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Public Opinion Polls for Inspection and Maintenance Programs: Some Technical Considerations

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I. Introduction

Since the passage of the 1977 Amendments to the Clean Air Act, several state and local governments have sponsored or have considered sponsoring opinion polls to determine public attitudes and knowledge about air quality issues and programs. In some cases, they have conducted these polls themselves; in other cases, they have sought the assistance of professional polling firms. The quality of these surveys varys widely and affects their potential usefulness for air planners and policymakers alike. The purpose of this report is to provide state and local governments with information that could be used in the planning and implementation of public opinion polls, especially those with respect to inspection and maintenance (I/M) programs.*

II. Purposes of I/M Public Opinion Polls

I/M public opinion polls can be undertaken to determine the public's: (1) perceptions of air pollution including its seriousness, sources, linkage to cars and trucks, and proposed solutions; (2) awareness and knowledge of the concepts of emission testing and repair to reduce auto pollution and help clean the air; (3) attitudes about I/M including acceptance of specific program elements and feelings about government regulation in this area; and (4) behaviors such as previous participation in voluntary I/M testing programs and care of the car's emission equipment and engine. It is useful to consider taking I/M public opinion polls during the three phases of an I/M program: the developmental phase, the startup phase, and the operational phase. For information regarding surveys that could be taken during these phases see Table 1.

Data from I/M public opinion polls can be used for program planning, feedback, and evaluation. Polling data for program planning include attitudinal, knowledge and behavioral data about motorists as well as input from the public in terms of interests, preferences, and suggestions for improving program effectiveness. Polls provide a way for the public to participate in actual program decision-making. Examples of how polling data can be used for program planning include:

- data on I/M awareness and knowledge levels could be used to assess the informational needs of specific target audiences; and

- data on perceptions about the causes of air pollution, emission testing and maintenance of motor vehicles can be used to identify any misconceptions about these topics.

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*Polls refer to a survey research methodology that employs a standardized measurement instrument, or questionnaire, that is administered by phone, face-to-face or mail. The terms polls and surveys are used interchangeably throughout this report.

Polling data can also be used for program evaluation. Program managers want to know how effective their public awareness programs are in informing and educating the public about I/M. They also want to know whether the program changes or modifications which they make help to improve program effectiveness. Examples of how polling data can be used for program evaluation include:

- data showing the number persons who are reached by the public awareness program, e.g., the percentage of persons who actually read, saw or heard I/M messages in the mass media;

- data showing new information that people acquire from exposure to a public awareness program; and

- data collected at two points in time (e.g., two separate surveys before and after a public awareness program) showing changes in awareness and knowledge levels.

Finally, polls can also be used for program feedback. This process enables the public and other groups to respond to proposed or actual program changes. Such information can be used to make program modifications or adjustments. Examples of how polling data can be used for program feedback include:

- data showing public approval or disapproval of a proposed I/M program change, such as performing tire pressure checks in addition to emission testing;

- data showing public reactions to an actual program change such as the use of computerized emission analyzers with a printout of testing results; and

- data showing any problems encountered by motorists or mechanics during the early implementation of the program.

III. Planning I/M Public Opinion Surveys

A. Timeliness of Surveys

The decision when to take a poll is almost as critical as the decision whether to take one. To be useful, polling data must be timely. For example, polling data for planning the overall public awareness program should be taken at least three months prior to program startup. If polling data is to be used for evaluating the impact of a public awareness campaign, it should be gathered the month immediately before and after the campaign. (See Table 1 for polls that could be taken during different phases of an I/M program.)

Some state or local planners may wish to "update" an old poll or wonder whether data from a poll taken 4-5 years ago is still valid today. If populations remained stable demographically and had little exposure to external influences, then polling data would probably remain valid indefinitely. For the most part, however, the demographic composition of

populations is continuously changing and large populations are constantly being affected by powerful outside influences. Change in population attitudes and behaviors is a complicated phenomenon. There is no one-to-one correspondence between exposure to external influences and attitudinal or behavioral change. External events are simply not that deterministic. Often attitudes and behaviors change slowly over time. For this reason, it is not too surprising to find some polling data relatively stable over a five-year period. On the other hand, it is equally possible to find some dramatic shifts in attitudes for the same time period, especially if several factors have been at work in the environment to produce these changes.

Several factors can influence the stability of public opinion data over time. They are: changes in the general state of economy which may affect public feelings about the relative cost and benefits of I/M; changes in the political climate and mass media coverage and treatment of air quality and I/M related issues which will affect awareness of these issues and feelings about them. Depending on external events, a one-year old poll may be invalid while one five-years old might still be an accurate indicator of how people feel about certain issues. There is no formula for determining when a public opinion poll is out of date. Specific knowledge of the local situation and good judgment must be used to make case by case decisions.

B. Types of Survey Methodologies

The three types of survey methodologies are commonly used for public opinion surveys. They are: face-to-face surveys, where an interviewer who is physically present conducts the interview; mail surveys, where the questionnaire is sent in the mail and completed and returned by a respondent; and telephone surveys, where interviews are conducted over the phone by an interviewer. Most major I/M public opinion surveys to date have employed telephone interviews. Dillman (1978) has rated the three survey methodologies for selected performance characteristics (see Table 2). Telephone interviews are rated higher than the others in avoiding interference by others in the interviewing process and in speed of implementation. They are rated lower than the others in not allowing for complex types of questions.

1. Face-to-Face Surveys

Where the goal is to obtain a sample that is representative of a large population, such as a city or state, face-to-face surveys can be quite expensive due to the high cost of identifying and contacting respondents. Where the goal is to obtain a representative sample from a relatively small and easily contacted population, such as I/M program managers or motorists that pass through an inspection lane, face-to-face surveys can be undertaken quite inexpensively. More complicated and in-depth questions can be asked in face-to-face surveys since the interivewer is present to give complete instructions. In general, these surveys are better than the others in holding respondents' interest and attention for a long period of time, i.e., 30-45 minutes.

2. Telephone Surveys

The major reason telephone surveys are used more often than face-to-face ones is their relative cost advantage. Compared to other methodologies, telephone interviewing is an "easy" method to administer. A representative sample of the population can be identified through the random generation of telephone numbers, i.e., random digit dialing. Interviewers also work from central headquarters where their work can be closely supervised. This helps to eliminate the effects that individual interviewers could have on the interviewing process. The questionnaire does not have to look "professional, since respondents never see it. All these factors contribute to the low cost of telephone surveys. Telephone surveys are recommended for major I/M surveys where the goal is to generalize survey findings to a large population. Their only drawbacks are: their length has to be kept short (15-20 minutes) to keep respondents from hanging up the phone; their questions, formats and response categories have to be kept simple to enable persons to comprehend them. Studies also show that respondents tend to give less complete answers to open-ended questions on telephone surveys than on other survey methodologies (see discussion of question formats in section III C).

3. Mail Surveys

Mail surveys have considerable potential for use by I/M program planners. Though not widely used, their convenience and low cost make them an attractive option to other methods in some instances. Also,new techniques in surveying respondents by mail (Dillman, 1978) have been developed that obtain response rates comparable to telephone and face-to-face methods. In general, though, mail surveys seem to work best with well-educated respondents who have the reading and writing skills to complete them without difficulty. They are also easier to administer to select groups than to the general population. For example, they seem to work quite well with professional groups that have a governing body and an up-to-date mailing list. This makes contacting and recontacting members of these groups fairly simple. Group members are also more likely to complete a mail questionnaire if they know that their organization is supporting it. However, some mail surveys can also be sent to members of the general population such as licensed motorists. A random sample of this group could be reached through applications for license renewals. To increase the response rate to mail surveys, it is important to make them attractive, simply worded, short, and logical. They should also have explicitly worded instructions, easy to follow formats, and convenient return procedures. They should take no longer than 15-20 minutes to complete.

C. Design of Survey Questionnaires

Information in this section is designed to assist persons faced with the tasks of either developing a questionnaire or working with a firm or group that has been hired to construct one. Comments pertain to all three types of survey questionnaires: face-to-face, telephone, and mail. Obviously, each survey type will also have some special requirements. To learn more about these requirements, we recommend that you consult Dillman (1978) for telephone and

mail surveys and Babbie (1973) for face-to-face ones. Below are a few important steps to follow in constructing a survey questionnaire.

Step 1 - Make a list of all the topics for which you would like to obtain information. Make sure the list is as complete as possible. It can be pared later on.

Step 2 - Decide whether any of these topics can be conveniently combined. This will help to shorten the list.

Step 3 - Rank the topics in terms of their relative importance, and select topics to be included in the questionnaire.

Step 4 - Under each topic, outline a list of all questions you want answered. At this point, be concerned only with question content and not the format or specific wording.

Step 5 - Arrange topics in a logical order for inclusion in the questionnaire.

Step 6 - Select items to be included in the questionnaire based on the priority of information and constraints on questionnaire length, i.e., time and funding constraints. A good rule to apply when deciding on questions to include is: "Collect only data that can be used."

Step 7 - Decide on the question format. Rewrite questions in these formats. You have options between a range of open and closed-ended type questions (see Table 3 for a discussion of five such formats).

Step 8 - Review question wording (see section 3A below).

Step 9 - Order the questions in the questionnaire keeping in mind the following principles. Begin with something easy and important. Include more important questions ahead of less important ones so that respondents do not lose interest in the interview process or get bored with it. Within topic or content area, group questions by formats for easy processing by respondents. Build a sense of continuity or flow to the questionnaire by taking advantage of linkages that respondents are likely to perceive among groups of questions. Position questions that are likely to be objectionable after ones that are likely to be unobjectionable so that respondents do not terminate the interview.

Step 10 - Prepare appropriate introduction, transitions and close for the questionnaire.

An important consideration in the construction of an I/M survey is how a topic such as I/M is introduced to the respondent. If I/M is not a widely known or understood concept, then it is necessary to provide enough detail about it so people are clear about what they are responding to. It is also important to place I/M in the context of other air pollution control strategies that people

are more familiar with. This will provide an indication how people feel about I/M relative to other strategies.

An I/M survey undertaken by the Highway Safety Research Institute of the University of Michigan accomplished just that. The questionnaire starts out by asking respondents if they ever have been bothered by air pollution. It then asks whether they feel air pollution is a problem in Michigan. It then mentions that the state is thinking about reducing air pollution by setting up yearly inspections of Michigan motor vehicles to test their exhaust emissions and to require owners to fix those engines which are causing too much air pollution. In trying to decide if such a vehicle inspection program is desirable, it cautions that one has to think about the value of reducing air pollution against the total program costs in time, travel, inspection fees, and repairs. Then it asks for a general opinion: "Do you favor or oppose a required emissions inspection program in your county." This question is followed up with one that specifically addresses some proposed parameters of the program. Several other I/M public opinion surveys which EPA reviewed used a similar approach.

1. Reviewing Question Format and Wording

At some point prior to conducting the actual I/M public opinion poll, the agency will be asked to comment on a draft questionnaire. Questions will have to be written in appropriate formats. Five such formats with examples are found in Table 3. Basically, questions can be either open or closed-ended. In open-ended questions, the respondent supplies the entire response. There are no pre-established response categories such as "approve" or "disapprove". In closed-ended questions, the researcher supplies the response categories which are sometimes ordered, i.e., categories which indicate degree of approval or disapproval.

