washington, DC	10 (4 - 20)	7 (2 - 15)	7 (2 - 15)	5 (1 - 12)	4 (1 - 11)	3 (0 - 9)	3 (0 - 8)	2 (0 - 6)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table C-11. Percent of Active Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons: Based on Adjusting 2004 O_3 Concentrations*

Location	Percent of Active Children Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	6.7% (4.6% - 10.4%)	6.5% (4.5% - 10.2%)	5.7% (3.8% - 9.1%)	4.9% (3.1% - 7.9%)	4.5% (2.8% - 7.3%)	4.4% (2.8% - 7.2%)	3.8% (2.2% - 6.1%)	2.9% (1.6% - 4.6%)
Boston	4.5% (2.8% - 7.2%)	3.9% (2.4% - 6.4%)	3.9% (2.3% - 6.3%)	3.7% (2.2% - 5.9%)	3% (1.7% - 4.9%)	2.7% (1.4% - 4.4%)	2.5% (1.3% - 4.1%)	1.9% (0.8% - 3.1%)
Chicago	3.2% (1.8% - 5.2%)	3% (1.6% - 4.8%)	2.7% (1.5% - 4.4%)	2.4% (1.2% - 3.8%)	2.1% (1% - 3.4%)	2% (0.9% - 3.2%)	1.8% (0.7% - 2.8%)	1.2% (0.3% - 2.1%)
Cleveland	4% (2.4% - 6.5%)	3.6% (2.1% - 5.8%)	3.4% (2% - 5.6%)	2.8% (1.5% - 4.4%)	2.6% (1.4% - 4.2%)	2.4% (1.2% - 3.9%)	2.2% (1.1% - 3.6%)	1.7% (0.7% - 2.7%)
Detroit	4.3% (2.7% - 7%)	3.9% (2.3% - 6.3%)	3.7% (2.2% - 6%)	3.5% (2.1% - 5.7%)	2.9% (1.6% - 4.6%)	2.6% (1.3% - 4.1%)	2.4% (1.2% - 3.9%)	1.8% (0.8% - 2.9%)
Houston	6.5% (4.6% - 9.9%)	5.8% (4.1% - 9%)	5.6% (3.8% - 8.7%)	4.6% (3% - 7.3%)	4.4% (2.9% - 7%)	4% (2.5% - 6.3%)	3.6% (2.3% - 5.8%)	2.6% (1.5% - 4.2%)
Los Angeles	3.6% (2.6% - 5.6%)	3.3% (2.5% - 5.2%)	2.9% (2.1% - 4.5%)	2.1% (1.6% - 3.2%)	2.1% (1.5% - 3.1%)	1.9% (1.4% - 2.9%)	1.6% (1.1% - 2.4%)	0.8% (0.5% - 1.2%)
New York	3.9% (2.4% - 6.4%)	3.6% (2.1% - 5.9%)	3.4% (1.9% - 5.4%)	2.5% (1.3% - 4%)	2.6% (1.4% - 4.2%)	2.5% (1.2% - 3.9%)	2.2% (1.1% - 3.5%)	1.6% (0.6% - 2.7%)
Philadelphia	5.4% (3.5% - 8.6%)	4.9% (3.1% - 7.9%)	4.6% (2.9% - 7.5%)	3.8% (2.2% - 6.1%)	3.6% (2.1% - 5.9%)	3.3% (1.9% - 5.4%)	3% (1.7% - 4.9%)	2.3% (1.2% - 3.7%)
Sacramento	3.7% (2.8% - 5.9%)	3.5% (2.6% - 5.5%)	3.1% (2.4% - 5%)	2.5% (1.9% - 3.8%)	2.3% (1.8% - 3.6%)	2.1% (1.6% - 3.3%)	1.8% (1.4% - 2.7%)	1.3% (1% - 1.9%)
St. Louis	4.8% (3.1% - 7.8%)	4.4% (2.7% - 7.2%)	4.1% (2.5% - 6.7%)	3.4% (2% - 5.5%)	3.2% (1.8% - 5.2%)	2.9% (1.6% - 4.7%)	2.7% (1.4% - 4.2%)	2.1% (1% - 3.3%)
Washington, DC	5.9% (4% - 9.2%)	5.2% (3.4% - 8.2%)	5.1% (3.3% - 8.1%)	4.3% (2.6% - 6.9%)	4% (2.4% - 6.4%)	3.5% (2.1% - 5.7%)	3.4% (1.9% - 5.4%)	2.5% (1.3% - 4%)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	2.2% (0.8% - 3.6%)	2.1% (0.8% - 3.5%)	1.7% (0.5% - 3%)	1.4% (0.3% - 2.5%)	1.2% (0.2% - 2.3%)	1.2% (0.2% - 2.3%)	1% (0.1% - 1.9%)	0.7% (0% - 1.5%)
Boston	1.3% (0.3% - 2.4%)	1.1% (0.2% - 2.1%)	1% (0.2% - 2%)	1% (0.1% - 1.9%)	0.7% (0% - 1.6%)	0.7% (0% - 1.4%)	0.6% (0% - 1.3%)	0.4% (0% - 1%)
Chicago	0.8% (0% - 1.7%)	0.7% (0% - 1.5%)	0.7% (0% - 1.4%)	0.6% (0% - 1.3%)	0.5% (0% - 1.1%)	0.4% (0% - 1.1%)	0.4% (0% - 0.9%)	0.3% (0% - 0.7%)
Cleveland	1.1% (0.1% - 2.1%)	0.9% (0.1% - 1.9%)	0.9% (0% - 1.8%)	0.7% (0% - 1.4%)	0.6% (0% - 1.4%)	0.6% (0% - 1.3%)	0.5% (0% - 1.2%)	0.4% (0% - 0.9%)
Detroit	1.2% (0.2% - 2.3%)	1% (0.1% - 2%)	1% (0.1% - 1.9%)	0.9% (0.1% - 1.8%)	0.7% (0% - 1.5%)	0.6% (0% - 1.3%)	0.6% (0% - 1.3%)	0.4% (0% - 1%)
Houston	2.2% (0.9% - 3.5%)	1.8% (0.6% - 3.1%)	1.7% (0.5% - 3%)	1.3% (0.3% - 2.4%)	1.2% (0.2% - 2.3%)	1.1% (0.1% - 2.1%)	1% (0.1% - 1.9%)	0.6% (0% - 1.4%)

Location	Percent of Active Children Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Los Angeles	1% (0.1% - 1.8%)	0.9% (0.1% - 1.7%)	0.8% (0.1% - 1.5%)	0.5% (0% - 1.1%)	0.5% (0% - 1%)	0.5% (0% - 1%)	0.4% (0% - 0.8%)	0.2% (0% - 0.4%)
New York	1% (0.1% - 2.1%)	0.9% (0.1% - 1.9%)	0.8% (0.1% - 1.7%)	0.6% (0% - 1.3%)	0.6% (0% - 1.4%)	0.6% (0% - 1.3%)	0.5% (0% - 1.2%)	0.4% (0% - 0.9%)
Philadelphia	1.6% (0.4% - 2.8%)	1.4% (0.3% - 2.5%)	1.3% (0.2% - 2.4%)	1% (0.1% - 2%)	0.9% (0% - 1.9%)	0.8% (0% - 1.7%)	0.7% (0% - 1.6%)	0.5% (0% - 1.2%)
Sacramento	1.1% (0.1% - 1.9%)	1% (0.1% - 1.7%)	0.9% (0.1% - 1.6%)	0.6% (0% - 1.2%)	0.6% (0% - 1.2%)	0.5% (0% - 1.1%)	0.4% (0% - 0.9%)	0.3% (0% - 0.6%)
St. Louis	1.3% (0.2% - 2.5%)	1.2% (0.1% - 2.3%)	1.1% (0.1% - 2.1%)	0.8% (0% - 1.8%)	0.8% (0% - 1.7%)	0.7% (0% - 1.5%)	0.6% (0% - 1.4%)	0.5% (0% - 1.1%)
Washington, DC	1.9% (0.6% - 3.2%)	1.5% (0.4% - 2.8%)	1.5% (0.4% - 2.7%)	1.2% (0.2% - 2.2%)	1.1% (0.1% - 2.1%)	0.9% (0.1% - 1.8%)	0.8% (0.1% - 1.8%)	0.6% (0% - 1.3%)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	0.4% (0.1% - 1.2%)	0.4% (0.1% - 1.2%)	0.3% (0% - 1%)	0.2% (0% - 0.8%)	0.2% (0% - 0.7%)	0.2% (0% - 0.7%)	0.1% (0% - 0.6%)	0.1% (0% - 0.4%)
Boston	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.2% (0% - 0.6%)	0.1% (0% - 0.6%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0% (0% - 0.3%)
Chicago	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0% (0% - 0.3%)	0% (0% - 0.2%)	0% (0% - 0.2%)
Cleveland	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0% (0% - 0.2%)
Detroit	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.1% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0% (0% - 0.2%)
Houston	0.5% (0.1% - 1.2%)	0.4% (0.1% - 1%)	0.3% (0% - 1%)	0.2% (0% - 0.7%)	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.1% (0% - 0.6%)	0.1% (0% - 0.4%)
Los Angeles	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0% (0% - 0.2%)	0% (0% - 0.1%)
New York	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0% (0% - 0.2%)
Philadelphia	0.3% (0% - 0.9%)	0.2% (0% - 0.8%)	0.2% (0% - 0.7%)	0.1% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)
Sacramento	0.2% (0% - 0.6%)	0.2% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0% (0% - 0.2%)
St. Louis	0.2% (0% - 0.8%)	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.4%)	0.1% (0% - 0.4%)	0% (0% - 0.3%)
Washington, DC	0.4% (0% - 1%)	0.3% (0% - 0.9%)	0.3% (0% - 0.9%)	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.5%)	0.1% (0% - 0.3%)

*Percents are median (0.5 fractile) percents of children. Percents in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table C-12. Percent of Active Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response Associated with Exposure to O_3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O_3 Seasons: Based on Adjusting 2002 O_3 Concentrations*

Location	Percent of Active Children Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
	Response = Decrease in FEV1 Greater Than or Equal to 10%							
Atlanta	9.8% (7.4% - 14.2%)	9.7% (7.2% - 14%)	8.4% (6.1% - 12.6%)	7.3% (5.2% - 11.3%)	6.8% (4.7% - 10.5%)	6.7% (4.6% - 10.5%)	5.7% (3.7% - 9.1%)	4.4% (2.7% - 7.2%)
Boston	10.9% (8.4% - 15%)	9.6% (7.2% - 13.5%)	9.4% (7.1% - 13.3%)	8.8% (6.5% - 12.7%)	7.3% (5.1% - 10.9%)	6.5% (4.5% - 9.9%)	6.1% (4.2% - 9.5%)	4.5% (2.8% - 7.3%)
Chicago	10.2% (7.7% - 14.5%)	9.4% (7% - 13.6%)	8.7% (6.4% - 12.8%)	7.6% (5.4% - 11.6%)	6.8% (4.7% - 10.6%)	6.3% (4.3% - 10%)	5.7% (3.8% - 9.2%)	4.3% (2.6% - 7%)
Cleveland	12.3% (9.6% - 16.7%)	10.8% (8.3% - 15.2%)	10.5% (8% - 14.8%)	8.8% (6.4% - 13%)	8.4% (6% - 12.5%)	7.3% (5.1% - 11.2%)	6.8% (4.7% - 10.7%)	5.3% (3.5% - 8.6%)
Detroit	11.4% (8.8% - 15.8%)	10.1% (7.6% - 14.4%)	9.8% (7.3% - 14.1%)	9.4% (7% - 13.8%)	7.5% (5.3% - 11.6%)	6.7% (4.6% - 10.6%)	6.4% (4.3% - 10.1%)	4.8% (3% - 7.8%)
Houston	6.7% (4.8% - 10.1%)	5.9% (4.2% - 9.2%)	5.7% (3.9% - 8.8%)	4.6% (3.1% - 7.3%)	4.4% (2.9% - 7%)	4.1% (2.7% - 6.5%)	3.7% (2.4% - 5.9%)	2.6% (1.5% - 4.2%)
Los Angeles	3.6% (2.7% - 5.6%)	3.5% (2.6% - 5.4%)	3% (2.2% - 4.7%)	2.1% (1.5% - 3.2%)	2.1% (1.5% - 3.2%)	2% (1.5% - 3.1%)	1.6% (1.2% - 2.4%)	0.8% (0.6% - 1.3%)
New York	9.5% (7.1% - 13.8%)	8.8% (6.4% - 13%)	8.2% (5.9% - 12.3%)	6.3% (4.2% - 9.9%)	6.5% (4.4% - 10.2%)	6.1% (4.1% - 9.7%)	5.5% (3.6% - 8.9%)	4.2% (2.5% - 6.8%)
Philadelphia	13% (10.3% - 17.5%)	11.7% (9.1% - 16.2%)	11.3% (8.7% - 15.7%)	9.3% (6.8% - 13.6%)	8.8% (6.4% - 13.1%)	8% (5.7% - 12.2%)	7.5% (5.3% - 11.6%)	5.7% (3.8% - 9.2%)
Sacramento	7% (5.5% - 10.4%)	6.3% (4.9% - 9.6%)	5.9% (4.5% - 9%)	4.8% (3.6% - 7.5%)	4.5% (3.4% - 7.1%)	4.2% (3.2% - 6.7%)	3.7% (2.8% - 5.9%)	2.7% (2% - 4.2%)
St. Louis	13.4% (10.7% - 17.8%)	12.3% (9.6% - 16.6%)	11.5% (8.9% - 15.9%)	9.6% (7.2% - 13.9%)	9% (6.7% - 13.2%)	8.2% (5.9% - 12.3%)	7.5% (5.3% - 11.5%)	5.6% (3.7% - 9%)
Washington, DC	11.9% (9.2% - 16.4%)	10.3% (7.8% - 14.7%)	10.2% (7.7% - 14.6%)	8.8% (6.5% - 13.1%)	8.1% (5.8% - 12.2%)	7.2% (5% - 11.1%)	6.8% (4.7% - 10.7%)	5.2% (3.4% - 8.5%)
	Response = Decrease in FEV1 Greater Than or Equal to 15%							
Atlanta	3.7% (2.1% - 5.6%)	3.6% (2.1% - 5.5%)	3% (1.5% - 4.6%)	2.4% (1.1% - 4%)	2.2% (0.8% - 3.6%)	2.2% (0.8% - 3.6%)	1.7% (0.4% - 3%)	1.2% (0.1% - 2.3%)
Boston	4.6% (2.8% - 6.5%)	3.8% (2.2% - 5.6%)	3.7% (2.1% - 5.5%)	3.4% (1.9% - 5.1%)	2.5% (1.2% - 4%)	2.1% (0.9% - 3.5%)	2% (0.8% - 3.3%)	1.3% (0.3% - 2.4%)
Chicago	4% (2.3% - 5.8%)	3.5% (2% - 5.3%)	3.1% (1.6% - 4.8%)	2.6% (1.2% - 4.2%)	2.2% (0.9% - 3.7%)	2% (0.7% - 3.4%)	1.7% (0.5% - 3%)	1.1% (0.1% - 2.2%)
Cleveland	5.1% (3.3% - 7.3%)	4.2% (2.6% - 6.2%)	4% (2.4% - 6%)	3.2% (1.7% - 4.9%)	2.9% (1.5% - 4.6%)	2.4% (1.1% - 3.9%)	2.2% (0.9% - 3.6%)	1.6% (0.4% - 2.8%)
Detroit	4.5% (2.8% - 6.6%)	3.8% (2.2% - 5.7%)	3.7% (2.1% - 5.5%)	3.5% (2% - 5.3%)	2.5% (1.2% - 4.1%)	2.1% (0.9% - 3.6%)	2% (0.7% - 3.4%)	1.3% (0.2% - 2.5%)
Houston	2.3% (1% - 3.6%)	1.9% (0.7% - 3.2%)	1.8% (0.6% - 3%)	1.3% (0.3% - 2.4%)	1.3% (0.3% - 2.3%)	1.1% (0.2% - 2.1%)	1% (0.1% - 1.9%)	0.6% (0% - 1.4%)

Location	Percent of Active Children Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
	0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Los Angeles	1% (0.2% - 1.8%)	1% (0.2% - 1.8%)	0.8% (0.1% - 1.5%)	0.5% (0% - 1.1%)	0.5% (0% - 1%)	0.5% (0% - 1%)	0.4% (0% - 0.8%)	0.2% (0% - 0.4%)
New York	3.5% (2% - 5.4%)	3.2% (1.7% - 4.9%)	2.8% (1.4% - 4.5%)	1.9% (0.7% - 3.3%)	2.1% (0.8% - 3.5%)	1.9% (0.6% - 3.2%)	1.6% (0.4% - 2.9%)	1.1% (0.1% - 2.2%)
Philadelphia	5.5% (3.6% - 7.8%)	4.8% (3% - 6.8%)	4.5% (2.7% - 6.5%)	3.4% (1.8% - 5.2%)	3.1% (1.6% - 4.9%)	2.7% (1.3% - 4.4%)	2.5% (1.1% - 4.1%)	1.7% (0.4% - 3%)
Sacramento	2.5% (1.2% - 3.8%)	2.2% (1% - 3.4%)	2% (0.8% - 3.1%)	1.5% (0.4% - 2.5%)	1.4% (0.3% - 2.3%)	1.2% (0.3% - 2.2%)	1.1% (0.2% - 1.9%)	0.7% (0% - 1.3%)
St. Louis	5.8% (3.8% - 8.1%)	5.1% (3.2% - 7.2%)	4.6% (2.9% - 6.7%)	3.6% (2.1% - 5.4%)	3.3% (1.8% - 5%)	2.9% (1.5% - 4.5%)	2.5% (1.2% - 4.1%)	1.7% (0.5% - 2.9%)
Washington, DC	4.9% (3% - 7%)	4% (2.3% - 5.9%)	3.9% (2.3% - 5.8%)	3.2% (1.7% - 4.9%)	2.8% (1.4% - 4.4%)	2.4% (1% - 3.9%)	2.2% (0.8% - 3.6%)	1.5% (0.3% - 2.7%)
	Response = Decrease in FEV1 Greater Than or Equal to 20%							
Atlanta	1% (0.3% - 2.1%)	1% (0.3% - 2.1%)	0.7% (0.2% - 1.7%)	0.5% (0.1% - 1.4%)	0.4% (0% - 1.2%)	0.4% (0% - 1.2%)	0.3% (0% - 0.9%)	0.2% (0% - 0.7%)
Boston	1.5% (0.7% - 2.9%)	1.1% (0.4% - 2.3%)	1.1% (0.4% - 2.2%)	1% (0.3% - 2%)	0.6% (0.1% - 1.4%)	0.5% (0.1% - 1.2%)	0.4% (0.1% - 1.1%)	0.2% (0% - 0.7%)
Chicago	1.1% (0.3% - 2.3%)	0.9% (0.2% - 2%)	0.7% (0.2% - 1.7%)	0.6% (0.1% - 1.4%)	0.4% (0% - 1.2%)	0.4% (0% - 1.1%)	0.3% (0% - 1%)	0.2% (0% - 0.7%)
Cleveland	1.6% (0.6% - 3%)	1.2% (0.4% - 2.4%)	1.1% (0.3% - 2.2%)	0.7% (0.1% - 1.7%)	0.7% (0.1% - 1.6%)	0.5% (0% - 1.3%)	0.4% (0% - 1.2%)	0.3% (0% - 0.9%)
Detroit	1.3% (0.4% - 2.6%)	1% (0.3% - 2.1%)	0.9% (0.2% - 2%)	0.9% (0.2% - 1.9%)	0.5% (0% - 1.4%)	0.4% (0% - 1.2%)	0.4% (0% - 1.1%)	0.2% (0% - 0.8%)
Houston	0.5% (0.1% - 1.3%)	0.4% (0.1% - 1.1%)	0.4% (0% - 1%)	0.2% (0% - 0.8%)	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.2% (0% - 0.6%)	0.1% (0% - 0.4%)
Los Angeles	0.2% (0% - 0.6%)	0.2% (0% - 0.6%)	0.1% (0% - 0.5%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)
New York	0.9% (0.3% - 2%)	0.8% (0.2% - 1.8%)	0.6% (0.1% - 1.6%)	0.4% (0% - 1.1%)	0.4% (0% - 1.1%)	0.3% (0% - 1%)	0.3% (0% - 0.9%)	0.2% (0% - 0.6%)
Philadelphia	1.8% (0.8% - 3.3%)	1.4% (0.5% - 2.8%)	1.3% (0.4% - 2.6%)	0.8% (0.2% - 1.9%)	0.7% (0.1% - 1.7%)	0.6% (0.1% - 1.5%)	0.5% (0.1% - 1.4%)	0.3% (0% - 0.9%)
Sacramento	0.6% (0.1% - 1.4%)	0.5% (0.1% - 1.2%)	0.4% (0% - 1.1%)	0.3% (0% - 0.8%)	0.2% (0% - 0.8%)	0.2% (0% - 0.7%)	0.2% (0% - 0.6%)	0.1% (0% - 0.4%)
St. Louis	1.9% (0.8% - 3.5%)	1.6% (0.6% - 3%)	1.3% (0.5% - 2.7%)	0.9% (0.2% - 2%)	0.8% (0.2% - 1.8%)	0.6% (0.1% - 1.6%)	0.5% (0.1% - 1.4%)	0.3% (0% - 0.9%)
Washington, DC	1.5% (0.6% - 2.9%)	1.1% (0.3% - 2.3%)	1.1% (0.3% - 2.2%)	0.8% (0.2% - 1.8%)	0.6% (0.1% - 1.5%)	0.5% (0.1% - 1.3%)	0.4% (0% - 1.2%)	0.2% (0% - 0.8%)

*Percents are median (0.5 fractile) percents of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Figure C-1. Percent Reductions in Aggregate Numbers (Across All Locations) of Occurrences of Lung Function Response Among Active School Age Children when O_3 Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, for Each of the Three Definitions of Response*

Figure C-1a. Based on 2004 Data

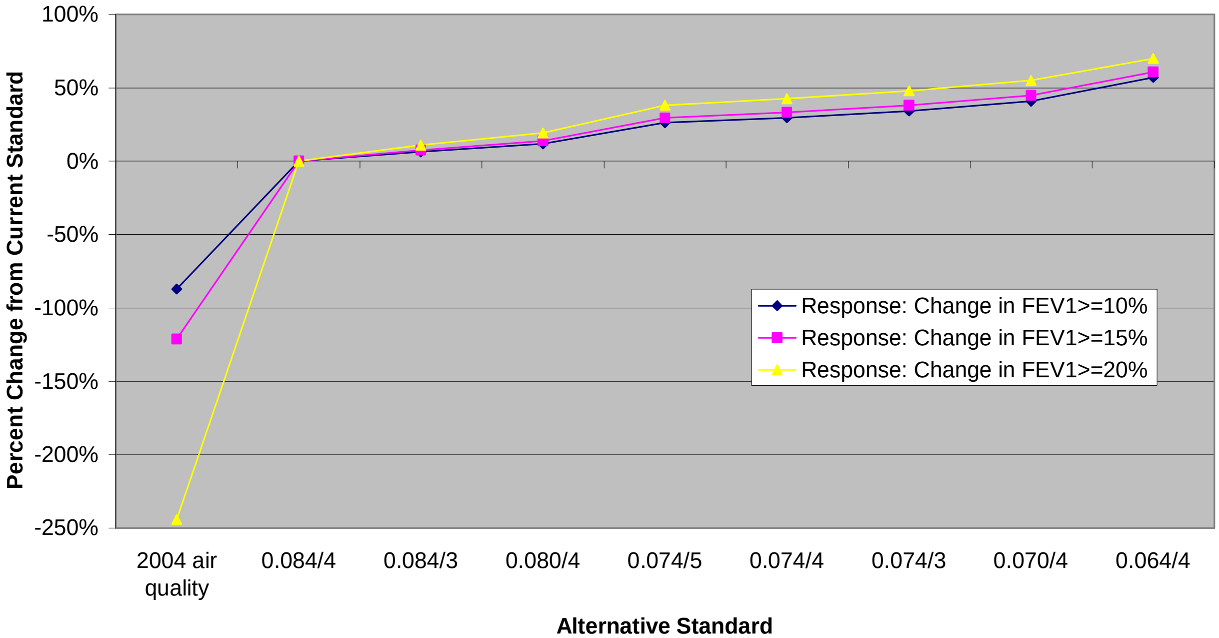
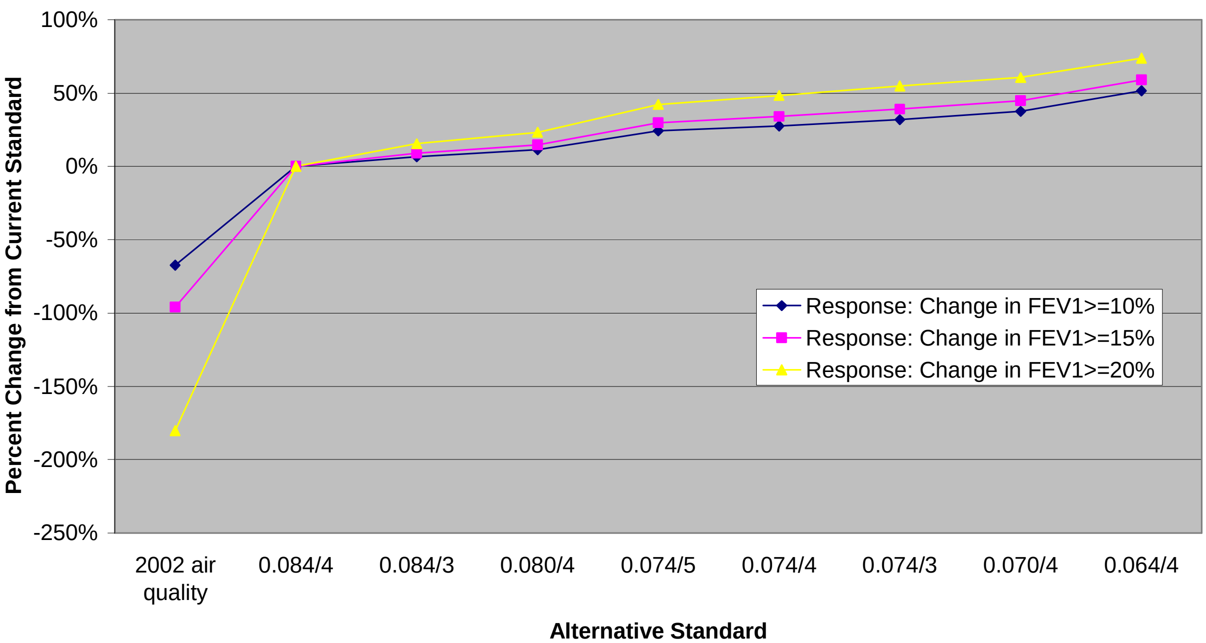


Figure C-1b. Based on 2002 Data



* The 8-hr average standards shown in these figures, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. The figure also compares the current standard to a recent year of air quality.

Figure C-2. Percent Reductions of Occurrences of Decrement in $FEV_1 \geq 15\%$ Among Active School Age Children when O_3 Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, Separately for Each Location*

Figure C-2a. Based on 2004 Data

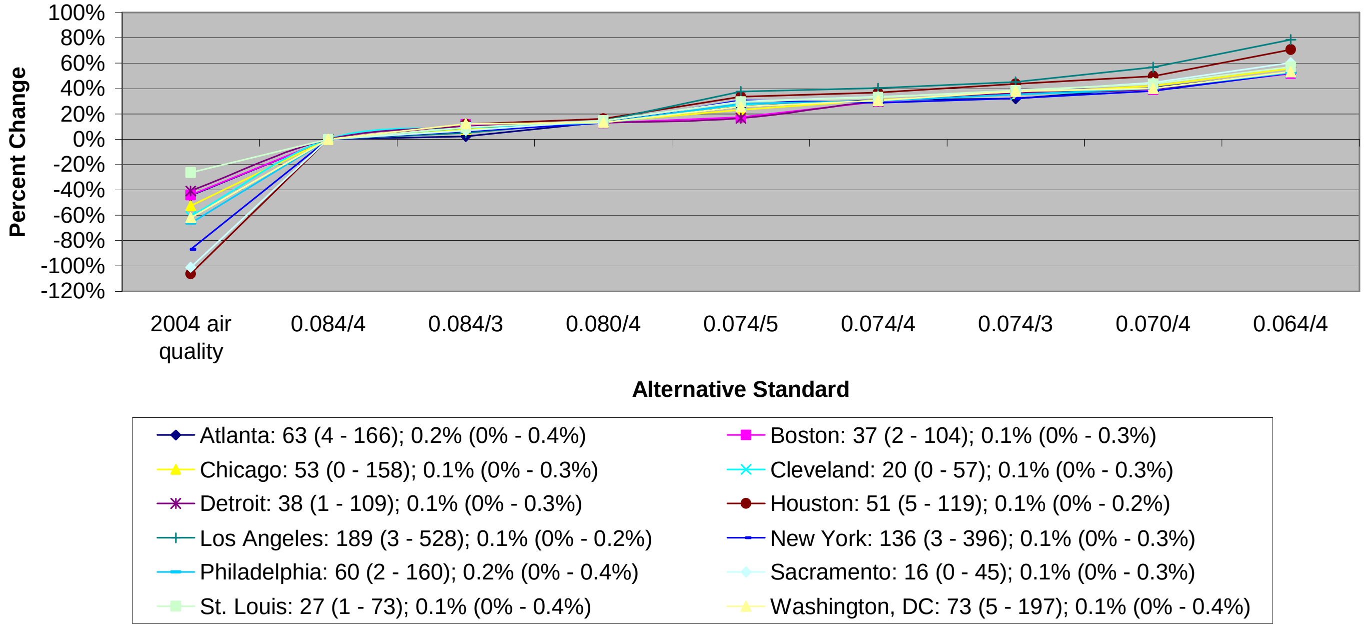
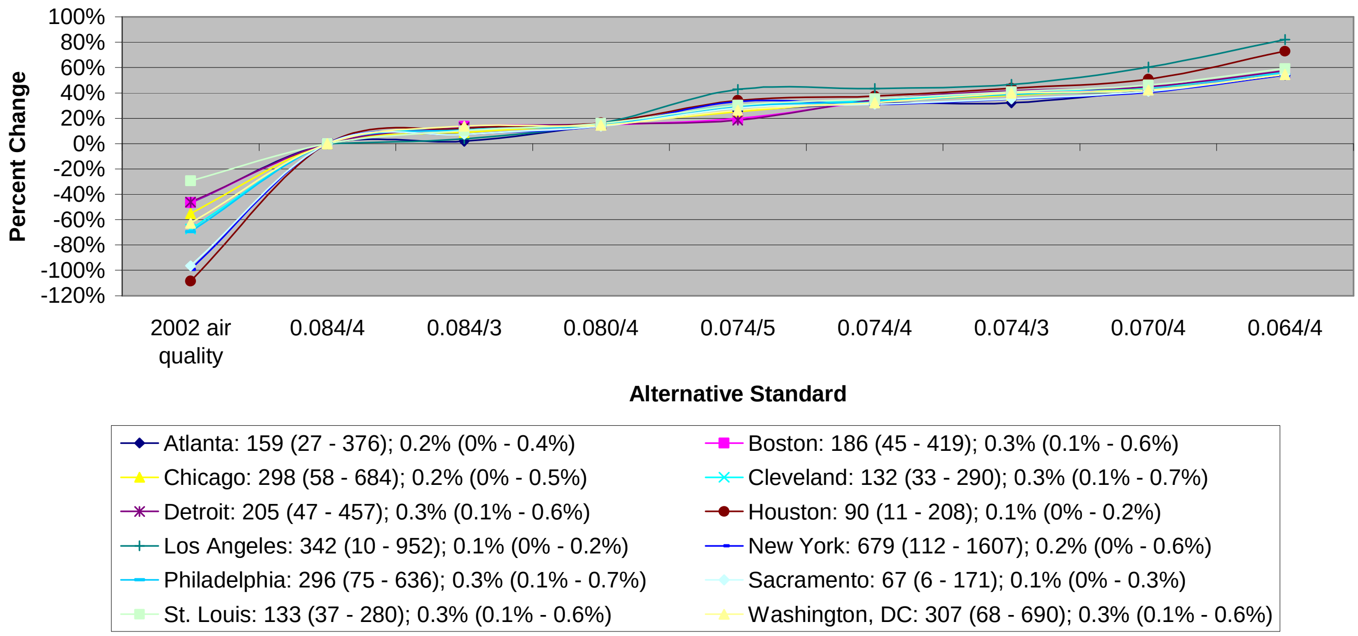


Figure C-2b. Based on 2002 Data



* The 8-hr average standards shown in these figures, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. The figure also compares the current standard to a recent year of air quality. The percent changes from the current standard (0.084/4) to a recent year of air quality were omitted for Los Angeles because they were so large in magnitude (-289% in 2004 and –294% in 2002). The incidence (and 95% credible interval) and percent of total incidence (and 95% credible interval) when O_3 concentrations just meet the current standard are shown for each location in the box below each figure.

Figure C-3. Percent Reductions in Aggregate Numbers (Across All Locations) of Active School Age Children Experiencing at Least One Occurrence of Lung Function Response when O_3 Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, for Each of the Three Definitions of Response*

Figure C-3a. Based on 2004 Data

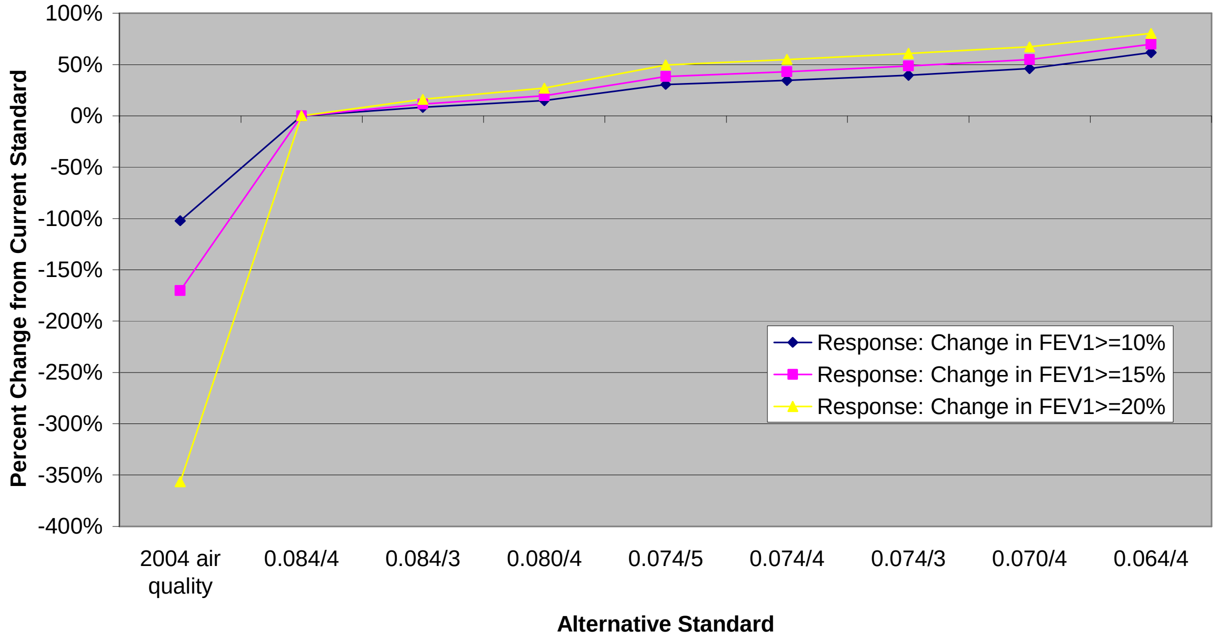
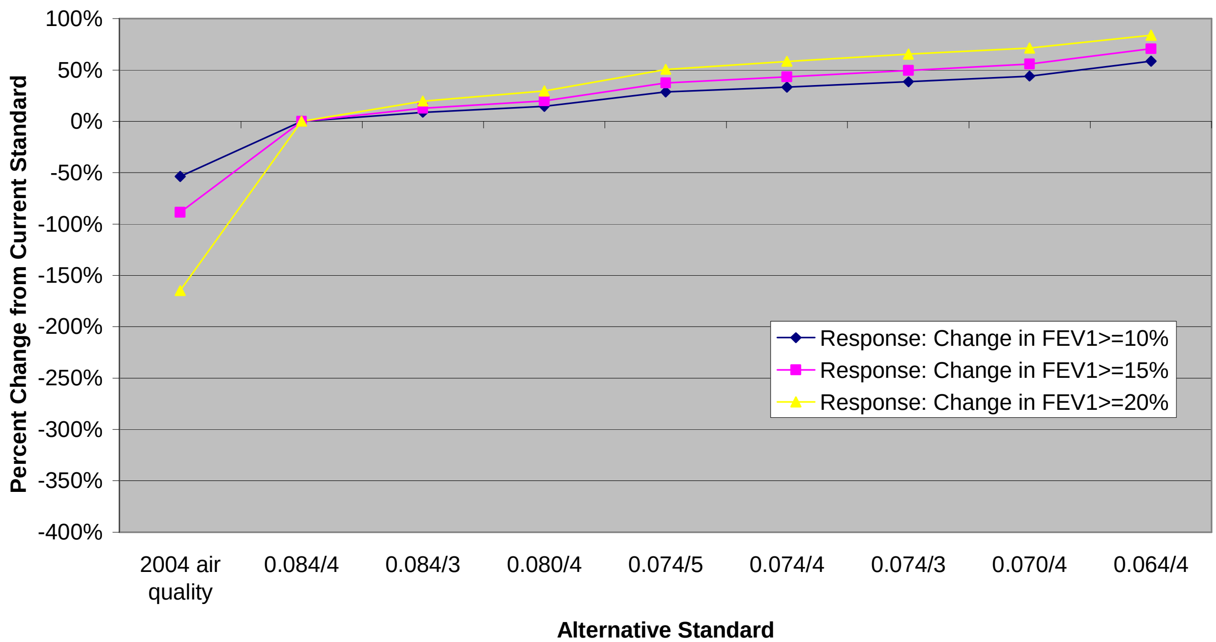


Figure C-3b. Based on 2002 Data



* The 8-hr average standards shown in these figures, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. The figure also compares the current standard to a recent year of air quality.

Figure C-4. Percent Reductions in Numbers of Active School Age Children Experiencing at Least One Decrement in $FEV_1 \geq 15\%$ when O_3 Concentrations are Reduced from Those Just Meeting the Current Standard to Those that Would Just Meet Each Alternative Standard, Separately for Each Location*

Figure C-4a. Based on 2004 Data

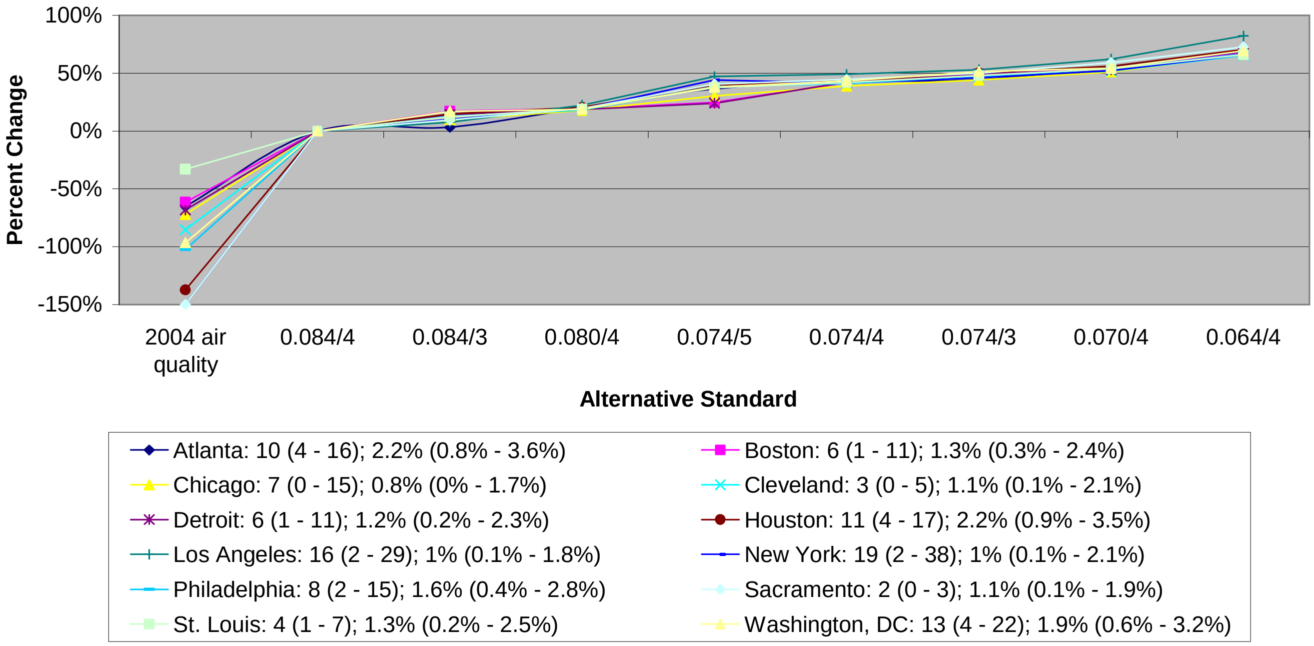
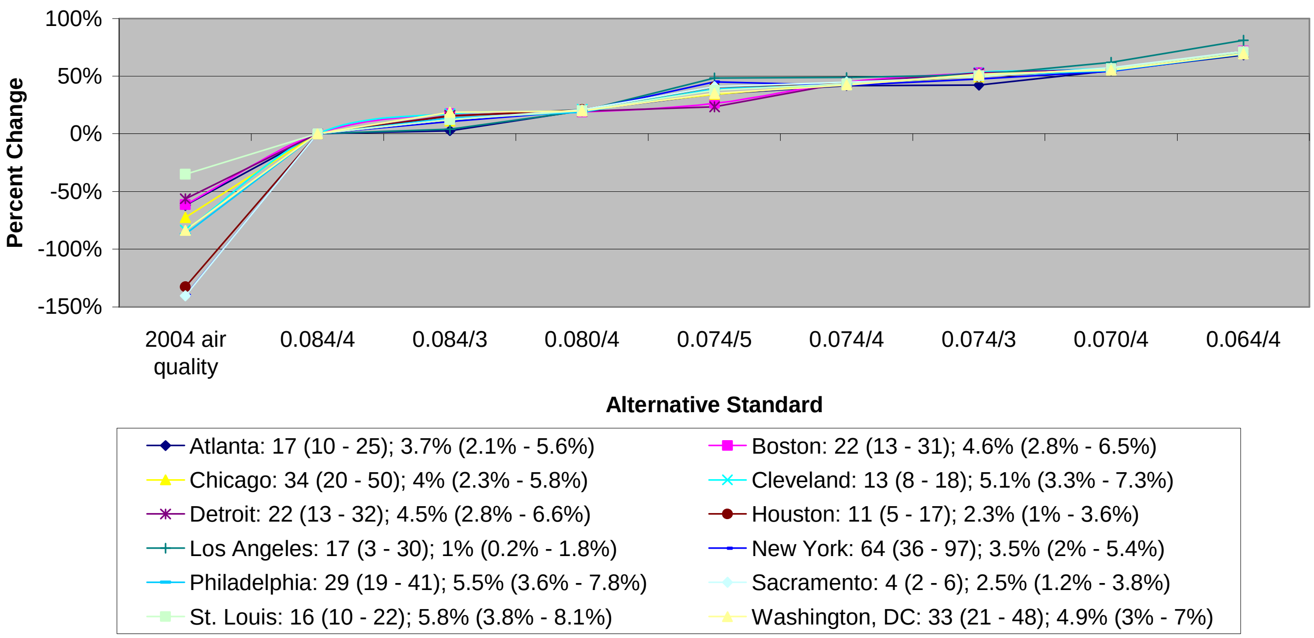


Figure C-4b. Based on 2002 Data



** The 8-hr average standards shown in these figures, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. The figure also compares the current standard to a recent year of air quality. The percent changes from the current standard (0.084/4) to a recent year of air quality were omitted for Los Angeles because they were so large in magnitude (-544% in 2004 and –537% in 2002).

