

David G. Hoel, Ph.D.
Principal Scientist

Professional Profile

Dr. David G. Hoel is a Principal Scientist in Exponent's Health Sciences Center for Epidemiology, Biostatistics, and Computational Biology. He has more than 40 years of experience in the fields of epidemiology, statistics, and risk analysis. He is internationally known for his work in risk assessment and has served on and also chaired numerous committees for the WHO and the U.N. as well as the U.S. National Academy of Sciences, the NIH, the EPA and the FDA. For over 20 years, Dr. Hoel was at the National Institute of Environmental Health Sciences, where he directed the Division of Risk Assessment, which included the Laboratories of Biochemical and Molecular Toxicology, as well as the Branches of Epidemiology and Statistics. This Division focused on the development of quantitative methods of estimating human health risks from environmental and occupational exposures. In addition to working with asbestos and chemicals, he is especially active in the area of radiation risk assessment. He has also been involved with issues of adverse outcomes of pharmaceuticals.

Dr. Hoel has published more than 175 papers and chapters in the general area of statistics and risk assessment. He also has been active in studies conducted by the National Research Council of the National Academy. These studies have included reports on beryllium, depleted uranium, dioxin/agent orange, radiation effects in space travel, and radiation dose reconstruction from atomic testing. He has also testified to Congress on several occasions, most recently to the Senate on trichloroethylene and perchlorate. For the last 15 years, he has taught doctoral students as well as clinical fellows at the Medical University of South Carolina, where he is a Distinguished University Professor. The courses he has taught have been in the areas of advanced methods in epidemiology, cancer epidemiology, and risk assessment. His doctoral students have taken positions in industry, universities, and government.

Academic Credentials and Professional Honors

Ph.D., Statistics, University of North Carolina at Chapel Hill, 1966

A.B., Mathematics and Statistics, University of California, Berkeley (with highest honors), 1961

U.S. Public Health Service Postdoctoral Traineeship in Preventive Medicine, Stanford University, 1966–1967

Member, National Academies' Board on Radiation and Nuclear Studies 2008–2010

National Associate, National Academy of Sciences and National Research Council, 2001

Fellow, American Association for the Advancement of Science, 1997

Ramazzini 1994 Award Recipient for "Contributions to Scientific Knowledge on the Oncogenic Effects of Nuclear Radiation"

Westinghouse Distinguished Scientist, 1993–2004

Member, Institute of Medicine, National Academy of Sciences, 1988

Mortimer Spiegelman Gold Medal Award, American Public Health Association, 1977
Fellow, American Statistical Association, 1974

Academic Appointments

Distinguished University Professor, Medical University of South Carolina, 1998–present
Clinical Professor, Department of Radiology, University of South Carolina School of Medicine,
2000–2009
Professor and Chairman, Department of Biometry and Epidemiology and Associate Director for
Epidemiology, Hollings Cancer Center, Medical University of South Carolina, 1993–1997
Adjunct Professor, Department of Biostatistics, University of North Carolina, Chapel Hill,
1970–1993

Publications

McGreevy KM, Lipsitz SR, Linder JA, Rimm E, Hoel DG. Using median regression to obtain adjusted estimates of central tendency for skewed laboratory and epidemiologic data. *J Clin Chem*, in press.

Gebregziabher M, Hoel DG. Applications of the Poly-k statistical test to life-time cancer bioassay studies. *J Hum Ecol Risk Assess*, in press.

Wilson DA, Diel JH, Hoel DG. Lung fibrosis and lung cancer incidence in Beagle dogs that inhaled $^{238}\text{PuO}_2$ or $^{239}\text{PuO}_2$. *Health Phys* 2009; 96:493–503.

Little MP, Hoel DG, Molitor J, Boice Jr JD, Wakeford R, Muirhead CR. New models for evaluation of radiation-induced lifetime cancer risk and its uncertainty in the UNSCEAR report. *Radiat Res* 2008; 169:660–676.

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Adelman AS, Groves FD, O'Rourke K, Sinha D, Hulsey TC, Lawson AB, Wartenberg D, Hoel DG. Residential mobility and risk of childhood acute lymphoblastic leukemia: An ecological study. *Br J Cancer* 2007; 97:140–144.