During the editing of the draft questionnaire, question wording will also have to be checked. Simple rules for writing questions abound such as those recommended by Payne (1951) and Babbie (1973). Some common rules are: use simple words; keep it short, be specific; do not talk down to respondents; avoid bias; avoid objectionable questions; and avoid hypothetical questions. Dillman (1978) suggests that a number of questions should be asked about each item considered for inclusion in the questionnaire. The questions are:

Q: WILL THE WORDS BE UNIFORMLY UNDERSTOOD?
For example, the phrase "maintenance of motor vehicles" could be replaced by "tune-up of cars."
(Solution: generally substitute simple for complex or difficult words.)

Q: DO THE QUESTIONS CONTAIN ABBREVIATIONS OR UNCONVENTIONAL PHRASES (OR JARGON)?
(Solution: Generally avoid abbreviations, foreign phrases or slang unless they refer to something that can be communicated more efficiently by the use of such terms, e.g., tampering instead of removal or rendering inoperative of emission control devices.)

Q: ARE THE QUESTIONS TOO VAGUE?
(Solution: Replace vague words with more precise ones, e.g., replace regularly with "number of times per week".)

Q: IS THE QUESTION TOO PRECISE?
(Solution: Revise the question to include categories that will aid recall of specific information, e.g., instead of asking person for number of times in a year their car has received a tune-up, include the categories such as none, 1-2, 3-4, five or more.)

Q: IS THE QUESTION BIASED?
Here's an example of the problem of establishing a behavioral expectation. "Most people have tune-ups done on their cars at least once a year. How about you? How often do you have your car tuned?" An improved question is: "How often do you have your car tuned?" An example of the problem of unequal comparison is a preference question where one category is made to appear more attractive. "Where would you prefer to take your car for inspection? To your local garage mechanic or to a centralized inspection station that has built-in quality control procedures?" An example of bias from unbalanced categories would be a questionnaire item with three categories representing favorable feelings towards a topic and only two categories representing unfavorable feelings towards it.
(Solution: Make sure the question does not: create a behavioral expectation, make one response category more attractive than others or more likely to be selected because of unbalanced categories, or contain affective terminology that might predispose respondents to answer in one way or another.)

Q: IS THE QUESTION OBJECTIONABLE?
Sources of objection include requests for personal or potentially embarrassing information. For example, it is objectionable to ask outright whether or not a person has tampered with the emission equipment on his or her car. In such a case, an indirect approach is preferable. "Do you happen to know whether the emission control equipment on your car has ever been worked on for any reason? (If yes, ask: "What was done to it as far as you know?") Similarly, the question could be prefaced with contextual material to overcome objections. For example, it could be prefaced with some background information. "In some cars, it is possible to remove or adjust the emission control equipment so it doesn't work. Are you aware that this can happen? (If "Yes") Do you approve of this happening?
(Solution: Obtain personal or sensitive information by using indirect questions, broad categories, background material, and series of questions to overcome objections.)

Q: IS THE QUESTION TOO DEMANDING?
For example, avoid asking persons to estimate the percent of air pollution caused by several major contributors. It's hard work, and some respondents might not be up to the task.
(Solution: Redesign questions that are difficult to answer, e.g., questions with more than 10 things to rank, questions requiring mathematical calculations, or recall from the distant past.)

Q: IS IT A DOUBLE QUESTION?
Some questions actually are two questions rolled into one. For example, it's ambiguous to ask in a single question whether people approve or disapprove of I/M and safety programs. They could favor one and not favor the other. Two separate questions are required.
(Solution: Rewrite question so that a respondent replies to a single point.

Q: DOES THE QUESTION HAVE A DOUBLE NEGATIVE?
(Solution: Reword the question in the affirmative to eliminate confusing language.)

Q: ARE THE ANSWER CHOICES MUTUALLY EXCLUSIVE?
(Solution: Make sure respondents cannot select more than one category and be correct; if necessary, break the question into parts.)

Q: DOES THE QUESTION ASSUME TOO MUCH KNOWLEDGE?
Some I/M and related areas are highly technical. To ask public opinions about air pollution regulations, pollution control devices, and airborne pollutants presupposes knowledge of these topics on the part of respondents. In some cases, this knowledge might not be present. Prior to asking opinions about highly technical topics, it is important first to establish what, if anything, people know about them, even if it is only self-reports of awareness or knowledge.
(Solution: Explain a topic or ask respondents if they are familiar with a topic before asking their attitudes about it.)

Q: IS THE QUESTION TECHNICALLY ACCURATE?
(Solution: During the editing of the questionnaire, identify and eliminate any questions with technical inaccuracies.)

Q: IS AN APPROPRIATE TIME PERIOD PROVIDED?
(Solution: Specifying a precise time period is usually easier for respondents than mental averaging, e.g., how many times in the past month or so as opposed to an average number of times per year.

Q: CAN THE RESPONSES BE COMPARED WITH EXISTING INFORMATION?
(Solution: Use the same questions and response categories as in other surveys.)

Q: ARE THE QUESTIONS TOO CRYPTIC?
(Solution: Use complete sentences rather than leaving words out for simplicity.)

2. Some Measurement Issues

A type of attitudinal scale commonly used in public opinion surveys is a 5-point Likert scale, named after Rensis Likert, the researcher who developed it. Typically respondents are asked the extent to which they approve (or favor) a particular proposal. On a 5-point scale, they could answer: "Strongly approve, somewhat approve, neutral (or no opinion), somewhat disapprove, or strongly disapprove." No more than a 5-point scale is recommended for telephone interviews because of the difficulty that some

respondents have in recalling accurately the response categories. The advantage of the 5-point scale over the 3-point one (e.g., approve, disapprove, and neutral) is that it obtains more information, i.e., the strength of approval and disapproval. For later analysis, a 5-point scale can be collapsed into three categories: approve, disapprove and neutral.

Very important is the treatment of the "neutral" or "unsure" category in surveys. It should be included in the questionnaire to permit persons who do not have knowledge or opinions about I/M to indicate this feeling. Not including a "neutral" or "unsure" category makes it appear that these persons have opinions when in fact they do not. This creates "pseudo data" which should be avoided. A significant number of respondents answering "neutral" or "unsure" for a particular question could suggest that the public awareness effort has not reached a significant number of motorists.

3. Pretesting the Questionnaire

The questionnaire should be pretested to make sure that it is clear to respondents and that it can be completed within a set time frame. Adding five to 10 minutes to a survey could increase its cost by 10-20% and decrease participation. The pretest could also pinpoint other problems with the questionnaire such as awkward or difficult wording, illogical sequencing, and boring formats. An important point to discuss with the research firm or group preparing the survey is the purpose and amount of pretesting that is proposed. Pretesting is sometimes done in small focused groups (8-12 persons) where the objective is to have persons react to topics and specific questions. This technique involves paying focused group members $15-$25 for their participation in about a two-hour session. A more elaborate pretest involves administration of a draft questionnaire to about 20-50 persons under actual field conditions. This form of pretest, even with machine tabulated results, should not add more than one week to the survey process. Depending on which type of survey methodology is used, the cost of pretesting is about $5-$25 per interview. Questionnaires should always be pretested. Some pretesting, regardless of how little, is always better than no pretesting.

4. Sample I/M Questions

Sample I/M questions that have been used in several public opinion surveys to date are included in Table 4. The questions attempt to determine whether I/M as an air pollution control strategy is favored or opposed, whether I/M is more or less acceptable than other air pollution control strategies, and whether I/M is acceptable in view of its costs. Other items commonly covered in a questionnaire are attitudes about the recommended parameters of the I/M program such as the inclusion of buses and large trucks, state versus private inspection stations, the maximum distance people want to travel to an inspection station, the longest permissible time for someone to spend at the inspection station waiting for inspection, the cost of inspections, the length of time to give the owner of a failed vehicle to get the emissions system working properly, the treatment of people who fail the emission test, exemptions for older cars and for persons who cannot afford to pay, combining

I/M with a safety or noise program, the I/M informational needs and preferences of motorists, and adding features to an I/M program such tire pressure checks which can improve fuel economy.

D. Sample Selection and Size

Where the goal is to generalize findings from a sample of respondents to a large population, such as people of a city or state, it is necessary to use scientific procedures to select the sample. These procedures help ensure that each person included in the sample has a known probability of being selected. (Different respondents may also purposely be chosen with unequal chances of selection, but if scientific procedures are followed each respondent will have a specific known probability of selection. For example, a researcher may wish to obtain a large subsample of young males to study their emissions attitudes and tampering behavior. In the analysis of the entire sample, this subsample would be weighted to reflect its actual number in the total population.) Following these procedures makes it possible to generalize sample findings to the parent population from which the sample is drawn.

Sample selection involves a decision about who to survey, such as adults 18-65, car owners, or persons who have a valid driver's license. Deciding on the sampling unit is a decision that should be made by the agency, not the polling firm. Surveys to determine the attitudes or knowledge of the general population should include all persons 18 or older currently residing in the geographical area of interest, rather than only licensed drivers or car owners.

Larger samples increase survey precision up to a point, but they also cost more. Obviously a balance must be struck between precision and cost. Larger size samples also permit in-depth analysis of population subgroups that might be of interest to program planners. These types of analyses would be useful if program planners suspect considerable variation in knowledge, attitudes and behaviors among these subgroups. The goal of these analyses might be to learn more about the information needs and misconceptions of these subgroups so that improved strategies for informing and educating them about I/M could be developed. A sample size of about 800 is usually large enough to permit a number of subgroups to be compared. As the size of subgroups increase, difference between them (in percentages) does not have to be as great to reach statistical significance (see Table 5).

An optimal sample size can be computed from formulas based on sampling theory statistics. With knowledge of the standard error of a sampling distribution of means (a measure of sampling error), and the desired confidence level and interval, the sample size can be easily computed (see Appendix I).

E. Accuracy of Survey Data

Sample size affects the accuracy of survey data. In general, the smaller the sample size, the larger the sampling error or degree of error that can be expected from a given sample design. A statement of sampling error must contain two essential components: the confidence level, which by convention is usually set at 95%; and the confidence interval, which by convention is sought

at about ±5%. Commonly, researchers will say that in 95 cases out of 100 the results based on the entire sample differ by no more than 5% points from what would have been obtained by interviewing all members of the population. (Sampling errors do not take into account a margain of additional error resulting from the various practical difficulties of taking a survey of public opinion, e.g., a low response rate.)

The relationship between sample size and accuracy of survey data is complex. It is valuable to increase sample size only up to a point to reduce sampling error. Beyond that point, sampling error only decreases slightly. Doubling the sample size does not reduce the sampling error by half, but only by the inverse of the square root of two. For example, going from a sample size of 400 to 800 only reduces sampling error by 29% (see Table 6). It is necessary to quadruple the sample size to halve the sampling error. Sampling error imposes restrictions on interpreting the data, especially with regards to the precision of results. (See Appendix II for a more complete explanation of how sample size affects the accuracy of survey data.)

The size of the population from which samples are drawn, whether it be a state of 12 million or a city of 600,000, only affects sampling error very slightly. The reason is because sampling error is linked to sampling theory which treats theoretical distributions of samples from an entire population regardless of its size.

Finally, response rate can affect the accuracy of polling data. Response rate is the percentage of all those who responded to the questionnaire from the pool of those who were eligible. If only half of those who were eligible responded, the response rate would be 50%. (See Appendix II for a more complete discussion of how response rates affect the accuracy of polling data.)