The incidence (and 95% credible interval) and percent of total incidence (and 95% credible interval) when O_3 concentrations just meet the current standard are shown for each location in the box below each figure.

C.3 Sensitivity Analysis: Impact of Alternative Estimates of Exposure-Response Function on Lung Function Response Estimates

Table C-13. Sensitivity Analysis: Impact of Alternative Estimates of Exposure-Response Function on Number of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Decrease in FEV1>=15%) Associated with Exposure to a Recent Year of Air Quality and with Exposure to O3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O3 Seasons: Based on Adjusting 2004 O3 Concentrations*

Location	Number of All Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards, Using Exposure-Response Functions that are Different Combinations of Logistic and Linear (Hockeystick)**											
	"as is"			0.084/4***			0.074/4			0.064/4		
	90%/10% Split	80%/20% Split	50%/50% Split	90%/10% Split	80%/20% Split	50%/50% Split	90%/10% Split	80%/20% Split	50%/50% Split	90%/10% Split	80%/20% Split	50%/50% Split
Atlanta	34 (19 - 51)	34 (19 - 51)	35 (20 - 52)	20 (8 - 34)	20 (8 - 34)	18 (9 - 34)	12 (2 - 22)	11 (2 - 22)	8 (2 - 22)	6 (0 - 14)	6 (0 - 14)	2 (0 - 13)
Chicago	27 (6 - 49)	26 (6 - 49)	19 (6 - 49)	15 (1 - 31)	14 (1 - 31)	6 (1 - 31)	9 (0 - 21)	8 (0 - 21)	2 (0 - 20)	5 (0 - 13)	5 (0 - 13)	1 (0 - 12)
Houston	57 (37 - 79)	57 (37 - 80)	59 (38 - 81)	23 (10 - 37)	23 (10 - 38)	21 (10 - 38)	13 (3 - 24)	13 (3 - 24)	9 (3 - 24)	7 (0 - 14)	6 (0 - 14)	2 (0 - 14)
Los Angeles	220 (149 - 298)	223 (150 - 300)	236 (155 - 307)	34 (5 - 62)	32 (5 - 62)	21 (5 - 61)	17 (1 - 36)	16 (1 - 36)	6 (1 - 35)	6 (0 - 14)	6 (0 - 14)	1 (0 - 13)
New York	112 (55 - 176)	113 (56 - 178)	108 (58 - 181)	43 (6 - 84)	42 (7 - 85)	26 (7 - 83)	25 (0 - 56)	24 (0 - 56)	8 (0 - 54)	14 (0 - 35)	13 (0 - 35)	2 (0 - 34)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table C-14. Sensitivity Analysis: Impact of Alternative Estimates of Exposure-Response Function on Number of All Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Decrease in FEV1>=15%) Associated with Exposure to a Recent Year of Air Quality and with Exposure to O3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O3 Seasons: Based on Adjusting 2002 O3 Concentrations*

Location	Number of All Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards, Using Exposure-Response Functions that are Different Combinations of Logistic and Linear (Hockeystick)**											
	"as is"			0.084/4***			0.074/4			0.064/4		
	90%/10% Split	80%/20% Split	50%/50% Split	90%/10% Split	80%/20% Split	50%/50% Split	90%/10% Split	80%/20% Split	50%/50% Split	90%/10% Split	80%/20% Split	50%/50% Split
Atlanta	59 (40 - 81)	60 (40 - 82)	62 (41 - 83)	36 (21 - 54)	37 (21 - 54)	38 (22 - 56)	21 (8 - 34)	21 (9 - 34)	19 (9 - 35)	11 (1 - 21)	10 (1 - 21)	6 (1 - 21)
Chicago	123 (83 - 169)	125 (83 - 170)	131 (86 - 173)	71 (41 - 106)	72 (41 - 107)	74 (42 - 110)	40 (15 - 66)	39 (16 - 67)	35 (16 - 68)	20 (2 - 40)	19 (2 - 40)	11 (2 - 39)
Houston	58 (38 - 80)	58 (38 - 81)	60 (39 - 82)	24 (11 - 38)	24 (11 - 39)	22 (11 - 39)	13 (3 - 24)	13 (3 - 24)	9 (3 - 24)	7 (0 - 14)	6 (0 - 14)	3 (0 - 14)
Los Angeles	220 (150 - 297)	223 (151 - 299)	231 (154 - 303)	35.00 (7 - 62)	34 (8 - 62)	24 (8 - 61)	18 (1 - 35)	17 (1 - 35)	8 (1 - 34)	7 (0 - 14)	6 (0 - 14)	2 (0 - 14)
New York	346 (244 - 462)	350 (245 - 463)	361 (252 - 469)	142 (79 - 216)	145 (81 - 218)	146 (83 - 224)	81 (29 - 138)	80 (30 - 139)	70 (30 - 140)	43 (3 - 86)	41 (3 - 86)	23 (4 - 84)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table C-15. Sensitivity Analysis: Impact of Alternative Estimates of Exposure-Response Function on Number of Asthmatic Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Decrease in FEV1>=10%) Associated with Exposure to a Recent Year of Air Quality and with Exposure to O3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O3 Seasons: Based on Adjusting 2004 O3 Concentrations*

Location	Number of Asthmatic Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards, Using Exposure-Response Functions that are Different Combinations of Logistic and Linear (Hockeystick)**											
	"as is"			0.084/4***			0.074/4			0.064/4		
	90%/10% Split	80%/20% Split	50%/50% Split	90%/10% Split	80%/20% Split	50%/50% Split	90%/10% Split	80%/20% Split	50%/50% Split	90%/10% Split	80%/20% Split	50%/50% Split
Atlanta	12 (9 - 17)	12 (9 - 17)	16 (9 - 18)	8 (6 - 12)	8 (6 - 13)	12 (6 - 13)	5 (3 - 9)	6 (3 - 9)	8 (3 - 10)	3 (2 - 5)	4 (2 - 6)	5 (2 - 6)
Chicago	14 (9 - 22)	14 (9 - 23)	21 (9 - 24)	9 (5 - 14)	9 (5 - 15)	13 (5 - 16)	6 (3 - 9)	6 (3 - 10)	8 (3 - 10)	3 (1 - 6)	3 (1 - 6)	3 (1 - 6)
Houston	17 (14 - 23)	17 (14 - 23)	22 (14 - 24)	9 (6 - 14)	9 (6 - 14)	13 (7 - 15)	6 (4 - 10)	6 (4 - 10)	9 (4 - 10)	4 (2 - 6)	4 (2 - 6)	5 (2 - 6)
Los Angeles	62 (52 - 81)	64 (52 - 82)	79 (53 - 85)	16.00 (11 - 25)	17 (11 - 26)	26 (12 - 28)	9 (6 - 14)	10 (6 - 15)	15 (7 - 16)	4 (2 - 6)	4 (2 - 6)	6 (2 - 6)
New York	51 (37 - 76)	53 (37 - 78)	71 (38 - 82)	26 (16 - 42)	27 (16 - 43)	39 (16 - 46)	17 (9 - 28)	18 (9 - 29)	24 (9 - 30)	11 (4 - 17)	11 (4 - 18)	12 (4 - 18)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Table C-16. Sensitivity Analysis: Impact of Alternative Estimates of Exposure-Response Function on Number of Asthmatic Children (Ages 5-18) Engaged in Moderate Exertion Estimated to Experience At Least One Lung Function Response (Decrease in FEV1>=10%) Associated with Exposure to a Recent Year of Air Quality and with Exposure to O3 Concentrations That Just Meet the Current and Alternative Daily Maximum 8-Hour Standards, for Location-Specific O3 Seasons: Based on Adjusting 2002 O3 Concentrations*

Location	Number of Asthmatic Children (in 1000s) Estimated to Experience at Least One Lung Function Response Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards, Using Exposure-Response Functions that are Different Combinations of Logistic and Linear (Hockeystick)**											
	"as is"			0.084/4***			0.074/4			0.064/4		
	90%/10% Split	80%/20% Split	50%/50% Split	90%/10% Split	80%/20% Split	50%/50% Split	90%/10% Split	80%/20% Split	50%/50% Split	90%/10% Split	80%/20% Split	50%/50% Split
Atlanta	18 (14 - 23)	18 (14 - 23)	22 (15 - 24)	13 (10 - 18)	13 (10 - 18)	17 (10 - 19)	9 (6 - 13)	9 (6 - 13)	12 (6 - 14)	5 (3 - 9)	6 (3 - 9)	8 (3 - 10)
Chicago	40 (32 - 53)	41 (33 - 54)	49 (33 - 55)	27 (20 - 39)	28 (21 - 40)	37 (21 - 42)	18 (12 - 29)	19 (12 - 29)	27 (13 - 31)	11 (7 - 19)	12 (7 - 19)	18 (7 - 21)
Houston	17 (13 - 23)	17 (13 - 23)	21 (14 - 24)	9 (6 - 14)	9 (7 - 14)	13 (7 - 15)	6 (4 - 9)	6 (4 - 10)	9 (4 - 10)	4 (2 - 6)	4 (2 - 6)	5 (2 - 6)
Los Angeles	61 (51 - 79)	62 (51 - 80)	76 (52 - 83)	16 (11 - 24)	16 (11 - 25)	26 (12 - 27)	9 (6 - 14)	10 (6 - 14)	15 (6 - 16)	4 (2 - 6)	4 (2 - 6)	6 (2 - 6)
New York	118 (97 - 147)	120 (97 - 149)	136 (99 - 152)	63 (47 - 91)	65 (47 - 93)	85 (49 - 97)	43 (29 - 67)	44 (29 - 69)	63 (30 - 72)	27 (16 - 44)	28 (16 - 45)	41 (17 - 48)

*Numbers are median (0.5 fractile) numbers of children. Numbers in parentheses below the median are 95% credible intervals based on statistical uncertainty surrounding the O3 coefficient.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest 1000.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Appendix D: Estimated Health Risks Associated with "As Is" O_3 Concentrations: April – September

D.1 Figures

Figure D-1. Estimated Annual Cases of Non-Accidental Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O_3 Above Background: Single-Pollutant, Single-City Models (April – September)

Figure D-1a. Based on 2004 Air Quality

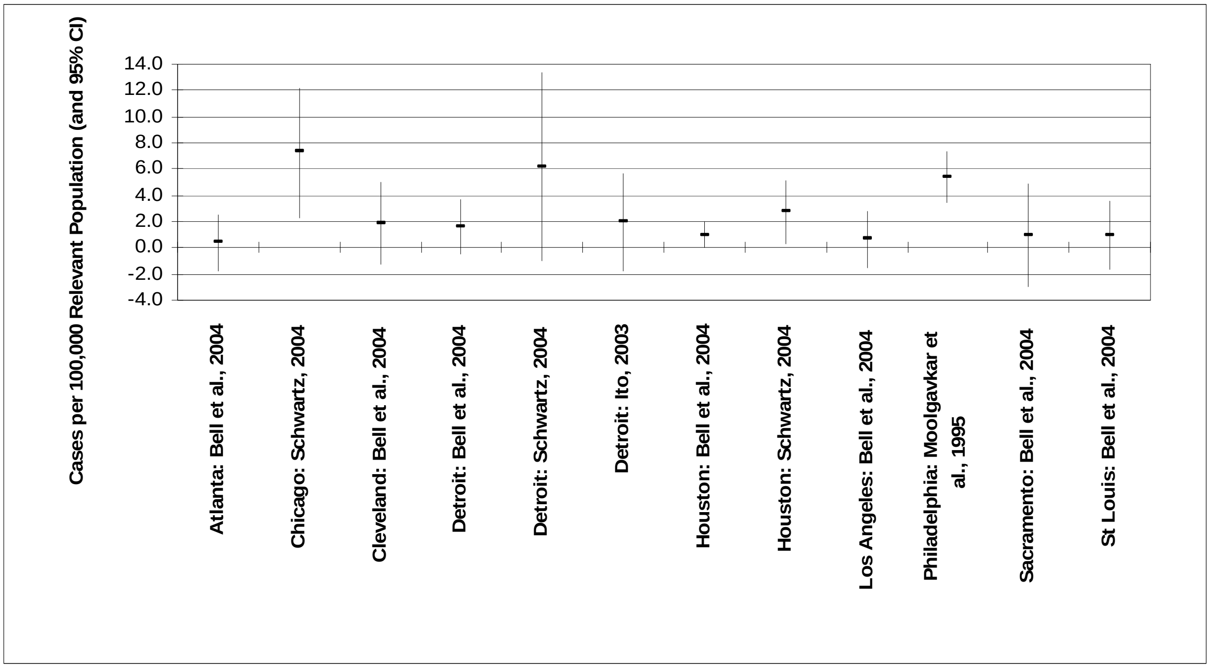


Figure D-1b. Based on 2002 Air Quality

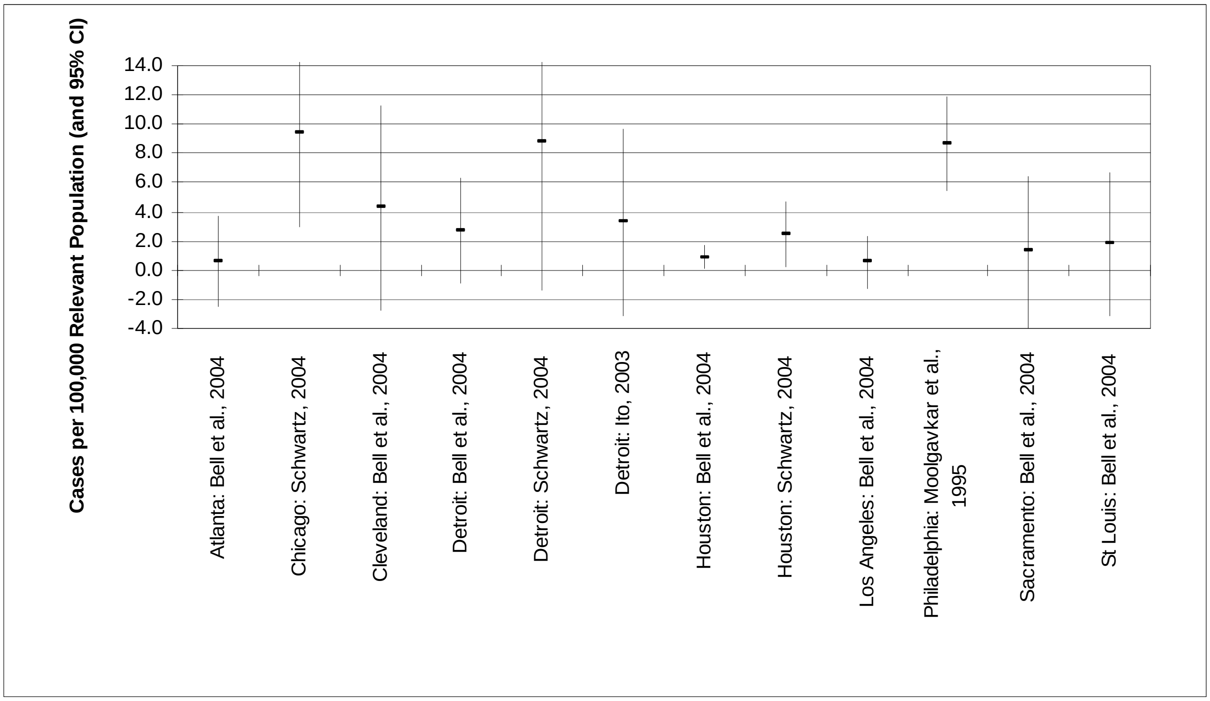


Figure D-2. Estimated Annual Cases of Cardiorespiratory Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O_3 Above Background (April – September): Single-Pollutant vs. Multi-Pollutant Models [Huang et al. (2004), additional pollutants, from left to right: none, CO, NO_2, PM_{10}, SO_2]

Figure D-2a. Based on 2004 Air Quality

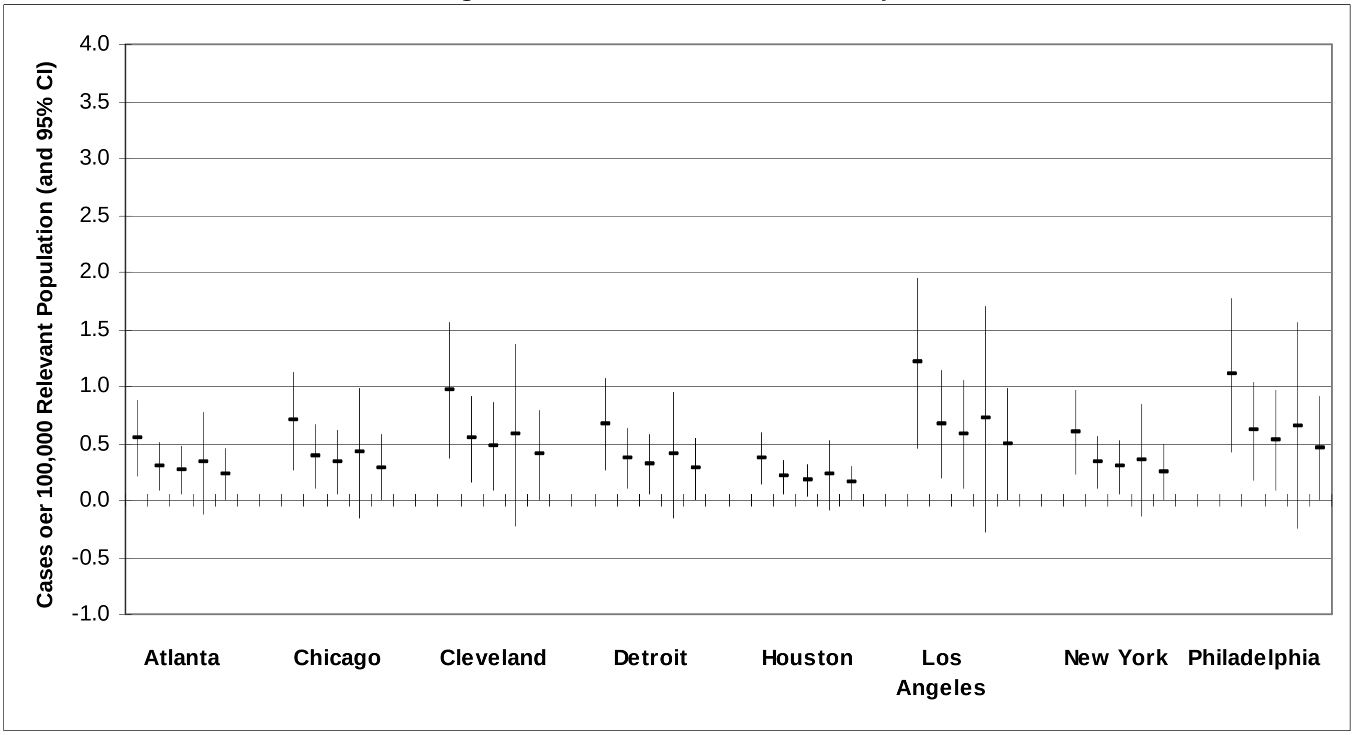


Figure D-2b. Based on 2002 Air Quality

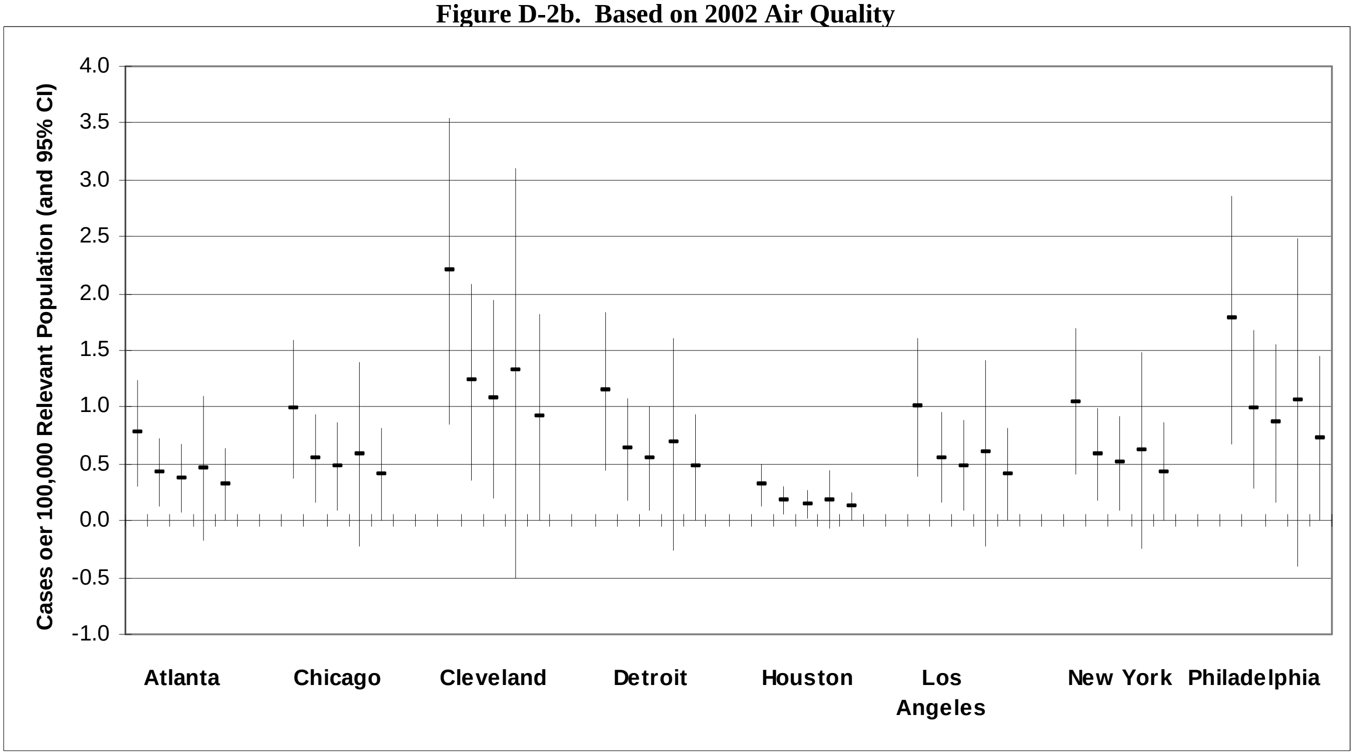


Figure D-3. Estimated Annual Cases of (Non-Accidental) Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O_3 Above Background (April – September): Single-City Model (left bar) vs. Multi-City Model (right bar)

Figure D-3a. Based on 2004 Air Quality

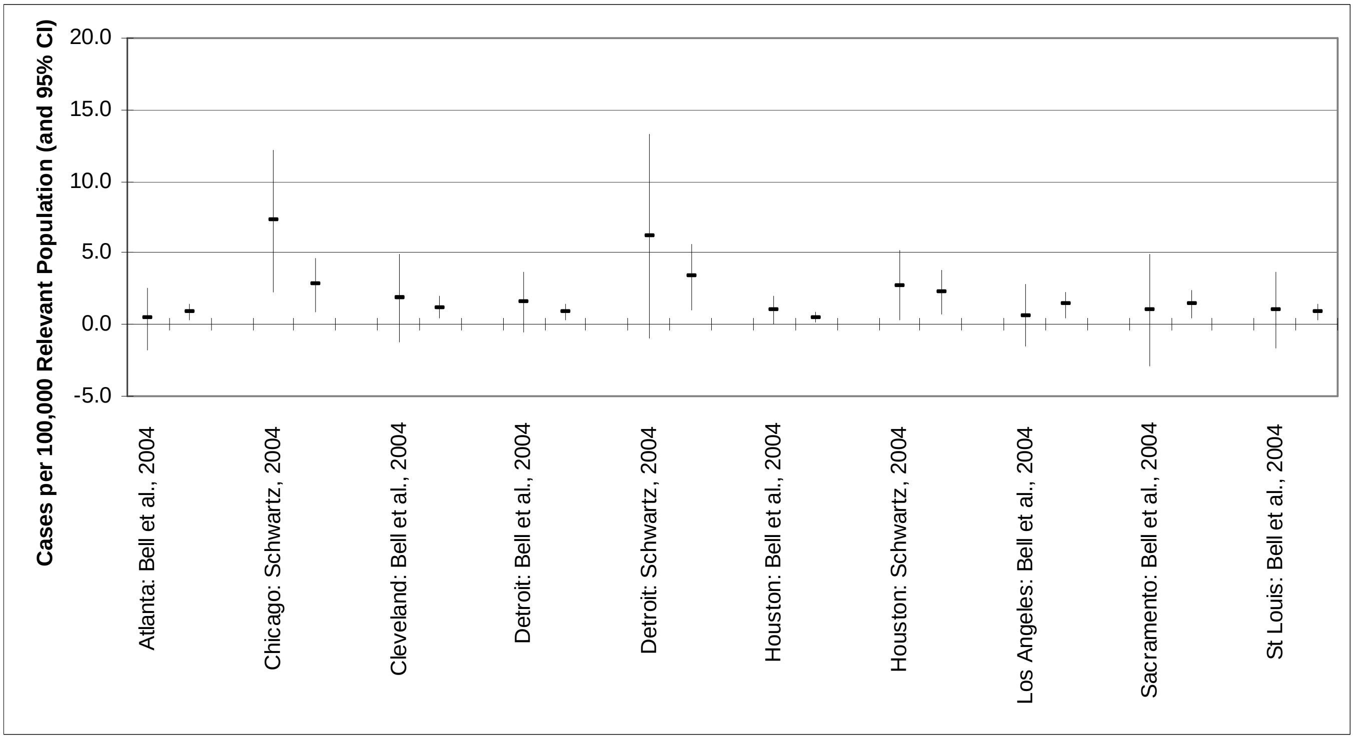


Figure D-3b. Based on 2002 Air Quality

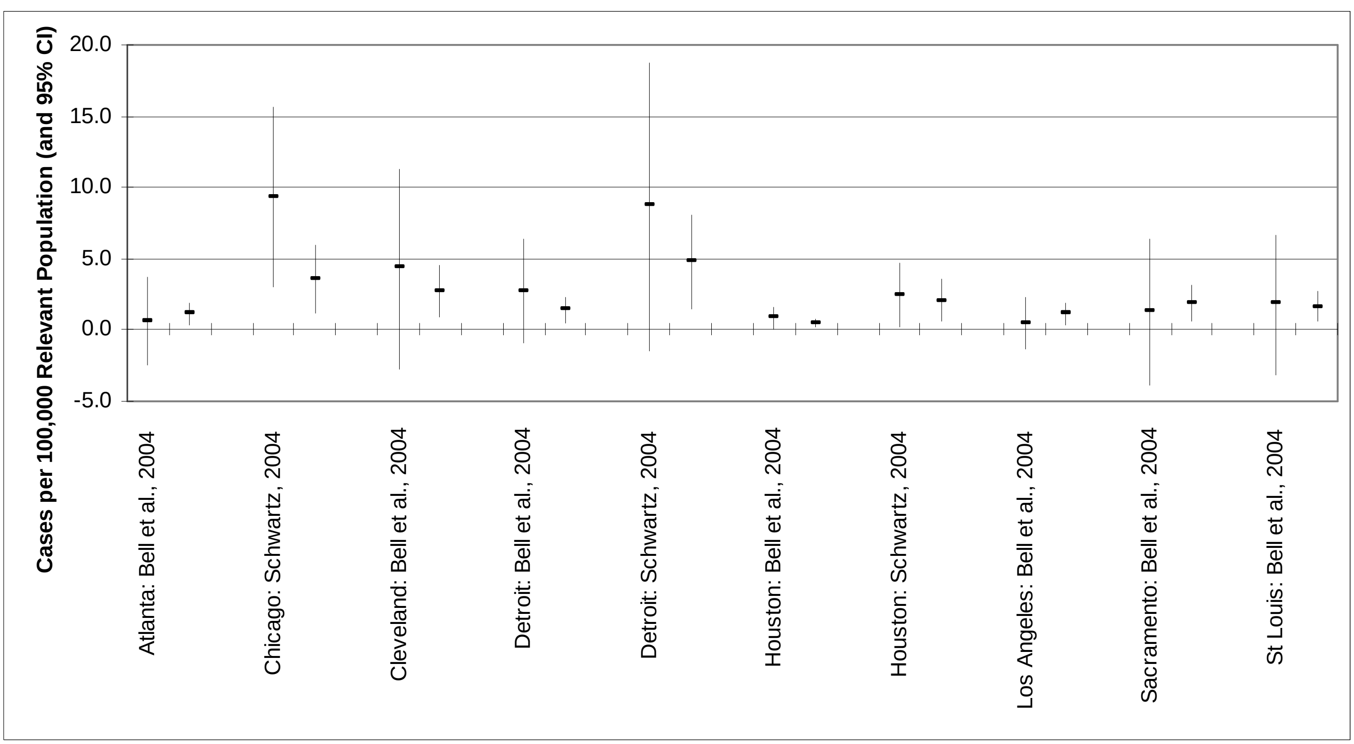


Figure D-4. Estimated Annual Cases of Cardiorespiratory Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O_3 Above Background (April – September): Single-City Model (left bar) vs. Multi-City Model (right bar) – Based on Huang et al. (2004)

Figure D-4a. Based on 2004 Air Quality

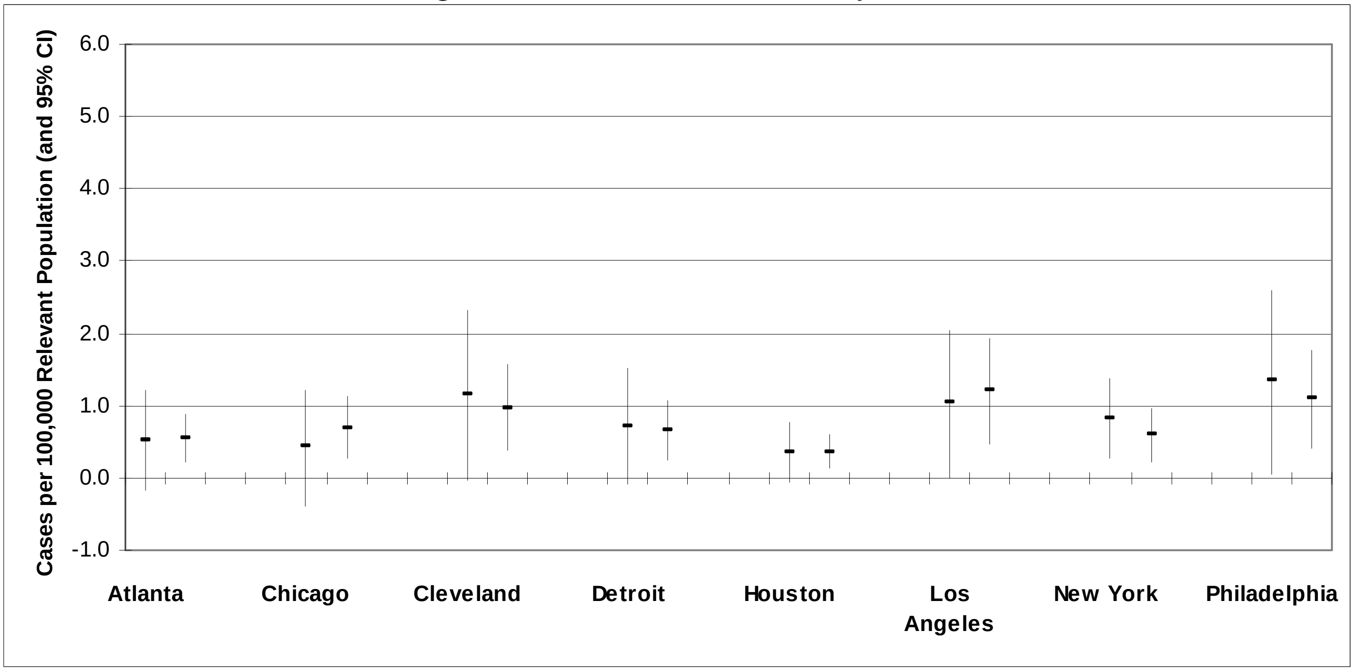


Figure D-4b. Based on 2002 Air Quality

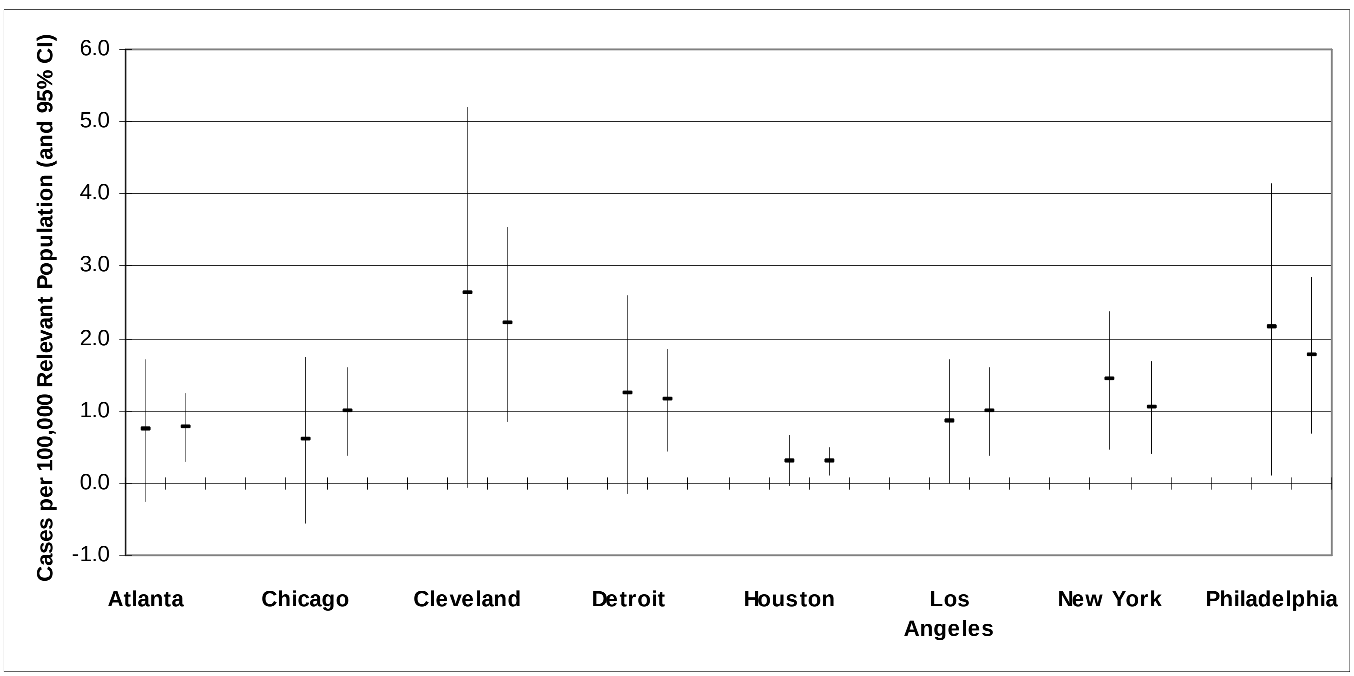


Figure D-5. Estimated Annual Cases of (Unscheduled) Hospital Admissions for Pneumonia in Detroit per 100,000 Relevant Population Associated with Short-Term Exposure to O_3 Above Background (April – September): Different Lag Models – Based on Ito (2003) [bars from left to right are 0-day, 1-day, 2-day, and 3-day lag models]

Figure D-5a. Based on 2004 Air Quality

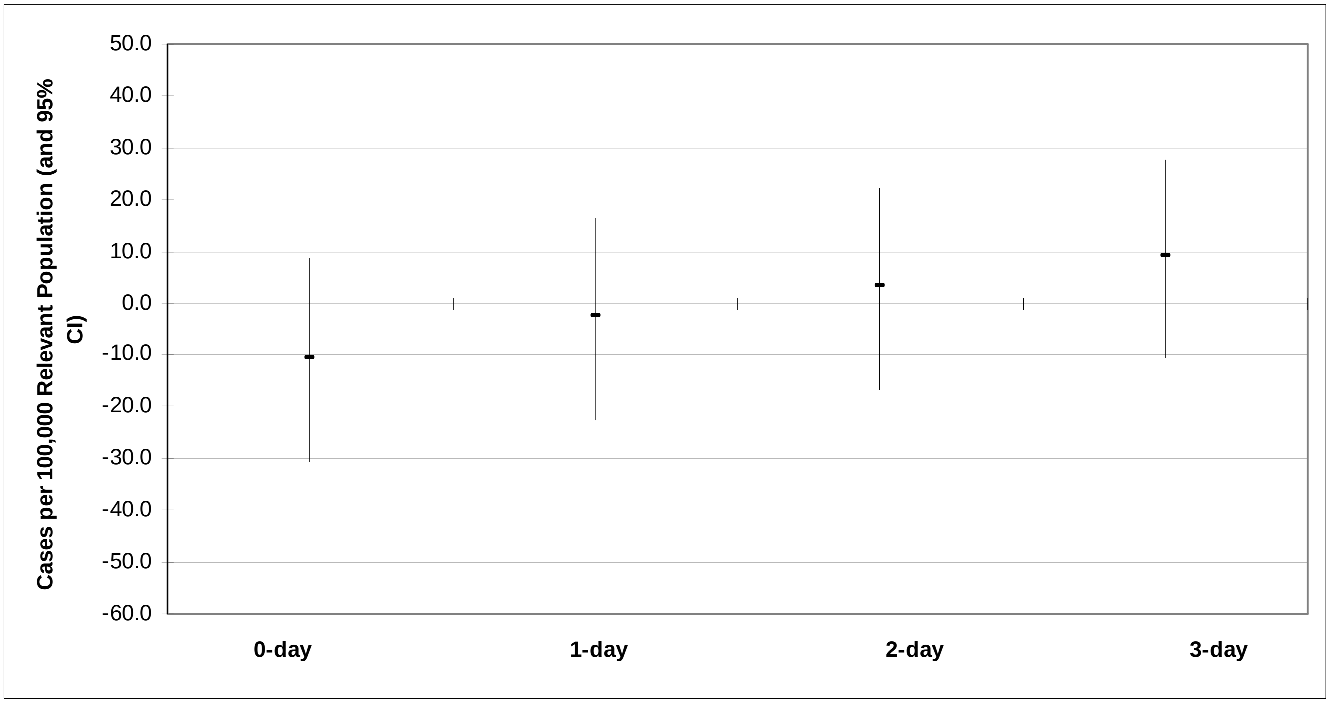


Figure D-5b. Based on 2002 Air Quality

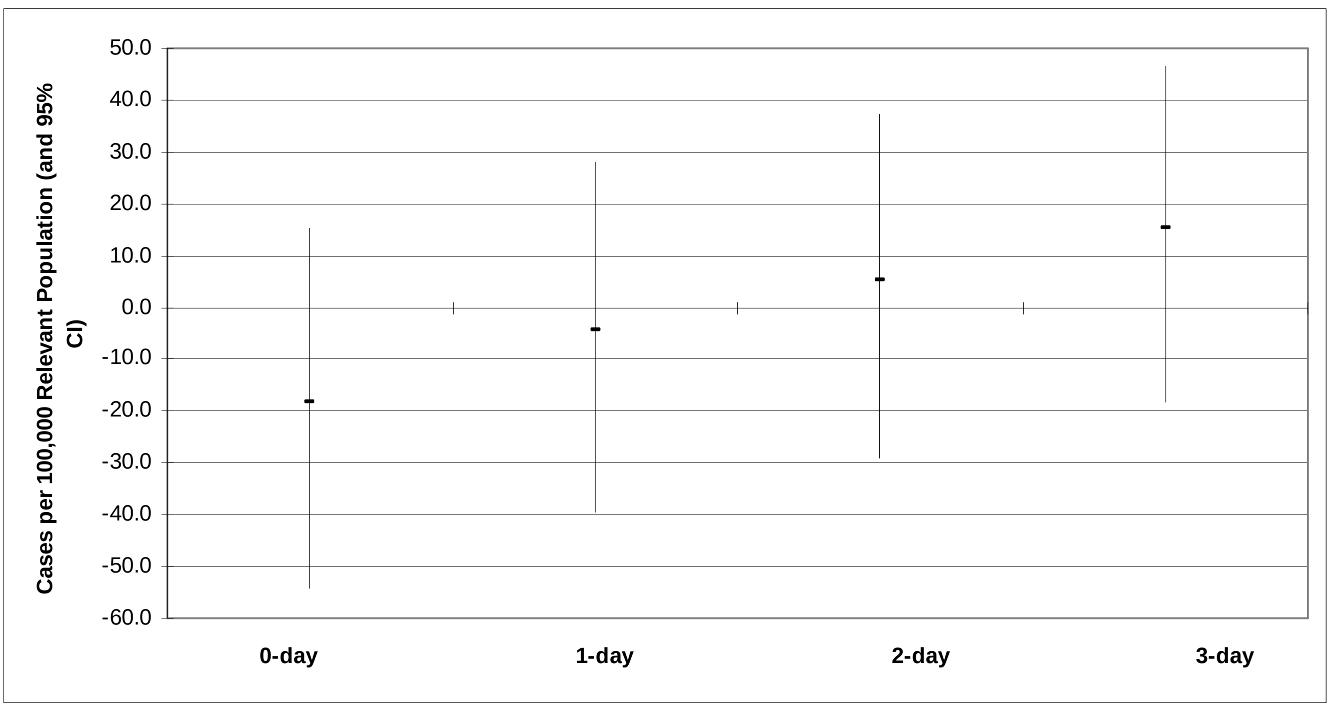


Figure D-6. Estimated Annual Cases of Non-Accidental Mortality Per 100,000 Relevant Population Associated with Short-Term Exposure to "As Is" O_3 Above Background for the Period April – September (Based on Bell et al., 2004 – 95 U.S. Cities) – Total and Contribution of 24-Hour O_3 Ranges