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Bronley-Delancey A, McMillan DC, McMillan JM, Jollow DJ, Mohr LC, Hoel DG. Application of cryopreserved human hepatocytes in trichloroethylene risk assessment: Relative disposition of chloral hydrate to its carcinogenic and non-carcinogenic metabolites. *Environ Health Perspect* 2006; 114:1237–1242.

McGreevy KM, Hoel B, Lipsitz SR, Hoel DG. Impact of nutrients on insulin-like growth factor-I, insulin-like growth factor binding protein-3 and their ratio in black and white males. *Pub Health Nutr* 2006; 10:97–105.

McGreevy KM, Lipsitz SR, Bissada NK, Hoel DG. Impact of race and baseline PSA on longitudinal PSA. *Int J Cancer* 2006; 118:1773–1776.

Priest ND, Hoel DG, Brooks PN. Relative toxicity of chronic irradiation by ^{45}Ca β - particles and ^{242}Cm α - particles, with respect to the production of lung tumours in BA/Ca mice. *Radiat Res* 2006; 166:782–793.

Makie T, Adcock D, Lackland DT, Hoel DG. Pulmonary abnormalities associated with occupational exposures. *Am J Indust Med* 2005; 48:365–372.

McGreevy KM, Hoel B, Lipsitz SR, Bissada, NK, Hoel DG. Racial and anthropometric differences in insulin-like growth factor I (IGF-I) and insulin-like growth factor binding protein-3 (IGFBP-3) levels. *Urology* 2005; 66:587–592.

Starr TB, Goodman JI, Hoel DG. Uses of benchmark dose methodology in quantitative risk assessment. *Regul Toxicol Pharmacol* 2005; 42:1–2.

Heath Jr, CW, Bond PD, Hoel DG, Meinhold CB. Residential radon exposure and lung cancer risk: Commentary on Cohen's county-based study. *Health Phys* 2004; 87:647–655.

Baker GS, Hoel DG. Corrections in the atomic bomb data to examine low dose risk. *Health Phys* 2003; 85:709–720.

Nakamura T, Hoel DG. Comparing risks between radiation and dioxin exposure based on two-stage model. *Environmetrics* 2003; 14:203–211.

Carnes BA, Grahn D, Hoel D. Mortality of atomic bomb survivors predicted from laboratory animals. *Radiat Res* 2003; 160:159–167.

Creasman WT, Hoel DG, DiSaia PJ. WHI: Now that the dust has settled. A commentary. *Am J Obstet Gynecol* 2003; 189:621–626.

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Radvoyevitch T, Hoel D. Biologically-based risk estimation for radiation-induced chronic myeloid leukemia. *Radiat Environ Biophys* 2000; 39:153–159.

Nicholas JS, Butler GC, Lackland DT, Hood WC, Hoel DG, Mohr LC. Flight deck magnetic fields in Commercial Aircraft. *Am J Ind Med* 2000; 38:548–554.

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Nicholas JS, Lackland DT, Dosemeci M, Mohr L, Dunbar JB, Grosche B, Hoel DG. Mortality among United States commercial pilots and navigators. *J Occup Environ Med* 1998; 40:980–985.

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Swenberg JA, Hoel DG, Magee PN. Mechanistic and statistical insight into the large carcinogenesis bioassays on DEN and DMN. *Cancer Res* 1991; 51:6409–6414.

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Yanagawa T, Hoel DG. Use of historical controls for animal experiments. *Environ Health Perspect* 1985; 63:217–224.

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Bernstein L, Gold LS, Ames BN, Pike MC, Hoel DG. Toxicity and carcinogenic potency. *Risk Anal* 1985; 5:263–264.

Portier C, Hoel DG. Design of animal carcinogenicity studies for goodness-of-fit to multistage models. *Fundam Appl Toxicol* 1984; 4:949–959.

Portier C, Hoel DG. Type 1 error of trend tests in proportions and the design of cancer screens. *Comm Stat A* 1984; 13:1–16.

Poon AH, Hoel DG. Nonparametric estimation of the survival function when cause of death is uncertain. *Biometrics* 1984; 40:1151–1158.

Brown KG, Hoel DG. Modeling time-to-tumor data: Analysis of the ED01 Study. *Fundam Appl Toxicol* 1983; 3:458–469.