In general, response rates are higher for face-to-face and telephone surveys (70-85%) than for mail ones (50-80%). However, a mail survey that has good follow-up procedures can achieve a response rate as high as 80%. Response rates of 70% or above are considered acceptable. A rate lower than that can introduce considerable error into estimates of sample characteristics.

IV. Analysis, Interpretation and Presentation of Survey Data

A. Data Analysis

To facilitate their interpretation, polling data is usually analyzed and presented in two simple forms. One form of data presentation is marginals which show the absolute numbers (Ns) and percentages for each response category to every question on the questionnaire. For example, for a question on an emissions inspection attitude the data presented might show that 41.0% of a sample of 800 strongly favored I/M; 16.9% somewhat favored it; 12.5% felt neutral about it; 20.9% somewhat opposed it; and 8.7% strongly opposed it. Another way to present data is in tables with crosstabs, which show the numbers (Ns) and percentages for each response category on key questions for different background factors such as age, sex, geographical location, income, and education. Sometimes opinions about emission testing would be examined

"controlling" for other opinions, such as those about clean air and pollution control. The tabular data would show the cases where there were significant differences in I/M attitudes by background factors and general attitudes (see Table 7).

More elaborate analyses of I/M data are possible and sometimes desirable, but they are sometimes difficult for planners to interpret and can add considerable costs to the survey. An example of a potentially useful anlaysis is a demographic profile of persons who engage in tampering with their car's emissions equipment or fuel switching. The objective of such an analysis would be to attempt to determine characteristics of these persons (personality and attitudinal) that would make it easier to design educational messages and media specifically for them. Other analyses of motorists' information needs or preferences could reveal groupings or clusters of needs or preferences that could be addressed separately by leaflets or booklets. For example, the survey could identify a number of consumer confidence issues that could be addressed in a publication.

B. Interpreting the Data

Data do not speak for themselves. They have to be interpreted. In interpreting the data from I/M public opinion polls, here are a few things to consider.

1. The most frequent statistic used in the analysis of polling data is the percentage. A typical analysis shows the percentages of respondents in the overall sample or subsample who favor or oppose some issue or who agree or disagree with some proposal. In interpreting these data, it is important to note the overall percentages for each response category. For example, does the majority (more than 50%) of respondents favor or oppose I/M? Does a plurality favor or oppose it (e.g., less than 50% favor but more favor than oppose)? What percentage is neutral or unsure about it? (If more than 10% fall into the "unsure" category, it is a fact worth noting.) Is the difference in percentages between those favoring and opposing I/M large or small? Does the difference reach statistical significance? (See Table 5 below.) Do I/M attitudes differ significantly depending on one's sex, geographical location, age, education, political thinking, perceptions of air quality, and car ownership?

2. In interpreting the data, it is useful to look for sizable differences in percentages and patterns among responses. Some differences will turn out larger than expected. That's worth noting. Others will turn out much smaller than expected. That's worth noting, too. For example, one I/M poll showed only very small differences in I/M attitudes when controlling for political thinking (e.g., for persons who classified

themselves as liberal, conservative or middle-of-the-road). It is also important to look for patterns in the data such as the consistency of responses to similar or related questions. The expectation is that respondents with positive attitudes towards one issue or proposal, should have positive attitudes towards other similar or related issues or proposals. Response consistency across several similar items adds support to one's interpretation of the data.

3. As an aid to interpreting data, it is often useful to compare findings with similar polls conducted elsewhere. Ideally, these comparisons can be made with earlier surveys that asked identical questions to a similar population. Such comparisons can provide two useful kinds of information. First, they can indicate whether your findings are within the range of what has been found elsewhere. If your findings are considerably different from those obtained elsewhere, you should be alerted to possible methodological problems in data collection, e.g., biased questions or interviewer effects. Second, they can indicate trends in the data. This is a technique commonly used by national polling firms that are able to show trends in public opinion on important issues. The University of Louisville has the most complete trend data on public opinions about I/M. Since 1978, it has conducted five air quality surveys in Jefferson County. These five surveys consistently show strong support for I/M (in the range of 61%-68%). The reporting of this trend data adds considerable weight to the conclusion of popular support for I/M in Jefferson County.

C. Presentation of Data

Careful consideration should be given to the presentation of data to various audiences. Each audience has its own information interests and needs. For example, a writeup of results for legislators should include a convenient summary of the main findings with their implications for public policy. A writeup of results for the press and broadcast media should include a convenient summary of main findings with emphasis on what is newsworthy and the relationship between survey findings and important issues of the day. In general, the main findings should be stated clearly, succinctly, and highlighted where appropriate. Their implications should be discussed fully. Audiences should not be overwhelmed by tables of statistics that are difficult to understand. Charts and graphs that are easy to interpret should be used whenever possible.

Often little care is taken in releasing data to various audiences. For state and local I/M planners, the implications of the results for program implementation should be stressed in a written report that could serve as an

internal working document for them. Planners should have a more sophisticated grasp of data so it is not a problem presenting them with a fully detailed report as long as data implications are clearly spelled out. Political leaders are interested more in public support for I/M and related issues. Their report should be brief and attractively presented. Public opinions about key program issues should be summarized. Special legislative briefings could be used as a vehicle to present survey results. Groups including lung association chapters, chambers of commerce, and service industry organizations will all have different interest in such surveys. For example, members of the service industry would be very interested in public sentiment regarding car maintenance, tampering with emissions control devices, and any proposed modifications of emissions testing procedures. The leaders of these groups should receive a brief, attractively presented report that summarizes public opinions about key I/M program issues. In cases where the group plans to assist with the I/M educational effort, a workshop or seminar is a highly appropriate format for presenting survey findings.

V. Costs for I/M Public Opinion Polls

Costs for an I/M public opinion poll are usually figured per completed interview. These costs can range anywhere from $10-$25 for each completed telephone interview, $25-$75 for face-to-face interviews, and $5-$15 for mail interviews. The range in price per completed interview will vary depending on two factors: (1) the total number of interviews completed, with cost decreasing as this number rises; and (2) options included as part of the survey. Below is a list of key items that are factored into the costs of such public opinion polls. Some of these items are standard features of any survey. Others, such as extent of pretesting, additional quality control measures, and special analyses, are options that increase survey costs.

A. Questionnaire Construction

The two aspects of questionnaire construction that directly affect its cost are length and question structure. Long-worded questions or ones with many branches or response categories add to questionnaire length. Questions which invite respondents to supply their own answers, i.e., open-ended questions, also add length. Respondents vary in their quickness and completeness of response to such questions. Interviewers also take extra time recording responses to such questions since they must write down the entire answers. Coding schemes for open-ended questions are usually elaborate and take considerable time to develop. This adds to survey costs. Questionnaires can be streamlined so that only the most important questions are asked. In deciding which items to include or discard, ask the questions: "Is the data from this item really important? How will it be used once it is collected?" Applying the criteria of importance and ultimate use will often show that data from some items have only marginal implications for the program.

B. Choice of Interview Methodology

Mail questionnaires are less expensive to administer than telephone interviews; and telephone interviews are less expensive to administer than face-to-face interviews.

C. Number of Followups to Obtain a Completed Interview

For example, some telephone surveys include up to seven callbacks, at varying times of the day and evening and on varying days of the week, before being considered a non-contact. Non-contacts are combined with refusals in computing response rate.

D. Pretesting the Questionnaire

Focused groups are used to test language, format, and design aspects of the questionnaire. Surveys are sometimes administered to about 25-50 respondents to check their length, test for any problems with the interview process, and determine the response distribution to specific survey items.

E. Coding and Keypunching

This includes transferring the data from the questionnaire to codesheets and punching data cards or entering data directly into a computer.

F. Data Management

This includes preparing the data for data analysis, i.e., making sure that the data set does not have "wild codes" or inappropriate response categories. Additional charges for computer time are made for the handling of complex data bases such as those with large samples, many cards of data, and two waves of data where samples have to be merged for some analyses.

G. Quality Control and Recordkeeping

This includes supervising the work of interviewers, coders, key punch operators, computer programmers, and data analysts.

H. Data Analysis

Additional charges may be made for detailed cross-tabulations and multivariate analyses of the data.

I. Reporting Results

Factors affecting costs are: number of reports; whether reports are typed, photocopied, or printed; distribution of reports; and holding meetings to discuss survey results.

J. Travel

This includes costs for meetings between the survey firm or group and contractor to discuss questionnaire development and survey results.

In negotiating with the research firm or group, it is important to identify the costs of the items above to determine whether they are included in the cost per interview. Knowing the cost of these options will help the agency to obtain the best product at the most reasonable price.

VI. Determining Who Should Conduct a Poll

Public opinion polls can be done either by outside consultants, such as professional polling firms and survey research groups at universities, or by state and local agencies themselves. Outside consultants should be used for major surveys where the objective is to generalize findings from a sample of respondents to a large population such as people of a city or state. The use of outside consultants adds considerable credibility to polling results. The issue of polling data credibility is important when there is a good chance findings will be closely scrutinized for their accuracy or public policy implications. (Of the major public opinion surveys completed to date, all but one was conducted by a polling firm or university group.)

In-house surveys can be undertaken by the personnel of state and local agencies for program planning purposes, especially when there are fewer restrictions on the quality of data to be collected. These are typically small, specialized surveys of easily reachable population subgroups, such as motorists at inspection lanes or garage mechanics. More often than not their goal is to detect rough patterns in attitudes or behaviors in these subgroups than to generalize findings to a large population. Issues of the statistical accuracy of the data and the "representativeness" of samples are often less important than issues of the timeliness and cost of data collection.

The decision to hire a polling firm requires careful consideration. The three most important things to consider are: the experience and expertise of the people who will conduct the poll; the methods to be used in conducting the poll; and the cost for conducting it.

A. Staff Experience and Expertise

Experience counts. Experience with telephone methodology, state-wide surveys, environmental issues are all valuable assests of a polling firm. Well-trained staff also help to eliminate "interviewer bias" that can occur in some surveys. The presence of skilled data analysts is also a big plus. The recommendations of former clients can be helpful in assessing the experience of the polling firm.

B. Methodological Considerations

Methods include the choice of an appropriate survey methodology and the use of quality control measures. If polling is to be conducted by phone (the technique that has been used for most I/M public opinion polls to date), make sure that the polling firm is using random digit dialing -- a proven method that ensures that almost every person in the population has a known probability of being selected for the sample or is sampled from some kind of complete listing such as driver license records. The use of telephone directories is inadequate in view of numerous unlisted numbers. (There is usually a very small proportion of the population which completely lacks telephone service, but this proportion is usually so small that it does not substantially affect the representativeness of the overall results.) If a mail survey is planned, make sure enough follow-up mailings will be made to achieve a satisfactory response rate.

In cases where there is likely to be more than one eligible respondent per household, it's important to have a sampling procedure to decide who gets interviewed. Better polling firms have such procedures. Without them there is a danger of biasing the sample by over-representing those persons, e.g., housewives and the elderly, who tend to be home more often than other household members.

The use of quality control measures such as interviewer supervision, callback procedures to contact persons identified through sampling techniques, and checking the coding of questionnaires and keypunching of cards (data records), help to distinguish between the good and mediocre polling firms. A good question to ask representatives of a polling firm is: "What quality control measures do you employ to help avoid biasing survey results?"