Figure D-6a. Based on 2004 Air Quality

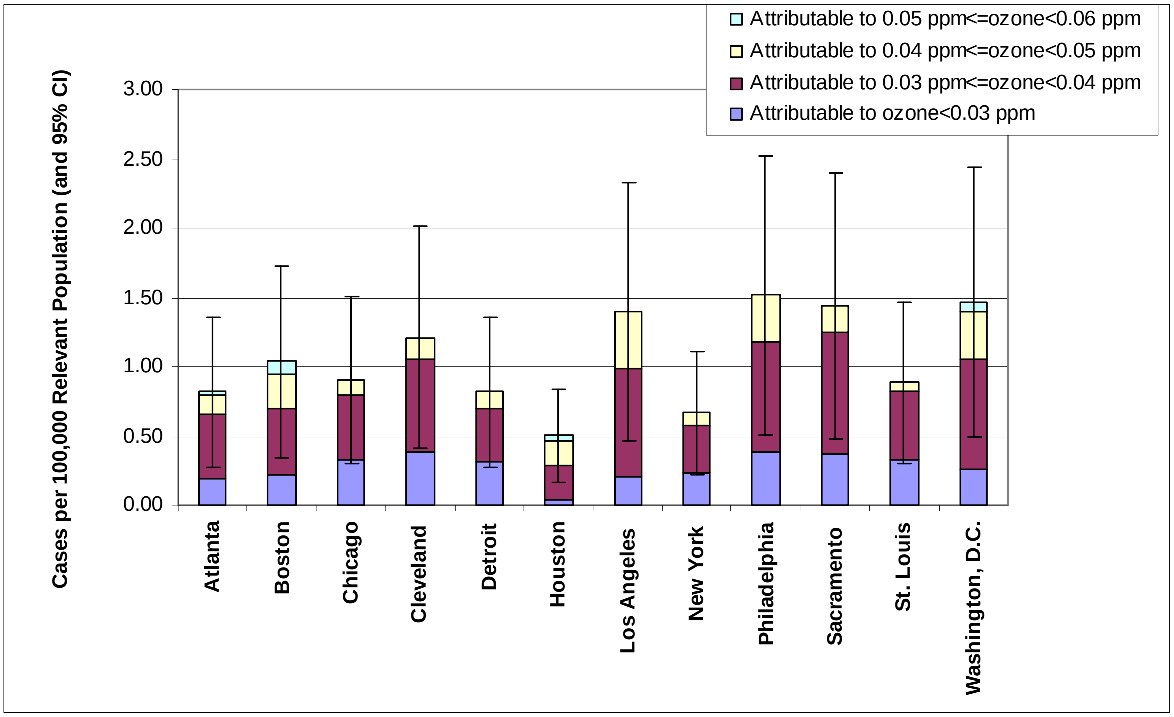


Figure D-6b. Based on 2002 Air Quality

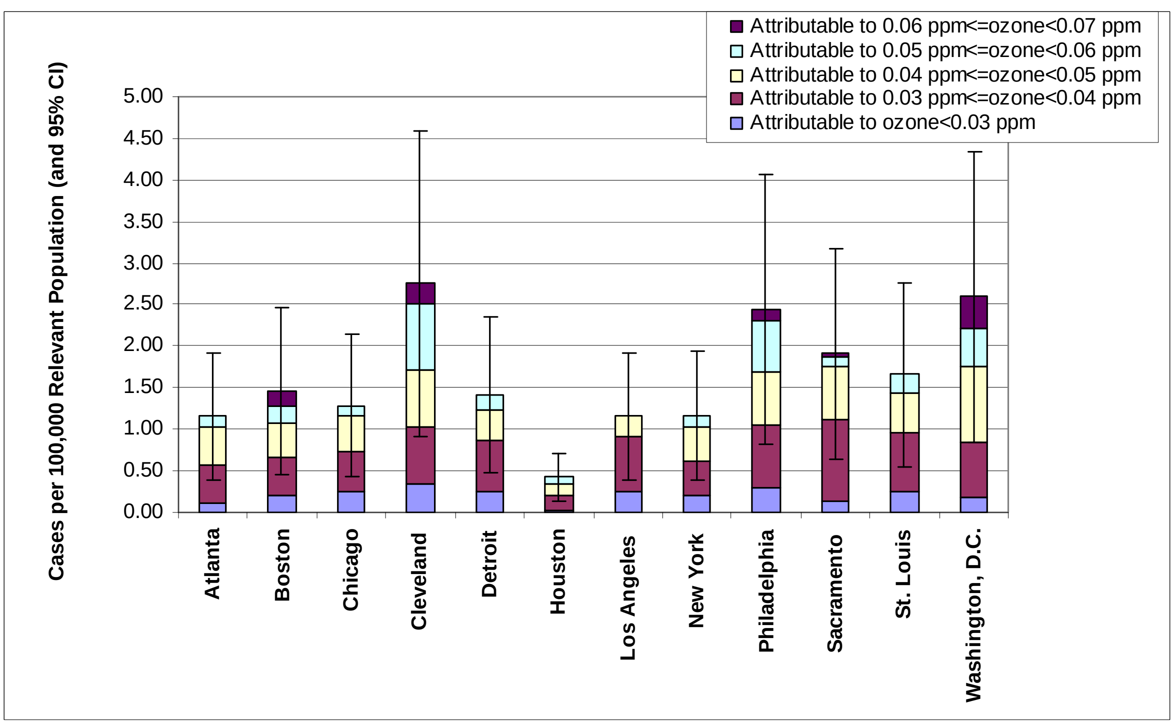


Figure D-7. Estimated Annual Cases of Cardiorespiratory Mortality Per 100,000 Relevant Population Associated with Short-Term Exposure to "As Is" O_3 Above Background for the Period April – September (Based on Huang et al., 2004 – 19 U.S. Cities) – Total and Contribution of 24-Hour O_3 Ranges

Figure D-7a. Based on 2004 Air Quality

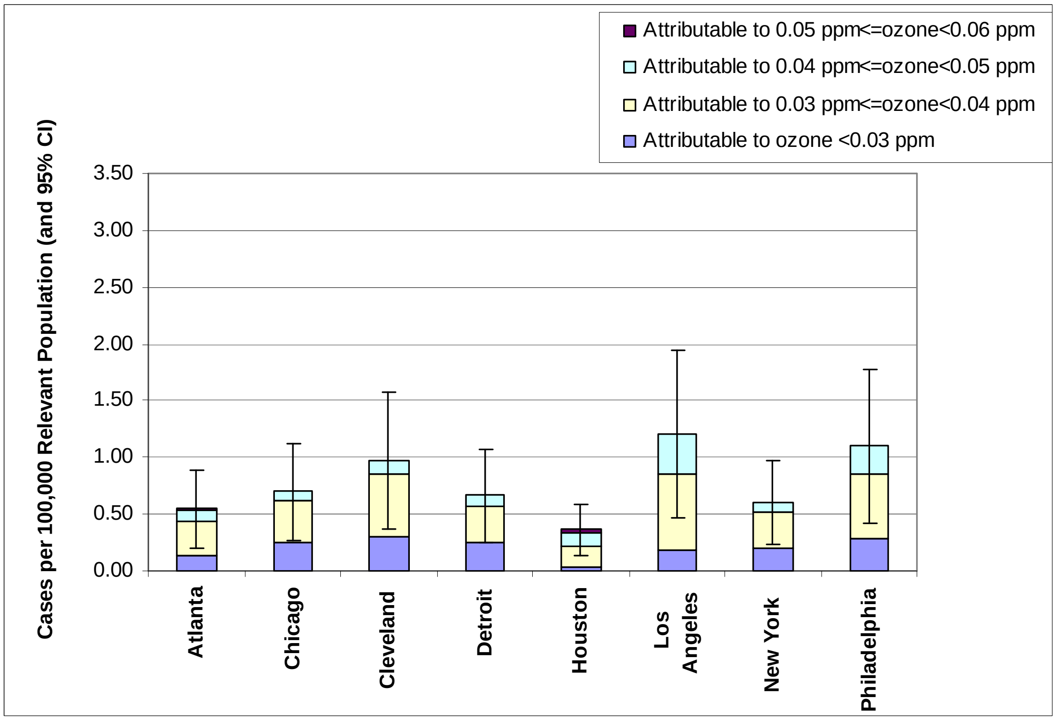
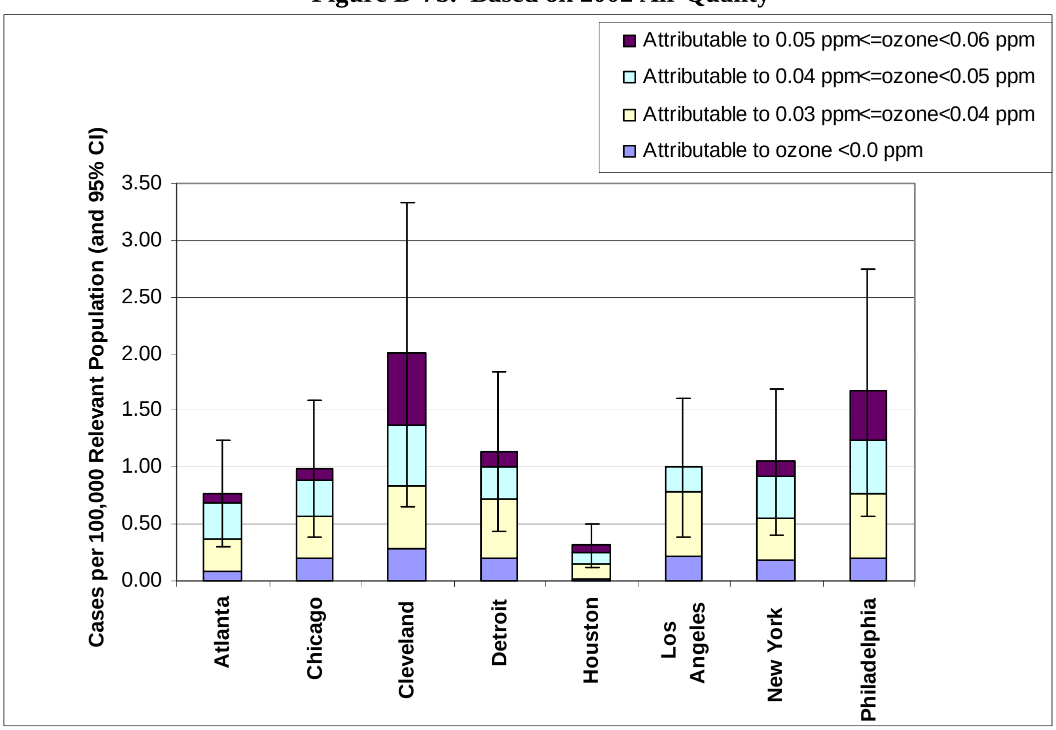


Figure D-7b. Based on 2002 Air Quality



D.2 Tables

Table D-1. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Atlanta, GA, April - September, 2004

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	6 (-26 - 38)	0.4 (-1.8 - 2.6)	0.1% (-0.6% - 0.8%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	12 (4 - 20)	0.8 (0.3 - 1.4)	0.3% (0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	8 (-3 - 18)	0.5 (-0.2 - 1.2)	0.8% (-0.3% - 1.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	8 (3 - 13)	0.5 (0.2 - 0.9)	0.8% (0.3% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	4 (1 - 8)	0.3 (0.1 - 0.5)	0.5% (0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	4 (1 - 7)	0.3 (0 - 0.5)	0.4% (0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	5 (-2 - 11)	0.3 (-0.1 - 0.8)	0.5% (-0.2% - 1.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	3 (0 - 7)	0.2 (0 - 0.4)	0.3% (0% - 0.7%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-2. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Atlanta, GA, April - September, 2002

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	9 (-37 - 54)	0.6 (-2.5 - 3.6)	0.2% (-0.8% - 1.2%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	17 (6 - 29)	1.2 (0.4 - 1.9)	0.4% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	11 (-4 - 25)	0.7 (-0.2 - 1.7)	1.1% (-0.4% - 2.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	11 (4 - 18)	0.8 (0.3 - 1.2)	1.2% (0.5% - 1.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	6 (2 - 11)	0.4 (0.1 - 0.7)	0.7% (0.2% - 1.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	6 (1 - 10)	0.4 (0.1 - 0.7)	0.6% (0.1% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	7 (-3 - 16)	0.5 (-0.2 - 1.1)	0.7% (-0.3% - 1.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	5 (0 - 9)	0.3 (0 - 0.6)	0.5% (0% - 1%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-3. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Boston, MA, April - September, 2004

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	7 (2 - 12)	1.0 (0.3 - 1.7)	0.3% (0.1% - 0.5%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	5300 (800 - 9200)	20700 (3300 - 36300)	9.4% (1.5% - 16.5%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	8400 (3800 - 12400)	33100 (14900 - 49100)	15.1% (6.8% - 22.3%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	7700 (3000 - 11800)	30400 (11800 - 46800)	13.8% (5.4% - 21.3%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	5400 (1700 - 8700)	21400 (6900 - 34500)	9.7% (3.1% - 15.7%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	5700 (700 - 10200)	22500 (2700 - 40200)	8.2% (1% - 14.7%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	6300 (1200 - 10800)	24700 (4800 - 42500)	9% (1.8% - 15.5%)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	15400 (5500 - 24200)	60800 (21800 - 95600)	11.9% (4.3% - 18.7%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences of mortality are rounded to the nearest whole number; incidences of respiratory symptom-days are rounded to the nearest 100. Incidences of mortality per 100,000 relevant population are rounded to the nearest tenth; incidences of respiratory symptom-days per 100,000 relevant population are rounded to the nearest 100. All percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-4. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Boston, MA, April - September, 2002

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	10 (3 - 17)	1.5 (0.5 - 2.5)	0.4% (0.1% - 0.7%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	6900 (1100 - 11800)	27200 (4500 - 46600)	12.4% (2% - 21.2%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	10800 (5000 - 15700)	42700 (19700 - 62100)	19.5% (9% - 28.3%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	10000 (4000 - 15000)	39400 (15700 - 59400)	17.9% (7.1% - 27%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	7200 (2400 - 11400)	28400 (9300 - 44900)	12.9% (4.2% - 20.5%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	7500 (900 - 13200)	29500 (3700 - 52000)	10.8% (1.3% - 19%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	8300 (1700 - 14000)	32800 (6600 - 55300)	11.9% (2.4% - 20.2%)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	20100 (7400 - 31000)	79200 (29000 - 122300)	15.5% (5.7% - 23.9%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences of mortality are rounded to the nearest whole number; incidences of respiratory symptom-days are rounded to the nearest 100. Incidences of mortality per 100,000 relevant population are rounded to the nearest tenth; incidences of respiratory symptom-days per 100,000 relevant population are rounded to the nearest 100. All percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-5. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Chicago, IL, April - September, 2004

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	49 (16 - 81)	0.9 (0.3 - 1.5)	0.2% (0.1% - 0.4%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	394 (125 - 658)	7.3 (2.3 - 12.2)	1.9% (0.6% - 3.1%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	148 (46 - 250)	2.8 (0.9 - 4.6)	0.7% (0.2% - 1.2%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	23 (-21 - 66)	0.4 (-0.4 - 1.2)	0.4% (-0.4% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	38 (14 - 61)	0.7 (0.3 - 1.1)	0.7% (0.3% - 1.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	21 (6 - 36)	0.4 (0.1 - 0.7)	0.4% (0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	18 (3 - 33)	0.3 (0.1 - 0.6)	0.4% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	22 (-9 - 53)	0.4 (-0.2 - 1)	0.4% (-0.2% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	15 (0 - 31)	0.3 (0 - 0.6)	0.3% (0% - 0.6%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-6. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Chicago, IL, April - September, 2002

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	69 (23 - 115)	1.3 (0.4 - 2.1)	0.3% (0.1% - 0.5%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	505 (161 - 840)	9.4 (3 - 15.6)	2.4% (0.8% - 4%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	191 (60 - 321)	3.6 (1.1 - 6)	0.9% (0.3% - 1.5%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	32 (-29 - 93)	0.6 (-0.5 - 1.7)	0.6% (-0.6% - 1.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	53 (20 - 86)	1.0 (0.4 - 1.6)	1% (0.4% - 1.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	30 (9 - 50)	0.6 (0.2 - 0.9)	0.6% (0.2% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	26 (5 - 47)	0.5 (0.1 - 0.9)	0.5% (0.1% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	32 (-12 - 75)	0.6 (-0.2 - 1.4)	0.6% (-0.2% - 1.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	22 (0 - 44)	0.4 (0 - 0.8)	0.4% (0% - 0.9%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-7. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Cleveland, OH, April - September, 2004

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	27 (-17 - 69)	1.9 (-1.2 - 5)	0.4% (-0.2% - 0.9%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	17 (6 - 28)	1.2 (0.4 - 2)	0.2% (0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	16 (0 - 32)	1.2 (0 - 2.3)	0.9% (0% - 1.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	14 (5 - 22)	1.0 (0.4 - 1.6)	0.7% (0.3% - 1.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	8 (2 - 13)	0.5 (0.2 - 0.9)	0.4% (0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	7 (1 - 12)	0.5 (0.1 - 0.9)	0.4% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	8 (-3 - 19)	0.6 (-0.2 - 1.4)	0.4% (-0.2% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	6 (0 - 11)	0.4 (0 - 0.8)	0.3% (0% - 0.6%)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	59 (15 - 102)	27.0 (6.9 - 46.8)	1.5% (0.4% - 2.6%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-8. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Cleveland, OH, April - September, 2002

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	61 (-38 - 157)	4.3 (-2.7 - 11.3)	0.8% (-0.5% - 2.1%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	38 (13 - 64)	2.8 (0.9 - 4.6)	0.5% (0.2% - 0.9%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	36 (-1 - 72)	2.6 (-0.1 - 5.2)	2% (0% - 3.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	31 (12 - 49)	2.2 (0.8 - 3.5)	1.6% (0.6% - 2.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	17 (5 - 29)	1.2 (0.4 - 2.1)	0.9% (0.3% - 1.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	15 (3 - 27)	1.1 (0.2 - 1.9)	0.8% (0.1% - 1.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	18 (-7 - 43)	1.3 (-0.5 - 3.1)	1% (-0.4% - 2.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	13 (0 - 25)	0.9 (0 - 1.8)	0.7% (0% - 1.3%)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	106 (27 - 182)	48.9 (12.6 - 84.1)	2.7% (0.7% - 4.6%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-9. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Detroit, MI, April - September, 2004

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	33 (-11 - 76)	1.6 (-0.5 - 3.7)	0.4% (-0.1% - 0.8%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	17 (6 - 28)	0.8 (0.3 - 1.4)	0.2% (0.1% - 0.3%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	128 (-21 - 274)	6.2 (-1 - 13.3)	1.4% (-0.2% - 2.9%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	70 (22 - 117)	3.4 (1.1 - 5.7)	0.7% (0.2% - 1.2%)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	40 (-37 - 116)	2.0 (-1.8 - 5.6)	0.4% (-0.4% - 1.2%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	15 (-2 - 31)	0.7 (-0.1 - 1.5)	0.6% (-0.1% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	14 (5 - 22)	0.7 (0.3 - 1.1)	0.6% (0.2% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	8 (2 - 13)	0.4 (0.1 - 0.6)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	7 (1 - 12)	0.3 (0.1 - 0.6)	0.3% (0% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	8 (-3 - 19)	0.4 (-0.2 - 0.9)	0.3% (-0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	6 (0 - 11)	0.3 (0 - 0.5)	0.2% (0% - 0.5%)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	13 (-10 - 34)	0.6 (-0.5 - 1.6)	1.6% (-1.3% - 4.3%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	0-day lag	24 hr avg.	none	-26 (-77 - 22)	-10.5 (-30.8 - 8.8)	-1% (-3% - 0.9%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	1-day lag	24 hr avg.	none	-6 (-56 - 41)	-2.6 (-22.6 - 16.5)	-0.2% (-2.2% - 1.6%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	2-day lag	24 hr avg.	none	8 (-42 - 55)	3.1 (-16.7 - 22.1)	0.3% (-1.6% - 2.1%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	3-day lag	24 hr avg.	none	22 (-26 - 68)	9.0 (-10.5 - 27.5)	0.9% (-1% - 2.7%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	0-day lag	24 hr avg.	none	-18 (-64 - 26)	-7.1 (-25.6 - 10.4)	-0.9% (-3.2% - 1.3%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	1-day lag	24 hr avg.	none	17 (-27 - 59)	6.8 (-11 - 23.7)	0.9% (-1.4% - 3%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	2-day lag	24 hr avg.	none	-3 (-48 - 41)	-1.0 (-19.5 - 16.5)	-0.1% (-2.4% - 2.1%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	3-day lag	24 hr avg.	none	1 (-45 - 44)	0.4 (-18 - 17.8)	0.1% (-2.3% - 2.2%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-10. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Detroit, MI, April - September, 2002

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	57 (-18 - 131)	2.8 (-0.9 - 6.3)	0.6% (-0.2% - 1.4%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	29 (10 - 48)	1.4 (0.5 - 2.3)	0.3% (0.1% - 0.5%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	181 (-30 - 385)	8.8 (-1.4 - 18.7)	1.9% (-0.3% - 4.1%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	99 (31 - 165)	4.8 (1.5 - 8)	1% (0.3% - 1.8%)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	69 (-64 - 198)	3.4 (-3.1 - 9.6)	0.7% (-0.7% - 2.1%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	26 (-3 - 54)	1.2 (-0.1 - 2.6)	1.1% (-0.1% - 2.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	24 (9 - 38)	1.1 (0.4 - 1.8)	1% (0.4% - 1.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	13 (4 - 22)	0.6 (0.2 - 1.1)	0.5% (0.2% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	11 (2 - 21)	0.6 (0.1 - 1)	0.5% (0.1% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	14 (-5 - 33)	0.7 (-0.3 - 1.6)	0.6% (-0.2% - 1.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	10 (0 - 19)	0.5 (0 - 0.9)	0.4% (0% - 0.8%)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	22 (-18 - 57)	1.0 (-0.9 - 2.7)	2.8% (-2.3% - 7.2%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	0-day lag	24 hr avg.	none	-45 (-135 - 37)	-18.3 (-54.3 - 15.1)	-1.8% (-5.2% - 1.5%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	1-day lag	24 hr avg.	none	-11 (-98 - 70)	-4.4 (-39.5 - 28.1)	-0.4% (-3.8% - 2.7%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	2-day lag	24 hr avg.	none	13 (-72 - 93)	5.4 (-29.1 - 37.4)	0.5% (-2.8% - 3.6%)
Hospital admissions (unscheduled), pneumonia	Ito (2003)	65+	3-day lag	24 hr avg.	none	38 (-45 - 116)	15.3 (-18.2 - 46.5)	1.5% (-1.8% - 4.5%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	0-day lag	24 hr avg.	none	-31 (-112 - 44)	-12.3 (-45.1 - 17.7)	-1.5% (-5.6% - 2.2%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	1-day lag	24 hr avg.	none	29 (-48 - 99)	11.7 (-19.1 - 39.9)	1.5% (-2.4% - 5%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	2-day lag	24 hr avg.	none	-4 (-85 - 69)	-1.7 (-34.2 - 27.9)	-0.2% (-4.3% - 3.5%)
Hospital admissions (unscheduled), COPD	Ito (2003)	65+	3-day lag	24 hr avg.	none	2 (-78 - 75)	0.7 (-31.5 - 30.2)	0.1% (-3.9% - 3.8%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-11. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Houston, TX, April - September, 2004

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	35 (2 - 67)	1.0 (0.1 - 2)	0.4% (0% - 0.7%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	17 (6 - 28)	0.5 (0.2 - 0.8)	0.2% (0.1% - 0.3%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	93 (9 - 176)	2.7 (0.3 - 5.2)	1% (0.1% - 1.9%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	78 (24 - 130)	2.3 (0.7 - 3.8)	0.9% (0.3% - 1.4%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	12 (-2 - 26)	0.4 (0 - 0.8)	0.6% (-0.1% - 1.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	13 (5 - 20)	0.4 (0.1 - 0.6)	0.6% (0.2% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	7 (2 - 12)	0.2 (0.1 - 0.3)	0.3% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	6 (1 - 11)	0.2 (0 - 0.3)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	7 (-3 - 18)	0.2 (-0.1 - 0.5)	0.4% (-0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	5 (0 - 10)	0.2 (0 - 0.3)	0.2% (0% - 0.5%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-12. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Houston, TX, April - September, 2002

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	29 (2 - 57)	0.9 (0.1 - 1.7)	0.3% (0% - 0.6%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	14 (5 - 24)	0.4 (0.1 - 0.7)	0.2% (0.1% - 0.3%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	85 (8 - 161)	2.5 (0.2 - 4.7)	0.9% (0.1% - 1.8%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	71 (22 - 119)	2.1 (0.7 - 3.5)	0.8% (0.2% - 1.3%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	10 (-1 - 22)	0.3 (0 - 0.6)	0.5% (-0.1% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	11 (4 - 17)	0.3 (0.1 - 0.5)	0.5% (0.2% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	6 (2 - 10)	0.2 (0.1 - 0.3)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	5 (1 - 9)	0.2 (0 - 0.3)	0.2% (0% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	6 (-2 - 15)	0.2 (-0.1 - 0.4)	0.3% (-0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	4 (0 - 9)	0.1 (0 - 0.3)	0.2% (0% - 0.4%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-13. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Los Angeles, CA, April - September, 2004

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)***	all	distributed lag	24 hr avg.	none	62 (-149 - 271)	0.6 (-1.6 - 2.8)	0.2% (-0.5% - 1%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)***	all	distributed lag	24 hr avg.	none	133 (45 - 221)	1.4 (0.5 - 2.3)	0.5% (0.2% - 0.8%)
Mortality, cardiorespiratory	Huang et al. (2004)***	all	distributed lag	24 hr avg.	none	99 (1 - 195)	1.0 (0 - 2.1)	1.3% (0% - 2.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	distributed lag	24 hr avg.	none	115 (44 - 185)	1.2 (0.5 - 1.9)	1.6% (0.6% - 2.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	CO	64 (19 - 108)	0.7 (0.2 - 1.1)	0.9% (0.3% - 1.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	NO2	56 (10 - 101)	0.6 (0.1 - 1.1)	0.8% (0.1% - 1.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	PM10	68 (-26 - 161)	0.7 (-0.3 - 1.7)	0.9% (-0.4% - 2.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	SO2	47 (0 - 94)	0.5 (0 - 1)	0.6% (0% - 1.3%)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)****	30+	0-day lag	24 hr avg.	none	75 (-32 - 179)	0.9 (-0.4 - 2.1)	1.7% (-0.7% - 4.1%)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)****	30+	0-day lag	24 hr avg.	none	46 (-60 - 148)	0.5 (-0.7 - 1.8)	1.2% (-1.6% - 4%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***Los Angeles is defined in this study as Los Angeles County.

****Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-14. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Los Angeles, CA, April - September, 2002

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)***	all	distributed lag	24 hr avg.	none	51 (-124 - 224)	0.5 (-1.3 - 2.4)	0.2% (-0.5% - 0.8%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)***	all	distributed lag	24 hr avg.	none	110 (37 - 184)	1.2 (0.4 - 1.9)	0.4% (0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. (2004)***	all	distributed lag	24 hr avg.	none	82 (1 - 162)	0.9 (0 - 1.7)	1.1% (0% - 2.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	distributed lag	24 hr avg.	none	95 (36 - 153)	1.0 (0.4 - 1.6)	1.3% (0.5% - 2.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	CO	53 (16 - 90)	0.6 (0.2 - 0.9)	0.7% (0.2% - 1.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	NO2	46 (8 - 84)	0.5 (0.1 - 0.9)	0.6% (0.1% - 1.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	PM10	57 (-22 - 134)	0.6 (-0.2 - 1.4)	0.8% (-0.3% - 1.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)***	all	0-day lag	24 hr avg.	SO2	39 (0 - 78)	0.4 (0 - 0.8)	0.5% (0% - 1.1%)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)****	30+	0-day lag	24 hr avg.	none	68 (-29 - 162)	0.8 (-0.3 - 1.9)	1.6% (-0.7% - 3.7%)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)****	30+	0-day lag	24 hr avg.	none	44 (-58 - 143)	0.5 (-0.7 - 1.7)	1.2% (-1.6% - 3.9%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***Los Angeles is defined in this study as Los Angeles County.

****Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-15. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Philadelphia, PA, April - September, 2004

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	23 (8 - 38)	1.5 (0.5 - 2.5)	0.3% (0.1% - 0.5%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	82 (52 - 112)	5.4 (3.4 - 7.4)	1% (0.6% - 1.4%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO2	82 (39 - 124)	5.4 (2.6 - 8.2)	1% (0.5% - 1.5%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	20 (1 - 39)	1.3 (0.1 - 2.6)	1.1% (0.1% - 2.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	17 (6 - 27)	1.1 (0.4 - 1.8)	0.9% (0.3% - 1.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	9 (3 - 16)	0.6 (0.2 - 1)	0.5% (0.1% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	8 (1 - 15)	0.5 (0.1 - 1)	0.4% (0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	10 (-4 - 24)	0.7 (-0.3 - 1.6)	0.5% (-0.2% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	7 (0 - 14)	0.5 (0 - 0.9)	0.4% (0% - 0.7%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-16. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Philadelphia, PA, April - September, 2002

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	37 (12 - 62)	2.4 (0.8 - 4.1)	0.5% (0.2% - 0.8%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	132 (83 - 180)	8.7 (5.5 - 11.9)	1.6% (1% - 2.2%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO2	131 (63 - 198)	8.6 (4.1 - 13.1)	1.6% (0.8% - 2.5%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	33 (2 - 63)	2.2 (0.1 - 4.1)	1.8% (0.1% - 3.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	27 (10 - 43)	1.8 (0.7 - 2.8)	1.5% (0.6% - 2.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	15 (4 - 25)	1.0 (0.3 - 1.7)	0.8% (0.2% - 1.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	13 (2 - 24)	0.9 (0.2 - 1.6)	0.7% (0.1% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	16 (-6 - 38)	1.1 (-0.4 - 2.5)	0.9% (-0.3% - 2.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	11 (0 - 22)	0.7 (0 - 1.5)	0.6% (0% - 1.2%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-17. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Sacramento, CA, April - September, 2004

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	12 (-36 - 59)	1.0 (-3 - 4.8)	0.3% (-0.9% - 1.4%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	18 (6 - 29)	1.4 (0.5 - 2.4)	0.4% (0.1% - 0.7%)

*Health effects are associated with short-term exposures to O_3.
**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-18. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Sacramento, CA, April - September, 2002

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	16 (-48 - 78)	1.3 (-3.9 - 6.4)	0.4% (-1.1% - 1.9%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	23 (8 - 39)	1.9 (0.6 - 3.2)	0.6% (0.2% - 0.9%)

*Health effects are associated with short-term exposures to O_3.
**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-19. Estimated Health Risks Associated with "As Is" O_3 Concentrations: St. Louis, MO, April - September, 2004

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	3 (-6 - 13)	1.0 (-1.7 - 3.6)	0.2% (-0.3% - 0.6%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	3 (1 - 5)	0.9 (0.3 - 1.5)	0.2% (0.1% - 0.3%)

*Health effects are associated with short-term exposures to O_3.
**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-20. Estimated Health Risks Associated with "As Is" O_3 Concentrations: St. Louis, MO, April - September, 2002

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	6 (-11 - 23)	1.9 (-3.1 - 6.7)	0.3% (-0.5% - 1.2%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	6 (2 - 10)	1.7 (0.6 - 2.8)	0.3% (0.1% - 0.5%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-21. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Washington, D.C., April - September, 2004

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	8 (3 - 14)	1.5 (0.5 - 2.4)	0.3% (0.1% - 0.5%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table D-22. Estimated Health Risks Associated with "As Is" O_3 Concentrations: Washington, D.C., April - September, 2002

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Health Effects Associated with O_3 Above Policy Relevant Background Levels**		
						Incidence	Incidence per 100,000 Relevant Population	Percent of Total Incidence
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	15 (5 - 25)	2.6 (0.9 - 4.4)	0.6% (0.2% - 0.9%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Appendix E: Estimated Health Risks Associated with O_3 Concentrations That Just Meet the Current 8-Hour Daily Maximum Standard: April – September

E.1 Figures

Figure E-1. Estimated Annual Cases of (Non-Accidental) Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O_3 Above Background When the Current 8-Hour Standard is Just Met: Single-Pollutant, Single-City Models (April – September)

Figure E-1a. Based on 2004 Air Quality

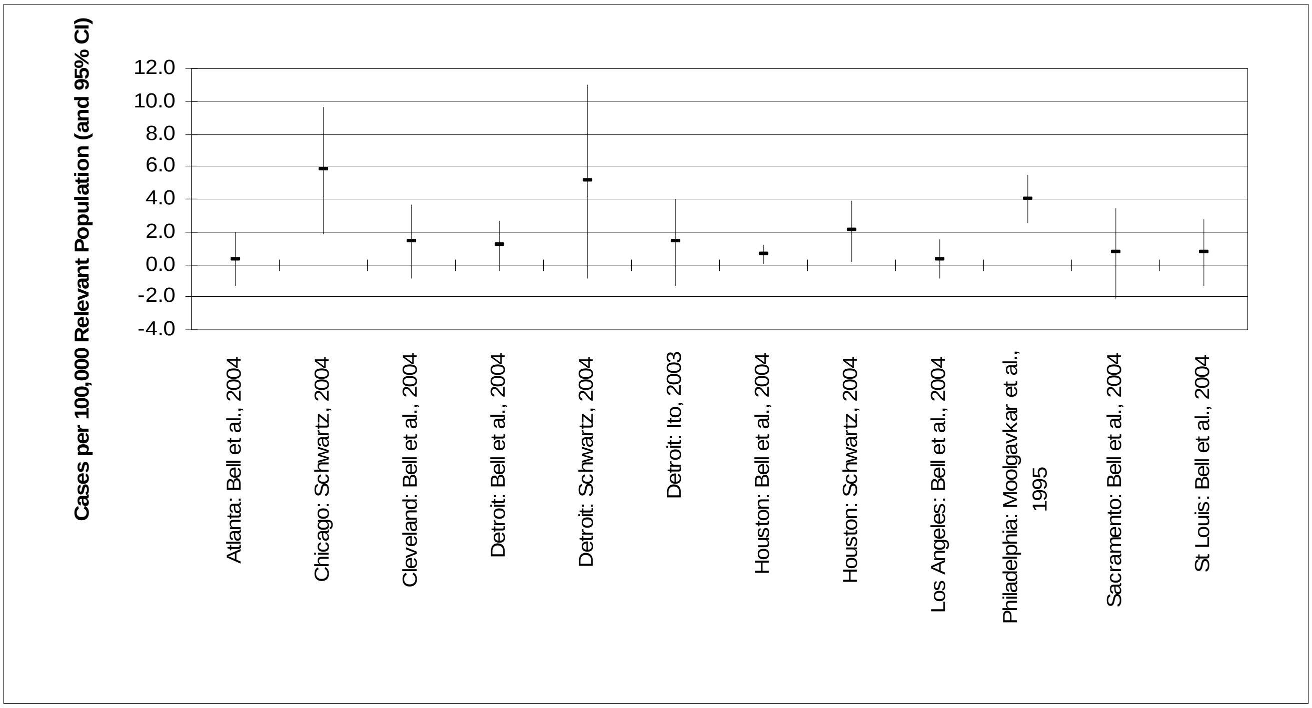


Figure E-1b. Based on 2002 Air Quality

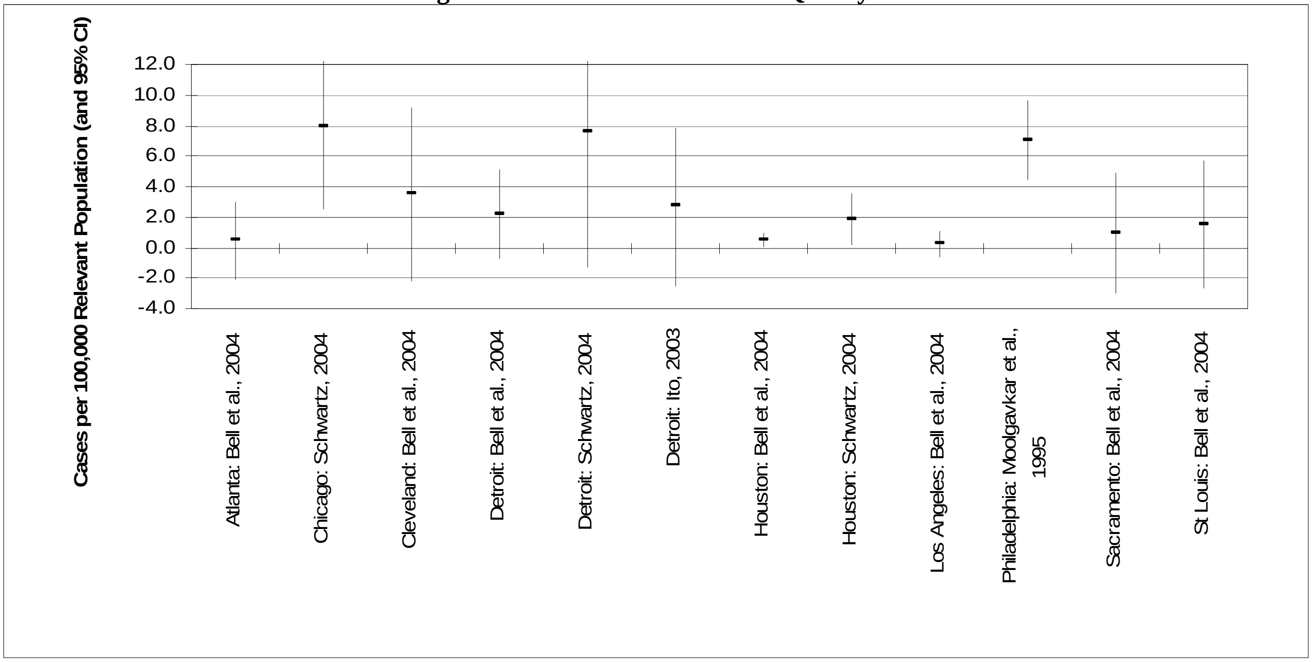


Figure E-2. Estimated Annual Cases of Cardiorespiratory Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O_3 Above Background When the Current 8-Hour Standard is Just Met (April – September): Single-Pollutant vs. Multi-Pollutant Models [Huang et al. (2004), additional pollutants, from left to right: none, CO, NO_2, PM_{10}, SO_2]

Figure E-2a. Based on 2004 Air Quality

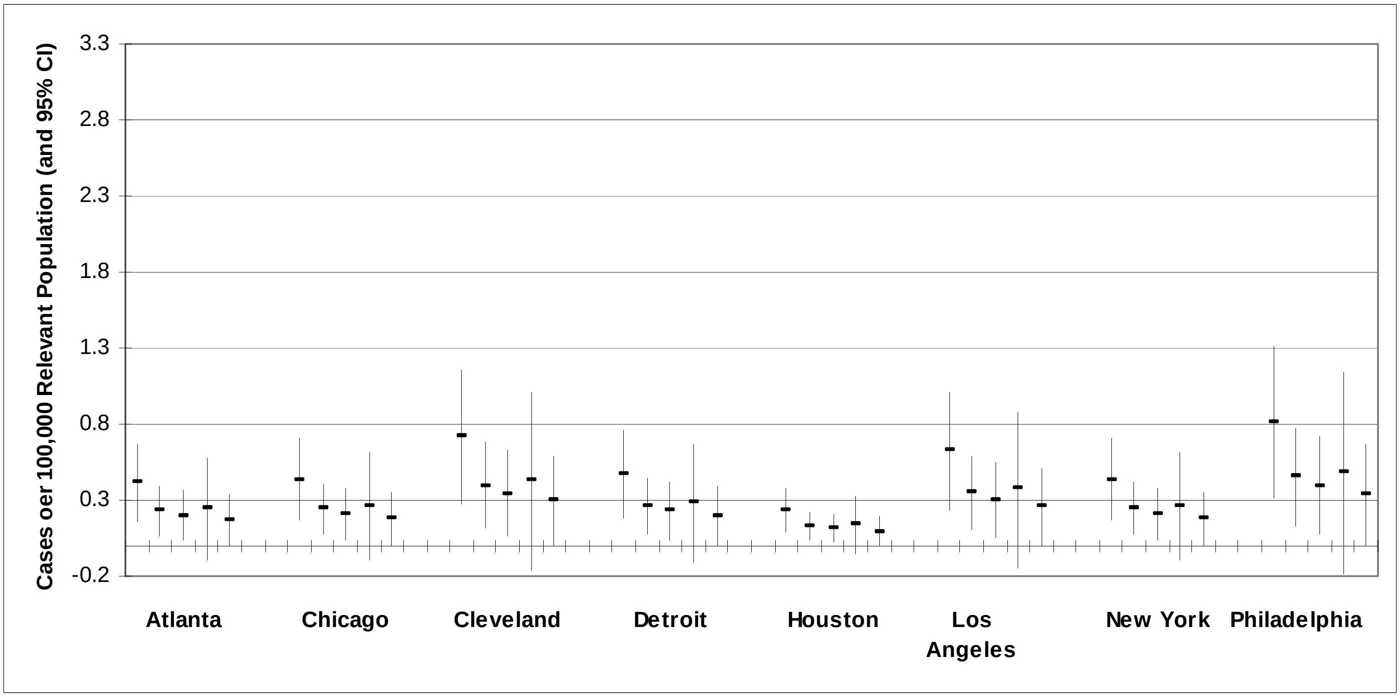


Figure E-2b. Based on 2002 Air Quality

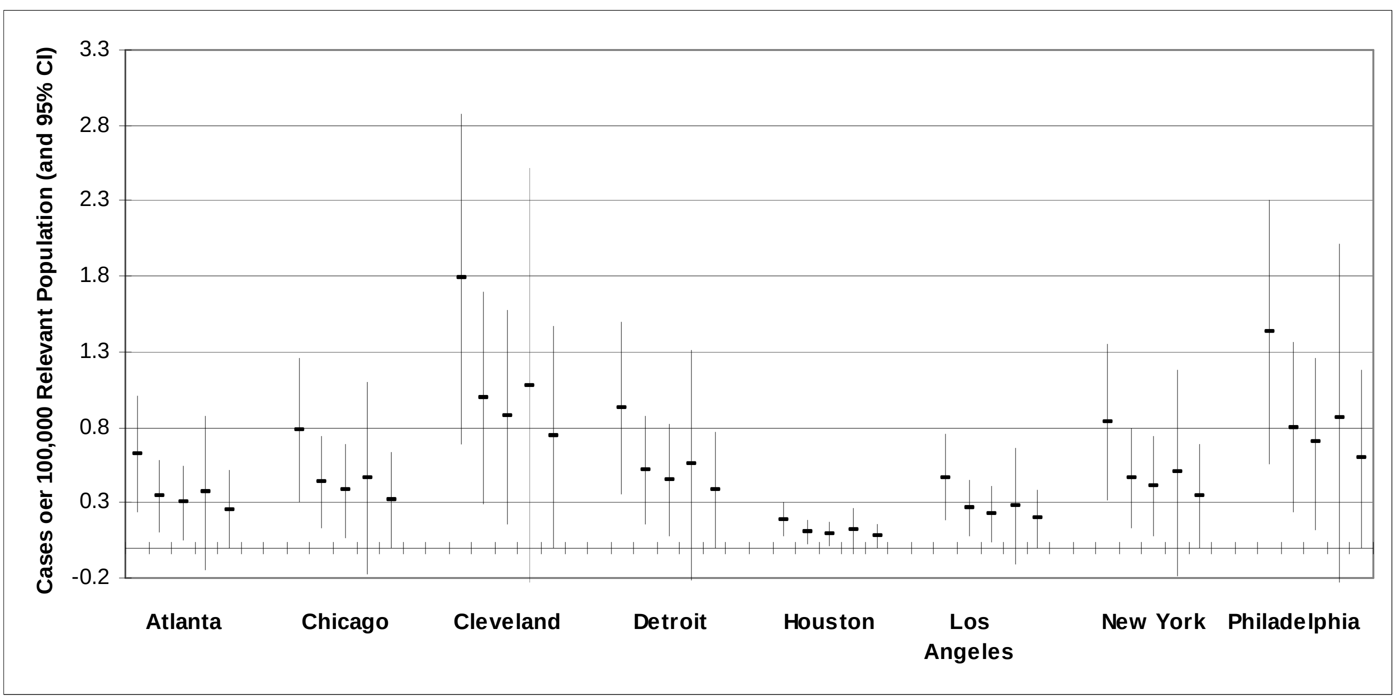


Figure E-3. Estimated Annual Cases of (Non-Accidental) Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O_3 Above Background When the Current 8-Hour Standard is Just Met (April – September): Single-City Model (left bar) vs. Multi-City Model (right bar)