Brown KG, Hoel DG. Multistage prediction of cancer in serially dosed animals with application to the ED01 study. *Fundam Appl Toxicol* 1983; 3:470–477.

Portier C, Hoel DG. Low-dose rate extrapolation using the multistage model. *Biometrics* 1983; 39:897–906.

Portier C, Hoel DG. Optimal bioassay design under the Armitage-Doll multistage model. *J Toxicol Environ Health* 1983; 12:1–19.

Hoel DG, Kaplan N, Anderson MW. Implication of nonlinear kinetics on risk estimation in carcinogenesis. *Science* 1983; 219:1032–1037.

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Pike MC, Krailo MD, Henderson BE, Casagrande JT, Hoel DG. ‘Hormonal’ risk factors, ‘breast tissue age’ and the age-incidence of breast cancer. *Nature* 1983; 303:767–770.

Hoel DG. Extrapolation of laboratory data to human health effects. *Environ Sci Res* 1982; 25:521–526.

Hoel DG. Statistical measures of risk. *Drug Metab Rev* 1982; 13:829–838.

Kato H, Brown CC, Hoel DG, Schull WJ. Studies of the mortality of A-Bomb survivors. Report 7. Mortality, 1950–1978: Part II. Mortality from causes other than cancer and mortality in early entrants. *Radiat Res* 1982; 91:243–264.

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Hogan MD, Hoel DG. Estimated cancer risk associated with occupational asbestos exposure. *Risk Anal* 1981; 1:67–76.

Haseman JK, Hoel DG, Jennrich RI. Some practical problems arising from the use of the gamma multi-hit model for risk estimation. *J Toxicol Environ Health* 1981; 8:379–386.

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Hoel DG. Dose-response in radiation carcinogenesis: Animal studies. pp. 93–103. In: Epidemiology and Quantitation of Environmental Risk in Humans from Radiation and Other Agents: Potential and Limitations. Castellani A (ed), Plenum Press, London, 1985.

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Portier CJ, Hoel DG, Van Ryzin J. Statistical analysis of the carcinogenesis bioassay data relating to the risks from exposure to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin. pp. 99–119. In: Public Health Risks of the Dioxins. Lowrance WW (ed), Rockefeller University, New York, NY, 1984.

Hoel DG. Conditional two sample tests with historical controls. pp. 229–236. In: Contributions to Statistics: Essays in Honour of Norman L. Johnson. Sen PK (ed), North Holland Publishing Company, Amsterdam, 1983.

Hogan MD, Hoel DG. Extrapolation to man. pp. 711–731. In: Principles and Methods of Toxicology. Hayes AW (ed), Raven Press, New York, NY, 1982.

Hoel DG, Crump KS. Waterborne carcinogens: A scientist's view. pp. 173–195. In: The Scientific Basis of Health in Safety Regulations. Crandell R, Lave L (ed), The Brookings Institute, 1981.

Gaylor DW, Hoel DG. Statistical analysis of carcinogenesis data from chronic animal studies. pp. 97–111. In: Carcinogens in Industry and Environment. Sontag JM (ed), Marcel Dekker, New York, NY, 1981.

Yanagimoto T, Hoel DG. Measures of the heaviness of tail of estimation of safe doses. Pp 347–357. In: *Recent Developments in Statistical Inference and Data Analysis*. Matusita K (ed), North Holland Publishing Company, New York, NY, 1980.

Hoel DG. Low-dose and species-to-species extrapolation for chemically induced carcinogenesis. pp. 135–145. In: *Banbury Report 1: Assessing Chemical Mutagens: The Risk to Humans*. McElheny VK, Abrahamson S (eds), Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, 1979.

Hoel DG. Some problems in low dose extrapolation. pp. 1391–1396. In: *Origins of Human Cancer, Volume 4, Book C*. Hiatt HH, Watson JD, Winsten JA (eds), Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, 1977.

Hoel DG, Sobel M, Weiss GH. A survey of adaptive sampling for clinical trials. pp. 29–61. In: *Perspectives in Biometrics*. Elashoff RM (ed), Academic Press, New York, NY, 1975.

Hoel DG. Some statistical aspects of experiments for determining the teratogenic effects of chemicals. pp. 375–381. In: *Statistical and Mathematical Aspects of Pollution Problems*. Pratt J (ed), Marcel Dekker, Inc., New York, NY, 1974.