C. Costs

In many cases, the budget is the bottom line. While it might make sense in some instances to select the more expensive polling firm because it offers some special options, more often than not the agency with the lowest bid will get the contract. All things being equal, there is usually no reason not to select the lowest bidder. When things are unequal, such as when a firm offers better quality controls than another or has more survey experience, one has to estimate the value of these differences in deciding which firm to choose. In general, the lower bidder should not be selected when there is reason to suspect any insurmountable problems with their staff expertise or training, their application of survey methodology, and their quality control measures.

Some administrative considerations also figure into the selection of a polling firm. Here are some questions that should be answered prior to actual selection. Is the firm conveniently located so that meetings with their representatives can be held as needed, i.e., at least once to review the draft questionnaire and another time to discuss project results? (If the firm is located in another part of the country, then provisions for travel will have to be built into the budget.) Will the firm seek any input in designing the questionnaire? What form will this input take? What analyses of data will be

undertaken? What will the final report look like? How soon after data collection will the final report be issued? How good is the firm at meeting reporting deadlines?

Here are a few tips on working effectively with a polling firm. Be highly directive initially so that the firm has a clear understanding of project goals and expected project outcomes. In developing a scope of work for the project, identify the key topic areas that should be covered in the survey. It is good to be as specific as possible, short of actually drafting questions. Leave that work to the polling firm. It's more important to specify all the areas in which questions should be asked so that no information is inadvertently left out of the questionnaire. In preparation for actual questionnare construction, it is useful to send a memo to the firm stating detailed suggestions for content to be included in the questionnaire. At that time, it is also useful to attach samples of questionnaires that have been used for I/M surveys in other states. (See attached samples of questionnaires developed by the Highway Safety Research Institute of the University of Michigan, the Survey Research Laboratory of the University of Illinois, and AHF Marketing Research of New York.)

VII. Summary

High quality, scientific polls require careful planning and attention to numerous details. There is considerable flexibility in the development and implementation of a poll. The decisions which are made about sample selection and size, the choice of a polling methodology, questionnaire design and wording, and the use of quality control measures will ultimately affect the cost and accuracy of polling results.

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APPENDIX I

DETERMINATION OF SAMPLE SIZE

Sample size can be calculated to insure that a desired confidence interval level is obtained, plus or minus a range of percentage points. By convention in public opinion research, the confidence level is set at 95% with a confidence interval of ±5%. This means that the chances are about 95 in 100 that, using the same survey procedures, the results in the study would not vary by more than five percentage points from the result that would be obtained from a complete coverage of the sample universe. The sample size is determined by the formula for the standard error (SE) of a sampling distribution of means and the formula for the confidence interval for the estimate of the population mean. The former is given by the formula:

$$SE = \text{square root of } \frac{PQ}{N-1} \text{ where}$$

P = the proportion of positive responses (e.g., .5 is 50%)
Q = (1-P) or the proportion of negative responses
N = sample size

To determine the sample size from the above formula, first determine the standard error. From sampling theory, it is known that a 95% confidence interval can be translated into a t score of 1.96 which represents a standardized measure of the number of deviational units a sample mean is from the population mean. Setting a confidence interval of 95% insures that in 95 out of 100 cases the sample mean will be no more than 1.96 units from the actual population mean. With this information, the SE can be easily calculated for the sample. SE=the confidence interval (.05) divided by t (1.96). SE=.0255. This information can then be used to determine the sample size.

$$SE = \text{square root of } \frac{PQ}{N-1}$$

$$.0255 = \frac{.5 \times .5}{N-1} \qquad \text{where } p = .5 \text{ (the worst possibility)*}$$

$$.0006508 = \frac{.25}{N-1}$$

$$N = 385$$

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* The reader should bear in mind that there is a relationship between the sample size needed for a certain confidence interval and the distribution of answers for specific question items. For example, given a question with a YES or NO answer, the number of respondents needed decreases with the movement away from an even distribution of yes/no answers. Given a random survey with a 50%/50% split on YES/NO answers, the minimum number of respondents needed would be in the area of about 390. However, should the distribution of answers obtained from respondents change to an 85%/15% split, then the needed sample size would drop to just less than 200 respondents. By convention in public opinion research, the "worst situation" (where there is a 50%/50% split) is usually used in the determination of sample size. This assures at least a 5% confidence interval for all combinations of response percentages. (Source: Adcock & Associates, Inc., Albuquerque, New Mexico, 1981)

APPENDIX II

ACCURACY OF SURVEY DATA

With a sample size of 800, a survey finding that 55% of respondents favored I/M as a strategy for air pollution control would have a sampling error of about 3.5, assuming the responding sample was a simple random sample of the population of interest (see Table 6). This means that the true percentage in the population has a 95% probability of being within the range of 51.5% to 55.5%, assuming no non-response bias. Consider for a moment the implications of a sample size of only 200, where 55% of the public were found to favor I/M. This sample would have a sampling error of 6.9, meaning that the true percentage in the population has a 95% probability of being within the range of 48.1% to 61.9%. In this case, one is less certain that the majority of the population actually favor I/M.

Response rate is calculated as the percentage resulting from completed interviews divided by the number of sample members known to be eligible. Inability to get an answer from a ringing number does not take that number out of the sample. In a sample of 400 persons with valid driver's licenses, if 40 households contacted by phone had no drivers, and 40 telephone numbers were non-working or commercial, the original sample of potential respondents would be adjusted to 320. Eighty numbers would be ineligible. Then, if 200 interviews were obtained, the response rate would be 62.5%.

If the actual feelings of non-respondents are extreme in either direction, then each 10% decrease in the response rate increases by 10 percentage points the range by which the distribution could be affected. An example will help to clarify this point. Let's say that we determined that the response rate to a recent mail survey was 50%. Suppose further that for a key I/M survey question 75% favored I/M and 25% opposed it. Suppose that all non-respondents (representing 50% of all those who were mailed a questionnaire but did not return it) were opposed to I/M. This would mean that the actual percent in the population who favor I/M is 37.5% (.75x.5) and the percent who oppose it is 62.5% (.50 + .25x.5).

Often there is no reason to suspect that non-respondents and respondents to a survey have substantially different attitudes. This is especially true for surveys treating non-controversial topics. I/M is a fairly controversial topic, as evidenced by the considerable amount of postive and negative treatment it has received in mass media nationwide. As a result, we could expect that at least a small percentage of non-respondents will be persons who refuse to be interviewed because they disapprove of the topic. For this reason, it would be important to obtain a high response rate to an I/M survey to protect against this source of potential bias. A way to reduce the number of potential refusals is to present I/M in the context of a general environmental survey which, presumably, would appeal to a broader base of the general public. This approach would add cost to the survey, but would also increase the response rate and data accuracy.

Table 1

Uses Of I/M Polling Data During I/M Program Phases

Phases of an I/M Program	Uses of Polling Data: Program Planning	Program Evaluation	Program Feedback
Developmental Phase (one-year prior to startup)	Assess informational needs of target audiences; also any misconceptions about I/M program	Determine baseline of public attitudes and knowledge	Obtain reactions from public to proposed program features or elements
Startup Phase (period immediately before and after startup)	Continue to assess informational needs of target audiences; identify public's concerns about I/M program	Determine whether public awareness program is reaching intended audiences	Obtain reactions to actual program features, (e.g., quality control and con venience aspects)
Operational Phase (the life of operating program)	Program evaluation data is fed back into the planning process to make any needed changes in I/M public awareness strategies	Determine changes in awareness and knowledge of I/M as result of the public awareness program	Obtain reactions to proposed program changes or modifications

Table 2

Rating of Face-to-Face Interviews, Telephone Interviews, and Mail Questionnaires for Selected Performance Characteristics (Dillman, 1978, pp. 74-75)

Performance Characteristics	METHOD: Face-to-Face Interviews	Mail Questionnaires	Telephone Interviews
I. Obtaining a Representative Sample			
A. Known opportunity for all members of population to be included in the sample.			
1. Completely listed populations.	High	High	High
2. Populations which are not completely listed (e.g., household occupants).	High	Medium	Medium
B. Control over selection or respondents within sampling units.	High	Medium	High
C. Likelihood that selected respondents will be located.	Medium	High	High
D. Insensitivity to substitution of respondents and households.	Medium	Low	Low
E. Response rates.			
1. Hetrogeneous samples (e.g., general public).	High	Medium	High
2. Homogeneous specialized samples (e.g., agency directors, ministers, students).	High	High	High
F. Likelihood that unknown bias from refusals will be avoided.	High	Low	High

Table 2 (cont.)

Performance Characteristics	Face-to-Face Interviews	Mail Questionnaires	Telephone Interviews
II. Questionnaire Constuction and Question Design			
A. Allowable length of questionnaire	High	Medium	Medium
B. Type of question.			
1. Allowable complexity.	High	Medium	Low
2. Success with open-ended questions.	High	Low	High
3. Success with screen questions.	High	Medium	High
4. Success with controlling sequence.	High	Low	High
5. Success with tedious or boring questions.	High	Low	Medium
C. Success in avoiding item non-response.	High	Medium	High
D. Insensitivity to questionnaire construction procedures.	High	Low	Medium
III. Obtaining Accurate Answers			
A. Likelihood that social desirability bias can be avoided.	Low	High	Medium
B. Likelihood that interviewer distortion and subversion can be avoided.	Low	High	Medium
C. Likelihood that contamination by others can be avoided.	Medium	Medium	High

Table 2 (cont.)

Performance Characteristics	Face-to-Face Interviews	Mail Questionnaires	Telephone Interviews
IV. Administrative Requirements			
A. Likelihood that personnel requirements can be met.	Low	High	High
B. Potential speed of implementation	Low	Low	High
C. Keeping costs low.			
1. Overall potential for low per interview costs.	Low	High	Medium
2. Insensitivity of costs to increasing geographical dispersion.	Low	High	Medium

Table 3

Deciding on Question Format

QUESTION FORMATS	EXAMPLES
OPEN-ENDED (Respondent supplies entire answer)	What are some of your reasons for favoring an emissions inspection program? (asked only to persons who responded that they favored one)
OPEN-ENDED WITH FIXED PARAMETERS (Respondent supplies answer within a range)	What do you think would be a reasonable longest distance for someone in your area to have to drive for an emissions inspection? _____MILES 98 NO OPINION
CLOSED-ENDED WITH ORDERED CHOICES (Researcher supplies response categories which are ordered in some way, e.g., category 1 reflects a difference in amount or degree than category 2)	To what extent do you agree or disagree with the following statement? Heavy duty trucks and buses should be included in an emissions inspection program. 1 Strongly disagree 2 Somewhat disagree 3 Neutral 4 Somewhat agree 5 Strongly agree
CLOSED-ENDED WITH UNORDERED RESPONSE CHOICES (Researcher supplies response categories which are unordered, e.g., categories do not reflect differences in amount or degree)	Who would you prefer to conduct an emissions test on your car? An inspector in a state-operated station or a private inspector in a state-licensed garage or service station? 1 STATE INSPECTORS 2 PRIVATE INSPECTORS 3 NO DIFFERENCE 4 NO OPINION
PARTIALLY CLOSED-ENDED (Researcher supplies response categories but also permits respondent to provide additional information)	If a vehicle owner could not afford to pay the costs of repairing the emissions system, do you think the vehicle should be exempted from the emissions requirements, or should the state set up a special fund for the repair of such vehicles, or should the vehicle be taken off the road, or what? 1 EXEMPTED 2 SPECIAL STATE FUND 3 TAKEN OFF THE ROAD 4 OTHER: _____ _____

Table 4

Sample I/M Survey Questions

The following questions were included as part of I/M public opinion surveys in several states.