Figure E-3a. Based on 2004 Air Quality

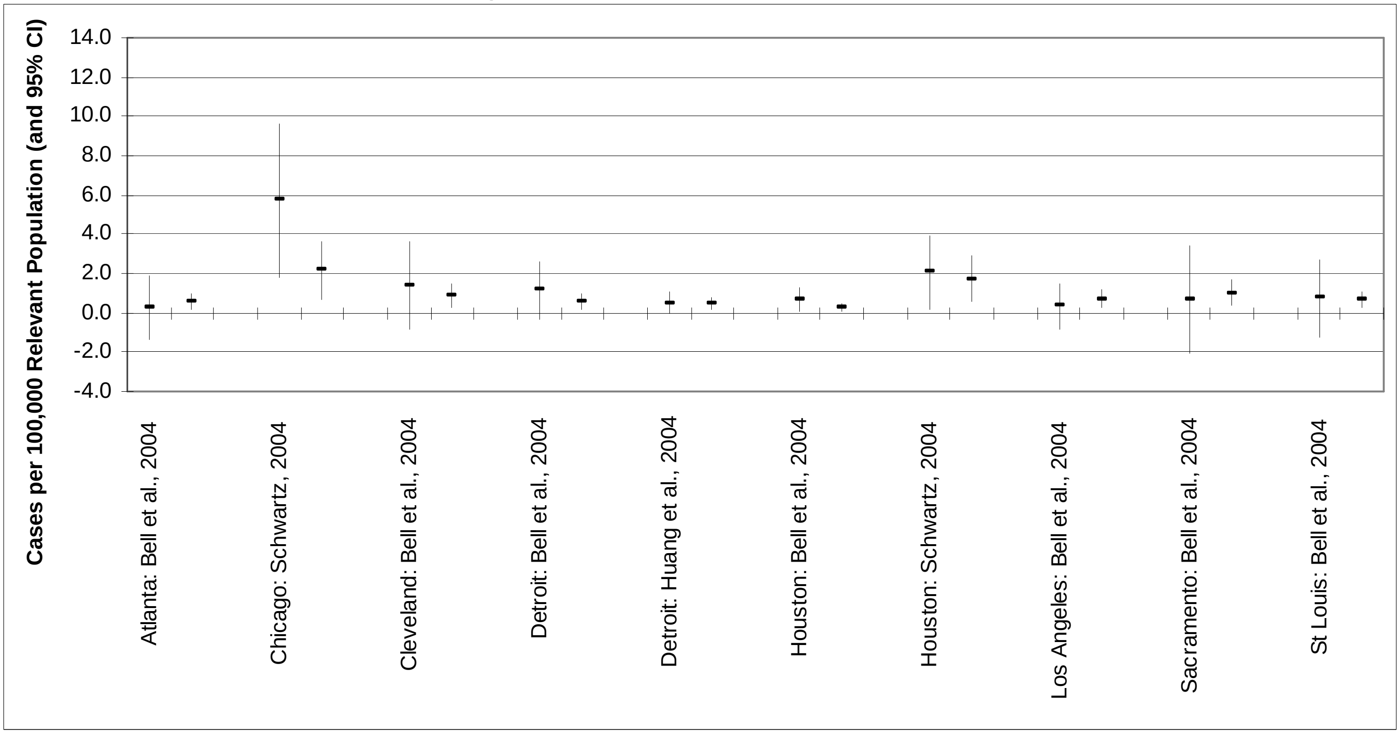


Figure E-3b. Based on 2002 Air Quality

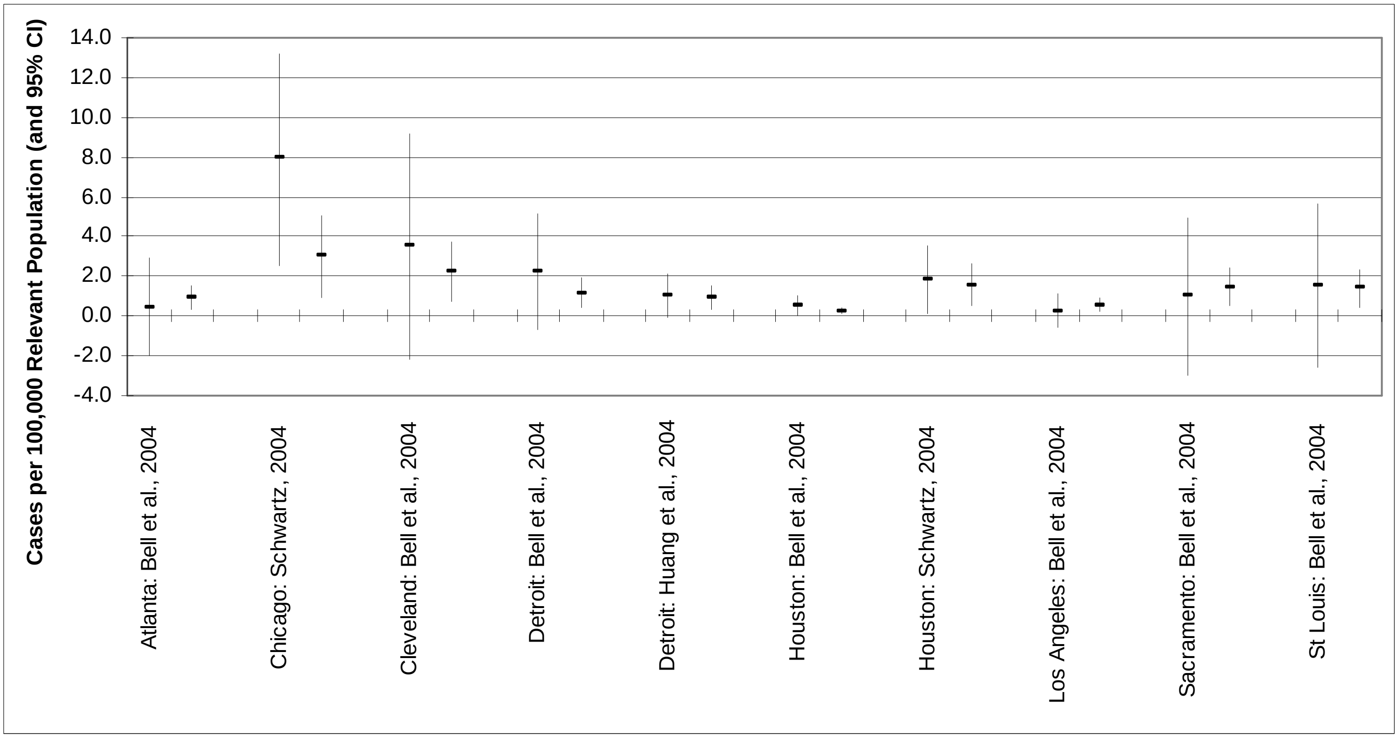


Figure E-4. Estimated Annual Cases of Cardiorespiratory Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O_3 Above Background When the Current 8-Hour Standard is Just Met (April – September): Single-City Model (left bar) vs. Multi-City Model (right bar) – Based on Huang et al. (2004)

Figure E-4a. Based on 2004 Air Quality

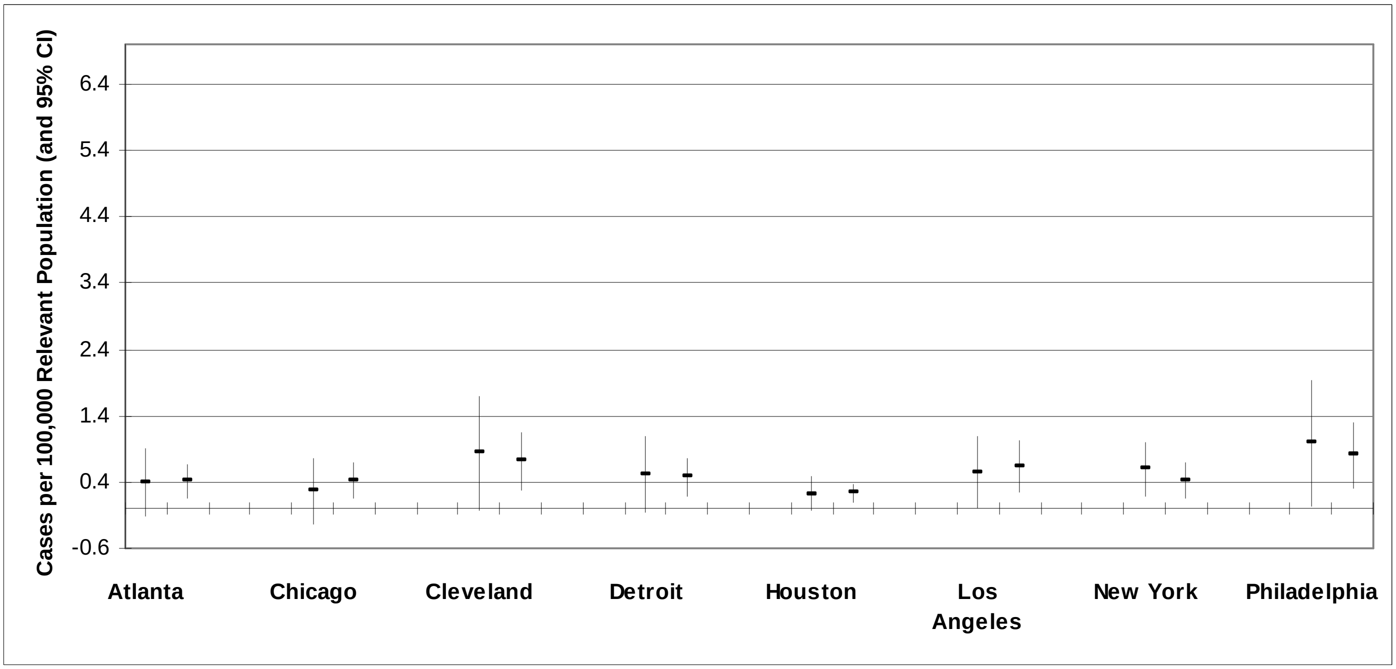


Figure E-4b. Based on 2002 Air Quality

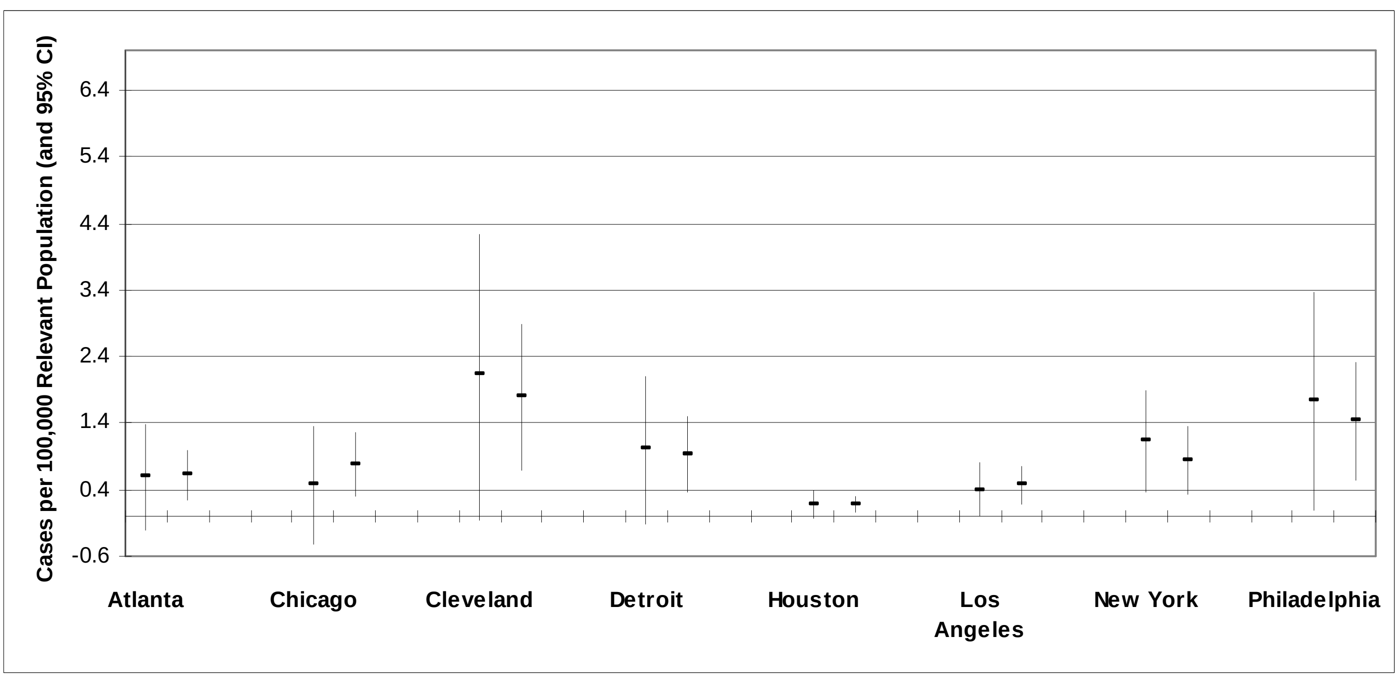


Figure E-5. Estimated Annual Cases of (Unscheduled) Hospital Admissions for Pneumonia in Detroit per 100,000 Relevant Population Associated with Short-Term Exposure to O_3 Above Background When the Current 8-Hour Standard is Just Met (April – September): Different Lag Models – Based on Ito (2003) [bars from left to right are 0-day, 1-day, 2-day, and 3-day lag models]

Figure E-5a. Based on 2004 Air Quality

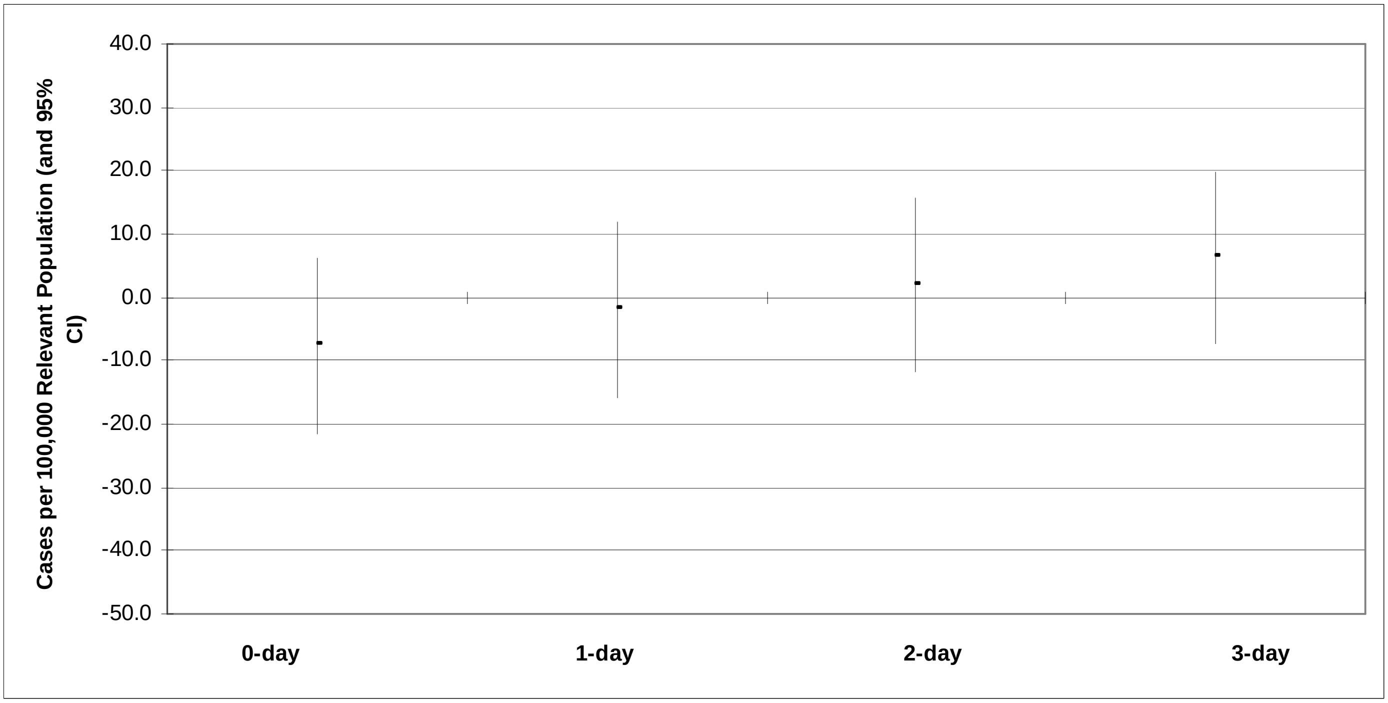


Figure E-5b. Based on 2002 Air Quality

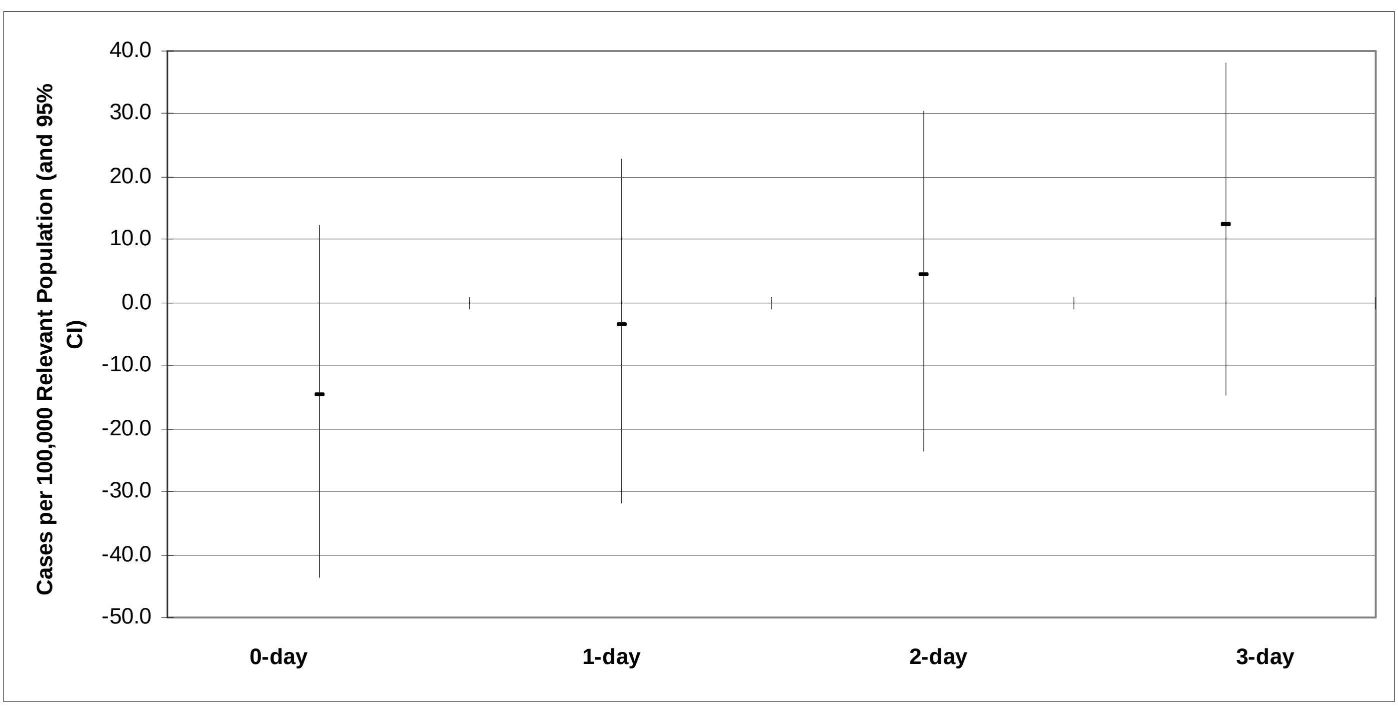


Figure E-6. Estimated Annual Cases of Non-Accidental Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O_3 Above Policy Relevant Background for the Period April – September When the Current 8-Hour Standard is Just Met (Based on Bell et al., 2004 – 95 U.S. Cities) – Total and Contribution of 24-Hour O_3 Ranges

Figure E-6a. Based on 2004 Air Quality

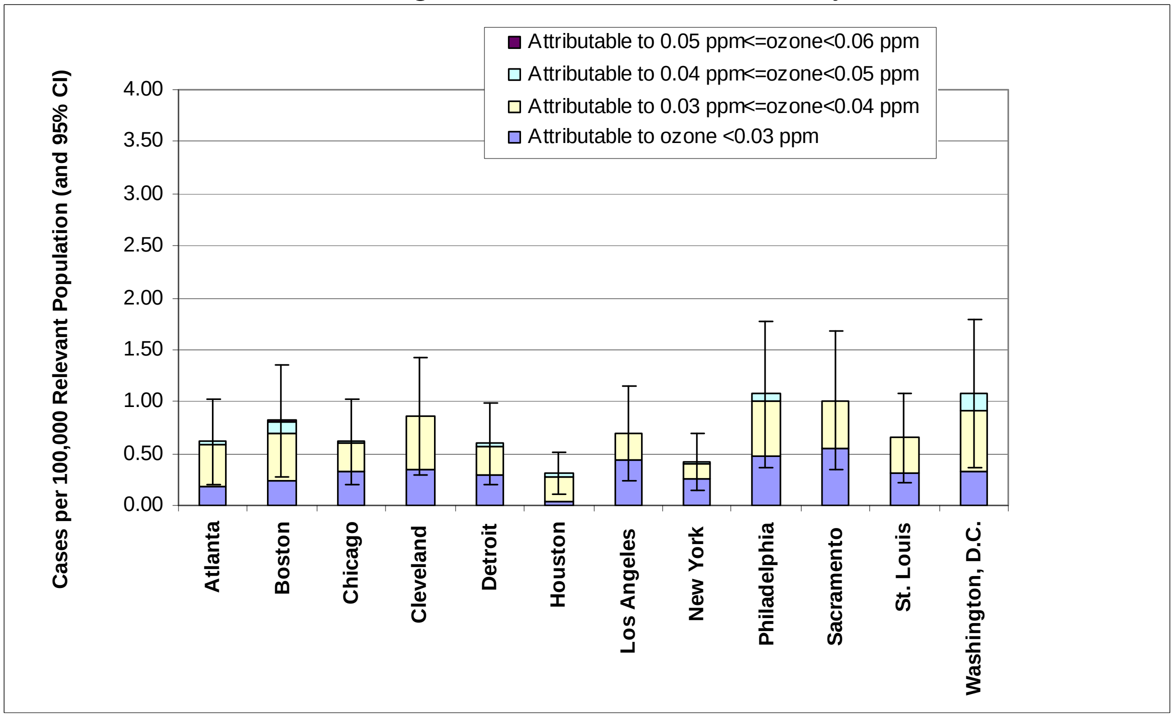


Figure E-6b. Based on 2002 Air Quality

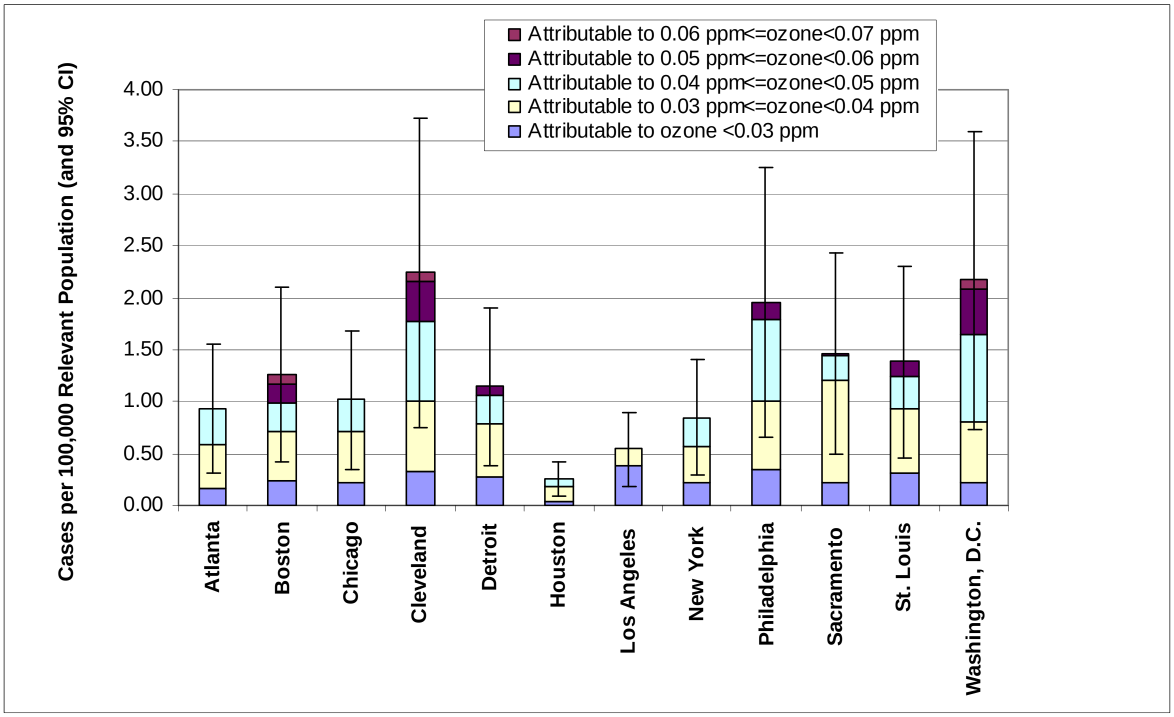


Figure E-7. Estimated Annual Cases of Cardiorespiratory Mortality per 100,000 Relevant Population Associated with Short-Term Exposure to O_3 Above Policy Relevant Background for the Period April – September When the Current 8-Hour Standard is Just Met (Based on Huang et al., 2004 – 19 U.S. Cities) – Total and Contribution of 24-Hour O_3 Ranges

Figure E-7a. Based on 2004 Air Quality

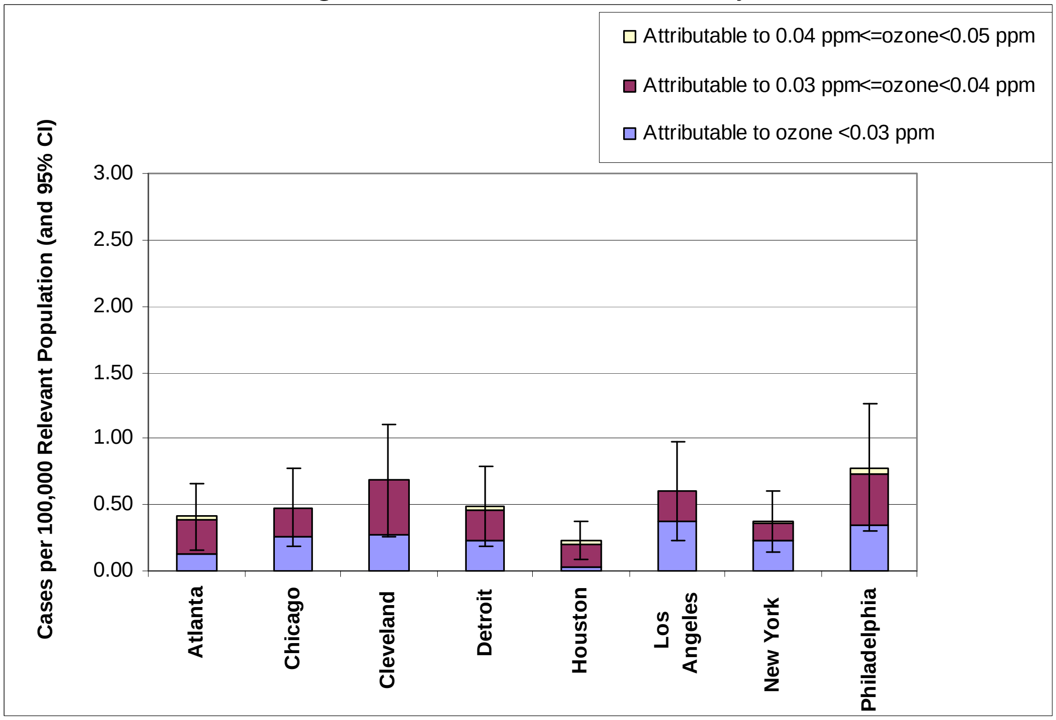
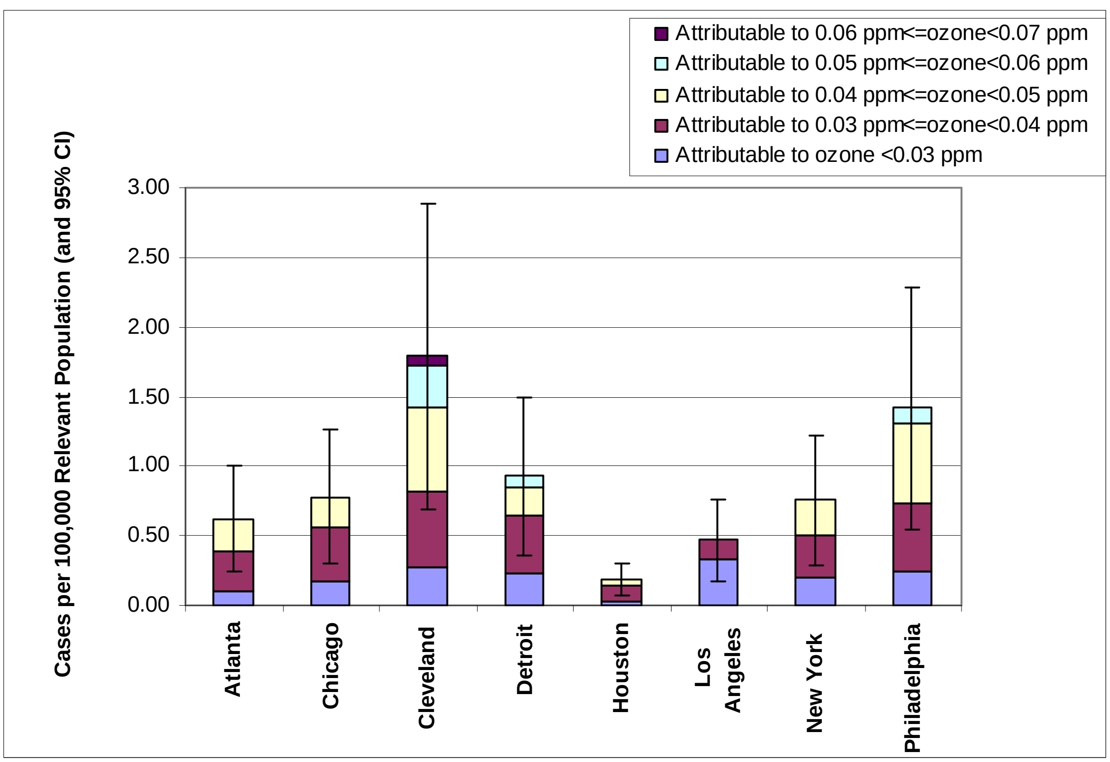


Figure E-7b. Based on 2002 Air Quality



E.2 Tables

Table E-1. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Atlanta, GA, April - September, Based on Adjusting 2004 O_3 Concentrations

0.080/4 0.070/4

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4****	0.074/5	0.074/4	0.074/3	0.070/4****	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	5 (-20 - 29)	5 (-20 - 29)	4 (-18 - 26)	4 (-16 - 23)	4 (-15 - 22)	4 (-15 - 22)	3 (-13 - 19)	3 (-11 - 16)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	9 (3 - 15)	9 (3 - 15)	8 (3 - 14)	7 (2 - 12)	7 (2 - 12)	7 (2 - 12)	6 (2 - 10)	5 (2 - 8)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	6 (-2 - 14)	6 (-2 - 13)	5 (-2 - 12)	5 (-2 - 11)	5 (-1 - 10)	4 (-1 - 10)	4 (-1 - 9)	3 (-1 - 7)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	6 (2 - 10)	6 (2 - 10)	6 (2 - 9)	5 (2 - 8)	5 (2 - 8)	5 (2 - 8)	4 (2 - 7)	3 (1 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	3 (1 - 6)	3 (1 - 6)	3 (1 - 5)	3 (1 - 5)	3 (1 - 4)	3 (1 - 4)	2 (1 - 4)	2 (1 - 3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	3 (1 - 5)	3 (1 - 5)	3 (0 - 5)	2 (0 - 4)	2 (0 - 4)	2 (0 - 4)	2 (0 - 4)	2 (0 - 3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	4 (-1 - 9)	4 (-1 - 9)	3 (-1 - 8)	3 (-1 - 7)	3 (-1 - 7)	3 (-1 - 7)	2 (-1 - 6)	2 (-1 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	3 (0 - 5)	2 (0 - 5)	2 (0 - 5)	2 (0 - 4)	2 (0 - 4)	2 (0 - 4)	2 (0 - 3)	1 (0 - 3)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-2. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Atlanta, GA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.3 (-1.3 - 1.9)	0.3 (-1.3 - 1.9)	0.3 (-1.2 - 1.8)	0.3 (-1.1 - 1.6)	0.2 (-1 - 1.5)	0.2 (-1 - 1.5)	0.2 (-0.9 - 1.3)	0.2 (-0.7 - 1.1)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.6)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.8)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.4)	0.2 (-0.1 - 0.4)	0.2 (-0.1 - 0.4)	0.1 (-0.1 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)