Chand N, Hoel DG. A comparison of models for determining safe levels of environmental agents. pp. 681–700. In: *Reliability and Biometry*. Proschan F, Serfling RJ (eds), SIAM, Philadelphia, PA, 1974.

Hoel DG, Weiss GH. A comparison of methods for choosing the better of two negative exponential lifetime distributions. pp. 619–636. In: *Reliability and Biometry*. Proschan F, Serfling RJ (eds), SIAM, Philadelphia, PA, 1974.

Published Presentations

Hoel DG. Multistage models of carcinogenesis and their implications for dose-response models and risk projections. pp. 123–126. *Proceedings, International Conference on Radiation Effects and Protection*, Mito, Japan, March 18–20, 1992.

Hoel DG. A balanced approach to risk assessment. pp. 305–311. *Proceedings, Toxicology and Industrial Health, Volume 7*. Tsuchiya K, Lee SD, Grant LD, Mehlman MA (eds), IXth UOEH International Symposium and First Pan Pacific Cooperative Symposium, Kitakyushu, Japan, 1991.

Ellett WH, Hoel DG, Cooper RD. BEIR V estimates of excess cancer mortality. pp. 309–314. *Proceedings, Statistics of Human Exposure to Ionizing Radiation Workshop*, Oxford, England, 1990, *Radiation Protection Dosimetry, Volume 36*, 1991.

Hoel DG. Extrapolation models of animal toxicity data to man. pp. 4-95 to 4-103. Proceedings, Environmental Risk Assessment: How New Regulations Will Affect the Utility Industry. Hoch RJ (ed), Electric Power Research Institute, Palo Alto, CA, 1981.

Hoel DG. Human risk assessment based on laboratory animal studies. pp. 22–24. Proceedings, Second Joint US/USSR Symposium on the Comprehensive Analysis of the Environment, U.S. Environmental Protection Agency, Washington, DC, 1975.

Hoel DG. Statistical models for estimating carcinogenic risks from animal data. pp. 285–291. Proceedings, 5th Annual Conference on Environmental Toxicology, AMRL-TR-74-125, Washington, DC, 1974.

Hoel DG, Sobel M. Comparisons of sequential procedures for selecting the best binomial population. Proceedings, Sixth Berkeley Symposium on Probability and Statistics 4:53–69, 1971.

Prior Experience

Professor and Chairman, Department of Biometry and Epidemiology and Associate Director for Epidemiology, Hollings Cancer Center, 1993–1997

Director, Division of Biometry and Risk Assessment, National Institute of Environmental Health Sciences, 1981–1993

Acting Director, National Institute of Environmental Health Sciences and also the National Toxicology Program, 1990–1991

Associate Director, Radiation Effects Research Foundation, Japan, 1984–1986

Visiting Scientist, Epidemiology Department, Radiation Effects Research Foundation, Japan, 1979–1980

Acting Scientific Director, National Institute of Environmental Health Sciences, 1977–1979

Chief, Biometry Branch, National Institute of Environmental Health Sciences, 1973–1981

Mathematical Statistician, National Institute of Environmental Health Sciences, 1970–1973

Adjunct Professor, Department of Biostatistics, University of North Carolina, Chapel Hill, 1970

Statistician, Oak Ridge National Laboratory, 1968–1970

Senior Mathematician, Westinghouse Research Laboratories, 1967–1968

Project Experience

Conducted an evaluation of laboratory and epidemiological studies since the publication of the National Academy of Sciences' report on the Biological Effects of Ionizing Radiation (BEIR VII) has been completed. The project was developed and sponsored by the Electric Power Research Institute (EPRI). The report of the findings and conclusions has been peer reviewed and the report will be released this year.

Contributed to the Exponent project on evidence of health impacts of sulfate and nitrate containing particles in ambient air. Results were published in the literature.

Evaluated the primate studies of early developmental effects of methyl chloride for the American Forest Products Association (AFPA). Besides analysis, presentations were made to the EPA administration.

A reanalysis of the Harvard Railroad Workers Study of lung cancer and diesel exhaust was carried out for Health Effects Institute in Boston. This related to attempts by the US EPA and Cal EPA to develop exposure standards for diesel exhaust. A committee report was published by HEI.