Arizona has had an emissions inspection program for cars and trucks for about three years now. Do you feel the program should be kept or repealed?. (Arizona State University Survey Research Center)

In the near future, everyone may be required to have their cars inspected for emissions each year. The way you feel now would you tend to oppose or favor annual emissions inspections? (California Air Resources Board)

Several ways are being considered all over the country for dealing with air pollution. For each of the following strategies under consideration, I would like you to tell me whether you are very much in favor, somewhat in favor, somewhat opposed or very much opposed to it. (A program of vehicle emissions inspection and maintenance was one of 22 items mentioned.) (Colorado Market Research Services Inc., University of Colorado Applied Sociological Research Team)

Should annual and safety inspections include tests to control air pollution?" (Metropolitan Dade County and the Dade-Monroe Lung Association, Florida)

Specific proposals have been made to cutdown the amount of pollution caused by cars and trucks. Using the other side of the green card [face-to-face interview] please read with me as I review one possible proposal.

a. All car and truck owners in the country would be <u>required</u> to get their vehicles inspected to see if they were causing too much pollution.
b. This inspection would cost $5-10.
c. Those who fail the inspection would have to get their vehicle fixed and return for another inspection.
d. Those who passed the inspection would receive a sticker for their windshield. Anyone driving without a sticker would be subject to a fine.

Do you favor or oppose this program?
(Urban Studies Center of the University of Louisville)

Some states have a combined program of inspection for both safety and emissions. Do you favor such a combined program for Michigan? (Highway Safety Research Institute, Ann Arbor, Michigan)

A yearly inspection of motor vehicles for pollution emission levels will be mandatory in the State of Nevada. Are you in favor of this law? (University of Nevada, Las Vegas)

Table 4 (cont.)

In the past, for economic reasons, there have been recommendations to eliminate our mandatory vehicle inspection program. Do you agree or disagree? (New Jersey Motor Vehicle Inspection Study Commission)

Starting in January 1981, cars will have to be inspected to find out whether they are safe and if they are polluting the air too much. The cost of the inspection will go up from $6.00 to $12.00. Do you think that this program is:

1. Good idea
2. Bad idea
3. Don't know

(Social Data Analysts, Inc., New York)

Do you think that exhaust emissions tests on automobiles are important? (Research Corporation of New England, Rhode Island)

Would you favor legislation requiring periodic inspection of emission systems on all cars? (Nashville AAA Mid-South Auto Club)

As mentioned in the letter, the state is thinking about reducing air pollution by setting up yearly inspections of Michigan motor vehicles to test their exhaust emissions and to require owners to fix those engines which are causing too much air pollution. In trying to decide if such a vehicle inspection program is desirable, one has to think about the value of reducing air pollution against the total program costs in time, travel, inspection fees, and repairs. What is your general opinion? Do you favor or oppose a required emissions inspection program in your county?

1 FAVOR
2 OPPOSE
3. NO OPINION - (GO TO NEXT QUESTION)

Do you feel strongly about that, or not very strongly?

1 STRONGLY
2 NOT VERY STRONGLY

(Highway Safety Research Institute, The University of Michigan)

A recent New York State program aimed at controlling air pollution is the Auto Emissions Inspection and Maintenance Program. As of January 1, 1981, all gasoline fueled vehicles in the New York metropolitan region (i.e., New York City, Rockland, Westchester, Nassau, and Suffolk counties) which weigh 8,500 lbs. or less must be inspected annually for emissions. In 1981, the Auto Emissions Inspection and Maintenance Program only requires the inspection of vehicles. Beginning in January, 1982 vehicles that fail the emissions test must be repaired in order to be registered. Based on what I've just read to you or what you may have

Table 4 (cont.)

previously head about the Auto Emissions Inspection and Maintenance Program, would you say that you (READ LIST)?

Strongly favor it
Somewhat favor it
Neither favor nor oppose it
Somewhat oppose it
Strongly oppose it

(Source: AHF Marketing Group)

To reduce air pollution from cars, the State of Illinois is considering a law that would require all cars, vans and pickup trucks in the Chicago metropolitan area to be tested for emissions. That means that you would have to take all cars into a designated place to be checked for pollution levels. This inspection would check only pollution levels and not safety problems. Each car would have to pass the test in order to get license plates. Would you favor or oppose such a program?

1. Favor
2. Oppose
3. Depends--Don't Know

(University of Illinois)

In the spring of 1983, the twice a year safety inspection for cars in Massachusetts will be replaced by a new inspection program. Under this new program, cars will have to be inspected just once a year, but the inspection will include not only mechanical safety, but also tailpipe emissions. In order to pass the tailpipe emissions inspection, a car's emissions would be measured against a standard set for that particular car's make and year. A 1980 car, for example, would have to meet a higher standard than a 1971 car. If the car fails either the safety or emissions inspection, it must be repaired before an inspection sticker will be issued. The cost for this once a year inspection will be $10 and will be done in gas stations as it is now. Were you aware of this new inspection program, or hadn't you heard about it before?

1. AWARE
2. HADN'T HEARD
3. DON'T KNOW

Based on the description I have just read, is your opinion of this new car inspection mainly favorable or mainly unfavorable?

1. MAINLY FAVORABLE
2. MAINLY UNFAVORABLE
3. DON'T KNOW

(Becker Research Corporation, Boston, Mass.)

Table 5

Sampling Tolerances for Comparisons Between Two Samples

Tolerances are also involved in the comparison of results from different parts of any one sample and in the comparison of results between two different, but comparable, samples. A difference, in other words, must be of at least a certain size to be considered statistically significant. The table below is a guide to the sampling tolerances applicable to such comparisons.

Size of samples compared	Differences required for significance at or near these percentage levels		
	10% or 90%	30% or 70%	50%
1000 and 1000	3	4	4
1000 and 750	3	4	5
1000 and 500	3	5	5
1000 and 250	4	6	7
1000 and 100	6	9	10
750 and 750	3	5	5
750 and 500	3	5	6
750 and 250	4	7	7
750 and 100	6	10	10
500 and 500	4	6	6
500 and 250	5	7	8
500 and 100	6	10	11
250 and 250	5	8	9
250 and 100	7	11	12
100 and 100	8	13	14

Source: Becker Research Corporation, Boston, Mass.

Table 6

Sampling Errors at a 95% Level of Confidence
for Various Percentages and Sample Sizes,
Assuming a Simple Random Sample
(Percentages)

Approximate Percentages	Sample or Subsample Size								
	1600	1000	800	400	250	200	150	100	50
50%	2.50	3.16	3.54	5.00	6.32	7.08	8.16	10.00	14.14
40% or 60%	2.45	3.10	3.48	4.90	6.20	6.92	8.00	9.80	13.86
30% or 70%	2.29	2.90	3.24	4.58	5.80	6.48	7.48	9.16	12.96
25% or 75%	2.17	2.74	3.06	4.34	5.48	6.12	7.08	8.67	12.24
20% or 80%	2.00	2.53	2.83	4.00	5.06	5.66	6.54	8.00	11.32
15% or 85%	1.78	2.26	2.52	3.58	4.52	5.04	5.84	7.14	10.10
10% or 90%	1.50	1.90	2.12	3.00	3.80	4.24	4.90	6.00	9.48
5% or 95%	1.09	1.38	1.54	2.18	2.76	3.08	3.56	4.36	6.16

Note: For a given sample size, the chances are 95 in 100 that the value being estimated lies within a range equal to the reported percentage, plus or minus the number of percentage points shown above.

Source: Internal document, Institute for Social Research, The University of Michigan, Ann Arbor, Michigan.

Table 7

Emissions Inspection Attitude by Background Factors
(Percentages)

	N	Strong Favor	Weak Favor	Weakly Oppose	Strong Oppose	Depends	No Opinion
AGE							
15-24	171	38.0	22.8	10.5	21.6	0	7.0
25-34	218	38.5	14.7	11.5	26.1	1.8	7.3
35-54	259	28.6	12.7	11.6	39.8	0.8	6.6
55+	159	17.6	20.1	15.1	32.7	3.1	11.3
SEX							
Male	417	29.3	16.3	12.0	36.0	1.2	5.3
Female	390	33.1	17.4	12.1	25.4	1.5	10.5
GEOGRAPHICAL AREA							
Wayne	179	39.7	16.2	13.4	21.2	1.1	8.4
Oakland, Macomb	175	37.7	14.3	10.3	29.1	1.7	6.9
Other Detroit SMSA	86	23.3	23.3	12.8	34.9	1.2	4.7
Genesee, Ingham Kent	92	34.8	21.7	9.8	23.9	4.3	5.4
Other Central SMSA Counties	81	29.6	13.6	11.1	38.3	0	7.4
Other Surburban SMSA Counties	50	16.0	14.0	18.0	44.0	0	8.0
Other Counties w Cities | 15,000	42	19.0	23.8	14.3	35.7	0	7.1
Rural Counties	104	21.2	14.4	10.6	39.4	1.0	13.5
INCOME							
Over $30,000	174	36.2	17.2	12.1	31.6	0.6	2.3
$20,000 - $30,000	238	29.4	16.8	12.2	32.8	2.9	5.9
$10,000 - $20,000	237	32.5	16.9	13.1	28.3	0.4	8.9
Under $10,000	105	28.6	15.2	9.5	29.5	1.9	15.2
TOTAL	809	31.0	16.9	12.0	30.9	1.4	7.8

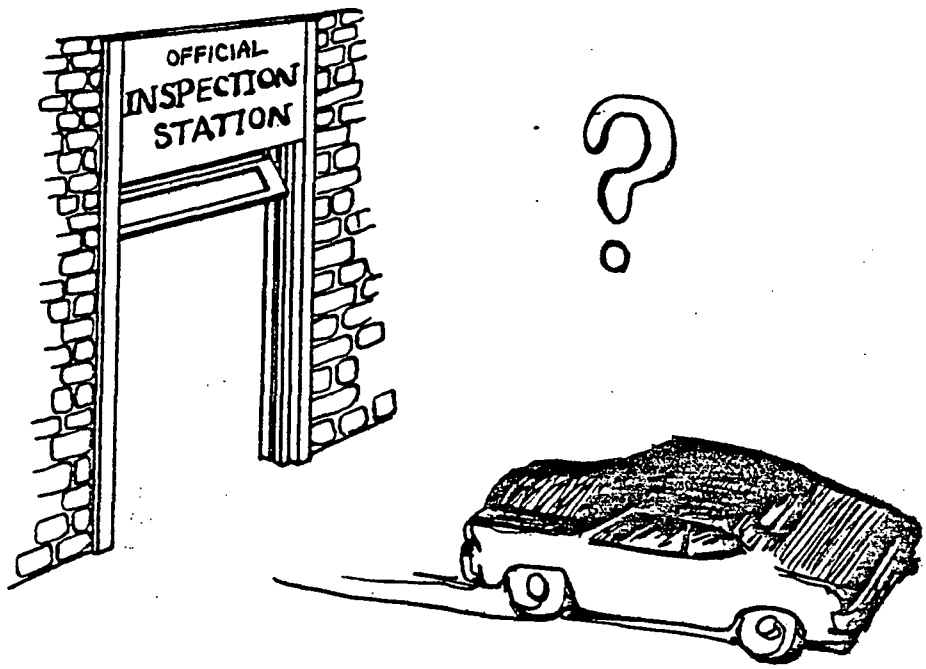
Source: Wolfe, A.C., Michigan Public Opinion Toward Motor Vehicle Inspection, Ann Arbor, Michigan: Highway Safety Research Institute, UM-HSRL-79-60, 1979.