*Health effects are associated with short-term exposures to O_3.
nearest tenth.
***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).
****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-3. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Atlanta, GA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.1% (-0.4% - 0.6%)	0.1% (-0.4% - 0.6%)	0.1% (-0.4% - 0.6%)	0.1% (-0.3% - 0.5%)	0.1% (-0.3% - 0.5%)	0.1% (-0.3% - 0.5%)	0.1% (-0.3% - 0.4%)	0.1% (-0.2% - 0.3%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.6% (-0.2% - 1.4%)	0.6% (-0.2% - 1.4%)	0.6% (-0.2% - 1.3%)	0.5% (-0.2% - 1.1%)	0.5% (-0.2% - 1.1%)	0.5% (-0.2% - 1.1%)	0.4% (-0.1% - 0.9%)	0.3% (-0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.4% (0.2% - 0.7%)	0.3% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.9%)	0.3% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.3% (0% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-4. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Atlanta, GA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	7 (-30 - 43)	7 (-30 - 43)	6 (-28 - 40)	6 (-26 - 38)	6 (-24 - 35)	6 (-24 - 35)	5 (-22 - 32)	4 (-19 - 27)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	14 (5 - 23)	14 (5 - 23)	13 (4 - 21)	12 (4 - 20)	11 (4 - 19)	11 (4 - 19)	10 (3 - 17)	9 (3 - 14)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	9 (-3 - 20)	9 (-3 - 20)	8 (-3 - 19)	8 (-3 - 18)	7 (-2 - 17)	7 (-2 - 17)	7 (-2 - 15)	6 (-2 - 13)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	9 (4 - 15)	9 (4 - 15)	9 (3 - 14)	8 (3 - 13)	8 (3 - 12)	8 (3 - 12)	7 (3 - 11)	6 (2 - 9)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	5 (2 - 9)	5 (1 - 9)	5 (1 - 8)	4 (1 - 8)	4 (1 - 7)	4 (1 - 7)	4 (1 - 6)	3 (1 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	4 (1 - 8)	4 (1 - 8)	4 (1 - 7)	4 (1 - 7)	4 (1 - 7)	4 (1 - 7)	3 (1 - 6)	3 (0 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	5 (-2 - 13)	5 (-2 - 13)	5 (-2 - 12)	5 (-2 - 11)	4 (-2 - 11)	4 (-2 - 11)	4 (-2 - 10)	3 (-1 - 8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	4 (0 - 8)	4 (0 - 8)	4 (0 - 7)	3 (0 - 7)	3 (0 - 6)	3 (0 - 6)	3 (0 - 6)	2 (0 - 5)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-5. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Atlanta, GA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.5 (-2 - 2.9)	0.5 (-2 - 2.9)	0.4 (-1.9 - 2.7)	0.4 (-1.8 - 2.5)	0.4 (-1.6 - 2.4)	0.4 (-1.7 - 2.4)	0.3 (-1.5 - 2.2)	0.3 (-1.3 - 1.8)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.3)	0.7 (0.2 - 1.1)	0.6 (0.2 - 1)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.6 (-0.2 - 1.4)	0.6 (-0.2 - 1.4)	0.6 (-0.2 - 1.3)	0.5 (-0.2 - 1.2)	0.5 (-0.2 - 1.1)	0.5 (-0.2 - 1.1)	0.4 (-0.1 - 1)	0.4 (-0.1 - 0.9)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.7)	0.4 (0.1 - 0.6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-6. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Atlanta, GA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.2% (-0.7% - 0.9%)	0.1% (-0.6% - 0.9%)	0.1% (-0.6% - 0.9%)	0.1% (-0.6% - 0.8%)	0.1% (-0.5% - 0.8%)	0.1% (-0.5% - 0.8%)	0.1% (-0.5% - 0.7%)	0.1% (-0.4% - 0.6%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.9% (-0.3% - 2.1%)	0.9% (-0.3% - 2.1%)	0.8% (-0.3% - 1.9%)	0.8% (-0.3% - 1.8%)	0.7% (-0.2% - 1.7%)	0.7% (-0.2% - 1.7%)	0.7% (-0.2% - 1.6%)	0.6% (-0.2% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.9% (0.4% - 1.5%)	0.9% (0.4% - 1.5%)	0.9% (0.3% - 1.4%)	0.8% (0.3% - 1.3%)	0.8% (0.3% - 1.2%)	0.8% (0.3% - 1.2%)	0.7% (0.3% - 1.1%)	0.6% (0.2% - 1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.1% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.5% (0.1% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.6% (-0.2% - 1.3%)	0.6% (-0.2% - 1.3%)	0.5% (-0.2% - 1.2%)	0.5% (-0.2% - 1.2%)	0.5% (-0.2% - 1.1%)	0.5% (-0.2% - 1.1%)	0.4% (-0.2% - 1%)	0.4% (-0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.4% (0% - 0.7%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-7. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Boston, MA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	6 (2 - 9)	5 (2 - 9)	5 (2 - 9)	5 (2 - 8)	4 (1 - 7)	4 (1 - 7)	4 (1 - 7)	3 (1 - 6)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	4500 (700 - 7900)	4200 (700 - 7500)	4200 (700 - 7400)	4100 (700 - 7300)	3800 (600 - 6700)	3600 (600 - 6400)	3500 (600 - 6200)	3100 (500 - 5500)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	7200 (3200 - 10700)	6800 (3000 - 10200)	6700 (3000 - 10100)	6600 (2900 - 9900)	6100 (2700 - 9200)	5800 (2600 - 8800)	5600 (2500 - 8500)	5000 (2200 - 7500)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	6600 (2500 - 10200)	6200 (2400 - 9700)	6200 (2400 - 9600)	6100 (2300 - 9400)	5600 (2100 - 8700)	5300 (2000 - 8300)	5200 (2000 - 8100)	4500 (1700 - 7100)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	4600 (1500 - 7500)	4400 (1400 - 7100)	4300 (1400 - 7000)	4200 (1300 - 6900)	3900 (1200 - 6300)	3700 (1200 - 6100)	3600 (1100 - 5900)	3100 (1000 - 5200)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	4800 (600 - 8700)	4600 (600 - 8300)	4500 (500 - 8200)	4400 (500 - 8000)	4100 (500 - 7400)	3900 (500 - 7100)	3800 (500 - 6900)	3300 (400 - 6000)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	5300 (1000 - 9200)	5000 (1000 - 8700)	5000 (1000 - 8700)	4900 (900 - 8500)	4500 (900 - 7800)	4300 (800 - 7500)	4100 (800 - 7200)	3600 (700 - 6400)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	13200 (4700 - 20800)	12400 (4400 - 19700)	12300 (4400 - 19600)	12100 (4300 - 19200)	11100 (3900 - 17700)	10600 (3700 - 16900)	10300 (3600 - 16400)	9000 (3200 - 14500)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences of mortality are rounded to the nearest whole number; incidences of respiratory symptom-days are rounded to the nearest 100.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-8. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Boston, MA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.8 (0.3 - 1.4)	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.2)	0.6 (0.2 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	17700 (2800 - 31100)	16700 (2700 - 29500)	16600 (2600 - 29200)	16200 (2600 - 28700)	14900 (2400 - 26400)	14200 (2200 - 25200)	13800 (2200 - 24500)	12000 (1900 - 21500)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	28400 (12700 - 42400)	26800 (12000 - 40200)	26600 (11900 - 39900)	26100 (11600 - 39200)	24100 (10700 - 36200)	23000 (10200 - 34700)	22300 (9800 - 33700)	19600 (8600 - 29700)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	26000 (10000 - 40300)	24600 (9500 - 38300)	24400 (9400 - 38000)	23900 (9200 - 37300)	22100 (8400 - 34400)	21000 (8000 - 32900)	20400 (7800 - 32000)	17900 (6800 - 28200)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	18200 (5800 - 29500)	17200 (5500 - 28000)	17100 (5400 - 27700)	16700 (5300 - 27200)	15300 (4900 - 25000)	14600 (4600 - 23900)	14200 (4500 - 23200)	12400 (3900 - 20400)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	19100 (2300 - 34500)	18000 (2200 - 32600)	17900 (2200 - 32400)	17500 (2100 - 31700)	16100 (1900 - 29200)	15300 (1800 - 27900)	14900 (1800 - 27100)	13000 (1500 - 23800)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	21000 (4100 - 36300)	19800 (3800 - 34400)	19700 (3800 - 34100)	19200 (3700 - 33400)	17700 (3400 - 30800)	16800 (3200 - 29400)	16300 (3100 - 28500)	14300 (2700 - 25100)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	51900 (18500 - 82200)	49000 (17400 - 77900)	48700 (17300 - 77300)	47700 (16900 - 75800)	43900 (15500 - 70000)	41800 (14800 - 66900)	40600 (14300 - 64900)	35600 (12500 - 57100)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences of mortality per 100,000 relevant population are rounded to the nearest tenth; incidences of respiratory symptom-days per 100,000 relevant population are rounded to the nearest 100.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-9. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Boston, MA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	8% (1.3% - 14.2%)	7.6% (1.2% - 13.4%)	7.5% (1.2% - 13.3%)	7.4% (1.2% - 13.1%)	6.8% (1.1% - 12%)	6.5% (1% - 11.5%)	6.3% (1% - 11.2%)	5.5% (0.9% - 9.8%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	12.9% (5.8% - 19.3%)	12.2% (5.5% - 18.3%)	12.1% (5.4% - 18.2%)	11.9% (5.3% - 17.8%)	11% (4.9% - 16.5%)	10.5% (4.6% - 15.8%)	10.1% (4.5% - 15.3%)	8.9% (3.9% - 13.5%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	11.9% (4.6% - 18.4%)	11.2% (4.3% - 17.4%)	11.1% (4.3% - 17.3%)	10.9% (4.2% - 17%)	10% (3.8% - 15.7%)	9.6% (3.7% - 15%)	9.3% (3.5% - 14.6%)	8.2% (3.1% - 12.8%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	8.3% (2.6% - 13.4%)	7.8% (2.5% - 12.7%)	7.8% (2.5% - 12.6%)	7.6% (2.4% - 12.4%)	7% (2.2% - 11.4%)	6.7% (2.1% - 10.9%)	6.5% (2% - 10.6%)	5.7% (1.8% - 9.3%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	7% (0.8% - 12.6%)	6.6% (0.8% - 11.9%)	6.5% (0.8% - 11.8%)	6.4% (0.8% - 11.6%)	5.9% (0.7% - 10.6%)	5.6% (0.7% - 10.2%)	5.4% (0.6% - 9.9%)	4.7% (0.6% - 8.7%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	7.6% (1.5% - 13.2%)	7.2% (1.4% - 12.5%)	7.2% (1.4% - 12.4%)	7% (1.4% - 12.2%)	6.4% (1.2% - 11.2%)	6.1% (1.2% - 10.7%)	5.9% (1.1% - 10.4%)	5.2% (1% - 9.1%)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	10.1% (3.6% - 16%)	9.6% (3.4% - 15.2%)	9.5% (3.4% - 15.1%)	9.3% (3.3% - 14.8%)	8.6% (3% - 13.7%)	8.2% (2.9% - 13%)	7.9% (2.8% - 12.7%)	6.9% (2.4% - 11.2%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-10. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Boston, MA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	9 (3 - 15)	8 (3 - 14)	8 (3 - 14)	8 (3 - 13)	7 (3 - 12)	7 (2 - 12)	7 (2 - 12)	6 (2 - 10)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	6100 (1000 - 10500)	5800 (900 - 10100)	5800 (900 - 10000)	5700 (900 - 9900)	5300 (900 - 9300)	5200 (800 - 9000)	5000 (800 - 8800)	4600 (700 - 8000)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	9600 (4400 - 14100)	9300 (4200 - 13600)	9200 (4200 - 13500)	9000 (4100 - 13300)	8500 (3800 - 12600)	8200 (3700 - 12200)	8000 (3600 - 11900)	7300 (3300 - 10900)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	8900 (3500 - 13500)	8500 (3300 - 13000)	8500 (3300 - 12900)	8300 (3200 - 12700)	7800 (3000 - 12000)	7600 (2900 - 11600)	7400 (2900 - 11400)	6700 (2600 - 10400)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	6400 (2100 - 10100)	6100 (2000 - 9700)	6000 (2000 - 9700)	5900 (1900 - 9500)	5600 (1800 - 9000)	5400 (1700 - 8700)	5300 (1700 - 8500)	4800 (1500 - 7700)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	6600 (800 - 11700)	6300 (800 - 11300)	6300 (800 - 11200)	6100 (800 - 11000)	5800 (700 - 10300)	5600 (700 - 10000)	5400 (700 - 9800)	4900 (600 - 8900)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	7300 (1500 - 12500)	7000 (1400 - 12000)	7000 (1400 - 11900)	6800 (1300 - 11700)	6400 (1300 - 11000)	6200 (1200 - 10700)	6100 (1200 - 10400)	5500 (1100 - 9500)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	17800 (6500 - 27700)	17100 (6200 - 26600)	16900 (6100 - 26400)	16600 (6000 - 25900)	15600 (5600 - 24500)	15100 (5400 - 23800)	14700 (5300 - 23200)	13400 (4800 - 21200)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences of mortality are rounded to the nearest whole number; incidences of respiratory symptom-days are rounded to the nearest 100.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-11. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Boston, MA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.3 (0.4 - 2.1)	1.2 (0.4 - 2)	1.2 (0.4 - 2)	1.2 (0.4 - 1.9)	1.1 (0.4 - 1.8)	1 (0.3 - 1.7)	1 (0.3 - 1.7)	0.9 (0.3 - 1.5)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	24100 (3900 - 41600)	23000 (3700 - 39900)	22800 (3700 - 39700)	22400 (3600 - 38900)	21000 (3400 - 36700)	20400 (3300 - 35600)	19800 (3200 - 34700)	18000 (2900 - 31600)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	38100 (17400 - 55800)	36500 (16600 - 53700)	36200 (16500 - 53400)	35500 (16100 - 52400)	33500 (15200 - 49600)	32500 (14700 - 48200)	31700 (14300 - 47100)	28800 (12900 - 43000)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	35000 (13800 - 53300)	33600 (13200 - 51200)	33300 (13100 - 50900)	32700 (12800 - 50000)	30800 (12000 - 47300)	29900 (11600 - 45900)	29100 (11300 - 44800)	26400 (10200 - 41000)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	25100 (8200 - 40000)	24000 (7800 - 38400)	23800 (7700 - 38200)	23400 (7600 - 37400)	22000 (7100 - 35300)	21300 (6800 - 34300)	20800 (6700 - 33500)	18800 (6000 - 30500)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	26100 (3200 - 46300)	25000 (3100 - 44400)	24800 (3000 - 44100)	24200 (3000 - 43200)	22800 (2800 - 40800)	22000 (2700 - 39500)	21500 (2600 - 38500)	19400 (2300 - 35000)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	29000 (5700 - 49300)	27700 (5500 - 47300)	27500 (5400 - 47000)	27000 (5300 - 46100)	25400 (5000 - 43500)	24500 (4800 - 42200)	24000 (4700 - 41200)	21700 (4200 - 37600)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	70200 (25500 - 109400	67300 (24400 - 105100	66800 (24200 - 104300	65400 (23600 - 102400)	61600 (22200 - 96700)	59600 (21400 - 93800)	58100 (20800 - 91600)	52700 (18800 - 83500)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences of mortality per 100,000 relevant population are rounded to the nearest tenth; incidences of respiratory symptom-days per 100,000 relevant population are rounded to the nearest 100.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-12. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Boston, MA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	11% (1.8% - 18.9%)	10.5% (1.7% - 18.2%)	10.4% (1.7% - 18.1%)	10.2% (1.6% - 17.7%)	9.6% (1.5% - 16.7%)	9.3% (1.5% - 16.2%)	9% (1.4% - 15.8%)	8.2% (1.3% - 14.4%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	17.3% (7.9% - 25.4%)	16.6% (7.6% - 24.5%)	16.5% (7.5% - 24.3%)	16.2% (7.3% - 23.9%)	15.3% (6.9% - 22.6%)	14.8% (6.7% - 21.9%)	14.4% (6.5% - 21.4%)	13.1% (5.9% - 19.6%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	PM2.5	16% (6.3% - 24.3%)	15.3% (6% - 23.3%)	15.2% (6% - 23.2%)	14.9% (5.8% - 22.7%)	14% (5.5% - 21.5%)	13.6% (5.3% - 20.9%)	13.3% (5.1% - 20.4%)	12% (4.6% - 18.7%)
Respiratory symptoms among asthmatic medication-users -- chest tightness	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	11.4% (3.7% - 18.2%)	10.9% (3.5% - 17.5%)	10.9% (3.5% - 17.4%)	10.6% (3.4% - 17%)	10% (3.2% - 16.1%)	9.7% (3.1% - 15.6%)	9.5% (3% - 15.2%)	8.6% (2.7% - 13.9%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	1 hr max.	none	9.5% (1.2% - 16.9%)	9.1% (1.1% - 16.2%)	9% (1.1% - 16.1%)	8.8% (1.1% - 15.8%)	8.3% (1% - 14.9%)	8% (1% - 14.4%)	7.8% (0.9% - 14%)	7.1% (0.9% - 12.8%)
Respiratory symptoms among asthmatic medication-users -- shortness of breath	Gent et al. (2003)	0 - 12	1-day lag	8 hr max.	none	10.6% (2.1% - 17.9%)	10.1% (2% - 17.2%)	10% (2% - 17.1%)	9.8% (1.9% - 16.8%)	9.2% (1.8% - 15.8%)	8.9% (1.8% - 15.4%)	8.7% (1.7% - 15%)	7.9% (1.5% - 13.7%)
Respiratory symptoms among asthmatic medication-users -- wheeze	Gent et al. (2003)	0 - 12	0-day lag	1 hr max.	PM2.5	13.7% (5% - 21.3%)	13.1% (4.8% - 20.5%)	13% (4.7% - 20.4%)	12.8% (4.6% - 20%)	12% (4.3% - 18.9%)	11.6% (4.2% - 18.3%)	11.3% (4.1% - 17.9%)	10.3% (3.7% - 16.3%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-13. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Chicago, IL, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	33 (11 - 55)	31 (10 - 52)	29 (10 - 48)	26 (9 - 43)	23 (8 - 39)	22 (7 - 36)	19 (6 - 32)	14 (5 - 24)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	314 (99 - 525)	300 (95 - 501)	288 (91 - 482)	268 (85 - 448)	249 (79 - 417)	238 (75 - 399)	222 (70 - 372)	183 (58 - 307)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	118 (37 - 199)	113 (35 - 190)	108 (34 - 182)	101 (31 - 170)	93 (29 - 157)	89 (28 - 151)	83 (26 - 140)	69 (21 - 116)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	16 (-14 - 45)	15 (-13 - 42)	14 (-12 - 39)	12 (-11 - 35)	11 (-10 - 31)	10 (-9 - 29)	9 (-8 - 26)	7 (-6 - 19)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	26 (10 - 41)	24 (9 - 39)	22 (9 - 36)	20 (8 - 32)	18 (7 - 29)	17 (6 - 27)	15 (6 - 24)	11 (4 - 18)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	14 (4 - 24)	13 (4 - 23)	12 (4 - 21)	11 (3 - 19)	10 (3 - 17)	9 (3 - 16)	8 (2 - 14)	6 (2 - 10)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	12 (2 - 23)	12 (2 - 21)	11 (2 - 20)	10 (2 - 18)	9 (2 - 16)	8 (1 - 15)	7 (1 - 13)	5 (1 - 10)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	15 (-6 - 36)	14 (-5 - 34)	13 (-5 - 32)	12 (-5 - 28)	11 (-4 - 25)	10 (-4 - 24)	9 (-3 - 21)	7 (-2 - 16)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	11 (0 - 21)	10 (0 - 20)	9 (0 - 18)	8 (0 - 16)	7 (0 - 15)	7 (0 - 14)	6 (0 - 12)	5 (0 - 9)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-14. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Chicago, IL, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.4)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	5.8 (1.9 - 9.8)	5.6 (1.8 - 9.3)	5.4 (1.7 - 9)	5 (1.6 - 8.3)	4.6 (1.5 - 7.7)	4.4 (1.4 - 7.4)	4.1 (1.3 - 6.9)	3.4 (1.1 - 5.7)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	2.2 (0.7 - 3.7)	2.1 (0.7 - 3.5)	2 (0.6 - 3.4)	1.9 (0.6 - 3.2)	1.7 (0.5 - 2.9)	1.7 (0.5 - 2.8)	1.6 (0.5 - 2.6)	1.3 (0.4 - 2.2)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.3 (-0.3 - 0.8)	0.3 (-0.2 - 0.8)	0.3 (-0.2 - 0.7)	0.2 (-0.2 - 0.7)	0.2 (-0.2 - 0.6)	0.2 (-0.2 - 0.5)	0.2 (-0.2 - 0.5)	0.1 (-0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.5 (0.2 - 0.8)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.4)	0.2 (-0.1 - 0.4)	0.1 (0 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-15. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Chicago, IL, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	1.5% (0.5% - 2.5%)	1.4% (0.5% - 2.4%)	1.4% (0.4% - 2.3%)	1.3% (0.4% - 2.1%)	1.2% (0.4% - 2%)	1.1% (0.4% - 1.9%)	1.1% (0.3% - 1.8%)	0.9% (0.3% - 1.5%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	0.6% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.3% (-0.3% - 0.9%)	0.3% (-0.3% - 0.8%)	0.3% (-0.2% - 0.8%)	0.2% (-0.2% - 0.7%)	0.2% (-0.2% - 0.6%)	0.2% (-0.2% - 0.6%)	0.2% (-0.2% - 0.5%)	0.1% (-0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.4% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.6%)	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.1% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-16. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Chicago, IL, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	55 (18 - 91)	52 (18 - 87)	50 (17 - 84)	47 (16 - 79)	44 (15 - 74)	43 (14 - 71)	40 (13 - 67)	34 (11 - 57)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	427 (136 - 712)	412 (131 - 687)	401 (127 - 669)	381 (121 - 636)	361 (115 - 603)	350 (111 - 585)	335 (106 - 559)	294 (93 - 493)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	161 (51 - 271)	156 (49 - 261)	151 (47 - 254)	144 (45 - 242)	136 (43 - 229)	132 (41 - 222)	126 (39 - 212)	111 (35 - 187)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	26 (-23 - 73)	25 (-22 - 70)	24 (-21 - 68)	22 (-20 - 64)	21 (-19 - 60)	20 (-18 - 57)	19 (-17 - 54)	16 (-14 - 46)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	42 (16 - 68)	40 (15 - 65)	39 (15 - 63)	36 (14 - 59)	34 (13 - 55)	33 (13 - 53)	31 (12 - 50)	26 (10 - 43)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	23 (7 - 40)	22 (7 - 38)	22 (6 - 37)	20 (6 - 34)	19 (6 - 32)	18 (5 - 31)	17 (5 - 29)	15 (4 - 25)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	20 (4 - 37)	19 (3 - 35)	19 (3 - 34)	18 (3 - 32)	16 (3 - 30)	16 (3 - 29)	15 (3 - 27)	13 (2 - 23)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	25 (-10 - 59)	24 (-9 - 57)	23 (-9 - 55)	22 (-8 - 51)	20 (-8 - 48)	20 (-8 - 46)	18 (-7 - 44)	16 (-6 - 37)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	17 (0 - 34)	17 (0 - 33)	16 (0 - 32)	15 (0 - 30)	14 (0 - 28)	14 (0 - 27)	13 (0 - 25)	11 (0 - 22)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-17. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Chicago, IL, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1 (0.3 - 1.7)	1 (0.3 - 1.6)	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.5)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.7 (0.3 - 1.2)	0.6 (0.2 - 1.1)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	7.9 (2.5 - 13.2)	7.7 (2.4 - 12.8)	7.5 (2.4 - 12.4)	7.1 (2.3 - 11.8)	6.7 (2.1 - 11.2)	6.5 (2.1 - 10.9)	6.2 (2 - 10.4)	5.5 (1.7 - 9.2)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	3 (0.9 - 5)	2.9 (0.9 - 4.9)	2.8 (0.9 - 4.7)	2.7 (0.8 - 4.5)	2.5 (0.8 - 4.3)	2.5 (0.8 - 4.1)	2.3 (0.7 - 3.9)	2.1 (0.6 - 3.5)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.5 (-0.4 - 1.4)	0.5 (-0.4 - 1.3)	0.4 (-0.4 - 1.3)	0.4 (-0.4 - 1.2)	0.4 (-0.3 - 1.1)	0.4 (-0.3 - 1.1)	0.4 (-0.3 - 1)	0.3 (-0.3 - 0.9)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.8 (0.3 - 1.3)	0.7 (0.3 - 1.2)	0.7 (0.3 - 1.2)	0.7 (0.3 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.5 (-0.2 - 1.1)	0.4 (-0.2 - 1.1)	0.4 (-0.2 - 1)	0.4 (-0.2 - 1)	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.7)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.4)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-18. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Chicago, IL, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	2% (0.6% - 3.4%)	2% (0.6% - 3.3%)	1.9% (0.6% - 3.2%)	1.8% (0.6% - 3%)	1.7% (0.5% - 2.9%)	1.7% (0.5% - 2.8%)	1.6% (0.5% - 2.7%)	1.4% (0.4% - 2.3%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	0.8% (0.2% - 1.3%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.5% (-0.5% - 1.4%)	0.5% (-0.4% - 1.4%)	0.5% (-0.4% - 1.3%)	0.4% (-0.4% - 1.2%)	0.4% (-0.4% - 1.2%)	0.4% (-0.4% - 1.1%)	0.4% (-0.3% - 1.1%)	0.3% (-0.3% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.8% (0.3% - 1.3%)	0.8% (0.3% - 1.3%)	0.8% (0.3% - 1.2%)	0.7% (0.3% - 1.2%)	0.7% (0.3% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.2% (0% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.5% (-0.2% - 1.2%)	0.5% (-0.2% - 1.1%)	0.5% (-0.2% - 1.1%)	0.4% (-0.2% - 1%)	0.4% (-0.2% - 0.9%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.9%)	0.3% (-0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-19. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Cleveland, OH, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	19 (-12 - 49)	18 (-11 - 46)	17 (-11 - 44)	15 (-9 - 39)	14 (-9 - 37)	14 (-9 - 36)	13 (-8 - 33)	10 (-6 - 26)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	12 (4 - 20)	11 (4 - 19)	11 (4 - 18)	9 (3 - 16)	9 (3 - 15)	9 (3 - 14)	8 (3 - 13)	6 (2 - 11)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	11 (0 - 23)	11 (0 - 21)	10 (0 - 21)	9 (0 - 18)	9 (0 - 17)	8 (0 - 17)	8 (0 - 15)	6 (0 - 12)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	10 (4 - 15)	9 (3 - 15)	9 (3 - 14)	8 (3 - 12)	7 (3 - 12)	7 (3 - 11)	6 (2 - 10)	5 (2 - 8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	5 (2 - 9)	5 (1 - 9)	5 (1 - 8)	4 (1 - 7)	4 (1 - 7)	4 (1 - 7)	4 (1 - 6)	3 (1 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	5 (1 - 8)	4 (1 - 8)	4 (1 - 8)	4 (1 - 7)	4 (1 - 6)	3 (1 - 6)	3 (1 - 6)	2 (0 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	6 (-2 - 13)	5 (-2 - 13)	5 (-2 - 12)	5 (-2 - 11)	4 (-2 - 10)	4 (-2 - 10)	4 (-1 - 9)	3 (-1 - 7)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	4 (0 - 8)	4 (0 - 7)	4 (0 - 7)	3 (0 - 6)	3 (0 - 6)	3 (0 - 6)	3 (0 - 5)	2 (0 - 4)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	45 (12 - 79)	43 (11 - 75)	42 (11 - 72)	37 (10 - 65)	36 (9 - 63)	35 (9 - 60)	32 (8 - 56)	27 (7 - 47)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-20. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Cleveland, OH, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	1.3 (-0.8 - 3.5)	1.3 (-0.8 - 3.3)	1.2 (-0.8 - 3.2)	1.1 (-0.7 - 2.8)	1 (-0.6 - 2.7)	1 (-0.6 - 2.6)	0.9 (-0.6 - 2.4)	0.7 (-0.5 - 1.9)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.9 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.3)	0.7 (0.2 - 1.1)	0.6 (0.2 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.8 (0 - 1.6)	0.8 (0 - 1.5)	0.7 (0 - 1.5)	0.6 (0 - 1.3)	0.6 (0 - 1.2)	0.6 (0 - 1.2)	0.5 (0 - 1.1)	0.4 (0 - 0.9)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.7 (0.3 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.7)	0.4 (0.1 - 0.6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.4 (0.1 - 0.6)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.4 (-0.2 - 1)	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.2 (-0.1 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.3 (0 - 0.6)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	20.9 (5.3 - 36.2)	19.8 (5.1 - 34.4)	19.2 (4.9 - 33.4)	17.3 (4.4 - 30)	16.6 (4.2 - 28.8)	16 (4.1 - 27.8)	14.9 (3.8 - 25.9)	12.4 (3.2 - 21.6)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-21. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Cleveland, OH, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.3% (-0.2% - 0.7%)	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.1% (-0.1% - 0.4%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.6% (0% - 1.2%)	0.6% (0% - 1.1%)	0.5% (0% - 1.1%)	0.5% (0% - 1%)	0.5% (0% - 0.9%)	0.4% (0% - 0.9%)	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.7%)	0.4% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	1.1% (0.3% - 2%)	1.1% (0.3% - 1.9%)	1.1% (0.3% - 1.8%)	0.9% (0.2% - 1.6%)	0.9% (0.2% - 1.6%)	0.9% (0.2% - 1.5%)	0.8% (0.2% - 1.4%)	0.7% (0.2% - 1.2%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-22. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Cleveland, OH, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	49 (-31 - 128)	47 (-30 - 123)	46 (-29 - 120)	43 (-27 - 112)	42 (-26 - 109)	40 (-25 - 105)	39 (-25 - 102)	35 (-22 - 91)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	31 (10 - 52)	30 (10 - 50)	29 (10 - 49)	27 (9 - 45)	27 (9 - 44)	26 (9 - 43)	25 (8 - 41)	22 (7 - 37)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	30 (-1 - 59)	28 (-1 - 57)	28 (-1 - 56)	26 (-1 - 52)	25 (-1 - 51)	24 (-1 - 49)	24 (-1 - 47)	21 (-1 - 42)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	25 (10 - 40)	24 (9 - 39)	24 (9 - 38)	22 (8 - 35)	21 (8 - 34)	21 (8 - 33)	20 (8 - 32)	18 (7 - 29)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	14 (4 - 24)	13 (4 - 23)	13 (4 - 22)	12 (4 - 21)	12 (3 - 20)	11 (3 - 19)	11 (3 - 19)	10 (3 - 17)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	12 (2 - 22)	12 (2 - 21)	11 (2 - 21)	11 (2 - 19)	10 (2 - 19)	10 (2 - 18)	10 (2 - 18)	9 (2 - 16)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	15 (-6 - 35)	14 (-6 - 34)	14 (-5 - 33)	13 (-5 - 31)	13 (-5 - 30)	12 (-5 - 29)	12 (-5 - 28)	11 (-4 - 25)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	10 (0 - 20)	10 (0 - 20)	10 (0 - 19)	9 (0 - 18)	9 (0 - 18)	8 (0 - 17)	8 (0 - 16)	7 (0 - 15)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	89 (23 - 153)	85 (22 - 147)	84 (22 - 145)	78 (20 - 135)	76 (20 - 132)	73 (19 - 127)	71 (18 - 123)	64 (16 - 111)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-23. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Cleveland, OH, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	3.5 (-2.2 - 9.2)	3.4 (-2.1 - 8.8)	3.3 (-2.1 - 8.6)	3.1 (-1.9 - 8)	3 (-1.9 - 7.8)	2.9 (-1.8 - 7.5)	2.8 (-1.8 - 7.3)	2.5 (-1.6 - 6.5)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	2.2 (0.8 - 3.7)	2.2 (0.7 - 3.6)	2.1 (0.7 - 3.5)	2 (0.7 - 3.3)	1.9 (0.6 - 3.2)	1.8 (0.6 - 3.1)	1.8 (0.6 - 3)	1.6 (0.5 - 2.7)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	2.1 (-0.1 - 4.2)	2 (-0.1 - 4.1)	2 (-0.1 - 4)	1.9 (0 - 3.7)	1.8 (0 - 3.6)	1.8 (0 - 3.5)	1.7 (0 - 3.4)	1.5 (0 - 3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.8 (0.7 - 2.9)	1.7 (0.7 - 2.8)	1.7 (0.6 - 2.7)	1.6 (0.6 - 2.5)	1.5 (0.6 - 2.5)	1.5 (0.6 - 2.4)	1.4 (0.5 - 2.3)	1.3 (0.5 - 2.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	1 (0.3 - 1.7)	1 (0.3 - 1.6)	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.4)	0.8 (0.2 - 1.4)	0.8 (0.2 - 1.4)	0.7 (0.2 - 1.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.9 (0.2 - 1.6)	0.8 (0.1 - 1.5)	0.8 (0.1 - 1.5)	0.8 (0.1 - 1.4)	0.7 (0.1 - 1.3)	0.7 (0.1 - 1.3)	0.7 (0.1 - 1.3)	0.6 (0.1 - 1.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	1.1 (-0.4 - 2.5)	1 (-0.4 - 2.4)	1 (-0.4 - 2.4)	0.9 (-0.4 - 2.2)	0.9 (-0.4 - 2.2)	0.9 (-0.3 - 2.1)	0.9 (-0.3 - 2)	0.8 (-0.3 - 1.8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.7 (0 - 1.5)	0.7 (0 - 1.4)	0.7 (0 - 1.4)	0.6 (0 - 1.3)	0.6 (0 - 1.3)	0.6 (0 - 1.2)	0.6 (0 - 1.2)	0.5 (0 - 1)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	40.9 (10.5 - 70.6)	39.3 (10.1 - 67.9)	38.6 (9.9 - 66.7)	36 (9.2 - 62.1)	35.2 (9 - 60.8)	33.9 (8.7 - 58.6)	32.9 (8.4 - 56.8)	29.5 (7.5 - 51.1)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-24. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Cleveland, OH, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.7% (-0.4% - 1.7%)	0.6% (-0.4% - 1.7%)	0.6% (-0.4% - 1.6%)	0.6% (-0.4% - 1.5%)	0.6% (-0.4% - 1.5%)	0.5% (-0.3% - 1.4%)	0.5% (-0.3% - 1.4%)	0.5% (-0.3% - 1.2%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	1.6% (0% - 3.2%)	1.5% (0% - 3%)	1.5% (0% - 3%)	1.4% (0% - 2.8%)	1.4% (0% - 2.7%)	1.3% (0% - 2.6%)	1.3% (0% - 2.5%)	1.1% (0% - 2.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.3% (0.5% - 2.1%)	1.3% (0.5% - 2.1%)	1.3% (0.5% - 2%)	1.2% (0.4% - 1.9%)	1.1% (0.4% - 1.8%)	1.1% (0.4% - 1.8%)	1.1% (0.4% - 1.7%)	1% (0.4% - 1.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.7% (0.2% - 1.3%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.6% (0.1% - 1.2%)	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1%)	0.6% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.5% (0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.8% (-0.3% - 1.9%)	0.8% (-0.3% - 1.8%)	0.8% (-0.3% - 1.8%)	0.7% (-0.3% - 1.6%)	0.7% (-0.3% - 1.6%)	0.7% (-0.3% - 1.5%)	0.6% (-0.2% - 1.5%)	0.6% (-0.2% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.6% (0% - 1.1%)	0.5% (0% - 1.1%)	0.5% (0% - 1%)	0.5% (0% - 1%)	0.5% (0% - 0.9%)	0.5% (0% - 0.9%)	0.4% (0% - 0.9%)	0.4% (0% - 0.8%)
Hospital admissions, respiratory illness	Schwartz et al. (1996)	65+	avg of 1-day and 2-day lags	1 hr max.	none	2.2% (0.6% - 3.9%)	2.2% (0.6% - 3.7%)	2.1% (0.5% - 3.7%)	2% (0.5% - 3.4%)	1.9% (0.5% - 3.3%)	1.9% (0.5% - 3.2%)	1.8% (0.5% - 3.1%)	1.6% (0.4% - 2.8%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-25. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Detroit, MI, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	24 (-8 - 56)	22 (-7 - 51)	21 (-7 - 49)	21 (-7 - 48)	17 (-6 - 40)	16 (-5 - 38)	15 (-5 - 35)	11 (-4 - 27)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	12 (4 - 20)	11 (4 - 19)	11 (4 - 18)	11 (4 - 18)	9 (3 - 15)	8 (3 - 14)	8 (3 - 13)	6 (2 - 10)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	107 (-17 - 229)	102 (-17 - 218)	99 (-16 - 212)	97 (-16 - 209)	87 (-14 - 186)	83 (-13 - 178)	78 (-13 - 168)	66 (-11 - 142)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	58 (18 - 98)	55 (17 - 93)	54 (17 - 91)	53 (17 - 89)	47 (15 - 79)	45 (14 - 76)	42 (13 - 72)	36 (11 - 61)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	29 (-27 - 85)	27 (-25 - 78)	26 (-24 - 75)	25 (-23 - 73)	21 (-20 - 62)	20 (-18 - 57)	18 (-17 - 53)	14 (-13 - 41)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	11 (-1 - 23)	10 (-1 - 21)	10 (-1 - 20)	9 (-1 - 20)	8 (-1 - 17)	7 (-1 - 15)	7 (-1 - 14)	5 (-1 - 11)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	10 (4 - 16)	9 (4 - 15)	9 (3 - 14)	9 (3 - 14)	7 (3 - 12)	7 (3 - 11)	6 (2 - 10)	5 (2 - 8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	6 (2 - 9)	5 (2 - 9)	5 (1 - 8)	5 (1 - 8)	4 (1 - 7)	4 (1 - 6)	3 (1 - 6)	3 (1 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	5 (1 - 9)	4 (1 - 8)	4 (1 - 8)	4 (1 - 8)	4 (1 - 6)	3 (1 - 6)	3 (1 - 5)	2 (0 - 4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	6 (-2 - 14)	6 (-2 - 13)	5 (-2 - 13)	5 (-2 - 12)	4 (-2 - 10)	4 (-2 - 10)	4 (-1 - 9)	3 (-1 - 7)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	4 (0 - 8)	4 (0 - 8)	4 (0 - 7)	4 (0 - 7)	3 (0 - 6)	3 (0 - 6)	3 (0 - 5)	2 (0 - 4)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	9 (-7 - 25)	9 (-7 - 23)	8 (-7 - 22)	8 (-6 - 22)	7 (-5 - 18)	6 (-5 - 17)	6 (-5 - 16)	4 (-3 - 12)

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Hospital admissions (unscheduled),	Ito (2003)	65+	0-day lag	24 hr avg.	none	-19 (-55 - 16)	-18 (-51 - 15)	-17 (-49 - 14)	-16 (-48 - 14)	-14 (-40 - 12)	-13 (-37 - 11)	-12 (-34 - 10)	-9 (-26 - 8)
Hospital admissions (unscheduled),	Ito (2003)	65+	1-day lag	24 hr avg.	none	-5 (-41 - 30)	-4 (-38 - 28)	-4 (-36 - 27)	-4 (-35 - 26)	-3 (-29 - 22)	-3 (-27 - 20)	-3 (-25 - 19)	-2 (-19 - 14)
Hospital admissions (unscheduled),	Ito (2003)	65+	2-day lag	24 hr avg.	none	6 (-30 - 40)	5 (-28 - 37)	5 (-27 - 36)	5 (-26 - 35)	4 (-22 - 29)	4 (-20 - 27)	4 (-19 - 25)	3 (-14 - 19)
Hospital admissions (unscheduled),	Ito (2003)	65+	3-day lag	24 hr avg.	none	16 (-19 - 50)	15 (-17 - 46)	14 (-17 - 44)	14 (-16 - 43)	12 (-14 - 37)	11 (-13 - 34)	10 (-12 - 31)	8 (-9 - 24)
Hospital admissions	Ito (2003)	65+	0-day lag	24 hr avg.	none	-13 (-46 - 19)	-12 (-42 - 17)	-11 (-41 - 17)	-11 (-39 - 16)	-9 (-33 - 14)	-9 (-31 - 13)	-8 (-28 - 12)	-6 (-22 - 9)
Hospital admissions	Ito (2003)	65+	1-day lag	24 hr avg.	none	12 (-20 - 43)	11 (-18 - 40)	11 (-18 - 38)	11 (-17 - 37)	9 (-14 - 31)	8 (-13 - 29)	8 (-12 - 27)	6 (-9 - 21)
Hospital admissions	Ito (2003)	65+	2-day lag	24 hr avg.	none	-2 (-35 - 30)	-2 (-32 - 28)	-2 (-31 - 27)	-2 (-30 - 26)	-1 (-25 - 22)	-1 (-24 - 20)	-1 (-22 - 19)	-1 (-17 - 14)
Hospital admissions	Ito (2003)	65+	3-day lag	24 hr avg.	none	1 (-32 - 32)	1 (-30 - 30)	1 (-29 - 29)	1 (-28 - 28)	1 (-23 - 24)	1 (-22 - 22)	0 (-20 - 20)	0 (-15 - 16)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-26. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Detroit, MI, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	1.2 (-0.4 - 2.7)	1.1 (-0.3 - 2.5)	1 (-0.3 - 2.4)	1 (-0.3 - 2.3)	0.8 (-0.3 - 2)	0.8 (-0.3 - 1.8)	0.7 (-0.2 - 1.7)	0.6 (-0.2 - 1.3)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	5.2 (-0.8 - 11.1)	4.9 (-0.8 - 10.6)	4.8 (-0.8 - 10.3)	4.7 (-0.8 - 10.1)	4.2 (-0.7 - 9)	4 (-0.7 - 8.6)	3.8 (-0.6 - 8.2)	3.2 (-0.5 - 6.9)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	2.8 (0.9 - 4.7)	2.7 (0.8 - 4.5)	2.6 (0.8 - 4.4)	2.6 (0.8 - 4.3)	2.3 (0.7 - 3.8)	2.2 (0.7 - 3.7)	2.1 (0.6 - 3.5)	1.7 (0.5 - 2.9)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	1.4 (-1.3 - 4.1)	1.3 (-1.2 - 3.8)	1.3 (-1.2 - 3.6)	1.2 (-1.1 - 3.6)	1 (-1 - 3)	1 (-0.9 - 2.8)	0.9 (-0.8 - 2.6)	0.7 (-0.6 - 2)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.5 (-0.1 - 1.1)	0.5 (-0.1 - 1)	0.5 (-0.1 - 1)	0.5 (-0.1 - 1)	0.4 (0 - 0.8)	0.4 (0 - 0.8)	0.3 (0 - 0.7)	0.3 (0 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.5 (0.2 - 0.8)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.4)	0.1 (-0.1 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	0.4 (-0.4 - 1.2)	0.4 (-0.3 - 1.1)	0.4 (-0.3 - 1.1)	0.4 (-0.3 - 1)	0.3 (-0.3 - 0.9)	0.3 (-0.2 - 0.8)	0.3 (-0.2 - 0.8)	0.2 (-0.2 - 0.6)

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Hospital admissions (unscheduled),	Ito (2003)	65+	0-day lag	24 hr avg.	none	-7.6 (-22.3 - 6.4)	-7.1 (-20.6 - 5.9)	-6.8 (-19.7 - 5.7)	-6.6 (-19.2 - 5.5)	-5.5 (-16.1 - 4.7)	-5.1 (-14.9 - 4.3)	-4.7 (-13.7 - 4)	-3.6 (-10.5 - 3.1)
Hospital admissions (unscheduled),	Ito (2003)	65+	1-day lag	24 hr avg.	none	-1.9 (-16.3 - 12)	-1.7 (-15.1 - 11.1)	-1.7 (-14.5 - 10.7)	-1.6 (-14.1 - 10.4)	-1.4 (-11.8 - 8.8)	-1.3 (-11 - 8.1)	-1.2 (-10.1 - 7.5)	-0.9 (-7.7 - 5.8)
Hospital admissions (unscheduled),	Ito (2003)	65+	2-day lag	24 hr avg.	none	2.3 (-12.1 - 16.1)	2.1 (-11.2 - 14.9)	2 (-10.7 - 14.3)	2 (-10.4 - 13.9)	1.7 (-8.8 - 11.7)	1.5 (-8.1 - 10.9)	1.4 (-7.5 - 10.1)	1.1 (-5.7 - 7.7)
Hospital admissions (unscheduled),	Ito (2003)	65+	3-day lag	24 hr avg.	none	6.5 (-7.6 - 20.1)	6 (-7 - 18.6)	5.8 (-6.7 - 17.9)	5.6 (-6.5 - 17.4)	4.8 (-5.5 - 14.7)	4.4 (-5.1 - 13.7)	4.1 (-4.7 - 12.6)	3.1 (-3.6 - 9.7)
Hospital admissions	Ito (2003)	65+	0-day lag	24 hr avg.	none	-5.2 (-18.5 - 7.5)	-4.8 (-17 - 7)	-4.6 (-16.3 - 6.7)	-4.4 (-15.9 - 6.5)	-3.7 (-13.3 - 5.5)	-3.5 (-12.4 - 5.1)	-3.2 (-11.4 - 4.7)	-2.4 (-8.7 - 3.6)
Hospital admissions	Ito (2003)	65+	1-day lag	24 hr avg.	none	5 (-8 - 17.3)	4.6 (-7.4 - 16)	4.4 (-7 - 15.4)	4.3 (-6.9 - 15)	3.6 (-5.8 - 12.6)	3.4 (-5.4 - 11.8)	3.1 (-4.9 - 10.8)	2.4 (-3.8 - 8.3)
Hospital admissions	Ito (2003)	65+	2-day lag	24 hr avg.	none	-0.7 (-14.1 - 12)	-0.7 (-13 - 11.1)	-0.6 (-12.5 - 10.7)	-0.6 (-12.1 - 10.4)	-0.5 (-10.2 - 8.8)	-0.5 (-9.5 - 8.1)	-0.5 (-8.7 - 7.5)	-0.3 (-6.7 - 5.8)
Hospital admissions	Ito (2003)	65+	3-day lag	24 hr avg.	none	0.3 (-13 - 13)	0.3 (-12 - 12)	0.3 (-11.5 - 11.5)	0.3 (-11.2 - 11.2)	0.2 (-9.4 - 9.5)	0.2 (-8.7 - 8.8)	0.2 (-8 - 8.1)	0.1 (-6.1 - 6.3)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-27. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Detroit, MI, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.3% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.1% (0% - 0.3%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	1.1% (-0.2% - 2.4%)	1.1% (-0.2% - 2.3%)	1.1% (-0.2% - 2.3%)	1% (-0.2% - 2.2%)	0.9% (-0.1% - 2%)	0.9% (-0.1% - 1.9%)	0.8% (-0.1% - 1.8%)	0.7% (-0.1% - 1.5%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.1% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.6%)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	0.3% (-0.3% - 0.9%)	0.3% (-0.3% - 0.8%)	0.3% (-0.3% - 0.8%)	0.3% (-0.2% - 0.8%)	0.2% (-0.2% - 0.7%)	0.2% (-0.2% - 0.6%)	0.2% (-0.2% - 0.6%)	0.1% (-0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.5% (-0.1% - 0.9%)	0.4% (0% - 0.9%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.4% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.2% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.1% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	1.2% (-0.9% - 3.2%)	1.1% (-0.9% - 2.9%)	1% (-0.8% - 2.8%)	1% (-0.8% - 2.8%)	0.9% (-0.7% - 2.3%)	0.8% (-0.6% - 2.2%)	0.7% (-0.6% - 2%)	0.6% (-0.4% - 1.5%)

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Hospital admissions (unscheduled),	Ito (2003)	65+	0-day lag	24 hr avg.	none	-0.7% (-2.1% - 0.6%)	-0.7% (-2% - 0.6%)	-0.7% (-1.9% - 0.5%)	-0.6% (-1.8% - 0.5%)	-0.5% (-1.6% - 0.5%)	-0.5% (-1.4% - 0.4%)	-0.5% (-1.3% - 0.4%)	-0.3% (-1% - 0.3%)
Hospital admissions (unscheduled),	Ito (2003)	65+	1-day lag	24 hr avg.	none	-0.2% (-1.6% - 1.2%)	-0.2% (-1.5% - 1.1%)	-0.2% (-1.4% - 1%)	-0.2% (-1.4% - 1%)	-0.1% (-1.1% - 0.8%)	-0.1% (-1.1% - 0.8%)	-0.1% (-1% - 0.7%)	-0.1% (-0.7% - 0.6%)
Hospital admissions (unscheduled),	Ito (2003)	65+	2-day lag	24 hr avg.	none	0.2% (-1.2% - 1.6%)	0.2% (-1.1% - 1.4%)	0.2% (-1% - 1.4%)	0.2% (-1% - 1.3%)	0.2% (-0.8% - 1.1%)	0.1% (-0.8% - 1.1%)	0.1% (-0.7% - 1%)	0.1% (-0.6% - 0.7%)
Hospital admissions (unscheduled),	Ito (2003)	65+	3-day lag	24 hr avg.	none	0.6% (-0.7% - 1.9%)	0.6% (-0.7% - 1.8%)	0.6% (-0.6% - 1.7%)	0.5% (-0.6% - 1.7%)	0.5% (-0.5% - 1.4%)	0.4% (-0.5% - 1.3%)	0.4% (-0.5% - 1.2%)	0.3% (-0.3% - 0.9%)
Hospital admissions	Ito (2003)	65+	0-day lag	24 hr avg.	none	-0.6% (-2.3% - 0.9%)	-0.6% (-2.1% - 0.9%)	-0.6% (-2% - 0.8%)	-0.6% (-2% - 0.8%)	-0.5% (-1.7% - 0.7%)	-0.4% (-1.5% - 0.6%)	-0.4% (-1.4% - 0.6%)	-0.3% (-1.1% - 0.5%)
Hospital admissions	Ito (2003)	65+	1-day lag	24 hr avg.	none	0.6% (-1% - 2.2%)	0.6% (-0.9% - 2%)	0.6% (-0.9% - 1.9%)	0.5% (-0.9% - 1.9%)	0.5% (-0.7% - 1.6%)	0.4% (-0.7% - 1.5%)	0.4% (-0.6% - 1.4%)	0.3% (-0.5% - 1%)
Hospital admissions	Ito (2003)	65+	2-day lag	24 hr avg.	none	-0.1% (-1.8% - 1.5%)	-0.1% (-1.6% - 1.4%)	-0.1% (-1.6% - 1.3%)	-0.1% (-1.5% - 1.3%)	-0.1% (-1.3% - 1.1%)	-0.1% (-1.2% - 1%)	-0.1% (-1.1% - 0.9%)	0% (-0.8% - 0.7%)
Hospital admissions	Ito (2003)	65+	3-day lag	24 hr avg.	none	0% (-1.6% - 1.6%)	0% (-1.5% - 1.5%)	0% (-1.4% - 1.4%)	0% (-1.4% - 1.4%)	0% (-1.2% - 1.2%)	0% (-1.1% - 1.1%)	0% (-1% - 1%)	0% (-0.8% - 0.8%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-28. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Detroit, MI, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	46 (-15 - 106)	43 (-14 - 100)	43 (-14 - 98)	42 (-14 - 97)	38 (-12 - 87)	35 (-11 - 81)	34 (-11 - 79)	29 (-9 - 67)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	24 (8 - 39)	22 (7 - 37)	22 (7 - 36)	22 (7 - 36)	19 (6 - 32)	18 (6 - 30)	18 (6 - 29)	15 (5 - 25)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	158 (-26 - 336)	150 (-24 - 320)	148 (-24 - 316)	147 (-24 - 313)	134 (-22 - 287)	128 (-21 - 274)	125 (-20 - 268)	111 (-18 - 239)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	86 (27 - 144)	82 (26 - 137)	81 (25 - 136)	80 (25 - 134)	73 (23 - 123)	70 (22 - 117)	68 (21 - 115)	61 (19 - 102)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	56 (-52 - 162)	53 (-49 - 151)	52 (-48 - 150)	51 (-48 - 147)	46 (-42 - 132)	43 (-40 - 124)	42 (-39 - 120)	36 (-33 - 103)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	21 (-2 - 44)	20 (-2 - 41)	19 (-2 - 40)	19 (-2 - 40)	17 (-2 - 36)	16 (-2 - 33)	16 (-2 - 33)	13 (-2 - 28)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	19 (7 - 31)	18 (7 - 29)	18 (7 - 29)	17 (7 - 28)	16 (6 - 25)	15 (6 - 24)	14 (5 - 23)	12 (5 - 20)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	11 (3 - 18)	10 (3 - 17)	10 (3 - 17)	10 (3 - 17)	9 (3 - 15)	8 (2 - 14)	8 (2 - 13)	7 (2 - 11)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	9 (2 - 17)	9 (2 - 16)	9 (2 - 16)	8 (2 - 15)	8 (1 - 14)	7 (1 - 13)	7 (1 - 13)	6 (1 - 11)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	11 (-4 - 27)	11 (-4 - 25)	11 (-4 - 25)	10 (-4 - 25)	9 (-4 - 22)	9 (-3 - 21)	8 (-3 - 20)	7 (-3 - 17)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	8 (0 - 16)	7 (0 - 15)	7 (0 - 15)	7 (0 - 14)	6 (0 - 13)	6 (0 - 12)	6 (0 - 12)	5 (0 - 10)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	18 (-14 - 46)	17 (-13 - 44)	16 (-13 - 43)	16 (-13 - 42)	14 (-12 - 38)	13 (-11 - 36)	13 (-11 - 35)	11 (-9 - 30)