Assessed the potential risks of prolonged inhibition of gastric acid inhibition for Glaxo Pharmaceuticals and attended Glaxo sponsored meetings in London and Florence with the proceedings published (Elder J (Ed.): Profound Gastric Acid Suppression: Long Term Safety Risk? Res Clinical Forums 1990; 12(1).

Advisory Appointments

National Academy of Sciences:

Subcommittee on Margin of Safety and Extrapolation of the Safe Drinking Water Committee, 1976–1977

Panel on Low Molecular Weight Halogenated Hydrocarbons of the Coordinating Committee for Scientific and Technical Assessments of Environmental Pollutants, 1976–1977

Risk Assessment Subcommittee, Safe Drinking Water Committee, 1978–1979

Committee on Chemical Environmental Mutagens, 1980–1983

Board on Toxicology and Environmental Health Hazards, 1982–1985

Committee on the Biological Effects of Ionizing Radiation (BEIR V), 1986–1989

Committee to Provide Interim Oversight of the DOE Nuclear Weapons Complex, 1988–1990

Committee on Environmental Epidemiology, 1990–1992

Committee on Epidemiology and Veterans Follow-up Studies, 1990–

Committee on Applied and Theoretical Statistics, 1991–1994

Committee on The Health Effects of Mustard Gas and Lewisite, 1991–1992

Committee to Study the Mortality of Military Personnel Present at Atmospheric Tests of Nuclear Weapons, 1993–1994

National Toxicology Program's Science Advisory Board 1994–1996

Committee on the Assessment of Wartime Exposure to Herbicides in Vietnam, 1996–2002

Committee to Review the Health Effects in Vietnam Veterans of Exposure to Herbicides, 1997–2003

Board of the Medical Follow-up Agency, 1996–2001

Commission on Life Sciences, 1999–2000

Advisor, Division on Earth and Life Studies (DELS), 2001–

Medical Follow-up Agency, Patterns of Illness and Care before Deployment to the Persian Gulf War, 2001–2003

Defense Threat Reduction Agency (DTRA), Committee to Review the Dose Reconstruction Program, 2002–2003

Committee on California Agriculture Res. Priorities - Pierce's Disease, 2003–2004

Committee on Evaluation of Radiation Shielding for Space Exploration 2006–2008

Committee on Beryllium Alloy Exposures 2006–2008

Committee on Health Effects of Depleted Uranium 2007–2008

Radiation Effects Research Foundation Science Council 2006–2010

Board on Radiation and Nuclear Studies 2008–2010

World Health Organization and Other International Advisory Groups:

International Agency for Research on Cancer Working Group on the Evaluation of the Carcinogenic Risks to Humans, 1977, 1981, 1982, 2009
Subcommittee of International Commission for Protection against Environmental Mutagens and Carcinogens (ICPEMC) October, 1977–1982
Environmental Mutagenesis and Carcinogenesis Panel, US-Japan Cooperative Medical Science Program, NCI; 1987–1992
Advisory Committee on The Radiation Protection of the Public from Radioactive Residues in Kazakhstan, International Atomic Energy Agency United Nations 2003–2005
Scientific Councilor: Radiation Effects Research Foundation (Hiroshima) 2006–2011

U.S. Environmental Protection Agency Advisory Committees:

Administrator's Pesticide Policy Advisory Committee, EPA, 1976
Carcinogen Assessment Group, EPA, 1977
Work Group on Health Effects Risks of the EPA Science Advisory Board's Committee on Research Strategies, 1987–1988
EPA's FIFRA (pesticide) Science Advisory Panel 1993–
EPA's Science Advisory Board's Radiation Advisory Committee 1993–1995
Chairman, EPA's Expert Panel Review of Benzene Risk Assessment, 1997
EPA's Science Advisory Board's Radiation Advisory Committee, 1996–
EPA's Science Advisory Board's Environmental Health Committee, 1997–2004
EPA's Science Advisory Board's Environmental Health Committee, TCE Health Risk Assessment: Synthesis and Characterization Review Panel, 2002
EPA's Expert Panel Review of Perchlorate, 2002
EPA's Expert Panel Review of Asbestos, 2003
EPA's Expert Panel Review, Supplemental Guidance for Assessing Cancer Susceptibility from early-life Exposure to Carcinogens" (SGACS), 2003
Board of Scientific Counselors' Subcommittee on Human Health Research 2008–