ATTACHMENTS

SAMPLE QUESTIONNAIRES FOR I/M SURVEYS IN THREE STATES

SURVEY OF MICHIGAN DRIVERS
CONCERNING MOTOR VEHICLE INSPECTIONS

A BRIEF QUESTIONNAIRE



Sponsored by: Michigan Department of Transportation

Survey Director: Dr. Arthur C. Wolfe
111 H.S.R.I.
University of Michigan
Ann Arbor, Mich. 48109
Tel. (313) 764-0248

DIRECTIONS: For most of the following questions please circle the number in front of your answer choice. On a few questions you will need to fill in a blank line or write out an answer in your own words.

1. Have you personally ever been bothered by air pollution in the county where you live?

   1 YES
   5 NO → (go to Q.2)

   1a. In the past year would you say you have been bothered by air pollution:

   1 A LOT [11]
   2 SOME
   3 NOT MUCH
   4 NOT AT ALL ?

2. How widespread do you think the air pollution problem in Michigan is? Would you say that air pollution is a serious problem: (circle one answer)

   1 NOWHERE IN MICHIGAN
   2 ONLY IN A FEW BIG CITIES
   3 THROUGHOUT SOUTHERN MICHIGAN
   4 ALL OVER THE STATE ?
   8 DON'T KNOW, NO OPINION [12]

3. You probably know that using regular gas in cars designed for no-lead gas increases the air pollution from such cars. Do you favor or oppose a law prohibiting motorists from using regular gas in no-lead cars?

   1 FAVOR
   2 OPPOSE
   8 NO OPINION [13]

4. As mentioned in the letter, the state is thinking about reducing air pollution by setting up yearly inspections of Michigan motor vehicles to test their exhaust emissions and to require owners to fix those engines which are causing too much air pollution. In trying to decide if such a vehicle inspection program is desirable, one has to think about the value of reducing air pollution against the total program costs in time, travel, inspection fees, and repairs. What is your general opinion? Do you favor or oppose a required emissions inspection program in your county?

   1 FAVOR
   2 OPPOSE
   80 NO OPINION → (go to Q.5) [14-15]

   4a. Do you feel strongly about that, or not very strongly?

   1 STRONGLY [15]
   2 NOT VERY STRONGLY

5. Another idea which has been mentioned for reducing air pollution in some places is to prohibit parking in certain areas with heavy air pollution in order to encourage people to use public transportation. If you had to choose between a no parking program and an emissions testing program, which would you prefer?

   1 NO PARKING
   2 EMISSIONS INSPECTION
   8 NO OPINION [16]

6. In thinking about a possible exhaust emissions inspection program for Michigan there are a number of decisions which would have to be made about how the program might work. One choice has to do with licensing a large number of private garages and service stations to do the inspections, or with setting up a limited number of new state stations to do the inspections. Do you think it would be better to set up special state inspection stations, or to license private garages to do the inspections?

1 STATE STATIONS — 800 NO OPINION → (go to Q.7)
2 PRIVATE GARAGES AND SERVICE STATIONS [17-19]

6a. Why do you feel that way?_____

_____ [18,19]

7. If an emissions inspection program is set up, do you favor or oppose including buses and large trucks in the program?

1 FAVOR — 8 NO OPINION [20]
2 OPPOSE

8. If an emissions inspection program is set up, do you think it should be required statewide, or only in the areas with the worst pollution problems?

1 STATEWIDE — 80 NO OPINION → (go to Q.9) [21-22]
2 WORST POLLUTION AREAS ONLY

8a. Do you feel strongly about that, or not very strongly?

1 STRONGLY [22]
2 NOT VERY STRONGLY

9. What do you think would be a reasonable longest distance for someone in your area to have to drive for an emissions inspection?

_____ MILES — 98 NO OPINION [23-24]

10. What do you think would be a reasonable longest time for someone to spend at the inspection station waiting and getting inspected?

_____ MINUTES — 998 NO OPINION [25-27]

11. What do you think would be a reasonable inspection fee, or do you think the inspection should be paid for by other state funds?

$_____ DOLLARS — 98 NO OPINION [28-29]

00 FREE, OTHER STATE FUNDS

12. If a vehicle did not meet the emissions standards for vehicles of its age and type, what do you think would be a reasonable length of time to give the owner to get the emissions system working properly?

_____ DAYS — 98 NO OPINION [30-31]

13. It has been suggested that some older cars should be exempted from having to repair their emissions systems if the repair cost was a large percentage of the vehicle's value. Do you favor or oppose this idea?

1 FAVOR — 800 NO OPINION→(go to Q.14)
2 OPPOSE→(go to Q.14) [32-34]

13a. What percentage of the vehicle's value should the repair cost be in order to be exempted?

(at least) _____ PER CENT — 98 NO OPINION [33-34]

14. If a vehicle owner could not afford to pay the costs of repairing the emissions system, do you think the vehicle should be exempted from the emissions requirements, or should the state set up a special fund for the repair of such vehicles, or should the vehicle be taken off the road, or what?

10 EXEMPTED→(go to Q.15) — 80 NO OPINION→(go to Q.15)
2 SPECIAL STATE FUND [35-36]
30 TAKEN OFF THE ROAD→(go to Q.15)
40 OTHER:_____→(go to Q.15)

14a. Should this be a loan fund which the owner has to pay back, or should it be a welfare grant?

1 LOAN — 8 NO OPINION [36]
2 WELFARE GRANT

15. Who do you think could be trusted more to do a proper emissions test, inspectors in state-operated stations or inspectors in state-licensed garages and service stations, or don't you think there would be any difference?

1 STATE INSPECTORS — 8 NO OPINION [37]
2 PRIVATE INSPECTORS
3 NO DIFFERENCE

16. Now we have a question about safety inspections. As you probably know, many other states require regular safety inspections of their registered vehicles for such components as lights, brakes, steering, and tires. Do you favor or oppose such a regular safety inspection program for Michigan?

1 FAVOR — 80 NO OPINION→(go to Q.17)
2 OPPOSE [38-39]

16a. Do you feel strongly about that, or not very strongly?

1 STRONGLY [39]
2 NOT VERY STRONGLY

17. Some states have combined programs of inspection for both safety and emissions. Do you favor or oppose such a combined program for Michigan?

1 FAVOR — 8 NO OPINION [40]
2 OPPOSE

18. A combined emissions and safety inspection would cost somewhat more than an emissions inspection alone. What do you think would be a reasonable combined inspection fee, or do you think the combined inspection should be paid for by other state funds?

$_____ DOLLARS 98 NO OPINION [41-42]

00 FREE, OTHER STATE FUNDS

19. How much do you think required vehicle safety inspections would reduce motor vehicle accidents in Michigan?

1 A LOT 8 NO OPINION [43]
2 SOME
3 NOT MUCH

20. It has also been suggested that an inspection program should include testing of vehicle noise and should make any noisy vehicle be fixed. Do you favor or oppose required state testing of motor vehicle noise?

1 FAVOR 80 NO OPINION → (go to Q.21) [44-45]
2 OPPOSE

20a. Do you feel strongly about that, or not very strongly?

1 STRONGLY [45]
2 NOT VERY STRONGLY

21. Are you ever disturbed by the noise made by individual noisy vehicles?

111 YES
77 NO → (go to Q.22)

21a. What types of vehicles disturb you the most?

[46,47]

---

22. How strictly do you think state rules on motor vehicle noise should be enforced?

1 VERY STRICTLY 8 NO OPINION [48]
2 SOMEWHAT STRICTLY
3 NOT VERY STRICTLY

23. Another idea which has been suggested is that the state should set up special diagnostic centers where motorists could pay to have problems with their motor vehicles diagnosed by impartial certified mechanics before taking them to private garages for repair. Such a center could also be used by people buying a new or used car to check for defects. Do you favor or oppose the state setting up such diagnostic centers?

1 FAVOR 8 NO OPINION [49]
2 OPPOSE

24. Now there are a few background questions about your household and its vehicles? How many licensed drivers are there in your household?

_____ NUMBER [50]

25. How many personal motor vehicles of what types are owned by your household?

CARS . . . . . _____ NUMBER [51]

VANS, PICKUPS, JEEPS, UTILITY VEHICLES . . _____ NUMBER [52]

MOTORCYCLES . . . . . _____ NUMBER [53]

OTHER:_____ _____ NUMBER [54]

26 What is the model year of the oldest vehicle? _____ YEAR [55-56]

27. Would you say that this vehicle is in safe operating condition now, or that there are some safety components which need repair?

100 SAFE NOW→(go to Q.28) 800 DON'T KNOW→(go to Q.28) [57-59]
2 REPAIRS NEEDED

27a. What components are these? _____ [58,59]

28. What do you think are the main types of vehicle defects which sometimes contribute to accidents?

_____

_____ [60,61,62]

29. Have you ever had occasion to use regular gasoline in a vehicle designed to use no-lead gasoline?

1 YES 8 DON'T KNOW, NOT SURE [63]
5 NO

30. How closely would you say you follow your owner's manual for regular service and repair of your vehicle(s)?

1 VERY CLOSELY 800000 DON'T KNOW→(go to Q.31) [64-69]
2 SOMEWHAT CLOSELY
300000 NOT VERY CLOSELY→(go to Q.31)

30a. About how often do you get your oldest vehicle tuned up?

_____ MILES or _____ MONTHS 99998 DON'T KNOW [65-69]

31. Do you, or does someone else in your household, do routine maintenance and repair of your vehicle(s), or do you usually have it done by a garage or service station?

1 DO IT MYSELF — 80000 DON'T KNOW → (go to Q.32)
20000 DONE BY SOMEONE ELSE IN HOUSEHOLD OR BY FRIEND → (go to Q.32)
30000 DONE BY PRIVATE GARAGE OR SERVICE STATION → (go to Q.32) [70-74]

31a. Do you consider the emissions control devices when you do a tune-up?

1 YES — 8 DON'T KNOW [71]
3 SOMEWHAT
5 NO

31b. If your vehicle exhaust system needed a major repair to meet the emissions standards, how likely is it that you would be able to make the repair yourself?

1 VERY LIKELY — 8 DON'T KNOW [72]
2 SOMEWHAT LIKELY
3 NOT VERY LIKELY

31c. Do you check your vehicle's brakes during the course of normal maintenance?

1 YES [73-74]
3 SOMETIMES
50 NO — (go to Q.32)

31d. How do you check the brakes? _____ [74]

_____

32. Do you believe that your vehicles' emissions control systems are working properly now?

10 YES → (go to Q.33) — 80 DON'T KNOW → (go to Q.33) [75-76]
5 NO

32a. Why is that? _____ [76]

_____

33. Finally there are 3 background questions for statistical purposes. In what year were you born?

_____ YEAR [77-78]

34. What is the highest level of education you have completed?

1 NO FORMAL EDUCATION
2 GRADE SCHOOL ONLY
3 SOME HIGH SCHOOL
4 COMPLETED HIGH SCHOOL
5 VOCATIONAL SCHOOL
6 SOME COLLEGE
7 COMPLETED A FOUR-YEAR COLLEGE
8 SOME GRADUATE WORK
9 COMPLETED A GRADUATE DEGREE
[79]

35. In which of the four categories below does your total yearly family income fall, before taxes?

5 LESS THAN $10,000
4 $10,000-$20,000
2 $20,000-$30,000
1 OVER $30,000
[80]

Is there anything else you would like to say about the problem of air pollution or about motor vehicle inspections, or do you have any suggestions concerning appropriate questions to include in a future questionnaire on this topic? If so, please use the space below for these additional comments.