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Hospital admissions (unscheduled),	Ito (2003)	65+	0-day lag	24 hr avg.	none	-37 (-109 - 30)	-34 (-102 - 29)	-34 (-100 - 28)	-33 (-99 - 28)	-30 (-88 - 25)	-28 (-82 - 23)	-27 (-80 - 23)	-23 (-68 - 19)
Hospital admissions (unscheduled),	Ito (2003)	65+	1-day lag	24 hr avg.	none	-9 (-79 - 57)	-8 (-74 - 53)	-8 (-73 - 53)	-8 (-72 - 52)	-7 (-64 - 46)	-7 (-60 - 44)	-7 (-58 - 42)	-6 (-50 - 36)
Hospital admissions (unscheduled),	Ito (2003)	65+	2-day lag	24 hr avg.	none	11 (-58 - 76)	10 (-55 - 71)	10 (-54 - 70)	10 (-53 - 69)	9 (-47 - 62)	8 (-44 - 58)	8 (-43 - 57)	7 (-37 - 48)
Hospital admissions (unscheduled),	Ito (2003)	65+	3-day lag	24 hr avg.	none	31 (-37 - 94)	29 (-34 - 89)	29 (-34 - 87)	28 (-33 - 86)	25 (-30 - 77)	24 (-28 - 73)	23 (-27 - 71)	20 (-23 - 60)
Hospital admissions	Ito (2003)	65+	0-day lag	24 hr avg.	none	-25 (-90 - 36)	-23 (-84 - 34)	-23 (-83 - 33)	-23 (-82 - 33)	-20 (-73 - 29)	-19 (-68 - 27)	-18 (-66 - 27)	-16 (-56 - 23)
Hospital admissions	Ito (2003)	65+	1-day lag	24 hr avg.	none	24 (-38 - 81)	22 (-36 - 76)	22 (-35 - 75)	22 (-35 - 74)	19 (-31 - 66)	18 (-29 - 62)	18 (-28 - 61)	15 (-24 - 52)
Hospital admissions	Ito (2003)	65+	2-day lag	24 hr avg.	none	-3 (-69 - 57)	-3 (-64 - 53)	-3 (-63 - 52)	-3 (-62 - 52)	-3 (-55 - 46)	-3 (-52 - 43)	-3 (-50 - 42)	-2 (-43 - 36)
Hospital admissions	Ito (2003)	65+	3-day lag	24 hr avg.	none	1 (-63 - 61)	1 (-59 - 57)	1 (-58 - 57)	1 (-57 - 56)	1 (-51 - 50)	1 (-48 - 47)	1 (-47 - 46)	1 (-39 - 39)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-29. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Detroit, MI, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	2.2 (-0.7 - 5.2)	2.1 (-0.7 - 4.8)	2.1 (-0.7 - 4.8)	2 (-0.7 - 4.7)	1.8 (-0.6 - 4.2)	1.7 (-0.6 - 3.9)	1.7 (-0.5 - 3.8)	1.4 (-0.5 - 3.3)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.1 (0.4 - 1.9)	1.1 (0.4 - 1.8)	1.1 (0.4 - 1.8)	1 (0.3 - 1.7)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.5)	0.9 (0.3 - 1.4)	0.7 (0.2 - 1.2)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	7.7 (-1.3 - 16.3)	7.3 (-1.2 - 15.5)	7.2 (-1.2 - 15.4)	7.1 (-1.2 - 15.2)	6.5 (-1.1 - 13.9)	6.2 (-1 - 13.3)	6.1 (-1 - 13)	5.4 (-0.9 - 11.6)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	4.2 (1.3 - 7)	4 (1.2 - 6.6)	3.9 (1.2 - 6.6)	3.9 (1.2 - 6.5)	3.5 (1.1 - 6)	3.4 (1.1 - 5.7)	3.3 (1 - 5.6)	2.9 (0.9 - 4.9)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	2.7 (-2.5 - 7.8)	2.6 (-2.4 - 7.4)	2.5 (-2.3 - 7.3)	2.5 (-2.3 - 7.2)	2.2 (-2.1 - 6.4)	2.1 (-1.9 - 6)	2 (-1.9 - 5.8)	1.7 (-1.6 - 5)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	1 (-0.1 - 2.1)	1 (-0.1 - 2)	0.9 (-0.1 - 2)	0.9 (-0.1 - 1.9)	0.8 (-0.1 - 1.7)	0.8 (-0.1 - 1.6)	0.8 (-0.1 - 1.6)	0.6 (-0.1 - 1.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.9 (0.4 - 1.5)	0.9 (0.3 - 1.4)	0.9 (0.3 - 1.4)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.2)	0.7 (0.3 - 1.1)	0.7 (0.3 - 1.1)	0.6 (0.2 - 1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.5 (0.2 - 0.9)	0.5 (0.1 - 0.8)	0.5 (0.1 - 0.8)	0.5 (0.1 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.5 (0.1 - 0.8)	0.4 (0.1 - 0.8)	0.4 (0.1 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.6 (-0.2 - 1.3)	0.5 (-0.2 - 1.2)	0.5 (-0.2 - 1.2)	0.5 (-0.2 - 1.2)	0.5 (-0.2 - 1.1)	0.4 (-0.2 - 1)	0.4 (-0.2 - 1)	0.4 (-0.1 - 0.8)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.4 (0 - 0.8)	0.4 (0 - 0.7)	0.4 (0 - 0.7)	0.3 (0 - 0.7)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.2 (0 - 0.5)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	0.9 (-0.7 - 2.3)	0.8 (-0.6 - 2.1)	0.8 (-0.6 - 2.1)	0.8 (-0.6 - 2.1)	0.7 (-0.6 - 1.9)	0.7 (-0.5 - 1.7)	0.6 (-0.5 - 1.7)	0.5 (-0.4 - 1.5)

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Hospital admissions (unscheduled),	Ito (2003)	65+	0-day lag	24 hr avg.	none	-14.8 (-43.7 - 12.3)	-13.9 (-40.8 - 11.5)	-13.7 (-40.3 - 11.4)	-13.5 (-39.7 - 11.2)	-12 (-35.3 - 10)	-11.2 (-33 - 9.4)	-10.9 (-32.1 - 9.1)	-9.3 (-27.2 - 7.8)
Hospital admissions (unscheduled),	Ito (2003)	65+	1-day lag	24 hr avg.	none	-3.6 (-31.9 - 22.9)	-3.4 (-29.8 - 21.5)	-3.3 (-29.4 - 21.2)	-3.3 (-29 - 20.9)	-2.9 (-25.8 - 18.7)	-2.7 (-24.1 - 17.5)	-2.7 (-23.5 - 17.1)	-2.3 (-19.9 - 14.6)
Hospital admissions (unscheduled),	Ito (2003)	65+	2-day lag	24 hr avg.	none	4.4 (-23.5 - 30.5)	4.1 (-22 - 28.6)	4 (-21.7 - 28.2)	4 (-21.4 - 27.8)	3.6 (-19 - 24.9)	3.3 (-17.8 - 23.4)	3.2 (-17.3 - 22.8)	2.8 (-14.7 - 19.5)
Hospital admissions (unscheduled),	Ito (2003)	65+	3-day lag	24 hr avg.	none	12.5 (-14.7 - 38)	11.7 (-13.8 - 35.6)	11.6 (-13.6 - 35.2)	11.4 (-13.4 - 34.7)	10.2 (-11.9 - 31.1)	9.5 (-11.2 - 29.2)	9.3 (-10.9 - 28.4)	7.9 (-9.3 - 24.3)
Hospital admissions	Ito (2003)	65+	0-day lag	24 hr avg.	none	-10 (-36.3 - 14.4)	-9.3 (-33.9 - 13.5)	-9.2 (-33.5 - 13.3)	-9.1 (-32.9 - 13.1)	-8.1 (-29.3 - 11.7)	-7.6 (-27.4 - 11)	-7.4 (-26.6 - 10.7)	-6.3 (-22.6 - 9.1)
Hospital admissions	Ito (2003)	65+	1-day lag	24 hr avg.	none	9.5 (-15.5 - 32.6)	8.9 (-14.5 - 30.6)	8.8 (-14.3 - 30.2)	8.7 (-14.1 - 29.8)	7.7 (-12.5 - 26.7)	7.3 (-11.7 - 25.1)	7.1 (-11.4 - 24.4)	6 (-9.7 - 20.9)
Hospital admissions	Ito (2003)	65+	2-day lag	24 hr avg.	none	-1.4 (-27.6 - 22.8)	-1.3 (-25.8 - 21.4)	-1.3 (-25.4 - 21.1)	-1.3 (-25 - 20.8)	-1.1 (-22.3 - 18.6)	-1.1 (-20.9 - 17.5)	-1 (-20.3 - 17)	-0.9 (-17.2 - 14.5)
Hospital admissions	Ito (2003)	65+	3-day lag	24 hr avg.	none	0.6 (-25.4 - 24.6)	0.5 (-23.8 - 23.1)	0.5 (-23.5 - 22.8)	0.5 (-23.1 - 22.5)	0.5 (-20.6 - 20.1)	0.4 (-19.2 - 18.9)	0.4 (-18.7 - 18.4)	0.4 (-15.9 - 15.7)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-30. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Detroit, MI, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.5% (-0.2% - 1.1%)	0.5% (-0.1% - 1.1%)	0.5% (-0.1% - 1%)	0.4% (-0.1% - 1%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	1.7% (-0.3% - 3.6%)	1.6% (-0.3% - 3.4%)	1.6% (-0.3% - 3.4%)	1.6% (-0.3% - 3.3%)	1.4% (-0.2% - 3%)	1.4% (-0.2% - 2.9%)	1.3% (-0.2% - 2.8%)	1.2% (-0.2% - 2.5%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	0.9% (0.3% - 1.5%)	0.9% (0.3% - 1.5%)	0.9% (0.3% - 1.4%)	0.8% (0.3% - 1.4%)	0.8% (0.2% - 1.3%)	0.7% (0.2% - 1.2%)	0.7% (0.2% - 1.2%)	0.6% (0.2% - 1.1%)
Mortality, non-accidental	Ito (2003)	all	0-day lag	24 hr avg.	none	0.6% (-0.6% - 1.7%)	0.6% (-0.5% - 1.6%)	0.6% (-0.5% - 1.6%)	0.5% (-0.5% - 1.6%)	0.5% (-0.5% - 1.4%)	0.5% (-0.4% - 1.3%)	0.4% (-0.4% - 1.3%)	0.4% (-0.3% - 1.1%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.9% (-0.1% - 1.8%)	0.8% (-0.1% - 1.7%)	0.8% (-0.1% - 1.7%)	0.8% (-0.1% - 1.6%)	0.7% (-0.1% - 1.5%)	0.7% (-0.1% - 1.4%)	0.6% (-0.1% - 1.3%)	0.5% (-0.1% - 1.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.8% (0.3% - 1.3%)	0.7% (0.3% - 1.2%)	0.7% (0.3% - 1.2%)	0.7% (0.3% - 1.2%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.4% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.5% (-0.2% - 1.1%)	0.4% (-0.2% - 1%)	0.4% (-0.2% - 1%)	0.4% (-0.2% - 1%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)
Mortality, respiratory	Ito (2003)	all	0-day lag	24 hr avg.	none	2.2% (-1.8% - 5.9%)	2.1% (-1.7% - 5.6%)	2.1% (-1.7% - 5.5%)	2.1% (-1.7% - 5.4%)	1.8% (-1.5% - 4.9%)	1.7% (-1.4% - 4.6%)	1.7% (-1.3% - 4.5%)	1.4% (-1.1% - 3.8%)

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Hospital admissions (unscheduled),	Ito (2003)	65+	0-day lag	24 hr avg.	none	-1.4% (-4.2% - 1.2%)	-1.3% (-3.9% - 1.1%)	-1.3% (-3.9% - 1.1%)	-1.3% (-3.8% - 1.1%)	-1.2% (-3.4% - 1%)	-1.1% (-3.2% - 0.9%)	-1.1% (-3.1% - 0.9%)	-0.9% (-2.6% - 0.8%)
Hospital admissions (unscheduled),	Ito (2003)	65+	1-day lag	24 hr avg.	none	-0.3% (-3.1% - 2.2%)	-0.3% (-2.9% - 2.1%)	-0.3% (-2.8% - 2%)	-0.3% (-2.8% - 2%)	-0.3% (-2.5% - 1.8%)	-0.3% (-2.3% - 1.7%)	-0.3% (-2.3% - 1.6%)	-0.2% (-1.9% - 1.4%)
Hospital admissions (unscheduled),	Ito (2003)	65+	2-day lag	24 hr avg.	none	0.4% (-2.3% - 2.9%)	0.4% (-2.1% - 2.8%)	0.4% (-2.1% - 2.7%)	0.4% (-2.1% - 2.7%)	0.3% (-1.8% - 2.4%)	0.3% (-1.7% - 2.3%)	0.3% (-1.7% - 2.2%)	0.3% (-1.4% - 1.9%)
Hospital admissions (unscheduled),	Ito (2003)	65+	3-day lag	24 hr avg.	none	1.2% (-1.4% - 3.7%)	1.1% (-1.3% - 3.4%)	1.1% (-1.3% - 3.4%)	1.1% (-1.3% - 3.3%)	1% (-1.2% - 3%)	0.9% (-1.1% - 2.8%)	0.9% (-1% - 2.7%)	0.8% (-0.9% - 2.3%)
Hospital admissions	Ito (2003)	65+	0-day lag	24 hr avg.	none	-1.2% (-4.5% - 1.8%)	-1.2% (-4.2% - 1.7%)	-1.2% (-4.2% - 1.7%)	-1.1% (-4.1% - 1.6%)	-1% (-3.7% - 1.5%)	-0.9% (-3.4% - 1.4%)	-0.9% (-3.3% - 1.3%)	-0.8% (-2.8% - 1.1%)
Hospital admissions	Ito (2003)	65+	1-day lag	24 hr avg.	none	1.2% (-1.9% - 4.1%)	1.1% (-1.8% - 3.8%)	1.1% (-1.8% - 3.8%)	1.1% (-1.8% - 3.7%)	1% (-1.6% - 3.3%)	0.9% (-1.5% - 3.1%)	0.9% (-1.4% - 3.1%)	0.8% (-1.2% - 2.6%)
Hospital admissions	Ito (2003)	65+	2-day lag	24 hr avg.	none	-0.2% (-3.5% - 2.9%)	-0.2% (-3.2% - 2.7%)	-0.2% (-3.2% - 2.6%)	-0.2% (-3.1% - 2.6%)	-0.1% (-2.8% - 2.3%)	-0.1% (-2.6% - 2.2%)	-0.1% (-2.5% - 2.1%)	-0.1% (-2.2% - 1.8%)
Hospital admissions	Ito (2003)	65+	3-day lag	24 hr avg.	none	0.1% (-3.2% - 3.1%)	0.1% (-3% - 2.9%)	0.1% (-2.9% - 2.9%)	0.1% (-2.9% - 2.8%)	0.1% (-2.6% - 2.5%)	0.1% (-2.4% - 2.4%)	0.1% (-2.3% - 2.3%)	0% (-2% - 2%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-31. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Houston, TX, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	22 (1 - 42)	20 (1 - 39)	19 (1 - 37)	17 (1 - 32)	16 (1 - 30)	15 (1 - 28)	13 (1 - 25)	8 (0 - 15)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	11 (4 - 18)	10 (3 - 16)	10 (3 - 16)	8 (3 - 13)	8 (3 - 13)	7 (2 - 12)	6 (2 - 11)	4 (1 - 6)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	70 (6 - 132)	66 (6 - 126)	65 (6 - 123)	59 (5 - 112)	57 (5 - 109)	55 (5 - 104)	52 (5 - 99)	42 (4 - 80)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	58 (18 - 98)	55 (17 - 93)	54 (17 - 91)	49 (15 - 83)	48 (15 - 81)	46 (14 - 77)	43 (14 - 73)	35 (11 - 59)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	8 (-1 - 16)	7 (-1 - 15)	7 (-1 - 15)	6 (-1 - 12)	6 (-1 - 12)	5 (-1 - 11)	5 (-1 - 10)	3 (0 - 6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	8 (3 - 13)	7 (3 - 12)	7 (3 - 11)	6 (2 - 10)	6 (2 - 9)	5 (2 - 8)	5 (2 - 8)	3 (1 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	4 (1 - 7)	4 (1 - 7)	4 (1 - 7)	3 (1 - 6)	3 (1 - 5)	3 (1 - 5)	3 (1 - 4)	2 (0 - 3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	4 (1 - 7)	3 (1 - 6)	3 (1 - 6)	3 (1 - 5)	3 (0 - 5)	3 (0 - 5)	2 (0 - 4)	1 (0 - 3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	5 (-2 - 11)	4 (-2 - 10)	4 (-2 - 10)	4 (-1 - 8)	3 (-1 - 8)	3 (-1 - 7)	3 (-1 - 7)	2 (-1 - 4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	3 (0 - 6)	3 (0 - 6)	3 (0 - 6)	2 (0 - 5)	2 (0 - 5)	2 (0 - 4)	2 (0 - 4)	1 (0 - 2)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-32. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Houston, TX, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.6 (0 - 1.2)	0.6 (0 - 1.1)	0.6 (0 - 1.1)	0.5 (0 - 0.9)	0.5 (0 - 0.9)	0.4 (0 - 0.8)	0.4 (0 - 0.7)	0.2 (0 - 0.4)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.1 (0 - 0.2)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	2 (0.2 - 3.9)	1.9 (0.2 - 3.7)	1.9 (0.2 - 3.6)	1.7 (0.2 - 3.3)	1.7 (0.2 - 3.2)	1.6 (0.1 - 3.1)	1.5 (0.1 - 2.9)	1.2 (0.1 - 2.3)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	1.7 (0.5 - 2.9)	1.6 (0.5 - 2.7)	1.6 (0.5 - 2.7)	1.4 (0.5 - 2.4)	1.4 (0.4 - 2.4)	1.3 (0.4 - 2.3)	1.3 (0.4 - 2.1)	1 (0.3 - 1.7)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.2)	0.1 (0.1 - 0.2)	0.1 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.1 (-0.1 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0 (0 - 0.1)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-33. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Houston, TX, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	0.8% (0.1% - 1.5%)	0.7% (0.1% - 1.4%)	0.7% (0.1% - 1.4%)	0.6% (0.1% - 1.2%)	0.6% (0.1% - 1.2%)	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1.1%)	0.5% (0% - 0.9%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.1% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.1% (0.1% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.1% (-0.1% - 0.4%)	0.1% (-0.1% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-34. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Houston, TX, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	18 (1 - 34)	16 (1 - 32)	16 (1 - 31)	13 (1 - 26)	13 (1 - 25)	12 (1 - 23)	11 (1 - 21)	7 (0 - 13)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	9 (3 - 15)	8 (3 - 13)	8 (3 - 13)	7 (2 - 11)	6 (2 - 10)	6 (2 - 10)	5 (2 - 9)	3 (1 - 5)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	63 (6 - 119)	59 (5 - 113)	58 (5 - 110)	53 (5 - 100)	51 (5 - 97)	48 (4 - 92)	46 (4 - 87)	36 (3 - 69)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	53 (16 - 88)	50 (16 - 84)	49 (15 - 82)	44 (14 - 74)	43 (13 - 72)	40 (13 - 68)	38 (12 - 64)	30 (9 - 51)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	6 (-1 - 13)	6 (-1 - 12)	6 (-1 - 12)	5 (-1 - 10)	5 (-1 - 10)	4 (-1 - 9)	4 (0 - 8)	2 (0 - 5)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	6 (2 - 10)	6 (2 - 10)	6 (2 - 9)	5 (2 - 8)	5 (2 - 7)	4 (2 - 7)	4 (1 - 6)	2 (1 - 4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	4 (1 - 6)	3 (1 - 6)	3 (1 - 5)	3 (1 - 5)	3 (1 - 4)	2 (1 - 4)	2 (1 - 4)	1 (0 - 2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	3 (1 - 6)	3 (1 - 5)	3 (0 - 5)	2 (0 - 4)	2 (0 - 4)	2 (0 - 4)	2 (0 - 3)	1 (0 - 2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	4 (-1 - 9)	4 (-1 - 8)	3 (-1 - 8)	3 (-1 - 7)	3 (-1 - 7)	3 (-1 - 6)	2 (-1 - 5)	1 (-1 - 3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	3 (0 - 5)	2 (0 - 5)	2 (0 - 5)	2 (0 - 4)	2 (0 - 4)	2 (0 - 3)	2 (0 - 3)	1 (0 - 2)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-35. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Houston, TX, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.5 (0 - 1)	0.5 (0 - 0.9)	0.5 (0 - 0.9)	0.4 (0 - 0.8)	0.4 (0 - 0.7)	0.3 (0 - 0.7)	0.3 (0 - 0.6)	0.2 (0 - 0.4)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.1 (0 - 0.2)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	1.8 (0.2 - 3.5)	1.7 (0.2 - 3.3)	1.7 (0.2 - 3.2)	1.5 (0.1 - 2.9)	1.5 (0.1 - 2.9)	1.4 (0.1 - 2.7)	1.3 (0.1 - 2.6)	1.1 (0.1 - 2)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	1.5 (0.5 - 2.6)	1.5 (0.5 - 2.5)	1.4 (0.4 - 2.4)	1.3 (0.4 - 2.2)	1.3 (0.4 - 2.1)	1.2 (0.4 - 2)	1.1 (0.4 - 1.9)	0.9 (0.3 - 1.5)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.1 (0.1 - 0.2)	0.1 (0.1 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.1 (0 - 0.2)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0.1 (0 - 0.1)	0 (0 - 0.1)	0 (0 - 0.1)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-36. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Houston, TX, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)
Mortality, non-accidental	Schwartz (2004)	all	0-day lag	1 hr max.	none	0.7% (0.1% - 1.3%)	0.7% (0.1% - 1.2%)	0.6% (0.1% - 1.2%)	0.6% (0.1% - 1.1%)	0.6% (0.1% - 1.1%)	0.5% (0% - 1%)	0.5% (0% - 1%)	0.4% (0% - 0.8%)
Mortality, non-accidental	Schwartz -- 14 US Cities (2004)	all	0-day lag	1 hr max.	none	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.2% (-0.1% - 0.4%)	0.1% (-0.1% - 0.3%)	0.1% (-0.1% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-37. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Los Angeles, CA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)*****	all	distributed lag	24 hr avg.	none	31 (-74 - 135)	30 (-72 - 131)	27 (-66 - 120)	22 (-52 - 95)	20 (-49 - 90)	19 (-46 - 83)	16 (-38 - 69)	9 (-22 - 41)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	67 (22 - 111)	64 (22 - 107)	59 (20 - 98)	47 (16 - 78)	44 (15 - 74)	41 (14 - 68)	34 (11 - 56)	20 (7 - 33)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	50 (0 - 98)	48 (0 - 95)	44 (0 - 88)	35 (0 - 69)	33 (0 - 65)	30 (0 - 61)	25 (0 - 50)	15 (0 - 30)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	57 (22 - 93)	56 (21 - 90)	51 (19 - 83)	40 (15 - 65)	38 (15 - 62)	35 (13 - 57)	29 (11 - 47)	17 (7 - 28)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)****	all	0-day lag	24 hr avg.	CO	32 (9 - 54)	31 (9 - 53)	28 (8 - 48)	22 (7 - 38)	21 (6 - 36)	20 (6 - 33)	16 (5 - 28)	10 (3 - 16)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO2	28 (5 - 50)	27 (5 - 49)	25 (4 - 45)	19 (3 - 35)	18 (3 - 34)	17 (3 - 31)	14 (3 - 26)	8 (1 - 15)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM10	34 (-13 - 81)	33 (-13 - 78)	30 (-12 - 72)	24 (-9 - 57)	23 (-9 - 54)	21 (-8 - 50)	17 (-7 - 41)	10 (-4 - 25)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO2	24 (0 - 47)	23 (0 - 46)	21 (0 - 42)	17 (0 - 33)	16 (0 - 31)	15 (0 - 29)	12 (0 - 24)	7 (0 - 14)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)******	30+	0-day lag	24 hr avg.	none	38 (-16 - 90)	37 (-16 - 88)	34 (-15 - 82)	28 (-12 - 67)	27 (-11 - 64)	25 (-11 - 61)	21 (-9 - 51)	13 (-6 - 32)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)******	30+	0-day lag	24 hr avg.	none	28 (-36 - 90)	27 (-35 - 89)	26 (-34 - 85)	23 (-29 - 73)	22 (-28 - 71)	21 (-27 - 69)	19 (-24 - 61)	14 (-18 - 45)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

*****Los Angeles is defined in this study as Los Angeles County.

******Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table E-38. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Los Angeles, CA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.3 (-0.8 - 1.4)	0.3 (-0.8 - 1.4)	0.3 (-0.7 - 1.3)	0.2 (-0.5 - 1)	0.2 (-0.5 - 0.9)	0.2 (-0.5 - 0.9)	0.2 (-0.4 - 0.7)	0.1 (-0.2 - 0.4)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.1)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.5 (0 - 1)	0.5 (0 - 1)	0.5 (0 - 0.9)	0.4 (0 - 0.7)	0.3 (0 - 0.7)	0.3 (0 - 0.6)	0.3 (0 - 0.5)	0.2 (0 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.6)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)****	all	0-day lag	24 hr avg.	CO	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO2	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM10	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.5)	0.2 (-0.1 - 0.4)	0.1 (0 - 0.3)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO2	0.2 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.1)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)******	30+	0-day lag	24 hr avg.	none	0.4 (-0.2 - 1.1)	0.4 (-0.2 - 1)	0.4 (-0.2 - 1)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.4)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)******	30+	0-day lag	24 hr avg.	none	0.3 (-0.4 - 1.1)	0.3 (-0.4 - 1.1)	0.3 (-0.4 - 1)	0.3 (-0.3 - 0.9)	0.3 (-0.3 - 0.9)	0.3 (-0.3 - 0.8)	0.2 (-0.3 - 0.7)	0.2 (-0.2 - 0.5)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

*****Los Angeles is defined in this study as Los Angeles County.

******Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table E-39. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Los Angeles, CA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.1% (-0.3% - 0.5%)	0.1% (-0.3% - 0.5%)	0.1% (-0.2% - 0.4%)	0.1% (-0.2% - 0.3%)	0.1% (-0.2% - 0.3%)	0.1% (-0.2% - 0.3%)	0.1% (-0.1% - 0.3%)	0% (-0.1% - 0.2%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.7% (0% - 1.3%)	0.6% (0% - 1.3%)	0.6% (0% - 1.2%)	0.5% (0% - 0.9%)	0.4% (0% - 0.9%)	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)	0.2% (0% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.8% (0.3% - 1.3%)	0.8% (0.3% - 1.2%)	0.7% (0.3% - 1.1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.4% (0.2% - 0.6%)	0.2% (0.1% - 0.4%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)****	all	0-day lag	24 hr avg.	CO	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO2	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)	0.3% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM10	0.5% (-0.2% - 1.1%)	0.4% (-0.2% - 1.1%)	0.4% (-0.2% - 1%)	0.3% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.2% (-0.1% - 0.6%)	0.1% (-0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO2	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)******	30+	0-day lag	24 hr avg.	none	0.9% (-0.4% - 2.1%)	0.8% (-0.4% - 2%)	0.8% (-0.3% - 1.9%)	0.6% (-0.3% - 1.5%)	0.6% (-0.3% - 1.5%)	0.6% (-0.2% - 1.4%)	0.5% (-0.2% - 1.2%)	0.3% (-0.1% - 0.7%)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)******	30+	0-day lag	24 hr avg.	none	0.8% (-1% - 2.5%)	0.7% (-1% - 2.4%)	0.7% (-0.9% - 2.3%)	0.6% (-0.8% - 2%)	0.6% (-0.8% - 1.9%)	0.6% (-0.7% - 1.9%)	0.5% (-0.7% - 1.7%)	0.4% (-0.5% - 1.2%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

*****Los Angeles is defined in this study as Los Angeles County.

******Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table E-40. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Los Angeles, CA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)*****	all	distributed lag	24 hr avg.	none	24 (-58 - 105)	23 (-55 - 100)	21 (-50 - 91)	15 (-36 - 66)	15 (-35 - 64)	13 (-32 - 59)	11 (-26 - 48)	7 (-16 - 29)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	52 (17 - 86)	49 (17 - 82)	45 (15 - 74)	33 (11 - 54)	32 (11 - 53)	29 (10 - 48)	24 (8 - 39)	14 (5 - 23)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	38 (0 - 76)	37 (0 - 73)	33 (0 - 66)	24 (0 - 48)	24 (0 - 47)	22 (0 - 43)	18 (0 - 35)	11 (0 - 21)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	45 (17 - 72)	43 (16 - 69)	39 (15 - 62)	28 (11 - 45)	27 (10 - 44)	25 (10 - 41)	20 (8 - 33)	12 (5 - 20)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)****	all	0-day lag	24 hr avg.	CO	25 (7 - 42)	24 (7 - 40)	21 (6 - 37)	16 (5 - 27)	15 (4 - 26)	14 (4 - 24)	11 (3 - 19)	7 (2 - 12)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO2	22 (4 - 39)	21 (4 - 37)	19 (3 - 34)	14 (2 - 25)	13 (2 - 24)	12 (2 - 22)	10 (2 - 18)	6 (1 - 11)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM10	27 (-10 - 63)	25 (-10 - 60)	23 (-9 - 55)	17 (-6 - 40)	16 (-6 - 39)	15 (-6 - 35)	12 (-5 - 29)	7 (-3 - 17)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO2	18 (0 - 37)	18 (0 - 35)	16 (0 - 32)	12 (0 - 23)	11 (0 - 22)	10 (0 - 21)	8 (0 - 17)	5 (0 - 10)
Hospital admissions (unscheduled), pulmonary illness --	Linn et al. (2000)******	30+	0-day lag	24 hr avg.	none	34 (-15 - 82)	33 (-14 - 80)	31 (-13 - 74)	24 (-10 - 59)	24 (-10 - 58)	23 (-10 - 55)	19 (-8 - 46)	12 (-5 - 28)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)******	30+	0-day lag	24 hr avg.	none	27 (-35 - 87)	26 (-34 - 85)	25 (-32 - 81)	21 (-27 - 69)	21 (-27 - 68)	20 (-26 - 66)	18 (-23 - 58)	13 (-17 - 43)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

*****Los Angeles is defined in this study as Los Angeles County.

******Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table E-41. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Los Angeles, CA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.3 (-0.6 - 1.1)	0.2 (-0.6 - 1.1)	0.2 (-0.5 - 1)	0.2 (-0.4 - 0.7)	0.2 (-0.4 - 0.7)	0.1 (-0.3 - 0.6)	0.1 (-0.3 - 0.5)	0.1 (-0.2 - 0.3)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.5 (0.2 - 0.8)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.4 (0 - 0.8)	0.4 (0 - 0.8)	0.4 (0 - 0.7)	0.3 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.5 (0.2 - 0.8)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)****	all	0-day lag	24 hr avg.	CO	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.4)	0.2 (0 - 0.3)	0.2 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO2	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.1 (0 - 0.3)	0.1 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM10	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.6)	0.2 (-0.1 - 0.6)	0.2 (-0.1 - 0.4)	0.2 (-0.1 - 0.4)	0.2 (-0.1 - 0.4)	0.1 (0 - 0.3)	0.1 (0 - 0.2)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO2	0.2 (0 - 0.4)	0.2 (0 - 0.4)	0.2 (0 - 0.3)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.2)	0.1 (0 - 0.1)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)******	30+	0-day lag	24 hr avg.	none	0.4 (-0.2 - 1)	0.4 (-0.2 - 1)	0.4 (-0.2 - 0.9)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)	0.2 (-0.1 - 0.5)	0.1 (-0.1 - 0.3)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)******	30+	0-day lag	24 hr avg.	none	0.3 (-0.4 - 1)	0.3 (-0.4 - 1)	0.3 (-0.4 - 1)	0.3 (-0.3 - 0.8)	0.2 (-0.3 - 0.8)	0.2 (-0.3 - 0.8)	0.2 (-0.3 - 0.7)	0.2 (-0.2 - 0.5)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

*****Los Angeles is defined in this study as Los Angeles County.

******Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table E-42. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Los Angeles, CA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.1% (-0.2% - 0.4%)	0.1% (-0.2% - 0.4%)	0.1% (-0.2% - 0.3%)	0.1% (-0.1% - 0.2%)	0.1% (-0.1% - 0.2%)	0% (-0.1% - 0.2%)	0% (-0.1% - 0.2%)	0% (-0.1% - 0.1%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. (2004)*****	all	distributed lag	24 hr avg.	none	0.5% (0% - 1%)	0.5% (0% - 1%)	0.5% (0% - 0.9%)	0.3% (0% - 0.7%)	0.3% (0% - 0.6%)	0.3% (0% - 0.6%)	0.2% (0% - 0.5%)	0.1% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	distributed lag	24 hr avg.	none	0.6% (0.2% - 1%)	0.6% (0.2% - 0.9%)	0.5% (0.2% - 0.8%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)****	all	0-day lag	24 hr avg.	CO	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	NO2	0.3% (0.1% - 0.5%)	0.3% (0% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	PM10	0.4% (-0.1% - 0.9%)	0.3% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.5%)	0.2% (-0.1% - 0.4%)	0.1% (0% - 0.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)*****	all	0-day lag	24 hr avg.	SO2	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)	0.2% (0% - 0.3%)	0.1% (0% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
Hospital admissions (unscheduled), pulmonary illness -- spring	Linn et al. (2000)******	30+	0-day lag	24 hr avg.	none	0.8% (-0.3% - 1.9%)	0.8% (-0.3% - 1.8%)	0.7% (-0.3% - 1.7%)	0.6% (-0.2% - 1.4%)	0.6% (-0.2% - 1.3%)	0.5% (-0.2% - 1.3%)	0.4% (-0.2% - 1.1%)	0.3% (-0.1% - 0.6%)
Hospital admissions (unscheduled), pulmonary illness -- summer	Linn et al. (2000)******	30+	0-day lag	24 hr avg.	none	0.7% (-0.9% - 2.4%)	0.7% (-0.9% - 2.3%)	0.7% (-0.9% - 2.2%)	0.6% (-0.7% - 1.9%)	0.6% (-0.7% - 1.9%)	0.5% (-0.7% - 1.8%)	0.5% (-0.6% - 1.6%)	0.4% (-0.5% - 1.2%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

