



Project Summary

Report of Workshops on Epidemiologic Studies of Airborne Particles

Edward P. Radford

The report upon which this summary is based represents the cumulative effort of both the members of the Workshop on Epidemiologic Studies of Airborne Particulates and EPA staff. The workshop was conducted after EPA developed a program called a Problem Definition Study for Epidemiologic Studies on Airborne Particles. The full report presents the recommendations that the workshop members prepared to assist the EPA in developing a research program to ascertain the biomedical effects of inhalable particulate matter. This definition of research was accomplished by identification of gaps in current knowledge, identification of research that needs to be performed to fill these gaps, and determination of research that has a high probability of providing a clear examination of the health effects of particles.

A summary of the recommendations follows:

- to study acute and chronic respiratory and acute cardiovascular diseases, in relation to exposure to airborne particles, a single cross-sectional prospective investigation involving several institutions should be given priority
- investigation of stomach cancer in relation to airborne particles is recommended
- adequate exposure estimates must be made
- quality assurance/control of all measurements is very important.

This Project Summary was developed by EPA's Health Effects Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

The members of the Workshop on Epidemiologic Studies of Airborne Particulates have met to assist the EPA in determining the research needed to meet the present and future research requirements of the Environmental Protection Agency in this field. This goal was accomplished by identification of gaps in current knowledge, identification of research that needs to be performed to fill these gaps and determination of research that the workshop members believe has a high probability of success.

Despite more than a decade of research, knowledge relating human disease to air pollutants is still incomplete. The question of primary interest to epidemiologists is: "What is the disease risk for a given level of exposure to a population?" This is the implicit question that needs to be answered for inhaled particles, but the panel agreed that before this question could be successfully addressed and meaningful studies performed, our knowledge of what to measure in the air and in human subjects, and which groups to measure, had to be evaluated. It was evident that

there were serious flaws in previous research in the area of particulate pollution. Some of these flaws included inadequate methods and the use of incomplete data sets; either exposure measurements and/or the measurements of disease endpoints were inadequate, resulting in improper conclusions.

The research areas that were explored and considered to be of prime concern in future research in studying possible health effects of airborne particles are outlined in the following section.

Summary of Recommendations

Note: In the body of the Project Report text, asterisks have been placed in the margin where recommendations concerning various aspects of the program were made to EPA. The following summary incorporates the major components of these individual recommendations:

1. To study acute cardiovascular and acute and chronic respiratory diseases, in relation to exposure to airborne particles, a single cross-sectional prospective investigation involving several centers should be given priority. The design would stratify communities by levels of airborne particles and by disease frequency and would include careful clinical evaluation and functional testing of preselected populations. Such a single multicenter study design is considered by the panel as having the best chance of a clear demonstration of effects of airborne particles on human health.
2. Special studies of potentially sensitive subgroups could be incorporated within the multicenter design, and combined effects of other pollutants should be investigated in such studies.

3. Investigation of stomach cancer in relation to airborne particles is recommended. The appropriate study design here should be developed as additional information is available.
4. Adequate biostatistical methodology should be an integral part of planning any studies.
5. Behavioral or psychological effects of particulate pollution are considered to be potentially important to EPA, and the panel recommends that a separate workshop be convened by EPA to consider pilot studies in this area.
6. In the epidemiologic studies proposed, careful attention to definition of exposure characteristics will be required. Included are the particle

size range investigated, appropriate field measuring equipment needed, physical and chemical characteristics of the particles, degree of similarity of particle sources and characteristics among the centers evaluated for health effects, sampling methods including appropriate monitoring strategies, and personal exposure assessment of both indoor and outdoor sources.

7. Quality assurance of both air measurements and clinical methods will be crucial to the success of any studies done. The workshop participants recommend that up to 30% of the funds available for air monitoring be allocated for quality assurance of these measurements.

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D. J. Kotchmar is the EPA Project Officer (see below).

The complete report, entitled "Report of Workshop on Epidemiologic Studies of Airborne Particles," (Order No. PB 81-190 480; Cost: \$6.50, subject to change) will be available only from:

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