THANK YOU VERY MUCH FOR EXPRESSING YOUR VIEWS ON THESE ISSUES OF GREAT IMPORTANCE TO YOUR STATE GOVERNMENT AND TO ALL OF THE CITIZENS OF MICHIGAN.

ZIF MARKETING RESEARCH
801 Second Avenue
New York, New York 10017

Final

NATIONAL CONSENSUS SURVEYS
#26771F WAVE I
JULY, 1981

AUTO EMISSIONS TRACKING STUDY

START CARD I

RESPONDENT INFORMATION BOX:

NAME: (PRINT) _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____

TEL.# (AREA CODE): ( ) _____ TIME STARTED: _____ TIME ENDED: _____

INTERVIEWER: _____ DATE: _____

CIRCLE COUNTY:

Manhattan	1	Nassau	6
Bronx	2	Rockland	7
Brooklyn	3	Suffolk	8
Queens	4	Westchester	9
Staten Island	5		

CIRCLE SEX:

Male	1
Female	2

ASK TO SPEAK TO AN ADULT 18 YEARS OF AGE OR OLDER.

Hello. I'm _____ of National Consensus Surveys. We are interviewing New York residents and I'd like to ask you a few questions.

A. First, please tell me the age and sex of all persons in your household 18 years of age or older.

Please start with the females, from oldest to youngest, then the ages of the males, from oldest to youngest.

(ASK TO SPEAK TO THE PERSON NEXT TO THE LOWEST "X" AND ASK Q.1a.)

	NAME	AGE	SEX
( )			
( )			
( )			
( )			
( )			
( )			
( )			

IF DESIGNATED RESPONDENT REFUSES, TERMINATE. DO NOT INTERVIEW OTHERS IN HOUSEHOLD.

IF DESIGNATED PERSON NOT AVAILABLE, MAKE CALLBACK APPOINTMENT AND RECORD BELOW:

	NAME	DATE	TIME
1ST ATTEMPT:			(AM/PM)
2ND ATTEMPT:			(AM/PM)

August 1981

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

IF NECESSARY, RE-INTRODUCE YOURSELF AND RE-READ INTRODUCTION.

1. I'm going to read you a short list of possible health problems facing residents of the New York metropolitan region. For each problem we'd like to know whether you view the problem as extremely serious, very serious, somewhat serious, not so serious, or not at all serious.

Let's start with ... (READ HEALTH PROBLEM NEXT TO "X"). Would you say that ... (FIRST HEALTH PROBLEM) is an extremely serious, very serious, somewhat serious, not so serious, or not at all serious problem to residents of the New York metropolitan region? (RECORD ANSWER BELOW. CONTINUE UNTIL ALL PROBLEMS HAVE BEEN ASKED ABOUT.)

(START HERE)	Extremely Serious	Very Serious	Somewhat Serious	Not So Serious	Not At All Serious
( ) Toxic wastes	5	4	3	2	1
( ) Water pollution	5	4	3	2	1
( ) Air pollution	5	4	3	2	1
( ) Chemicals and additives in foods	5	4	3	2	1
( ) Noise pollution	5	4	3	2	1

2a. There are several major contributors to air pollution in the New York metropolitan region. What percent of air pollution would you say is caused by ... (READ LIST)?

SOURCE	PERCENT
Pollution caused by industry	____%
Pollution caused by motor vehicles	____%
Pollution caused by public utilities	____%
Pollution caused through residential use, such as home heating	____%
Pollution caused by other sources (SPECIFY):	
_____	____%
_____	
	TOTAL = 100%

IF TOTAL DOES NOT ADD TO 100%, SAY TO RESPONDENT: "This adds to (more/less) than 100%. Can we please go over what percent of air pollution is caused by (READ SOURCES NAMED IN Q.2a.)

2b. Now, thinking only about motor vehicle pollution, what percent is caused by ... (READ LIST)?

TYPE OF VEHICLE	PERCENT
Commercial vehicles, such as trucks and taxis	____%
Passenger cars	____%
Buses	____%
Other (SPECIFY):	
_____	____%
	TOTAL = 100%

IF TOTAL DOES NOT ADD TO 100%, SAY TO RESPONDENT: "This adds to (more/less) than 100%. Can we please go over what percent of air pollution is caused by (READ SOURCES NAMED IN Q.2b.)

3a. During the past year, several regulatory programs aimed at controlling air pollution in the New York metropolitan region have gone into effect. Please tell me the names of any city, state, or federal regulations to control air pollution in the New York metropolitan region which have gone into effect in the past year. (PROBE:) What others have you heard of? (DO NOT READ LIST.)

New York State Auto Emissions Inspection/ Maintenance Program ——— 1
All others ——— 2

IF RESPONDENT MENTIONS "NEW YORK AUTO EMISSIONS INSPECTION AND MAINTENANCE PROGRAM" SKIP TO Q.4a. OTHERWISE, READ Q.3b.

3b. A recent New York State program aimed at controlling air pollution is the Auto Emissions Inspection and Maintenance Program. As of January 1, 1981, all gasoline fueled vehicles in the New York metropolitan region (i.e., New York City, Rockland, Westchester, Nassau, and Suffolk counties) which weigh 8,500 lbs. or less must be inspected annually for emissions.

In 1981 the Auto Emissions Inspection and Maintenance Program only requires the inspection of vehicles. Beginning in January, 1982 vehicles that fail the emissions test must be repaired in order to be registered.

Based upon what I've just read to you or what you may have previously heard about the Auto Emissions Inspection and Maintenance Program, would you say that you ... (READ LIST)?

Strongly favor it ——— 5
Somewhat favor it ——— 4
Neither favor nor oppose it ——— 3
Somewhat oppose it ——— 2
Strongly oppose it ——— 1

3c. Why do you feel that way? (PROBE:) What other reason do you have for saying that?

_____

_____

_____

_____

(SKIP TO Q.5.)

(ASK ONLY IF AUTO EMISSIONS INSPECTION AND MAINTENANCE PROGRAM IS MENTIONED IN Q.3a:)

4a. You mentioned that during the past year New York State has begun the Auto Emissions Inspecton and Maintenance Program. Based upon your personal experience or what you may have heard about it, would you say that you ... (READ LIST)?

Strongly favor it ——— 5
Somewhat favor it ——— 4
Neither favor nor oppose it ——— 3
Somewhat oppose it ——— 2
Strongly oppose it ——— 1

4b. Why do you feel that way? (PROBE:) What other reasons do you have for saying that?

_____

_____

_____

_____

(ASK EVERYONE:)

5. Have you seen or heard any advertising about the New York State Auto Emissions Inspection and Maintenance Program?

(ASK Q.6) ← Yes ——— 1
(SKIP TO Q.7) ← No ——— 2
Don't know ——— 3

6. What do you recall seeing or hearing about the Auto Emissions Inspection and Maintenance Program? (PROBE:) What else did the ad say or show?

_____

_____

_____

_____

7. I'm going to read a short list of statements which might describe particular aspects of the Auto Emissions Inspection and Maintenance Program. Please tell me if you strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree with each statement.

Let's begin with ... (READ STATEMENT NEXT TO "X".) Would you say you strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree? (RECORD BELOW AND CONTINUE UNTIL ALL STATEMENTS HAVE BEEN ASKED ABOUT.)

(START HERE)	Strongly Agree	Somewhat Agree	Neither Agree Nor Disagree	Somewhat Disagree	Strongly Disagree
( ) Automobile mechanics have the knowledge and training necessary to repair emissions control devices	5	4	3	2	1
( ) The auto emissions inspection and maintenance program will significantly improve air quality in the New York metropolitan region	5	4	3	2	1
( ) There is a sufficient number of auto emissions inspection stations	5	4	3	2	1
( ) Automobile mechanics are generally honest about needed repairs	5	4	3	2	1
( ) Certain cars should be exempt — that is, not have to undergo — auto emissions inspection	5	4	3	2	1
( ) Automobile mechanics will generally charge a fair price for needed emissons control repairs	5	4	3	2	1
( ) All motor vehicles — not just passenger cars — should be inspected for auto emissions	5	4	3	2	1
( ) Auto emissions inspection stations are conveniently located	5	4	3	2	1
( ) Automobile mechanics who work on emissions control devices should be certified by New York State	5	4	3	2	1
( ) The auto emissions inspection and maintenance program is unnecessary government regulation	5	4	3	2	1

(FOR ALL RESPONDENTS WHO ANSWERED "STRONGLY" OR "SOMEWHAT" AGREE — BOXED AREAS IN Q.7 — ASK Q.8. OTHERWISE, SKIP TO Q.9a.)

8. You said that certain cars should be exempt — that is, not have to undergo — auto emissions inspection. Under what circumstances or what types of cars should be exempt from being inspected for auto emissions? (PROBE:) Are there any other circumstances or other types of cars which should be exempt?

_____

_____

_____

_____

9a. Some people have proposed that if a car fails the auto emissions inspection, a ceiling be put on the cost of repairs that have to be made. That is, no matter what the cost of needed repairs are, a car owner would only be required to spend a set amount for repairs. A car would be registered whether or not all the needed repairs on emissions control devices were made.

Do you think that there should be such a ceiling on the cost of repairs that have to be made?

Yes ———— 1
No ———— 2

9b. (IF "YES":) What is the maximum amount of money that a car owner be required to pay for repairs to emissions control devices?

(RECORD AMOUNT TO NEAREST DOLLAR): $___ ___ ___ ___

10. Some people believe that removing emissions control devices — such as catalytic converters — improves gas mileage and car performance. Do you think that removing emissions control devices actually does improve gas mileage and car performance?

Yes ———— 1
No ———— 2

11. As you may know, since 1957 New York State has required that each year all passenger vehicles undergo a mandatory safety inspection. This inspection involves the checking of brakes, tires, lights, steering, suspension, etc. to see if they are in proper working order. We would like to know whether you feel that this safety inspection program has contributed to highway and driving safety. Would you say that the program has contributed ... (READ LIST)?

Very much ———— 4
Somewhat ———— 3
A little, or ———— 2
Not at all to highway and driving safety? ———— 1

12a. Do you think that this annual mandatory safety inspection program should be continued?

(CONTINUE) ← Yes ———— 1
No ———— 2

12b. Why do you say that? (PROBE:) What other reasons do you have for feeling this way?

_____

_____

_____

_____

13a. Are you a licensed driver?

Yes ———— 1
No ———— 2

13b. Do you personally own a car?

(SKIP TO Q.15) ← Yes ———— 1
(ASK Q.14) ← No ———— 2

14. Do you pay for any of the expenses for maintaining or repairing a car?

Yes ———— 1
No ———— 2

ASK EVERYONE:

15. Including any cars that you may own, in total how many cars do people in this household own?

(WRITE IN NUMBER:) ____ ____

ASK Q's. 16a-20 ONLY IF ONE OR MORE CARS IN Q.15. OTHERWISE, SKIP TO Q.21.