*****Los Angeles is defined in this study as Los Angeles County.

******Los Angeles is defined in this study as Los Angeles, Riverside, San Bernardino, and Orange Counties. The spring C-R function was run with April - June air quality data; the summer C-R function was run with July - September air quality data.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table E-43. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Philadelphia, PA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	17 (6 - 28)	15 (5 - 25)	15 (5 - 25)	13 (4 - 22)	13 (4 - 21)	12 (4 - 20)	11 (4 - 19)	9 (3 - 15)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	59 (37 - 81)	54 (34 - 75)	54 (34 - 74)	47 (30 - 65)	46 (29 - 63)	42 (27 - 58)	41 (26 - 56)	33 (21 - 46)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO2	59 (28 - 90)	54 (26 - 82)	53 (25 - 81)	47 (22 - 71)	46 (22 - 69)	42 (20 - 64)	41 (19 - 62)	33 (16 - 50)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	15 (1 - 28)	14 (1 - 26)	13 (1 - 26)	12 (1 - 23)	11 (1 - 22)	10 (0 - 20)	10 (0 - 20)	8 (0 - 16)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	12 (5 - 19)	11 (4 - 18)	11 (4 - 18)	10 (4 - 16)	9 (4 - 15)	9 (3 - 14)	8 (3 - 13)	7 (3 - 11)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	7 (2 - 11)	6 (2 - 11)	6 (2 - 10)	5 (2 - 9)	5 (2 - 9)	5 (1 - 8)	5 (1 - 8)	4 (1 - 6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	6 (1 - 11)	5 (1 - 10)	5 (1 - 10)	5 (1 - 8)	5 (1 - 8)	4 (1 - 8)	4 (1 - 7)	3 (1 - 6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	7 (-3 - 17)	7 (-3 - 16)	7 (-2 - 15)	6 (-2 - 14)	6 (-2 - 13)	5 (-2 - 12)	5 (-2 - 12)	4 (-2 - 10)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	5 (0 - 10)	5 (0 - 9)	5 (0 - 9)	4 (0 - 8)	4 (0 - 8)	4 (0 - 7)	3 (0 - 7)	3 (0 - 6)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-44. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Philadelphia, PA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.1 (0.4 - 1.8)	1 (0.3 - 1.7)	1 (0.3 - 1.7)	0.9 (0.3 - 1.5)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.8 (0.3 - 1.3)	0.6 (0.2 - 1)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	3.9 (2.5 - 5.3)	3.6 (2.3 - 4.9)	3.5 (2.2 - 4.9)	3.1 (2 - 4.3)	3 (1.9 - 4.2)	2.8 (1.8 - 3.8)	2.7 (1.7 - 3.7)	2.2 (1.4 - 3)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO2	3.9 (1.8 - 5.9)	3.6 (1.7 - 5.4)	3.5 (1.7 - 5.4)	3.1 (1.5 - 4.7)	3 (1.4 - 4.6)	2.8 (1.3 - 4.2)	2.7 (1.3 - 4.1)	2.2 (1 - 3.3)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	1 (0 - 1.9)	0.9 (0 - 1.7)	0.9 (0 - 1.7)	0.8 (0 - 1.5)	0.8 (0 - 1.5)	0.7 (0 - 1.3)	0.7 (0 - 1.3)	0.5 (0 - 1.1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.8 (0.3 - 1.3)	0.7 (0.3 - 1.2)	0.7 (0.3 - 1.2)	0.6 (0.2 - 1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.5 (0.2 - 0.9)	0.4 (0.2 - 0.7)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.4 (0.1 - 0.8)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.5 (-0.2 - 1.1)	0.4 (-0.2 - 1)	0.4 (-0.2 - 1)	0.4 (-0.1 - 0.9)	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.8)	0.3 (-0.1 - 0.6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.3 (0 - 0.7)	0.3 (0 - 0.6)	0.3 (0 - 0.6)	0.3 (0 - 0.5)	0.3 (0 - 0.5)	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.2 (0 - 0.4)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-45. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Philadelphia, PA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	0.7% (0.5% - 1%)	0.7% (0.4% - 0.9%)	0.7% (0.4% - 0.9%)	0.6% (0.4% - 0.8%)	0.6% (0.4% - 0.8%)	0.5% (0.3% - 0.7%)	0.5% (0.3% - 0.7%)	0.4% (0.3% - 0.6%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO2	0.7% (0.3% - 1.1%)	0.7% (0.3% - 1%)	0.7% (0.3% - 1%)	0.6% (0.3% - 0.9%)	0.6% (0.3% - 0.9%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.4% (0.2% - 0.6%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	0.8% (0% - 1.5%)	0.7% (0% - 1.4%)	0.7% (0% - 1.4%)	0.6% (0% - 1.2%)	0.6% (0% - 1.2%)	0.6% (0% - 1.1%)	0.6% (0% - 1.1%)	0.4% (0% - 0.9%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.7% (0.3% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.7%)	0.4% (0.1% - 0.6%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.4% (-0.1% - 0.9%)	0.4% (-0.1% - 0.8%)	0.4% (-0.1% - 0.8%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.7%)	0.3% (-0.1% - 0.6%)	0.2% (-0.1% - 0.5%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.3% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.5%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.4%)	0.2% (0% - 0.3%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-46. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Philadelphia, PA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	30 (10 - 50)	28 (10 - 47)	28 (9 - 47)	26 (9 - 43)	26 (9 - 42)	24 (8 - 40)	24 (8 - 40)	21 (7 - 35)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	107 (67 - 146)	101 (63 - 138)	101 (63 - 137)	93 (58 - 127)	91 (57 - 124)	86 (54 - 117)	85 (53 - 116)	75 (47 - 103)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO2	106 (51 - 161)	100 (48 - 152)	100 (48 - 151)	92 (44 - 140)	90 (43 - 137)	85 (41 - 129)	84 (40 - 128)	75 (36 - 114)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	26 (1 - 51)	25 (1 - 48)	25 (1 - 48)	23 (1 - 44)	23 (1 - 44)	21 (1 - 41)	21 (1 - 41)	19 (1 - 36)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	22 (8 - 35)	21 (8 - 33)	21 (8 - 33)	19 (7 - 30)	19 (7 - 30)	18 (7 - 28)	17 (7 - 28)	15 (6 - 25)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	12 (4 - 21)	11 (3 - 19)	11 (3 - 19)	11 (3 - 18)	10 (3 - 18)	10 (3 - 17)	10 (3 - 16)	9 (3 - 15)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	11 (2 - 19)	10 (2 - 18)	10 (2 - 18)	9 (2 - 17)	9 (2 - 16)	8 (2 - 15)	8 (1 - 15)	7 (1 - 14)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	13 (-5 - 31)	12 (-5 - 29)	12 (-5 - 29)	11 (-4 - 27)	11 (-4 - 26)	10 (-4 - 25)	10 (-4 - 24)	9 (-4 - 22)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	9 (0 - 18)	8 (0 - 17)	8 (0 - 17)	8 (0 - 16)	8 (0 - 15)	7 (0 - 14)	7 (0 - 14)	6 (0 - 13)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-47. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Philadelphia, PA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	2 (0.7 - 3.3)	1.9 (0.6 - 3.1)	1.9 (0.6 - 3.1)	1.7 (0.6 - 2.9)	1.7 (0.6 - 2.8)	1.6 (0.5 - 2.6)	1.6 (0.5 - 2.6)	1.4 (0.5 - 2.3)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	7 (4.4 - 9.6)	6.6 (4.2 - 9.1)	6.6 (4.2 - 9.1)	6.1 (3.9 - 8.4)	6 (3.8 - 8.2)	5.7 (3.6 - 7.7)	5.6 (3.5 - 7.6)	5 (3.1 - 6.8)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO2	7 (3.3 - 10.6)	6.6 (3.2 - 10)	6.6 (3.1 - 10)	6.1 (2.9 - 9.2)	6 (2.8 - 9)	5.6 (2.7 - 8.5)	5.6 (2.7 - 8.4)	4.9 (2.4 - 7.5)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	1.7 (0.1 - 3.4)	1.6 (0.1 - 3.2)	1.6 (0.1 - 3.2)	1.5 (0.1 - 2.9)	1.5 (0.1 - 2.9)	1.4 (0.1 - 2.7)	1.4 (0.1 - 2.7)	1.2 (0.1 - 2.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.4 (0.5 - 2.3)	1.4 (0.5 - 2.2)	1.4 (0.5 - 2.2)	1.2 (0.5 - 2)	1.2 (0.5 - 2)	1.2 (0.4 - 1.9)	1.1 (0.4 - 1.8)	1 (0.4 - 1.6)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.8 (0.2 - 1.4)	0.8 (0.2 - 1.3)	0.8 (0.2 - 1.3)	0.7 (0.2 - 1.2)	0.7 (0.2 - 1.2)	0.6 (0.2 - 1.1)	0.6 (0.2 - 1.1)	0.6 (0.2 - 1)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.7 (0.1 - 1.3)	0.7 (0.1 - 1.2)	0.7 (0.1 - 1.2)	0.6 (0.1 - 1.1)	0.6 (0.1 - 1.1)	0.6 (0.1 - 1)	0.6 (0.1 - 1)	0.5 (0.1 - 0.9)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.9 (-0.3 - 2)	0.8 (-0.3 - 1.9)	0.8 (-0.3 - 1.9)	0.7 (-0.3 - 1.8)	0.7 (-0.3 - 1.7)	0.7 (-0.3 - 1.6)	0.7 (-0.3 - 1.6)	0.6 (-0.2 - 1.4)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.6 (0 - 1.2)	0.6 (0 - 1.1)	0.6 (0 - 1.1)	0.5 (0 - 1)	0.5 (0 - 1)	0.5 (0 - 0.9)	0.5 (0 - 0.9)	0.4 (0 - 0.8)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-48. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Philadelphia, PA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	none	1.3% (0.8% - 1.8%)	1.3% (0.8% - 1.7%)	1.3% (0.8% - 1.7%)	1.2% (0.7% - 1.6%)	1.1% (0.7% - 1.5%)	1.1% (0.7% - 1.5%)	1.1% (0.7% - 1.4%)	0.9% (0.6% - 1.3%)
Mortality, non-accidental	Moolgavkar et al. (1995)	all	1-day lag	24 hr avg.	TSP, SO2	1.3% (0.6% - 2%)	1.2% (0.6% - 1.9%)	1.2% (0.6% - 1.9%)	1.1% (0.5% - 1.7%)	1.1% (0.5% - 1.7%)	1.1% (0.5% - 1.6%)	1% (0.5% - 1.6%)	0.9% (0.4% - 1.4%)
Mortality, cardiorespiratory	Huang et al. (2004)	all	distributed lag	24 hr avg.	none	1.4% (0.1% - 2.8%)	1.4% (0.1% - 2.6%)	1.4% (0.1% - 2.6%)	1.2% (0.1% - 2.4%)	1.2% (0.1% - 2.4%)	1.2% (0.1% - 2.2%)	1.1% (0.1% - 2.2%)	1% (0% - 2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.2% (0.5% - 1.9%)	1.1% (0.4% - 1.8%)	1.1% (0.4% - 1.8%)	1% (0.4% - 1.7%)	1% (0.4% - 1.6%)	1% (0.4% - 1.5%)	0.9% (0.4% - 1.5%)	0.8% (0.3% - 1.3%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	CO	0.7% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1.1%)	0.6% (0.2% - 1%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.9%)	0.5% (0.2% - 0.9%)	0.5% (0.1% - 0.8%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	NO2	0.6% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 1%)	0.5% (0.1% - 0.9%)	0.5% (0.1% - 0.9%)	0.5% (0.1% - 0.8%)	0.5% (0.1% - 0.8%)	0.4% (0.1% - 0.7%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	PM10	0.7% (-0.3% - 1.7%)	0.7% (-0.3% - 1.6%)	0.7% (-0.3% - 1.6%)	0.6% (-0.2% - 1.4%)	0.6% (-0.2% - 1.4%)	0.6% (-0.2% - 1.3%)	0.6% (-0.2% - 1.3%)	0.5% (-0.2% - 1.2%)
Mortality, cardiorespiratory	Huang et al. -- 19 US Cities (2004)	all	0-day lag	24 hr avg.	SO2	0.5% (0% - 1%)	0.5% (0% - 0.9%)	0.5% (0% - 0.9%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.4% (0% - 0.8%)	0.3% (0% - 0.7%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-49. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Sacramento, CA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	8 (-25 - 42)	8 (-25 - 41)	8 (-23 - 39)	7 (-21 - 35)	7 (-21 - 34)	7 (-20 - 34)	6 (-19 - 31)	5 (-16 - 26)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	12 (4 - 21)	12 (4 - 20)	11 (4 - 19)	10 (4 - 17)	10 (3 - 17)	10 (3 - 17)	9 (3 - 15)	8 (3 - 13)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-50. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Sacramento, CA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.7 (-2.1 - 3.4)	0.7 (-2 - 3.3)	0.6 (-1.9 - 3.1)	0.6 (-1.8 - 2.9)	0.6 (-1.7 - 2.8)	0.5 (-1.7 - 2.7)	0.5 (-1.5 - 2.5)	0.4 (-1.3 - 2.2)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1 (0.3 - 1.7)	1 (0.3 - 1.6)	0.9 (0.3 - 1.6)	0.9 (0.3 - 1.4)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.4)	0.8 (0.3 - 1.3)	0.6 (0.2 - 1.1)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-51. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Sacramento, CA, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.2% (-0.6% - 1%)	0.2% (-0.6% - 1%)	0.2% (-0.6% - 0.9%)	0.2% (-0.5% - 0.8%)	0.2% (-0.5% - 0.8%)	0.2% (-0.5% - 0.8%)	0.1% (-0.5% - 0.7%)	0.1% (-0.4% - 0.6%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-52. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Sacramento, CA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	12 (-37 - 60)	12 (-36 - 58)	11 (-35 - 57)	11 (-32 - 53)	10 (-32 - 52)	10 (-31 - 50)	10 (-30 - 49)	9 (-27 - 44)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	18 (6 - 30)	17 (6 - 29)	17 (6 - 28)	16 (5 - 26)	15 (5 - 26)	15 (5 - 25)	14 (5 - 24)	13 (4 - 22)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-53. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Sacramento, CA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	1 (-3 - 4.9)	1 (-2.9 - 4.8)	0.9 (-2.8 - 4.6)	0.9 (-2.6 - 4.3)	0.9 (-2.6 - 4.2)	0.8 (-2.5 - 4.1)	0.8 (-2.4 - 4)	0.7 (-2.2 - 3.6)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.5 (0.5 - 2.4)	1.4 (0.5 - 2.4)	1.4 (0.5 - 2.3)	1.3 (0.4 - 2.1)	1.3 (0.4 - 2.1)	1.2 (0.4 - 2)	1.2 (0.4 - 2)	1.1 (0.4 - 1.8)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-54. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Sacramento, CA, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.3% (-0.9% - 1.4%)	0.3% (-0.8% - 1.4%)	0.3% (-0.8% - 1.3%)	0.3% (-0.8% - 1.3%)	0.2% (-0.8% - 1.2%)	0.2% (-0.7% - 1.2%)	0.2% (-0.7% - 1.2%)	0.2% (-0.6% - 1%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-55. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: St. Louis, MO, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	3 (-4 - 9)	2 (-4 - 8)	2 (-4 - 8)	2 (-3 - 6)	2 (-3 - 6)	1 (-2 - 5)	1 (-2 - 5)	1 (-1 - 3)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	2 (1 - 4)	2 (1 - 3)	2 (1 - 3)	2 (1 - 3)	1 (0 - 2)	1 (0 - 2)	1 (0 - 2)	1 (0 - 1)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-56. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: St. Louis, MO, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.7 (-1.2 - 2.7)	0.7 (-1.1 - 2.4)	0.6 (-1 - 2.3)	0.5 (-0.8 - 1.8)	0.5 (-0.8 - 1.7)	0.4 (-0.7 - 1.5)	0.4 (-0.6 - 1.3)	0.2 (-0.4 - 0.9)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.7 (0.2 - 1.1)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.4 (0.2 - 0.7)	0.4 (0.1 - 0.7)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-57. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: St. Louis, MO, April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.1% (-0.2% - 0.5%)	0.1% (-0.2% - 0.4%)	0.1% (-0.2% - 0.4%)	0.1% (-0.1% - 0.3%)	0.1% (-0.1% - 0.3%)	0.1% (-0.1% - 0.3%)	0.1% (-0.1% - 0.2%)	0% (-0.1% - 0.1%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-58. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: St. Louis, MO, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	5 (-9 - 20)	5 (-9 - 19)	5 (-8 - 18)	4 (-8 - 16)	4 (-7 - 15)	4 (-7 - 15)	4 (-6 - 14)	3 (-5 - 12)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	5 (2 - 8)	5 (2 - 8)	4 (1 - 7)	4 (1 - 7)	4 (1 - 6)	4 (1 - 6)	3 (1 - 6)	3 (1 - 5)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-59. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: St. Louis, MO, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	1.6 (-2.6 - 5.6)	1.5 (-2.5 - 5.4)	1.4 (-2.4 - 5.2)	1.3 (-2.2 - 4.7)	1.2 (-2.1 - 4.5)	1.2 (-2 - 4.3)	1.1 (-1.8 - 4)	0.9 (-1.5 - 3.3)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.4 (0.5 - 2.3)	1.3 (0.4 - 2.2)	1.3 (0.4 - 2.1)	1.2 (0.4 - 1.9)	1.1 (0.4 - 1.8)	1.1 (0.4 - 1.8)	1 (0.3 - 1.6)	0.8 (0.3 - 1.4)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-60. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: St. Louis, MO, April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. (2004)	all	distributed lag	24 hr avg.	none	0.3% (-0.5% - 1%)	0.3% (-0.4% - 0.9%)	0.2% (-0.4% - 0.9%)	0.2% (-0.4% - 0.8%)	0.2% (-0.4% - 0.8%)	0.2% (-0.3% - 0.7%)	0.2% (-0.3% - 0.7%)	0.2% (-0.3% - 0.6%)
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-61. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Washington, D.C., April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	7 (2 - 12)	6 (2 - 10)	6 (2 - 11)	6 (2 - 9)	6 (2 - 9)	5 (2 - 8)	5 (2 - 8)	4 (1 - 7)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-62. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Washington, D.C., April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	1.2 (0.4 - 2.1)	1 (0.3 - 1.7)	1.1 (0.4 - 1.9)	1 (0.3 - 1.6)	1 (0.3 - 1.6)	0.8 (0.3 - 1.4)	0.9 (0.3 - 1.5)	0.7 (0.2 - 1.2)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-63. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Washington, D.C., April - September, Based on Adjusting 2004 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-64. Estimated Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Washington, D.C., April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	14 (5 - 23)	12 (4 - 20)	13 (4 - 21)	12 (4 - 19)	12 (4 - 19)	10 (3 - 17)	11 (4 - 18)	10 (3 - 16)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-65. Estimated Incidence of Health Risks per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Washington, D.C., April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Incidence of Health Effects per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	2.4 (0.8 - 3.9)	2.1 (0.7 - 3.5)	2.2 (0.8 - 3.7)	2 (0.7 - 3.4)	2 (0.7 - 3.4)	1.8 (0.6 - 3)	1.9 (0.6 - 3.2)	1.7 (0.6 - 2.9)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Table E-66. Estimated Percent of Total Incidence of Health Risks Associated with O_3 Concentrations that Just Meet the Current and Alternative 8-Hour Daily Maximum Standards: Washington, D.C., April - September, Based on Adjusting 2002 O_3 Concentrations

Health Effects*	Study	Ages	Lag	Exposure Metric	Other Pollutants in Model	Percent of Total Incidence of Health Effects Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**							
						0.084/4***	0.084/3	0.080/4	0.074/5	0.074/4	0.074/3	0.070/4	0.064/4
Mortality, non-accidental	Bell et al. -- 95 US Cities (2004)	all	distributed lag	24 hr avg.	none	0.5% (0.2% - 0.8%)	0.4% (0.1% - 0.7%)	0.5% (0.2% - 0.8%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)	0.4% (0.1% - 0.7%)	0.4% (0.1% - 0.6%)

*Health effects are associated with short-term exposures to O_3.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

****This alternative 8-hr standard assumes an alternative rounding convention where the standard is specified to the third decimal place.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O3 coefficient.

Appendix F: Calculation of Risk Above Policy Relevant Background

Appendix F: Calculation of Risk Above Policy Relevant Background

The estimated policy relevant background (PRB) ozone concentrations that we are using are derived from GEOS-CHEM model predictions, and the measured ambient ozone concentrations are sometimes lower than these PRB values. There is a question of how to best treat this in our estimation of risk above PRB.

Let x_0 denote the "as is" (ambient) O_3 level, and y_0 denote the corresponding baseline incidence rate. The difference in health effects incidence, $\Delta y = y_0 - y$, corresponding to a given difference in ambient O_3 levels, $\Delta x = (x_0 - x) > 0$ can be calculated for log-linear concentration-response functions by:

$$\Delta y = y_0[1 - e^{-\beta \Delta x}] . \qquad (1)$$

If we let $\Delta x = c - b$, where c = the "as is" O_3 concentration and b = the PRB O_3 concentration, the risk above background ($\Delta y = y_0 - y_b$ = the difference in health effects incidence rates from the as-is concentration incidence rate, y_0, to the PRB concentration incidence rate, y_b) can similarly be calculated for log-linear concentration-response functions by equation 1 (where now $\Delta y = y_0 - y_b$ and $\Delta x = c - b$).

Without loss of generality we can take the baseline incidence rate y_0 to be 1. Then

$$\Delta y = [1 - e^{-\beta \Delta x}]. \qquad (2)$$

Now we consider the implications of different ways of calculating risk above background. To simplify this analysis, we use the approximation to equation (2), valid for $\beta \approx 0$,

$$\Delta y = \beta \, \Delta x = \beta \, (c - b) . \qquad (3)$$

Let c_t be the measured concentrations (t=1 to N), b_t the true background concentrations, and B the estimated background concentration. Then the overall bias, θ, in the estimated background is given by

$$\theta = B - \frac{1}{N} \sum_t b_t \qquad (4)$$

The true risk above background, R, is

$$R = \sum_t \Delta y = \beta \sum_t \Delta x = \beta \sum_t (c_t - b_t) \qquad (5)$$

If the measured concentrations c_t are always greater than the estimated background B, then equation 3 (approximating equation 2) gives an estimated risk above background of

$$\hat{R} = \beta \sum_t (c_t - B) = \beta \sum_t c_t - \beta B \tag{6}$$

and the error E of this estimate is

$$E = R - \hat{R} = \beta \sum_t (c_t - b_t) - \beta \sum_t (c_t - B) = \beta \sum_t (B - b_t) = \beta N \theta \tag{7}$$

However, the measured concentrations are sometimes smaller than the estimated background. In these cases we cannot use equation 6 since it is not physically realizable. The error E of our risk estimate will depend on how we calculate risk in this situation.

Method I. When $c_t < B$ we set the risk to zero in equation 6, with the rationale that, since ambient concentrations cannot go below background, we lower the estimated background concentrations in these cases down to the ambient concentration c_t.

Then the estimate of risk above background is

$$\beta \sum_{t|c_t > B} (c_t - B) \tag{8}$$

where $t|c_t > B$ indicates the summation over all times t when $c_t > B$.

The error E of this estimate is

$$E = \beta \sum_t (c_t - b_t) - \beta \sum_{t|c_t > B} (c_t - B) = \beta N \theta + \beta \sum_{t|c_t \le B} (c_t - B) \tag{9}$$

since

$$\beta \sum_t (c_t - b_t) - \beta \sum_t (c_t - B) = \beta N \theta \tag{10}$$

$$\beta \sum_t (c_t - b_t) - \beta \sum_{t|c_t > B} (c_t - B) - \beta \sum_{t|c_t \le B} (c_t - B) = \beta N \theta \tag{11}$$

$$\beta\sum_{t}(c_t - b_t) - \beta\sum_{t|c_t>B}(c_t - B) = \beta N\theta + \beta\sum_{t|c_t\le B}(c_t - B) \tag{12}$$

Method II. When $c_t < B$ we set the background for that day equal to c_t and increase B on other days to yield the original monthly average background concentration, or use some other method of adjusting b_t to use daily varying background concentrations B_t that are always less then the measured concentrations and whose average is the original monthly average background concentration B. This approach places more credence on the average estimated background than on the estimated background values for individual hours. The error of this estimate of risk above background is given by

$$E = \beta\sum_{t}(B_t - b_t) = \beta(N B - \sum_{t} b_t) = \beta N\theta \tag{13}$$

Discussion

To recap, the error of the estimate of risk if we use method I is:

$$E_I = \beta N\theta + \beta\sum_{t|c_t\le B}(c_t - B)$$

and the error of the estimate of risk if we use method II is:

$$E_{II} = \beta N\theta\ .$$

If we have overestimated background, $\theta > 0$, and $E_{II} > 0$. Since the second term in E_I, $\beta\sum_{t|c_t\le B}(c_t - B)$, must be ≤ 0, $E_I \le E_{II}$. If, as is likely, $\beta\sum_{t|c_t\le B}(c_t - B)$ is smaller in absolute value than $\beta N\theta$, then $0 \le E_I \le E_{II}$.

If we have overestimated background, then, the first method would be preferable; if background is underestimated, then the second method would be more accurate. Since we believe that we have overestimated background in cases where the observed concentration is lower than the estimates background obtained from the GEOS-CHEM model, we have applied the first method in estimating risks in this draft report.

Appendix G: Explanation of How a Distributed Lag Model Can Be Used in the Risk Assessment

A linear concentration-response (C-R) function with a distributed lag has the following form:

$$y_t = \alpha + \beta_0 x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2} + \ldots + \beta_n x_{t-n}$$

Without loss of generality, we illustrate the application of a distributed lag model to a risk assessment letting n=2 – i.e., with a model in which today's mortality is a function of today's pollutant concentration, x_t, yesterday's pollutant concentration, x_{t-1}, and the day before yesterday's pollutant concentration, x_{t-2}. The model is:

$$y_t = \alpha + \beta_0 x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2} \ .$$

Given this model, the following three equations hold:

$$y_t = \alpha + \beta_0 x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2}$$

$$y_{t+1} = \alpha + \beta_0 x_{t+1} + \beta_1 x_t + \beta_2 x_{t-1}$$

$$y_{t+2} = \alpha + \beta_0 x_{t+2} + \beta_1 x_{t+1} + \beta_2 x_t$$

Summing these three equations and collecting terms yields:

$$\sum_{i=t}^{t+2} y_i = 3\alpha + \beta_0 x_{t+2} + \left(\sum_{i=0}^{1} \beta_i \right) x_{t+1} + \left(\sum_{i=0}^{2} \beta_i \right) x_t + \left(\sum_{i=1}^{2} \beta_i \right) x_{t-1} + \beta_2 x_{t-2} \ .$$

Thus a change in the pollutant concentration on day t (i.e., a change in x_t) results in a change in the *sum* of mortality cases on days t, t+1, and t+2. In particular, if we let z_t denote $\sum_{i=t}^{t+2} y_i$, then

$$\frac{\partial z_t}{\partial x_t} = \sum_{i=0}^{2} \beta_i \ .$$

Thus, the change in the sum of mortality incidence on the same day, next day, and day after that equals the *sum* of the coefficients for the pollutant concentration on the same day, the previous day, and the day before that. Note that the application of a distributed lag model in a risk assessment thus does not require any assumption that the decreases on all the days in the model are the same. It does require that the distributed lag C-R function is linear. Because the log-linear functions used in the risk assessment are almost linear, the above is a good approximation.

Appendix H: Additional Results for Five Locations for the Current Standard and Two Alternative Standards, Based on 2002, 2003, and 2004 Air Quality Data

Table H-1. Estimated Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2003 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with 2003 O_3 Concentrations and O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
				2003 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	6 (-26 - 37)	5 (-20 - 29)	4 (-15 - 22)	3 (-11 - 16)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 20)	9 (3 - 15)	7 (2 - 12)	5 (2 - 8)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	64 (22 - 107)	55 (18 - 91)	43 (14 - 71)	31 (10 - 52)
	Schwartz (2004)	0-day lag	1 hr max.	445 (141 - 742)	403 (128 - 674)	332 (105 - 556)	261 (83 - 438)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	168 (53 - 282)	152 (48 - 256)	125 (39 - 211)	98 (31 - 166)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	36 (2 - 70)	18 (1 - 35)	11 (1 - 22)	4 (0 - 8)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	18 (6 - 30)	9 (3 - 15)	6 (2 - 9)	2 (1 - 3)
	Schwartz (2004)	0-day lag	1 hr max.	101 (9 - 191)	66 (6 - 125)	52 (5 - 98)	34 (3 - 65)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	84 (26 - 141)	55 (17 - 93)	43 (14 - 73)	28 (9 - 48)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	56 (-136 - 246)	22 (-52 - 95)	12 (-28 - 51)	5 (-12 - 23)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	121 (41 - 201)	47 (16 - 78)	25 (8 - 42)	11 (4 - 18)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	79 (27 - 132)	54 (18 - 90)	43 (15 - 72)	32 (11 - 54)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table H-2. Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2003 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with 2003 O_3 Concentrations and O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
				2003 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.4 (-1.7 - 2.5)	0.3 (-1.3 - 2)	0.2 (-1 - 1.5)	0.2 (-0.7 - 1.1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.8 (0.3 - 1.3)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)	0.3 (0.1 - 0.6)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.2 (0.4 - 2)	1 (0.3 - 1.7)	0.8 (0.3 - 1.3)	0.6 (0.2 - 1)
	Schwartz (2004)	0-day lag	1 hr max.	8.3 (2.6 - 13.8)	7.5 (2.4 - 12.5)	6.2 (2 - 10.3)	4.9 (1.5 - 8.1)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	3.1 (1 - 5.3)	2.8 (0.9 - 4.8)	2.3 (0.7 - 3.9)	1.8 (0.6 - 3.1)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	1.1 (0.1 - 2)	0.5 (0 - 1)	0.3 (0 - 0.6)	0.1 (0 - 0.2)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5 (0.2 - 0.9)	0.3 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.1 (0 - 0.1)
	Schwartz (2004)	0-day lag	1 hr max.	3 (0.3 - 5.6)	1.9 (0.2 - 3.7)	1.5 (0.1 - 2.9)	1 (0.1 - 1.9)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.5 (0.8 - 4.2)	1.6 (0.5 - 2.7)	1.3 (0.4 - 2.1)	0.8 (0.3 - 1.4)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.6 (-1.4 - 2.6)	0.2 (-0.5 - 1)	0.1 (-0.3 - 0.5)	0.1 (-0.1 - 0.2)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.3 (0.4 - 2.1)	0.5 (0.2 - 0.8)	0.3 (0.1 - 0.4)	0.1 (0 - 0.2)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.9 (0.3 - 1.5)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.6)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table H-3. Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2003 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with 2003 O_3 Concentrations and O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
				2003 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.6% - 0.8%)	0.1% (-0.4% - 0.6%)	0.1% (-0.3% - 0.5%)	0.1% (-0.2% - 0.3%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.5%)	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)
	Schwartz (2004)	0-day lag	1 hr max.	2.1% (0.7% - 3.5%)	1.9% (0.6% - 3.2%)	1.6% (0.5% - 2.6%)	1.2% (0.4% - 2.1%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.8% (0.2% - 1.3%)	0.7% (0.2% - 1.2%)	0.6% (0.2% - 1%)	0.5% (0.1% - 0.8%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.4% (0% - 0.8%)	0.2% (0% - 0.4%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0% (0% - 0%)
	Schwartz (2004)	0-day lag	1 hr max.	1.1% (0.1% - 2.1%)	0.7% (0.1% - 1.4%)	0.6% (0.1% - 1.1%)	0.4% (0% - 0.7%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.9% (0.3% - 1.6%)	0.6% (0.2% - 1%)	0.5% (0.1% - 0.8%)	0.3% (0.1% - 0.5%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.5% - 0.9%)	0.1% (-0.2% - 0.3%)	0% (-0.1% - 0.2%)	0% (0% - 0.1%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4% (0.1% - 0.7%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0% (0% - 0.1%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table H-4. Estimated Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2004 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with 2004 O_3 Concentrations and O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
				2004 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	6 (-26 - 38)	5 (-20 - 29)	4 (-15 - 22)	3 (-11 - 16)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 20)	9 (3 - 15)	7 (2 - 12)	5 (2 - 8)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	49 (16 - 81)	33 (11 - 55)	23 (8 - 39)	14 (5 - 24)
	Schwartz (2004)	0-day lag	1 hr max.	394 (125 - 658)	314 (99 - 525)	249 (79 - 417)	183 (58 - 307)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	148 (46 - 250)	118 (37 - 199)	93 (29 - 157)	69 (21 - 116)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	35 (2 - 67)	22 (1 - 42)	16 (1 - 30)	8 (0 - 15)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 28)	11 (4 - 18)	8 (3 - 13)	4 (1 - 6)
	Schwartz (2004)	0-day lag	1 hr max.	93 (9 - 176)	70 (6 - 132)	57 (5 - 109)	42 (4 - 80)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	78 (24 - 130)	58 (18 - 98)	48 (15 - 81)	35 (11 - 59)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	62 (-149 - 271)	31 (-74 - 135)	20 (-49 - 90)	9 (-22 - 41)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	133 (45 - 221)	67 (22 - 111)	44 (15 - 74)	20 (7 - 33)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	60 (20 - 100)	43 (15 - 72)	33 (11 - 55)	24 (8 - 39)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table H-5. Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2004 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with 2004 O_3 Concentrations and O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
				2004 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.4 (-1.8 - 2.6)	0.3 (-1.3 - 1.9)	0.2 (-1 - 1.5)	0.2 (-0.7 - 1.1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.8 (0.3 - 1.4)	0.6 (0.2 - 1)	0.5 (0.2 - 0.8)	0.3 (0.1 - 0.6)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.9 (0.3 - 1.5)	0.6 (0.2 - 1)	0.4 (0.1 - 0.7)	0.3 (0.1 - 0.4)
	Schwartz (2004)	0-day lag	1 hr max.	7.3 (2.3 - 12.2)	5.8 (1.9 - 9.8)	4.6 (1.5 - 7.7)	3.4 (1.1 - 5.7)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.8 (0.9 - 4.6)	2.2 (0.7 - 3.7)	1.7 (0.5 - 2.9)	1.3 (0.4 - 2.2)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	1 (0.1 - 2)	0.6 (0 - 1.2)	0.5 (0 - 0.9)	0.2 (0 - 0.4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5 (0.2 - 0.8)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)	0.1 (0 - 0.2)
	Schwartz (2004)	0-day lag	1 hr max.	2.7 (0.3 - 5.2)	2 (0.2 - 3.9)	1.7 (0.2 - 3.2)	1.2 (0.1 - 2.3)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.3 (0.7 - 3.8)	1.7 (0.5 - 2.9)	1.4 (0.4 - 2.4)	1 (0.3 - 1.7)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.6 (-1.6 - 2.8)	0.3 (-0.8 - 1.4)	0.2 (-0.5 - 0.9)	0.1 (-0.2 - 0.4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.4 (0.5 - 2.3)	0.7 (0.2 - 1.2)	0.5 (0.2 - 0.8)	0.2 (0.1 - 0.4)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.7 (0.2 - 1.1)	0.5 (0.2 - 0.8)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.4)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table H-6. Estimated Percent of Total Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2004 O_3 Concentrations*

Location	Study	Lag	Exposure Metric	Percent of Total Incidence of Non-Accidental Mortality Associated with 2004 O_3 Concentrations and O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
				2004 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.1% (-0.6% - 0.8%)	0.1% (-0.4% - 0.6%)	0.1% (-0.3% - 0.5%)	0.1% (-0.2% - 0.3%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	1.9% (0.6% - 3.1%)	1.5% (0.5% - 2.5%)	1.2% (0.4% - 2%)	0.9% (0.3% - 1.5%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.7% (0.2% - 1.2%)	0.6% (0.2% - 0.9%)	0.4% (0.1% - 0.7%)	0.3% (0.1% - 0.6%)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.4% (0% - 0.7%)	0.2% (0% - 0.5%)	0.2% (0% - 0.3%)	0.1% (0% - 0.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)	0% (0% - 0.1%)
	Schwartz (2004)	0-day lag	1 hr max.	1% (0.1% - 1.9%)	0.8% (0.1% - 1.5%)	0.6% (0.1% - 1.2%)	0.5% (0% - 0.9%)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.9% (0.3% - 1.4%)	0.6% (0.2% - 1.1%)	0.5% (0.2% - 0.9%)	0.4% (0.1% - 0.7%)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.2% (-0.5% - 1%)	0.1% (-0.3% - 0.5%)	0.1% (-0.2% - 0.3%)	0% (-0.1% - 0.2%)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.4%)	0.2% (0.1% - 0.3%)	0.1% (0% - 0.1%)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2% (0.1% - 0.3%)	0.1% (0% - 0.2%)	0.1% (0% - 0.2%)	0.1% (0% - 0.1%)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table H-7. Estimated Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2003 O_3 Concentrations*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
		2003 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Atlanta	8 (-2 - 17)	6 (-2 - 14)	4 (-1 - 10)	5 (-1 - 11)
	19 U.S. Cities	8 (3 - 13)	6 (2 - 10)	4 (2 - 7)	5 (2 - 8)
Chicago	Chicago	30 (-27 - 86)	16 (-14 - 45)	17 (-15 - 49)	20 (-18 - 58)
	19 U.S. Cities	49 (19 - 80)	26 (10 - 41)	28 (11 - 45)	33 (13 - 53)
Houston	Houston	13 (-2 - 27)	8 (-1 - 16)	6 (-1 - 13)	4 (-1 - 9)
	19 U.S. Cities	13 (5 - 21)	8 (3 - 13)	6 (2 - 10)	4 (2 - 7)
Los Angeles	Los Angeles	90 (1 - 178)	50 (0 - 98)	24 (0 - 48)	19 (0 - 37)
	19 U.S. Cities	104 (40 - 168)	57 (22 - 93)	28 (11 - 45)	22 (8 - 35)
New York	New York	97 (31 - 161)	53 (17 - 89)	50 (16 - 83)	53 (17 - 89)
	19 U.S. Cities	71 (27 - 114)	39 (15 - 63)	36 (14 - 59)	39 (15 - 63)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table H-8. Estimated Cardiorespiratory Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2003 O_3 Concentrations*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
		2003 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Atlanta	0.5 (-0.2 - 1.2)	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.7)	0.3 (-0.1 - 0.7)
	19 U.S. Cities	0.5 (0.2 - 0.9)	0.4 (0.2 - 0.7)	0.3 (0.1 - 0.5)	0.3 (0.1 - 0.5)
Chicago	Chicago	0.6 (-0.5 - 1.6)	0.3 (-0.3 - 0.8)	0.3 (-0.3 - 0.9)	0.4 (-0.3 - 1.1)
	19 U.S. Cities	0.9 (0.4 - 1.5)	0.5 (0.2 - 0.8)	0.5 (0.2 - 0.8)	0.6 (0.2 - 1)
Houston	Houston	0.4 (0 - 0.8)	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.1 (0 - 0.3)
	19 U.S. Cities	0.4 (0.1 - 0.6)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.1 (0 - 0.2)
Los Angeles	Los Angeles	0.9 (0 - 1.9)	0.5 (0 - 1)	0.3 (0 - 0.5)	0.2 (0 - 0.4)
	19 U.S. Cities	1.1 (0.4 - 1.8)	0.6 (0.2 - 1)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
New York	New York	1.1 (0.3 - 1.8)	0.6 (0.2 - 1)	0.6 (0.2 - 0.9)	0.6 (0.2 - 1)
	19 U.S. Cities	0.8 (0.3 - 1.3)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)	0.4 (0.2 - 0.7)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table H-9. Estimated Percent of Total Incidence of Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2003 O_3 Concentrations*

Risk Assessment Location	Study Location	Percent of Total Incidence of Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
		2003 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Atlanta	0.8% (-0.3% - 1.8%)	0.6% (-0.2% - 1.4%)	0.4% (-0.1% - 1%)	0.5% (-0.2% - 1.1%)
	19 U.S. Cities	0.8% (0.3% - 1.3%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.7%)	0.5% (0.2% - 0.8%)
Chicago	Chicago	0.6% (-0.5% - 1.7%)	0.3% (-0.3% - 0.9%)	0.3% (-0.3% - 1%)	0.4% (-0.4% - 1.1%)
	19 U.S. Cities	1% (0.4% - 1.6%)	0.5% (0.2% - 0.8%)	0.5% (0.2% - 0.9%)	0.6% (0.2% - 1%)
Houston	Houston	0.6% (-0.1% - 1.3%)	0.4% (0% - 0.8%)	0.3% (0% - 0.6%)	0.2% (0% - 0.4%)
	19 U.S. Cities	0.6% (0.2% - 1%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.3%)
Los Angeles	Los Angeles	1.2% (0% - 2.4%)	0.7% (0% - 1.3%)	0.3% (0% - 0.6%)	0.3% (0% - 0.5%)
	19 U.S. Cities	1.4% (0.5% - 2.3%)	0.8% (0.3% - 1.3%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.5%)
New York	New York	1.1% (0.3% - 1.8%)	0.6% (0.2% - 1%)	0.6% (0.2% - 0.9%)	0.6% (0.2% - 1%)
	19 U.S. Cities	0.8% (0.3% - 1.3%)	0.4% (0.2% - 0.7%)	0.4% (0.2% - 0.7%)	0.4% (0.2% - 0.7%)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table H-10. Estimated Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2004 O_3 Concentrations*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
		2004 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Atlanta	8 (-3 - 18)	6 (-2 - 14)	5 (-1 - 10)	3 (-1 - 7)
	19 U.S. Cities	8 (3 - 13)	6 (2 - 10)	5 (2 - 8)	3 (1 - 5)
Chicago	Chicago	23 (-21 - 66)	16 (-14 - 45)	11 (-10 - 31)	7 (-6 - 19)
	19 U.S. Cities	38 (14 - 61)	26 (10 - 41)	18 (7 - 29)	11 (4 - 18)
Houston	Houston	16 (0 - 32)	8 (-1 - 16)	6 (-1 - 12)	3 (0 - 6)
	19 U.S. Cities	14 (5 - 22)	8 (3 - 13)	6 (2 - 9)	3 (1 - 5)
Los Angeles	Los Angeles	15 (-2 - 31)	50 (0 - 98)	33 (0 - 65)	15 (0 - 30)
	19 U.S. Cities	14 (5 - 22)	57 (22 - 93)	38 (15 - 62)	17 (7 - 28)
New York	New York	12 (-2 - 26)	53 (17 - 89)	41 (13 - 68)	29 (9 - 49)
	19 U.S. Cities	13 (5 - 20)	39 (15 - 63)	30 (11 - 48)	21 (8 - 34)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O_3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences are rounded to the nearest whole number.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table H-11. Estimated Cardiorespiratory Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2004 O3 Concentrations*

Risk Assessment Location	Study Location	Cardiorespiratory Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
		2004 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Atlanta	0.5 (-0.2 - 1.2)	0.4 (-0.1 - 0.9)	0.3 (-0.1 - 0.7)	0.2 (-0.1 - 0.5)
	19 U.S. Cities	0.5 (0.2 - 0.9)	0.4 (0.2 - 0.7)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)
Chicago	Chicago	0.4 (-0.4 - 1.2)	0.3 (-0.3 - 0.8)	0.2 (-0.2 - 0.6)	0.1 (-0.1 - 0.4)
	19 U.S. Cities	0.7 (0.3 - 1.1)	0.5 (0.2 - 0.8)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.3)
Houston	Houston	1.2 (0 - 2.3)	0.2 (0 - 0.5)	0.2 (0 - 0.4)	0.1 (0 - 0.2)
	19 U.S. Cities	1 (0.4 - 1.6)	0.2 (0.1 - 0.4)	0.2 (0.1 - 0.3)	0.1 (0 - 0.1)
Los Angeles	Los Angeles	0.7 (-0.1 - 1.5)	0.5 (0 - 1)	0.3 (0 - 0.7)	0.2 (0 - 0.3)
	19 U.S. Cities	0.7 (0.3 - 1.1)	0.6 (0.2 - 1)	0.4 (0.2 - 0.6)	0.2 (0.1 - 0.3)
New York	New York	0.4 (0 - 0.8)	0.6 (0.2 - 1)	0.5 (0.1 - 0.8)	0.3 (0.1 - 0.5)
	19 U.S. Cities	0.4 (0.1 - 0.6)	0.4 (0.2 - 0.7)	0.3 (0.1 - 0.5)	0.2 (0.1 - 0.4)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O_3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Incidences per 100,000 relevant population are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table H-12. Estimated Percent of Total Incidence of Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Two Alternative 8-Hour Daily Maximum Standards: April - September, Based on Adjusting 2004 O_3 Concentrations*

Risk Assessment Location	Study Location	Percent of Total Incidence of Cardiorespiratory Mortality Associated with O_3 Concentrations that Just Meet the Current and Alternative O_3 Standards**			
		2004 Air Quality	0.084/4***	0.074/4	0.064/4
Atlanta	Atlanta	0.8% (-0.3% - 1.8%)	0.6% (-0.2% - 1.4%)	0.5% (-0.2% - 1.1%)	0.3% (-0.1% - 0.8%)
	19 U.S. Cities	0.8% (0.3% - 1.3%)	0.6% (0.2% - 1%)	0.5% (0.2% - 0.8%)	0.3% (0.1% - 0.6%)
Chicago	Chicago	0.4% (-0.4% - 1.3%)	0.3% (-0.3% - 0.9%)	0.2% (-0.2% - 0.6%)	0.1% (-0.1% - 0.4%)
	19 U.S. Cities	0.7% (0.3% - 1.2%)	0.5% (0.2% - 0.8%)	0.4% (0.1% - 0.6%)	0.2% (0.1% - 0.3%)
Houston	Houston	0.9% (0% - 1.7%)	0.4% (0% - 0.8%)	0.3% (0% - 0.6%)	0.1% (0% - 0.3%)
	19 U.S. Cities	0.7% (0.3% - 1.2%)	0.4% (0.1% - 0.6%)	0.3% (0.1% - 0.4%)	0.1% (0.1% - 0.2%)
Los Angeles	Los Angeles	0.6% (-0.1% - 1.3%)	0.7% (0% - 1.3%)	0.4% (0% - 0.9%)	0.2% (0% - 0.4%)
	19 U.S. Cities	0.6% (0.2% - 0.9%)	0.8% (0.3% - 1.3%)	0.5% (0.2% - 0.8%)	0.2% (0.1% - 0.4%)
New York	New York	0.6% (-0.1% - 1.2%)	0.6% (0.2% - 1%)	0.5% (0.1% - 0.8%)	0.3% (0.1% - 0.5%)
	19 U.S. Cities	0.6% (0.2% - 1%)	0.4% (0.2% - 0.7%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)

*All results are for cardiovascular and respiratory mortality (among all ages) associated with short-term exposures to O_3. Results are based on single-pollutant single-city models or a single-pollutant multi-city model estimated in Huang et al. (2004).

**Incidence was quantified down to estimated policy relevant background levels. Percents are rounded to the nearest tenth.

***These 8-hr average standards, denoted m/n, are characterized by a concentration of m ppm and an nth daily maximum. So, for example, the current standard is 0.084/4 -- 0.084 ppm, 4th daily maximum 8-hr average. These nth daily maximum standards require that the average of the 3 annual nth daily maxima over a 3-year period be at or below the specified level (e.g., 0.084 ppm).

