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Preface

This issue of *Inhalation Toxicology* is dedicated to the broad and important topic of aerosol dosimetry. For inhaled particles, the traditional concept of dose—mass of an administered substance, sometimes normalized to body weight or surface area—is far too simplistic. The particles in an inhaled aerosol deposit on airway surfaces in complex patterns, or are exhaled, avoiding deposition altogether. Once deposited, the fates of particles depend on their physiochemical properties, their initial deposition site, and the health status of the individual subject. Particles and their components may be cleared by mucociliary action, enter tissue fluids (e.g., blood and lymph), be distributed throughout the body, or be taken up by cells and tissues in the respiratory tract. Aerosol dosimetry covers all of these dynamic events. Advances in aerosol dosimetry are made by contributions from several disciplines, including chemists, physicists, atmospheric scientists, engineers, mathematicians, physiologists, toxicologists, microbiologists, pharmacologists, anatomists, risk assessors, physicians, veterinarians, and others. Such diverse scientists seldom meet together because they attend their own specialty meetings. The “Frontiers in Aerosol Dosimetry Research” Conference was held in order to bring these specialists together to exchange ideas and to facilitate future research efforts.

The conference was held at the Beckman Center of the National Academies in Irvine, California, on October 24 and 25, 2005. It was attended by about 90 scientists, including postgraduate and graduate students, from 12 countries. The attendees came from universities, research institutes, industry laboratories, government laboratories, and consultant firms. Fifty-four papers were presented, ranging from basic to applied topics.

The papers were organized into seven sessions: Inhaled Aerosols; Posters (covering a large variety of topics); Tobacco Smoke Dosimetry; Computational Fluid Dynamic Modeling; Nanoparticles and Other Aerosols; Tobacco Smoke Biomarkers; and Miscellaneous Topics.

The attendees were invited to submit written suggestions for future research. The submitted research needs were summarized and are included in this journal issue.

The primary sponsors, which supplied direct funding, were: the University of California Tobacco-Related Disease Research Program (TRDRP); the Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (CDC/NIOSH); the University of California Office of Research and Graduate Studies (UCI-RGS); and the Charles S. Stocking Family Trust Fund.

Other sponsors, who provided personnel, supplies, and announcements, included: the University of California, Irvine, Center for Occupational and Environmental Health; the University of California, Los Angeles, Center for Occupational and Environmental Health; the UCLA/UCI Southern California NIOSH Education and Research Center; and the University of California, Irvine, Department of Community and Environmental Medicine.

The conference was under the direction of cochairs Robert Phalen and Michael Oldham, and the conference administrator Susan Akhavan. The Local Committee, which assisted with logistics, registration, audiovisual needs, and record keeping, included: Susan Akhavan, Robin Ferguson, Neha Gowadia, Ali Hamade, Michael Kleinman, Loyda Mendez, and Jane Reimund. The Program Committee, who developed the program, evaluated submitted abstracts, and chaired the scientific sessions, included: Robert Phalen—UC Irvine; Michael Oldham—UC Irvine; Christopher Coggins—Carson Watts Consulting; Donald Gardner—editor of the journal *Inhalation Toxicology*; Lara Gundel—Lawrence Berkeley National Lab; William Hinds—UC Los Angeles; Mark Hoover—NIOSH; Ted Martonen—U.S. EPA; Michael Schum—California EPA; and Bruce Westerberg—Battelle Science & Technology International. Willie McKinney, Jr., Philip Morris, USA, served as an additional session cochair. The session assistants included doctoral students: Neha Gowadia, Loyda Mendez, and Ali Hamade.

Two publications were generated by the conference: this peer-reviewed issue of *Inhalation Toxicology*, and a *Proceedings* that includes the conference program, session chairs’ summaries, abstracts, submitted papers, the research needs summary, evaluations summary, a list of attendees, and an index of authors. The *Proceedings*, in electronic form, may be obtained through the NIOSH web site, and hard copies are available at the cost of printing and mailing, from the Air Pollution Health Effects Laboratory, Department of Community and Environmental Medicine, University of California, Irvine, CA 92697-1825, USA (fax: 949-824-4763).

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