16a. Are any of the car or cars that people in your household own 1978 models or newer?

Yes ———— 1
No ———— 2

16b. Are any of these cars older than 1978?

Yes ———— 1
No ———— 2

17. Please think about manufacturers' warranties covering emissions control devices. To the best of your knowledge, do these warranties generally extend beyond the first year of owning the car?

Yes ———— 1
No ———— 2

18. Have any of the cars that members of your household own been inspected under the New York State Auto Emissions Inspection and Maintenance Program?

Yes ———— 1
No ———— 2

19. Who usually repairs or maintains the cars owned by members of your household? (READ LIST. CIRCLE AS MANY AS APPLY.)

You ———— 1
Other family member(s) ———— 2
Service station ———— 3
Dealer ———— 4
Other (SPECIFY):
_____ 0
_____

20. What would you estimate the average bill for the repair of auto emissions control devices to be?

(RECORD AMOUNT TO NEAREST DOLLAR:) $ ___ ___ ___ ___

ASK EVERYONE:

Finally, some questions for classification purposes only.

21. Which of the following groups includes your age? (READ LIST.)

18 to 24	1
25 to 34	2
35 to 44	3
45 to 54	4
55 to 64	5
65 or over	6

22. What is your marital status? (READ LIST.)

Married	1
Single	2
Separated	3
Divorced	4
Widowed	5

23. Including yourself, what is the total number of people in your household?

One	1
Two	2
Three	3
Four	4
Five	5
Six or more	6

24. What was the last grade of formal school you completed? Was it ... (READ LIST)?

Grade school or less	1
Some high school	2
Completed high school	3
Vocational or technical school beyond high school	4
Some college	5
Completed college or more	6

25a. Do you work outside your home at a paid job?

(ASK Q.25b) ←	Yes	1
(SKIP TO Q.26) ←	No	2

25b. In an average work week, do you work 35 or more hours per week, or less than 35 hours per week?

35 hours or more	3
Less than 35 hours	4

26. Finally, which of the following income groups includes your total annual family income before taxes? (READ LIST.)

Under $5,000	1
$5,000 to under $8,000	2
$8,000 to under $10,000	3
$10,000 to under $15,000	4
$15,000 to under $20,000	5
$20,000 to under $25,000	6
$25,000 to under $30,000	7
$30,000 or more	8
(DO NOT READ)	
Refused	x
Don't know	y

THANK RESPONDENT FOR HIS/HER COOPERATION.
BE SURE ALL INFORMATION IN BOX ON TOP OF FIRST PAGE IS COMPLETE.

I.D.# _____ 1-3

Study 385 4-6

Survey Research Laboratory
University of Illinois

Attitudes on Air Pollution
385

1/80

Time Interview Began _____:_____ [ ] *AM* [ ] *PM* 7-10

Hello, is this *(phone #)* ? My name is _____, and I'm calling from the Survey Research Laboratory at the University of Illinois in Urbana. We are doing a study in the Chicago area on peoples' attitudes towards air pollution.

1. How serious do you feel air pollution is in the Chicago area? Would you say it's . . .

Very serious, ... 1 11

Somewhat serious, ... 2

Not too serious, or 3

Not at all serious? 4

Don't know 8

2. Which do you think causes more air pollution in the Chicago area--factories or motor vehicles such as buses, trucks, and autos?

Factories 1 12

Motor vehicles 2

Equal 3

Don't know 8

3. What in your opinion could be done to cut down on pollution from automobiles? *(Circle all that apply)*

More public transportation/reduce use of cars . . 1 13

Manufacturers should improve cars 2 14

Better emissions inspections of cars 3 15

*Other (Specify)*_____

_____ 4 16

Don't know 8

4. Would you say that pollution control devices on cars help to improve air quality . . .

Very much, ... 1 17

Somewhat, ... 2

Very little, or 3

Not at all? 4

Don't know *8*

5. How much do you think the government is doing to control pollution from cars? Would you say it's doing too much, what it should be doing, or doing too little?

Too much 1 18

What it should be doing 2

Too little 3

Don't know *8*

6. Do you think it's all right for people to remove pollution control devices from their cars or should they be fined if they do so?

All right 1 19

Fined 2

Neither *3*

Don't know *8*

7. Do you think it's all right for people to use leaded gas in a car that should take unleaded or should they be fined if they do so?

All right 1 20

Fined 2

Neither *3*

Don't right *8*

8a. To reduce air pollution from cars, the State of Illinois is considering a law that would require all cars, vans and pick-up trucks in the Chicago metropolitan area to be tested for emissions. That means that you would have to take all cars into a designated place to be checked for pollution levels. This inspection would check only pollution levels and not safety problems. Each car would have to pass the test in order to get license plates. Would you favor or oppose such a program?

Favor 1 21

Oppose *(Skip to d)* 2

Depends—don't know (Skip to e) 8

b. How much do you think it would cost to have a car inspected for emissions?

$_____ 22-23
(If $7 or more skip to Q.9)

Don't know 98

c. If the inspection cost about $9 would you favor it or oppose it?

Favor 1 24

Oppose 2

Don't know 8

(Skip to Q.9)

d. Why would you oppose such a program?

_____ 25

_____ 26

_____

(Skip to f)

e. What would it depend on?

_____ 27

_____ 28

_____

f. How much do you think it would cost to have a car inspected for emissions?

$_____ 29-30
(If $14 or less skip to Q.9)

Don't know 98

g. If the inspection cost about $9 would you favor it or oppose it?

Favor 1 31

Oppose 2

Don't know *8*

9. If an emission inspection program were set up . . .

a. Should it include buses?

Yes 1 32

No 2

Don't know *8*

b. Should it include large trucks?

Yes 1 33

No 2

Don't know *8*

c. Should it be required statewide or only in areas where pollution is very bad?

Statewide 1 34

Bad areas 2

Don't know *8*

d. Should the program be funded by an inspection fee or paid for by other state funds?

Inspection fee 1 35

Other state funds 2

Both *3*

Don't know *8*

e. Should the testing be done by state inspectors or through private garages and service stations?

State 1 36

Private 2

Both *3*

Don't know *8*

10. Would you favor or oppose an emissions inspection program if it also included an inspection for safety problems?

Favor 1 37

Oppose 2

Depends--Don't know *8*

11. How many cars, vans and pickup trucks belong to you and the other members of your household?

_____ vehicles 38

None *(Skip to Q.20)* 0

	(A) Car 1	(B) Car 2	(C) Car 3	(D) Car 4
12. (For each) What is the make, model and year?				
a. Make	_____	_____	_____	_____
b. Model	_____	_____	_____	_____
c. Year	_____ 39–40	_____ 56–57	_____ 73–74	_____ 15–16
Don't know .	. *98*	*98*	*98*	*98*
13. How many cylinders does it have?				
Two	. . 1	1	1	1
Four	. . 2 41	2 58	2 75	2 17
Six	. . 3	3	3	3
Eight	. . 4	4	4	4
Don't know	. . *8*	*8*	*8*	*8*
14. On the average, about how often is the engine tuned-up?	42–43 _____ miles (___ times/ year) 44 *New car 97* *DK . . 98*	59–60 _____ miles (___ times/ year) 61 *New car 97* *DK . . 98*	76–77 _____ miles (___ times year) 78 *New car 97* *DK . . . 98*	18–19 _____ miles (___ times/ year) 20 *New car 97* *DK . . . 98*
15. When it needs engine repairs, who usually works on it? *(Circle all that apply)*			79/BK 80/1 1–3/Dup	
Self *(Skip to.Q.17)* . . .	. . . . . 1 45	1 62	1 4	1 21
Friend or relative . . .	. . . . . 2 46	2 63	2 5	2 22
Service station mechanic	. . . . . 3 47	3 64	3 6	3 23
Independent garage mechanic	. . . . . 4 48	4 65	4 7	4 24
Dealership	. . . . . 5 49	5 66	5 8	5 25
Other	. . . . . 6 50	6 67	6 9	6 26
Not app (Skip to Q.17) .	. . . . . *7* 51	*7* 68	*7* 10	*7* 27

	(A) Car 1	(B) Car 2	(C) Car 3	(D) Car 4
16. Are you usually satisfied with the repair service you receive?				
Yes	1 52	1 69	1 11	1 28
Varies	2	2	2	2
No	3	3	3	3
17. Has it ever been taken in for a specific emission inspection?				
Yes	1 53	1 70	1 12	1 29
No	2	2	2	2
Don't know	*8*	*8*	*8*	*8*
18a. Do you think it would pass or fail an emissions inspection if it were done today?				
Pass *(Skip to Q.19)*	1 54	1 71	1 13	1 30
Fail	2	2	2	2
Don't know *(Skip to Q.18)*	8	8	8	8
b. Why do you think it would fail?				
Old-Because of age of car	*1* 55	*1* 72	*1* 14	*1* 31
Engine bad	*2*	*2*	*2*	*2*
Other	*3*	*3*	*3*	*3*

19. On the average how much do you think it would cost to get a car fixed if it failed to meet the inspection?

$_____ 32–34

Don't know *998*

20. If someone's car failed inspection and the owner could not afford to make repairs, what do you think should be done? Do you think . . .

The vehicle should be taken off road after a reasonable time, ... 1 35

The vehicle should be exempt, or 2

Should state funds be available to help pay? . . 3

Other (Specify) _____ 4

Don't know *8*

Now I'd like to ask you some information about your household, so that we can compare your answers with the answers of others like you.

21a. Do you live in the City of Chicago or outside of Chicago?

Chicago *(Skip to Q.22)* 1 36

Outside 2

b. In what county do you live?

Cook *(Skip to Q.22)* 1 37

DuPage *(Skip to Q.22)* 2

Kane *(Skip to Q.22)* 3

Lake *(Skip to Q.22)* 4

McHenry *(Skip to Q.22)* 5

Will *(Skip to Q.22)* 6

Don't know 8

c. In or near what town do you live?

_____

22. Including yourself, how many people currently live in this household?

_____ 38

23. Do you have a current driver's license?

Yes 1 39

No 2

24a. What is your present job title?

_____ 40-41

b. What kind of work do you do; that is, what are your duties on this job?

_____

c. In what business or industry is this; that is, what product is made or what service is given?

_____

25. What is the highest grade or year in school you have completed?

None								00	42-43
Elementary	01	02	03	04	05	06	07	08	
High school					09	10	11	12	
College					13	14	15	16	
Some graduate school								17	
Graduate or professional degree								18	

26. In what year were you born? 19____ *(Code 00 for 1900 or earlier)* 44-45

27. Was your total family income before taxes last year (1979) . . .

(Repeat until "Yes"; then circle)

Less than $5,000?	Yes	1	46
Less than $10,000?	Yes	2	
Less than $15,000?	Yes	3	
Less than $20,000?	Yes	4	
Less than $25,000?	Yes	5	
	No	6	
Refused		*7*	
Don't know		*8*	

THANK YOU FOR YOUR COOPERATION.

28. *SEX*

Circle sex of respondent.

Male	*1*	47
Female	*2*	48-63/BK

Time Interview Ended _____:_____ [ ] *AM* [ ] *PM* 64-67

*Int. ID#*_____ 68-70

*Coder ID#*_____ 71-73

*Check coder ID#*_____ 74-76

*Keypunch ID#*_____ 77-79

80/2