Note: Numbers in parentheses are 95% credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Appendix I: Additional PRB Sensitivity Analyses

Table I-1. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality Associated with "As Is" O_3 Concentrations: April - September, 2004*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	6 (-26 - 38)	14 (-61 - 87)	3 (-14 - 20)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 20)	28 (9 - 46)	7 (2 - 11)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	7 (2 - 12)	11 (4 - 19)	4 (1 - 7)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	49 (16 - 81)	85 (28 - 141)	21 (7 - 36)
	Schwartz (2004)	0-day lag	1 hr max.	394 (125 - 658)	493 (157 - 822)	298 (94 - 498)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	148 (46 - 250)	186 (58 - 313)	112 (35 - 189)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	27 (-17 - 69)	45 (-29 - 118)	14 (-9 - 37)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 28)	29 (10 - 48)	9 (3 - 15)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	33 (-11 - 76)	61 (-20 - 140)	16 (-5 - 36)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 28)	31 (10 - 52)	8 (3 - 13)
	Schwartz (2004)	0-day lag	1 hr max.	128 (-21 - 274)	159 (-26 - 339)	99 (-16 - 211)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	70 (22 - 117)	86 (27 - 145)	54 (17 - 90)
	Ito (2003)	0-day lag	24 hr avg.	40 (-37 - 116)	74 (-68 - 213)	19 (-18 - 55)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	35 (2 - 67)	54 (3 - 104)	19 (1 - 37)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 28)	27 (9 - 44)	10 (3 - 16)
	Schwartz (2004)	0-day lag	1 hr max.	93 (9 - 176)	110 (10 - 208)	78 (7 - 148)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	78 (24 - 130)	92 (29 - 154)	65 (20 - 109)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	62 (-149 - 271)	85 (-206 - 372)	40 (-97 - 177)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	133 (45 - 221)	183 (62 - 304)	87 (29 - 145)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	60 (20 - 100)	105 (35 - 174)	30 (10 - 50)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	23 (8 - 38)	36 (12 - 60)	12 (4 - 21)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	82 (52 - 112)	129 (81 - 176)	45 (28 - 61)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	12 (-36 - 59)	17 (-52 - 85)	7 (-22 - 36)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	18 (6 - 29)	25 (9 - 42)	11 (4 - 18)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	3 (-6 - 13)	7 (-11 - 24)	1 (-2 - 5)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	3 (1 - 5)	6 (2 - 10)	1 (0 - 2)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	8 (3 - 14)	13 (4 - 21)	5 (2 - 8)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-2. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality Associated with "As Is" O_3 Concentrations: April - September, 2002*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	9 (-37 - 54)	17 (-72 - 103)	6 (-25 - 35)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 29)	33 (11 - 55)	11 (4 - 19)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	10 (3 - 17)	15 (5 - 25)	7 (2 - 12)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	69 (23 - 115)	104 (35 - 173)	42 (14 - 70)
	Schwartz (2004)	0-day lag	1 hr max.	505 (161 - 840)	605 (193 - 1005)	410 (130 - 683)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	191 (60 - 321)	229 (72 - 384)	155 (49 - 260)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	61 (-38 - 157)	81 (-51 - 210)	43 (-27 - 112)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	38 (13 - 64)	52 (17 - 86)	27 (9 - 46)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	57 (-18 - 131)	86 (-28 - 197)	36 (-11 - 82)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	29 (10 - 48)	44 (15 - 73)	18 (6 - 30)
	Schwartz (2004)	0-day lag	1 hr max.	181 (-30 - 385)	212 (-35 - 451)	150 (-25 - 320)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	99 (31 - 165)	116 (36 - 194)	82 (26 - 138)
	Ito (2003)	0-day lag	24 hr avg.	69 (-64 - 198)	105 (-98 - 300)	43 (-40 - 125)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	29 (2 - 57)	48 (3 - 93)	17 (1 - 32)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	14 (5 - 24)	24 (8 - 39)	8 (3 - 14)
	Schwartz (2004)	0-day lag	1 hr max.	85 (8 - 161)	103 (9 - 194)	69 (6 - 132)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	71 (22 - 119)	86 (27 - 144)	58 (18 - 97)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	51 (-124 - 224)	73 (-178 - 322)	31 (-76 - 138)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	110 (37 - 184)	158 (53 - 263)	68 (23 - 113)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	105 (35 - 174)	156 (52 - 258)	69 (23 - 115)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	37 (12 - 62)	51 (17 - 85)	26 (9 - 43)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	132 (83 - 180)	181 (114 - 247)	91 (57 - 124)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	16 (-48 - 78)	21 (-63 - 102)	11 (-35 - 56)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	23 (8 - 39)	31 (10 - 51)	17 (6 - 28)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	6 (-11 - 23)	10 (-17 - 36)	4 (-6 - 14)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	6 (2 - 10)	9 (3 - 15)	3 (1 - 6)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	15 (5 - 25)	20 (7 - 33)	11 (4 - 18)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-3. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with "As Is" O_3 Concentrations: April - September, 2004*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.4 (-1.8 - 2.6)	0.9 (-4.1 - 5.9)	0.2 (-1 - 1.4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.8 (0.3 - 1.4)	1.9 (0.6 - 3.1)	0.4 (0.1 - 0.7)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.0 (0.3 - 1.7)	1.6 (0.5 - 2.7)	0.6 (0.2 - 1)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.9 (0.3 - 1.5)	1.6 (0.5 - 2.6)	0.4 (0.1 - 0.7)
	Schwartz (2004)	0-day lag	1 hr max.	7.3 (2.3 - 12.2)	9.2 (2.9 - 15.3)	5.5 (1.8 - 9.3)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.8 (0.9 - 4.6)	3.5 (1.1 - 5.8)	2.1 (0.7 - 3.5)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	1.9 (-1.2 - 5)	3.3 (-2.1 - 8.5)	1.0 (-0.6 - 2.7)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.2 (0.4 - 2)	2.1 (0.7 - 3.4)	0.6 (0.2 - 1.1)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	1.6 (-0.5 - 3.7)	2.9 (-0.9 - 6.8)	0.8 (-0.2 - 1.8)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.8 (0.3 - 1.4)	1.5 (0.5 - 2.5)	0.4 (0.1 - 0.6)
	Schwartz (2004)	0-day lag	1 hr max.	6.2 (-1 - 13.3)	7.7 (-1.3 - 16.5)	4.8 (-0.8 - 10.2)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	3.4 (1.1 - 5.7)	4.2 (1.3 - 7)	2.6 (0.8 - 4.4)
	Ito (2003)	0-day lag	24 hr avg.	2.0 (-1.8 - 5.6)	3.6 (-3.3 - 10.3)	0.9 (-0.9 - 2.7)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	1.0 (0.1 - 2)	1.6 (0.1 - 3.1)	0.6 (0 - 1.1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5 (0.2 - 0.8)	0.8 (0.3 - 1.3)	0.3 (0.1 - 0.5)
	Schwartz (2004)	0-day lag	1 hr max.	2.7 (0.3 - 5.2)	3.2 (0.3 - 6.1)	2.3 (0.2 - 4.3)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.3 (0.7 - 3.8)	2.7 (0.8 - 4.5)	1.9 (0.6 - 3.2)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.6 (-1.6 - 2.8)	0.9 (-2.2 - 3.9)	0.4 (-1 - 1.9)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.4 (0.5 - 2.3)	1.9 (0.6 - 3.2)	0.9 (0.3 - 1.5)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.7 (0.2 - 1.1)	1.2 (0.4 - 1.9)	0.3 (0.1 - 0.6)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.5 (0.5 - 2.5)	2.4 (0.8 - 4)	0.8 (0.3 - 1.4)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	5.4 (3.4 - 7.4)	8.5 (5.3 - 11.6)	2.9 (1.8 - 4)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	1.0 (-3 - 4.8)	1.4 (-4.3 - 6.9)	0.6 (-1.8 - 3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.4 (0.5 - 2.4)	2.1 (0.7 - 3.4)	0.9 (0.3 - 1.5)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	1.0 (-1.7 - 3.6)	1.9 (-3.2 - 6.9)	0.4 (-0.6 - 1.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.9 (0.3 - 1.5)	1.7 (0.6 - 2.8)	0.3 (0.1 - 0.5)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.5 (0.5 - 2.4)	2.2 (0.7 - 3.7)	0.8 (0.3 - 1.4)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-4. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with "As Is" O_3 Concentrations: April - September, 2002*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.6 (-2.5 - 3.6)	1.1 (-4.9 - 6.9)	0.4 (-1.7 - 2.4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.2 (0.4 - 1.9)	2.2 (0.7 - 3.7)	0.8 (0.3 - 1.3)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.5 (0.5 - 2.5)	2.2 (0.7 - 3.6)	1.0 (0.3 - 1.7)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.3 (0.4 - 2.1)	1.9 (0.7 - 3.2)	0.8 (0.3 - 1.3)
	Schwartz (2004)	0-day lag	1 hr max.	9.4 (3 - 15.6)	11.2 (3.6 - 18.7)	7.6 (2.4 - 12.7)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	3.6 (1.1 - 6)	4.3 (1.3 - 7.2)	2.9 (0.9 - 4.8)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	4.3 (-2.7 - 11.3)	5.8 (-3.7 - 15.1)	3.1 (-2 - 8)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	2.8 (0.9 - 4.6)	3.7 (1.2 - 6.2)	2.0 (0.7 - 3.3)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	2.8 (-0.9 - 6.3)	4.2 (-1.4 - 9.6)	1.7 (-0.6 - 4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.4 (0.5 - 2.3)	2.1 (0.7 - 3.5)	0.9 (0.3 - 1.5)
	Schwartz (2004)	0-day lag	1 hr max.	8.8 (-1.4 - 18.7)	10.3 (-1.7 - 21.9)	7.3 (-1.2 - 15.5)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	4.8 (1.5 - 8)	5.6 (1.8 - 9.4)	4.0 (1.2 - 6.7)
	Ito (2003)	0-day lag	24 hr avg.	3.4 (-3.1 - 9.6)	5.1 (-4.7 - 14.6)	2.1 (-2 - 6)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.9 (0.1 - 1.7)	1.4 (0.1 - 2.7)	0.5 (0 - 0.9)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4 (0.1 - 0.7)	0.7 (0.2 - 1.2)	0.2 (0.1 - 0.4)
	Schwartz (2004)	0-day lag	1 hr max.	2.5 (0.2 - 4.7)	3.0 (0.3 - 5.7)	2.0 (0.2 - 3.9)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.1 (0.7 - 3.5)	2.5 (0.8 - 4.2)	1.7 (0.5 - 2.9)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.5 (-1.3 - 2.4)	0.8 (-1.9 - 3.4)	0.3 (-0.8 - 1.5)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.2 (0.4 - 1.9)	1.7 (0.6 - 2.8)	0.7 (0.2 - 1.2)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.2 (0.4 - 2)	1.7 (0.6 - 2.9)	0.8 (0.3 - 1.3)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	2.4 (0.8 - 4.1)	3.4 (1.1 - 5.6)	1.7 (0.6 - 2.8)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	8.7 (5.5 - 11.9)	11.9 (7.5 - 16.2)	6.0 (3.8 - 8.2)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	1.3 (-3.9 - 6.4)	1.7 (-5.2 - 8.4)	0.9 (-2.8 - 4.6)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.9 (0.6 - 3.2)	2.5 (0.8 - 4.2)	1.4 (0.5 - 2.3)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	1.9 (-3.1 - 6.7)	2.8 (-4.8 - 10.3)	1.1 (-1.8 - 3.9)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.7 (0.6 - 2.8)	2.5 (0.8 - 4.2)	1.0 (0.3 - 1.6)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	2.6 (0.9 - 4.4)	3.5 (1.2 - 5.8)	1.9 (0.6 - 3.2)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-5. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current Standard (0.084 ppm, 4th Daily Maximum): April - September, 2004*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	5 (-20 - 29)	12 (-53 - 76)	2 (-9 - 14)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	9 (3 - 15)	24 (8 - 40)	4 (1 - 7)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	6 (2 - 9)	10 (3 - 16)	3 (1 - 5)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	30 (10 - 50)	67 (23 - 112)	12 (4 - 19)
	Schwartz (2004)	0-day lag	1 hr max.	310 (98 - 519)	412 (131 - 689)	220 (70 - 368)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	117 (37 - 197)	155 (49 - 262)	83 (26 - 139)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	20 (-12 - 51)	36 (-22 - 93)	9 (-5 - 23)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 21)	23 (8 - 38)	6 (2 - 9)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	23 (-8 - 54)	49 (-16 - 113)	10 (-3 - 23)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 20)	25 (8 - 42)	5 (2 - 8)
	Schwartz (2004)	0-day lag	1 hr max.	105 (-17 - 226)	138 (-22 - 294)	78 (-13 - 167)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	57 (18 - 96)	75 (23 - 126)	42 (13 - 71)
	Ito (2003)	0-day lag	24 hr avg.	29 (-26 - 83)	60 (-55 - 172)	12 (-11 - 35)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	22 (1 - 42)	39 (2 - 75)	9 (1 - 18)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	11 (4 - 18)	19 (6 - 32)	5 (2 - 8)
	Schwartz (2004)	0-day lag	1 hr max.	70 (6 - 133)	86 (8 - 163)	56 (5 - 106)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	58 (18 - 98)	72 (23 - 121)	47 (15 - 79)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	32 (-77 - 141)	52 (-126 - 228)	13 (-31 - 57)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	69 (23 - 115)	112 (38 - 187)	28 (9 - 46)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	43 (15 - 72)	76 (25 - 126)	15 (5 - 24)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	17 (6 - 28)	29 (10 - 48)	7 (2 - 12)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	61 (38 - 83)	103 (64 - 140)	26 (17 - 36)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	8 (-25 - 41)	13 (-40 - 65)	4 (-13 - 21)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 20)	20 (7 - 32)	6 (2 - 11)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	3 (-4 - 9)	5 (-9 - 20)	1 (-1 - 3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	2 (1 - 4)	5 (2 - 8)	1 (0 - 1)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	7 (2 - 12)	10 (3 - 17)	3 (1 - 5)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-6. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet the Current Standard (0.084 ppm, 4th Daily Maximum): April - September, 2002*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	7 (-30 - 43)	15 (-63 - 90)	4 (-18 - 26)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	14 (5 - 23)	29 (10 - 48)	8 (3 - 14)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	9 (3 - 15)	13 (4 - 21)	6 (2 - 9)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	55 (18 - 91)	88 (29 - 146)	31 (10 - 51)
	Schwartz (2004)	0-day lag	1 hr max.	427 (136 - 712)	526 (167 - 876)	333 (106 - 556)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	161 (51 - 271)	199 (62 - 334)	126 (39 - 212)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	49 (-31 - 128)	69 (-44 - 180)	33 (-21 - 87)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	31 (10 - 52)	44 (15 - 73)	21 (7 - 35)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	46 (-15 - 106)	73 (-24 - 169)	27 (-9 - 63)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	24 (8 - 39)	38 (13 - 62)	14 (5 - 23)
	Schwartz (2004)	0-day lag	1 hr max.	158 (-26 - 336)	189 (-31 - 403)	128 (-21 - 273)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	86 (27 - 144)	103 (32 - 173)	70 (22 - 117)
	Ito (2003)	0-day lag	24 hr avg.	56 (-52 - 162)	89 (-83 - 256)	33 (-31 - 95)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	18 (1 - 34)	34 (2 - 65)	8 (1 - 16)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	9 (3 - 15)	17 (6 - 28)	4 (1 - 7)
	Schwartz (2004)	0-day lag	1 hr max.	63 (6 - 119)	80 (7 - 151)	48 (4 - 92)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	53 (16 - 88)	66 (21 - 112)	40 (13 - 68)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	24 (-58 - 105)	44 (-106 - 192)	9 (-22 - 41)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	52 (17 - 86)	95 (32 - 157)	20 (7 - 33)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	84 (28 - 139)	121 (41 - 202)	45 (15 - 74)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	30 (10 - 50)	43 (14 - 71)	19 (6 - 32)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	107 (67 - 146)	152 (96 - 208)	68 (43 - 94)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	12 (-37 - 60)	17 (-51 - 83)	8 (-24 - 40)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	18 (6 - 30)	25 (8 - 41)	12 (4 - 20)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	5 (-9 - 20)	9 (-15 - 31)	3 (-5 - 11)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	5 (2 - 8)	8 (3 - 13)	3 (1 - 4)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	14 (5 - 23)	17 (6 - 28)	9 (3 - 14)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-7. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet An Alternative Standard of 0.074 ppm, 4th Daily Maximum: April - September, 2004*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	4 (-15 - 22)	11 (-47 - 68)	1 (-6 - 9)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	7 (2 - 12)	22 (7 - 36)	3 (1 - 5)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	4 (1 - 7)	8 (3 - 14)	2 (1 - 3)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	23 (8 - 39)	55 (19 - 92)	6 (2 - 10)
	Schwartz (2004)	0-day lag	1 hr max.	249 (79 - 417)	347 (110 - 580)	157 (50 - 263)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	93 (29 - 157)	131 (41 - 220)	59 (18 - 99)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	14 (-9 - 37)	30 (-19 - 78)	6 (-3 - 14)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	9 (3 - 15)	19 (6 - 32)	3 (1 - 6)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	17 (-6 - 40)	40 (-13 - 93)	6 (-2 - 13)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	9 (3 - 15)	21 (7 - 34)	3 (1 - 5)
	Schwartz (2004)	0-day lag	1 hr max.	87 (-14 - 186)	117 (-19 - 251)	59 (-9 - 126)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	47 (15 - 79)	64 (20 - 107)	32 (10 - 54)
	Ito (2003)	0-day lag	24 hr avg.	21 (-20 - 62)	49 (-45 - 142)	7 (-6 - 20)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	16 (1 - 30)	32 (2 - 62)	6 (0 - 11)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	8 (3 - 13)	16 (5 - 26)	3 (1 - 5)
	Schwartz (2004)	0-day lag	1 hr max.	57 (5 - 109)	73 (7 - 139)	44 (4 - 84)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	48 (15 - 81)	61 (19 - 103)	37 (12 - 62)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	20 (-49 - 90)	41 (-98 - 179)	6 (-15 - 27)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	44 (15 - 74)	88 (29 - 146)	13 (4 - 22)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	33 (11 - 55)	64 (21 - 106)	9 (3 - 15)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	13 (4 - 21)	25 (8 - 41)	5 (2 - 8)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	46 (29 - 63)	88 (55 - 120)	17 (11 - 24)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	7 (-21 - 34)	11 (-35 - 57)	3 (-9 - 16)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	10 (3 - 17)	17 (6 - 28)	5 (2 - 8)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	2 (-3 - 6)	4 (-7 - 16)	0 (-1 - 1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1 (0 - 2)	4 (1 - 6)	0 (0 - 0)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	6 (2 - 9)	9 (3 - 14)	2 (1 - 3)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-8. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet An Alternative Standard of 0.074 ppm, 4th Daily Maximum: April - September, 2002*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	6 (-24 - 35)	13 (-57 - 81)	3 (-13 - 19)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	11 (4 - 19)	26 (9 - 43)	6 (2 - 10)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	7 (3 - 12)	12 (4 - 19)	5 (2 - 8)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	44 (15 - 74)	76 (26 - 127)	22 (7 - 37)
	Schwartz (2004)	0-day lag	1 hr max.	361 (115 - 603)	460 (146 - 767)	269 (85 - 450)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	136 (43 - 229)	174 (54 - 292)	102 (32 - 171)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	42 (-26 - 109)	62 (-39 - 160)	27 (-17 - 71)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	27 (9 - 44)	39 (13 - 65)	17 (6 - 29)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	38 (-12 - 87)	64 (-21 - 146)	20 (-7 - 47)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	19 (6 - 32)	33 (11 - 54)	10 (3 - 17)
	Schwartz (2004)	0-day lag	1 hr max.	134 (-22 - 287)	166 (-27 - 354)	105 (-17 - 224)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	73 (23 - 123)	90 (28 - 152)	57 (18 - 96)
	Ito (2003)	0-day lag	24 hr avg.	46 (-42 - 132)	77 (-72 - 223)	25 (-23 - 72)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	13 (1 - 25)	27 (2 - 53)	5 (0 - 10)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	6 (2 - 10)	13 (4 - 22)	2 (1 - 4)
	Schwartz (2004)	0-day lag	1 hr max.	51 (5 - 97)	67 (6 - 128)	37 (3 - 71)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	43 (13 - 72)	56 (18 - 95)	31 (10 - 52)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	15 (-35 - 64)	33 (-80 - 145)	4 (-10 - 18)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	32 (11 - 53)	71 (24 - 118)	9 (3 - 15)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	70 (23 - 116)	107 (36 - 177)	34 (12 - 57)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	26 (9 - 42)	38 (13 - 63)	16 (5 - 26)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	91 (57 - 124)	136 (85 - 185)	55 (35 - 76)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	10 (-32 - 52)	15 (-46 - 74)	7 (-20 - 33)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	15 (5 - 26)	22 (7 - 37)	10 (3 - 16)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	4 (-7 - 15)	7 (-12 - 27)	2 (-4 - 8)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	4 (1 - 6)	7 (2 - 11)	2 (1 - 3)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	12 (4 - 19)	15 (5 - 25)	7 (2 - 12)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.
**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.
***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.
Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-9. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet An Alternative Standard of 0.064 ppm, 4th Daily Maximum: April - September, 2004*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	3 (-11 - 16)	10 (-41 - 59)	1 (-4 - 5)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	5 (2 - 8)	19 (6 - 31)	2 (1 - 3)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	3 (1 - 6)	7 (2 - 11)	1 (0 - 2)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	14 (5 - 24)	43 (14 - 72)	2 (1 - 4)
	Schwartz (2004)	0-day lag	1 hr max.	183 (58 - 307)	281 (89 - 470)	98 (31 - 164)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	69 (21 - 116)	105 (33 - 178)	37 (11 - 62)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	10 (-6 - 26)	24 (-15 - 63)	3 (-2 - 8)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	6 (2 - 11)	15 (5 - 26)	2 (1 - 3)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	11 (-4 - 27)	32 (-10 - 73)	2 (-1 - 5)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	6 (2 - 10)	16 (5 - 27)	1 (0 - 2)
	Schwartz (2004)	0-day lag	1 hr max.	66 (-11 - 142)	97 (-16 - 207)	40 (-6 - 85)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	36 (11 - 61)	52 (16 - 88)	21 (7 - 36)
	Ito (2003)	0-day lag	24 hr avg.	14 (-13 - 41)	38 (-35 - 111)	3 (-3 - 8)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	8 (0 - 15)	21 (1 - 41)	2 (0 - 3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	4 (1 - 6)	10 (3 - 17)	1 (0 - 1)
	Schwartz (2004)	0-day lag	1 hr max.	42 (4 - 80)	56 (5 - 106)	30 (3 - 56)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	35 (11 - 59)	47 (15 - 79)	25 (8 - 42)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	9 (-22 - 41)	27 (-64 - 117)	1 (-3 - 6)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	20 (7 - 33)	57 (19 - 96)	3 (1 - 5)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	24 (8 - 39)	51 (17 - 84)	4 (1 - 7)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	9 (3 - 15)	20 (7 - 34)	3 (1 - 4)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	33 (21 - 46)	73 (46 - 100)	10 (6 - 13)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	5 (-16 - 26)	10 (-29 - 48)	2 (-6 - 10)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	8 (3 - 13)	14 (5 - 24)	3 (1 - 5)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	1 (-1 - 3)	3 (-5 - 11)	0 (0 - 0)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1 (0 - 1)	3 (1 - 5)	0 (0 - 0)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	4 (1 - 7)	7 (2 - 12)	1 (0 - 2)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-10. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality Associated with O_3 Concentrations that Just Meet An Alternative Standard of 0.064 ppm, 4th Daily Maximum: April - September, 2002*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	4 (-19 - 27)	12 (-50 - 72)	2 (-9 - 13)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	9 (3 - 14)	23 (8 - 38)	4 (1 - 7)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	6 (2 - 10)	10 (3 - 17)	3 (1 - 6)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	34 (11 - 57)	65 (22 - 108)	15 (5 - 25)
	Schwartz (2004)	0-day lag	1 hr max.	294 (93 - 493)	393 (125 - 656)	206 (65 - 345)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	111 (35 - 187)	148 (46 - 249)	77 (24 - 130)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	35 (-22 - 91)	54 (-34 - 141)	21 (-13 - 55)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	22 (7 - 37)	34 (12 - 57)	13 (4 - 22)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	29 (-9 - 67)	54 (-17 - 124)	14 (-4 - 32)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	15 (5 - 25)	28 (9 - 46)	7 (2 - 12)
	Schwartz (2004)	0-day lag	1 hr max.	111 (-18 - 239)	143 (-23 - 305)	83 (-13 - 177)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	61 (19 - 102)	78 (24 - 130)	45 (14 - 75)
	Ito (2003)	0-day lag	24 hr avg.	36 (-33 - 103)	66 (-61 - 189)	17 (-16 - 49)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	7 (0 - 13)	17 (1 - 34)	2 (0 - 4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	3 (1 - 5)	9 (3 - 14)	1 (0 - 2)
	Schwartz (2004)	0-day lag	1 hr max.	36 (3 - 69)	51 (5 - 97)	24 (2 - 46)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	30 (9 - 51)	43 (13 - 72)	20 (6 - 34)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	7 (-16 - 29)	21 (-50 - 91)	1 (-2 - 4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	14 (5 - 23)	45 (15 - 74)	2 (1 - 3)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	57 (19 - 95)	87 (29 - 145)	23 (8 - 38)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	21 (7 - 35)	33 (11 - 56)	12 (4 - 20)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	75 (47 - 103)	119 (75 - 163)	43 (27 - 59)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	9 (-27 - 44)	13 (-40 - 66)	5 (-16 - 26)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	13 (4 - 22)	20 (7 - 33)	8 (3 - 13)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	3 (-5 - 12)	6 (-10 - 22)	1 (-2 - 5)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	3 (1 - 5)	5 (2 - 9)	1 (0 - 2)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	10 (3 - 16)	13 (5 - 22)	6 (2 - 9)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-11. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current Standard (0.084 ppm, 4th Daily Maximum): April - September, 2004*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.3 (-1.3 - 1.9)	0.8 (-3.5 - 5.1)	0.1 (-0.6 - 0.9)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 1)	1.6 (0.5 - 2.7)	0.3 (0.1 - 0.5)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.8 (0.3 - 1.4)	1.4 (0.5 - 2.3)	0.4 (0.1 - 0.7)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 0.9)	1.3 (0.4 - 2.1)	0.2 (0.1 - 0.4)
	Schwartz (2004)	0-day lag	1 hr max.	5.8 (1.8 - 9.7)	7.7 (2.4 - 12.8)	4.1 (1.3 - 6.8)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.2 (0.7 - 3.7)	2.9 (0.9 - 4.9)	1.5 (0.5 - 2.6)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	1.4 (-0.9 - 3.7)	2.6 (-1.6 - 6.7)	0.6 (-0.4 - 1.6)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.9 (0.3 - 1.5)	1.6 (0.5 - 2.7)	0.4 (0.1 - 0.7)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	1.1 (-0.4 - 2.6)	2.4 (-0.8 - 5.5)	0.5 (-0.2 - 1.1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 1)	1.2 (0.4 - 2)	0.2 (0.1 - 0.4)
	Schwartz (2004)	0-day lag	1 hr max.	5.1 (-0.8 - 10.9)	6.7 (-1.1 - 14.3)	3.8 (-0.6 - 8.1)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.8 (0.9 - 4.7)	3.6 (1.1 - 6.1)	2.1 (0.6 - 3.5)
	Ito (2003)	0-day lag	24 hr avg.	1.4 (-1.3 - 4)	2.9 (-2.7 - 8.4)	0.6 (-0.5 - 1.7)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.6 (0 - 1.2)	1.1 (0.1 - 2.2)	0.3 (0 - 0.5)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3 (0.1 - 0.5)	0.6 (0.2 - 0.9)	0.1 (0 - 0.2)
	Schwartz (2004)	0-day lag	1 hr max.	2.1 (0.2 - 3.9)	2.5 (0.2 - 4.8)	1.6 (0.2 - 3.1)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	1.7 (0.5 - 2.9)	2.1 (0.7 - 3.6)	1.4 (0.4 - 2.3)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.3 (-0.8 - 1.5)	0.5 (-1.3 - 2.4)	0.1 (-0.3 - 0.6)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.7 (0.2 - 1.2)	1.2 (0.4 - 2)	0.3 (0.1 - 0.5)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5 (0.2 - 0.8)	0.8 (0.3 - 1.4)	0.2 (0.1 - 0.3)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.1 (0.4 - 1.9)	1.9 (0.6 - 3.2)	0.5 (0.2 - 0.8)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	4.0 (2.5 - 5.5)	6.8 (4.2 - 9.2)	1.7 (1.1 - 2.4)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.7 (-2.1 - 3.4)	1.1 (-3.3 - 5.4)	0.4 (-1.1 - 1.8)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.0 (0.3 - 1.7)	1.6 (0.5 - 2.7)	0.5 (0.2 - 0.9)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.7 (-1.2 - 2.7)	1.6 (-2.6 - 5.7)	0.2 (-0.3 - 0.8)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.7 (0.2 - 1.1)	1.4 (0.5 - 2.3)	0.2 (0.1 - 0.3)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.2 (0.4 - 2.1)	1.8 (0.6 - 3)	0.5 (0.2 - 0.9)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-12. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet the Current Standard (0.084 ppm, 4th Daily Maximum): April - September, 2002*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.5 (-2 - 2.9)	1.0 (-4.3 - 6.1)	0.3 (-1.2 - 1.8)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.9 (0.3 - 1.6)	1.9 (0.7 - 3.2)	0.6 (0.2 - 0.9)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.3 (0.4 - 2.1)	1.9 (0.6 - 3.1)	0.8 (0.3 - 1.4)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.0 (0.3 - 1.7)	1.6 (0.5 - 2.7)	0.6 (0.2 - 0.9)
	Schwartz (2004)	0-day lag	1 hr max.	7.9 (2.5 - 13.2)	9.8 (3.1 - 16.3)	6.2 (2 - 10.4)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	3.0 (0.9 - 5)	3.7 (1.2 - 6.2)	2.3 (0.7 - 3.9)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	3.5 (-2.2 - 9.2)	5.0 (-3.1 - 12.9)	2.4 (-1.5 - 6.2)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	2.2 (0.8 - 3.7)	3.2 (1.1 - 5.2)	1.5 (0.5 - 2.5)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	2.2 (-0.7 - 5.2)	3.6 (-1.2 - 8.2)	1.3 (-0.4 - 3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.1 (0.4 - 1.9)	1.8 (0.6 - 3)	0.7 (0.2 - 1.1)
	Schwartz (2004)	0-day lag	1 hr max.	7.7 (-1.3 - 16.3)	9.2 (-1.5 - 19.5)	6.2 (-1 - 13.2)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	4.2 (1.3 - 7)	5.0 (1.6 - 8.4)	3.4 (1.1 - 5.7)
	Ito (2003)	0-day lag	24 hr avg.	2.7 (-2.5 - 7.8)	4.3 (-4 - 12.4)	1.6 (-1.5 - 4.6)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.5 (0 - 1)	1.0 (0.1 - 1.9)	0.2 (0 - 0.5)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3 (0.1 - 0.4)	0.5 (0.2 - 0.8)	0.1 (0 - 0.2)
	Schwartz (2004)	0-day lag	1 hr max.	1.8 (0.2 - 3.5)	2.3 (0.2 - 4.4)	1.4 (0.1 - 2.7)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	1.5 (0.5 - 2.6)	2.0 (0.6 - 3.3)	1.2 (0.4 - 2)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.3 (-0.6 - 1.1)	0.5 (-1.1 - 2)	0.1 (-0.2 - 0.4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5 (0.2 - 0.9)	1.0 (0.3 - 1.7)	0.2 (0.1 - 0.3)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.9 (0.3 - 1.6)	1.4 (0.5 - 2.3)	0.5 (0.2 - 0.8)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	2.0 (0.7 - 3.3)	2.8 (0.9 - 4.7)	1.3 (0.4 - 2.1)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	7.0 (4.4 - 9.6)	10.0 (6.3 - 13.7)	4.5 (2.8 - 6.2)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	1.0 (-3 - 4.9)	1.4 (-4.2 - 6.8)	0.7 (-2 - 3.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.5 (0.5 - 2.4)	2.0 (0.7 - 3.4)	1.0 (0.3 - 1.6)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	1.6 (-2.6 - 5.6)	2.5 (-4.2 - 9)	0.9 (-1.4 - 3.1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.4 (0.5 - 2.3)	2.2 (0.7 - 3.7)	0.8 (0.3 - 1.3)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	2.4 (0.8 - 3.9)	3.0 (1 - 4.9)	1.5 (0.5 - 2.5)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-13. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet An Alternative Standard of 0.074 ppm, 4th Daily Maximum : April - September, 2004*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.2 (-1 - 1.5)	0.7 (-3.2 - 4.6)	0.1 (-0.4 - 0.6)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5 (0.2 - 0.8)	1.5 (0.5 - 2.4)	0.2 (0.1 - 0.3)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 1.1)	1.2 (0.4 - 2)	0.3 (0.1 - 0.5)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4 (0.1 - 0.7)	1.0 (0.3 - 1.7)	0.1 (0 - 0.2)
	Schwartz (2004)	0-day lag	1 hr max.	4.6 (1.5 - 7.7)	6.5 (2 - 10.8)	2.9 (0.9 - 4.9)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	1.7 (0.5 - 2.9)	2.4 (0.8 - 4.1)	1.1 (0.3 - 1.8)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	1.0 (-0.6 - 2.7)	2.1 (-1.3 - 5.6)	0.4 (-0.2 - 1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 1.1)	1.4 (0.5 - 2.3)	0.3 (0.1 - 0.4)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	0.8 (-0.3 - 2)	2.0 (-0.6 - 4.5)	0.3 (-0.1 - 0.6)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4 (0.1 - 0.7)	1.0 (0.3 - 1.7)	0.1 (0 - 0.2)
	Schwartz (2004)	0-day lag	1 hr max.	4.2 (-0.7 - 9)	5.7 (-0.9 - 12.2)	2.8 (-0.5 - 6.1)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.3 (0.7 - 3.8)	3.1 (1 - 5.2)	1.5 (0.5 - 2.6)
	Ito (2003)	0-day lag	24 hr avg.	1.0 (-1 - 3)	2.4 (-2.2 - 6.9)	0.3 (-0.3 - 1)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.5 (0 - 0.9)	0.9 (0.1 - 1.8)	0.2 (0 - 0.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2 (0.1 - 0.4)	0.5 (0.2 - 0.8)	0.1 (0 - 0.1)
	Schwartz (2004)	0-day lag	1 hr max.	1.7 (0.2 - 3.2)	2.2 (0.2 - 4.1)	1.3 (0.1 - 2.5)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	1.4 (0.4 - 2.4)	1.8 (0.6 - 3)	1.1 (0.3 - 1.8)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.2 (-0.5 - 0.9)	0.4 (-1 - 1.9)	0.1 (-0.2 - 0.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5 (0.2 - 0.8)	0.9 (0.3 - 1.5)	0.1 (0 - 0.2)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4 (0.1 - 0.6)	0.7 (0.2 - 1.2)	0.1 (0 - 0.2)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.8 (0.3 - 1.4)	1.6 (0.5 - 2.7)	0.3 (0.1 - 0.5)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	3.0 (1.9 - 4.2)	5.8 (3.6 - 7.9)	1.1 (0.7 - 1.6)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.6 (-1.7 - 2.8)	0.9 (-2.8 - 4.6)	0.3 (-0.8 - 1.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.8 (0.3 - 1.4)	1.4 (0.5 - 2.3)	0.4 (0.1 - 0.6)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.5 (-0.8 - 1.7)	1.2 (-2.1 - 4.5)	0.1 (-0.1 - 0.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.4 (0.1 - 0.7)	1.1 (0.4 - 1.8)	0.1 (0 - 0.1)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.0 (0.3 - 1.6)	1.5 (0.5 - 2.5)	0.4 (0.1 - 0.6)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-14. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet An Alternative Standard of 0.074 ppm, 4th Daily Maximum : April - September, 2002*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.4 (-1.6 - 2.4)	0.9 (-3.8 - 5.5)	0.2 (-0.9 - 1.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.8 (0.3 - 1.3)	1.7 (0.6 - 2.9)	0.4 (0.1 - 0.7)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.1 (0.4 - 1.8)	1.7 (0.6 - 2.8)	0.7 (0.2 - 1.1)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.8 (0.3 - 1.4)	1.4 (0.5 - 2.4)	0.4 (0.1 - 0.7)
	Schwartz (2004)	0-day lag	1 hr max.	6.7 (2.1 - 11.2)	8.6 (2.7 - 14.3)	5.0 (1.6 - 8.4)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.5 (0.8 - 4.3)	3.2 (1 - 5.4)	1.9 (0.6 - 3.2)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	3.0 (-1.9 - 7.8)	4.4 (-2.8 - 11.5)	1.9 (-1.2 - 5.1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.9 (0.6 - 3.2)	2.8 (0.9 - 4.7)	1.2 (0.4 - 2.1)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	1.8 (-0.6 - 4.2)	3.1 (-1 - 7.1)	1.0 (-0.3 - 2.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.9 (0.3 - 1.5)	1.6 (0.5 - 2.6)	0.5 (0.2 - 0.8)
	Schwartz (2004)	0-day lag	1 hr max.	6.5 (-1.1 - 13.9)	8.0 (-1.3 - 17.2)	5.1 (-0.8 - 10.9)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	3.5 (1.1 - 6)	4.4 (1.4 - 7.4)	2.8 (0.9 - 4.7)
	Ito (2003)	0-day lag	24 hr avg.	2.2 (-2.1 - 6.4)	3.8 (-3.5 - 10.8)	1.2 (-1.1 - 3.5)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.4 (0 - 0.7)	0.8 (0 - 1.5)	0.1 (0 - 0.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2 (0.1 - 0.3)	0.4 (0.1 - 0.7)	0.1 (0 - 0.1)
	Schwartz (2004)	0-day lag	1 hr max.	1.5 (0.1 - 2.9)	2.0 (0.2 - 3.8)	1.1 (0.1 - 2.1)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	1.3 (0.4 - 2.1)	1.7 (0.5 - 2.8)	0.9 (0.3 - 1.5)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.2 (-0.4 - 0.7)	0.3 (-0.8 - 1.5)	0.0 (-0.1 - 0.2)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3 (0.1 - 0.6)	0.7 (0.3 - 1.2)	0.1 (0 - 0.2)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.8 (0.3 - 1.3)	1.2 (0.4 - 2)	0.4 (0.1 - 0.6)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.7 (0.6 - 2.8)	2.5 (0.8 - 4.2)	1.0 (0.3 - 1.7)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	6.0 (3.8 - 8.2)	8.9 (5.6 - 12.2)	3.6 (2.3 - 5)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.9 (-2.6 - 4.2)	1.2 (-3.7 - 6.1)	0.5 (-1.6 - 2.7)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.3 (0.4 - 2.1)	1.8 (0.6 - 3)	0.8 (0.3 - 1.3)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	1.2 (-2.1 - 4.5)	2.1 (-3.6 - 7.7)	0.6 (-1 - 2.2)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.1 (0.4 - 1.8)	1.9 (0.6 - 3.2)	0.5 (0.2 - 0.9)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	2.0 (0.7 - 3.4)	2.7 (0.9 - 4.4)	1.2 (0.4 - 2)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-15. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet An Alternative Standard of 0.064 ppm, 4th Daily Maximum : April - September, 2004*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.2 (-0.7 - 1.1)	0.6 (-2.8 - 4)	0.1 (-0.2 - 0.4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3 (0.1 - 0.6)	1.3 (0.4 - 2.1)	0.1 (0 - 0.2)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5 (0.2 - 0.8)	1.0 (0.3 - 1.6)	0.2 (0.1 - 0.3)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3 (0.1 - 0.4)	0.8 (0.3 - 1.3)	0.0 (0 - 0.1)
	Schwartz (2004)	0-day lag	1 hr max.	3.4 (1.1 - 5.7)	5.2 (1.7 - 8.7)	1.8 (0.6 - 3)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	1.3 (0.4 - 2.2)	2.0 (0.6 - 3.3)	0.7 (0.2 - 1.1)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	0.7 (-0.5 - 1.9)	1.7 (-1.1 - 4.6)	0.2 (-0.1 - 0.5)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.5 (0.2 - 0.8)	1.1 (0.4 - 1.8)	0.1 (0 - 0.2)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	0.6 (-0.2 - 1.3)	1.5 (-0.5 - 3.5)	0.1 (0 - 0.3)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3 (0.1 - 0.5)	0.8 (0.3 - 1.3)	0.1 (0 - 0.1)
	Schwartz (2004)	0-day lag	1 hr max.	3.2 (-0.5 - 6.9)	4.7 (-0.8 - 10.1)	1.9 (-0.3 - 4.1)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	1.7 (0.5 - 2.9)	2.5 (0.8 - 4.3)	1.0 (0.3 - 1.8)
	Ito (2003)	0-day lag	24 hr avg.	0.7 (-0.6 - 2)	1.9 (-1.7 - 5.4)	0.1 (-0.1 - 0.4)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.2 (0 - 0.4)	0.6 (0 - 1.2)	0.0 (0 - 0.1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1 (0 - 0.2)	0.3 (0.1 - 0.5)	0.0 (0 - 0)
	Schwartz (2004)	0-day lag	1 hr max.	1.2 (0.1 - 2.3)	1.6 (0.2 - 3.1)	0.9 (0.1 - 1.7)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	1.0 (0.3 - 1.7)	1.4 (0.4 - 2.3)	0.7 (0.2 - 1.2)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.1 (-0.2 - 0.4)	0.3 (-0.7 - 1.2)	0.0 (0 - 0.1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2 (0.1 - 0.4)	0.6 (0.2 - 1)	0.0 (0 - 0)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.3 (0.1 - 0.4)	0.6 (0.2 - 0.9)	0.0 (0 - 0.1)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 1)	1.3 (0.5 - 2.2)	0.2 (0.1 - 0.3)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	2.2 (1.4 - 3)	4.8 (3 - 6.6)	0.6 (0.4 - 0.9)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.4 (-1.3 - 2.2)	0.8 (-2.4 - 3.9)	0.2 (-0.5 - 0.8)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 1.1)	1.2 (0.4 - 1.9)	0.2 (0.1 - 0.4)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.2 (-0.4 - 0.9)	0.9 (-1.5 - 3.3)	0.0 (0 - 0.1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.2 (0.1 - 0.4)	0.8 (0.3 - 1.3)	0.0 (0 - 0)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.7 (0.2 - 1.2)	1.3 (0.4 - 2.1)	0.2 (0.1 - 0.4)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

Table I-16. Sensitivity Analysis: Impact of Alternative Estimates of Policy Relevant Background (PRB) on Estimated Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Concentrations that Just Meet An Alternative Standard of 0.064 ppm, 4th Daily Maximum : April - September, 2002*

Location	Study	Lag	Exposure Metric	Incidence of Non-Accidental Mortality per 100,000 Relevant Population Associated with O_3 Above:**		
				Estimates of PRB Concentrations	Estimates of PRB Concentrations Minus 5 ppb***	Estimates of PRB Concentrations Plus 5 ppb
Atlanta	Bell et al. (2004)	distributed lag	24 hr avg.	0.3 (-1.3 - 1.8)	0.8 (-3.4 - 4.9)	0.1 (-0.6 - 0.9)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 1)	1.5 (0.5 - 2.6)	0.3 (0.1 - 0.5)
Boston	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.9 (0.3 - 1.5)	1.5 (0.5 - 2.4)	0.5 (0.2 - 0.8)
Chicago	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 1.1)	1.2 (0.4 - 2)	0.3 (0.1 - 0.5)
	Schwartz (2004)	0-day lag	1 hr max.	5.5 (1.7 - 9.2)	7.3 (2.3 - 12.2)	3.8 (1.2 - 6.4)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.1 (0.6 - 3.5)	2.8 (0.9 - 4.6)	1.4 (0.5 - 2.4)
Cleveland	Bell et al. (2004)	distributed lag	24 hr avg.	2.5 (-1.6 - 6.5)	3.9 (-2.4 - 10.1)	1.5 (-0.9 - 3.9)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.6 (0.5 - 2.7)	2.5 (0.8 - 4.1)	1.0 (0.3 - 1.6)
Detroit	Bell et al. (2004)	distributed lag	24 hr avg.	1.4 (-0.5 - 3.3)	2.6 (-0.8 - 6)	0.7 (-0.2 - 1.6)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.7 (0.2 - 1.2)	1.3 (0.4 - 2.2)	0.3 (0.1 - 0.6)
	Schwartz (2004)	0-day lag	1 hr max.	5.4 (-0.9 - 11.6)	6.9 (-1.1 - 14.8)	4.0 (-0.7 - 8.6)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	2.9 (0.9 - 4.9)	3.8 (1.2 - 6.3)	2.2 (0.7 - 3.7)
	Ito (2003)	0-day lag	24 hr avg.	1.7 (-1.6 - 5)	3.2 (-3 - 9.2)	0.8 (-0.8 - 2.4)
Houston	Bell et al. (2004)	distributed lag	24 hr avg.	0.2 (0 - 0.4)	0.5 (0 - 1)	0.1 (0 - 0.1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1 (0 - 0.2)	0.3 (0.1 - 0.4)	0.0 (0 - 0)
	Schwartz (2004)	0-day lag	1 hr max.	1.1 (0.1 - 2)	1.5 (0.1 - 2.9)	0.7 (0.1 - 1.4)
	Schwartz -- 14 US Cities (2004)	0-day lag	1 hr max.	0.9 (0.3 - 1.5)	1.3 (0.4 - 2.1)	0.6 (0.2 - 1)
Los Angeles	Bell et al. (2004)	distributed lag	24 hr avg.	0.1 (-0.2 - 0.3)	0.2 (-0.5 - 1)	0.0 (0 - 0)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.1 (0 - 0.2)	0.5 (0.2 - 0.8)	0.0 (0 - 0)
New York	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.6 (0.2 - 1.1)	1.0 (0.3 - 1.6)	0.3 (0.1 - 0.4)
Philadelphia	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.4 (0.5 - 2.3)	2.2 (0.7 - 3.7)	0.8 (0.3 - 1.3)
	Moolgavkar et al. (1995)	1-day lag	24 hr avg.	5.0 (3.1 - 6.8)	7.8 (4.9 - 10.7)	2.8 (1.8 - 3.9)
Sacramento	Bell et al. (2004)	distributed lag	24 hr avg.	0.7 (-2.2 - 3.6)	1.1 (-3.3 - 5.4)	0.4 (-1.3 - 2.1)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.1 (0.4 - 1.8)	1.6 (0.5 - 2.7)	0.6 (0.2 - 1)
St Louis	Bell et al. (2004)	distributed lag	24 hr avg.	0.9 (-1.5 - 3.3)	1.8 (-3 - 6.4)	0.4 (-0.6 - 1.4)
	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	0.8 (0.3 - 1.4)	1.6 (0.5 - 2.6)	0.3 (0.1 - 0.6)
Washington	Bell et al. -- 95 US Cities (2004)	distributed lag	24 hr avg.	1.7 (0.6 - 2.9)	2.3 (0.8 - 3.9)	1.0 (0.3 - 1.6)

*All results are for mortality (among all ages) associated with short-term exposures to O_3. All results are based on single-pollutant models.

**Incidences are rounded to the nearest whole number; incidences per 100,000 relevant population and percents are rounded to the nearest tenth.

***In Atlanta, 10 ppb were subtracted from estimated PRB concentrations; in all other locations, 5 ppb were subtracted.

Note: Numbers in parentheses are 95% confidence or credible intervals based on statistical uncertainty surrounding the O_3 coefficient.

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