Non EPA Advisory Panels

International Agency for Research on Cancer Working Group on the Use of Mechanistic Data to Evaluate the Carcinogenicity of Chemicals to Humans, 1991
Chairman, Subcommittee on Estimation of Risks of Irreversible, Delayed Toxicity of the DHEW Committee to Coordinate Toxicology and Related Programs, 1975
Scientific Advisory Board of the National Center for Toxicological Research, 1977–1980
Ad Hoc Working Group to Develop Radioepidemiological Tables, NIH, 1984
Chairman, Research Needs Subcommittee of the Committee to Coordinate the Environment and Related Programs, U.S. Public Health Service, 1990–1991
Office of Technology Assessment Advisory Panel on Aging Nuclear Power Plants: Life Attainment, License Renewal, and Decommissioning, Congress of the United States, 1992
Interagency Staff Group for Development of OSTP Carcinogen Document, Office of Science and Technology Policy, 1983–1984

DOD's Breast Cancer Research Program Integration Panel, 1995–1996
NIH's Consensus Development Panel on Breast Cancer Screening in Women Ages 40-49, 1997
FDA's Transmissible Spongiform Encephalopathies Advisory Committee, 1997–2000
Consultant, FDA's Center for Biologics Evaluation and Research (CBER), 2004–2008
U.S. Consumer Product Safety Commission's Chronic Hazard Advisory Panel, 1999–
Scientific Advisory Committee of the Electric Power Research Institute's (EPRI)
Environmental Risk Analysis Program, 1994–1995
Scientific Committee 89 (non-ionizing radiation), National Council on Radiation Protection
and Measurements (NCRP), 1994–1995
Scientific Advisory Board, Environmental Health Foundation (EHF), 1994–1998

Editorships and Editorial Review Boards

Associate Editor, Journal of Statistical Computation and Simulation, 1972–1978
Associate Editor, Journal of the American Statistical Association, 1973–1979
Member, Editorial Board of the Journal of Toxicology and Environmental Health, 1975–1979
Member, Editorial Board of Communications in Statistics, Part B - Simulation and Computation, 1977–1979
Member, Editorial Board of the Journal of Environmental Pathology and Toxicology, 1979–1980
Member, Editorial Board of Fundamental and Applied Toxicology, 1981–1986
Member, Editorial Board of Environmental Health Perspectives, 1973–2000
Member, Editorial Advisory Board of Journal of Statistical Computation and Simulation, 1978–
Member, Editorial Board of the IMA Journal of Mathematics Applied in Medicine and Biology, 1983–1988
Section Editor, Journal of Environmental Pathology, Toxicology and Oncology, 1986–
Contributing Editor, American Journal of Industrial Medicine, 1987–
Associate Editor, Environmental Research, 1987–
Member, Editorial Board of Risk Analysis, 1987–1990
Associate Editor, Journal of Communications in Statistics, 1987 –
Associate Editor, Biological Monitoring: An International Journal, 1988–1990
Member, International Advisory Board, Journal of Environmental Statistics, 1992–1995
Section Editor, Encyclopedia of Biostatistics, 1996–1997
Editorial Board, Environmental and Ecological Statistics, 2004–

Peer Reviewer

- *National Research Council/National Academies*
- *Institute of Medicine*
- *Risk Analysis*
- *Environmental Health Perspectives*
- *British Journal of Cancer*
- *Journal of the National Cancer Institute*
- *American Journal of Epidemiology*
- *Journal of the American Statistical Association*
- *Biometrics*
- *Journal of Statistical Computation and Simulation*
- *Communications in Statistics, Part B - Simulation and Computation*
- *Journal of Toxicology and Environmental Health*
- *Journal of Environmental Pathology and Toxicology*
- *Fundamental and Applied Toxicology*
- *Journal of Mathematics Applied in Medicine and Biology*
- *Journal of Environmental Pathology, Toxicology and Oncology*
- *American Journal of Industrial Medicine*
- *Environmental Research*

Professional Affiliations

- American Statistical Association
- Biometric Society
- Society for Risk Analysis
- Collegium Ramazzini
- American Association for the Advancement of Science
- Radiation Research Society
- Health Phys Society
- Society for Epidemiological Research