The National Academies of SCIENCES • ENGINEERING • MEDICINE

Developing a Long-Term Strategy for Low-Dose Radiation Research in the United States

PUBLIC MEETING #6 (Virtual) December 9, 2021, All times are ET

DRAFT PUBLIC AGENDA

ZOOM CONNECTION

https://nasem.zoom.us/j/92710702069?pwd=blBjNm8xZVFTOG95bjVBV3lQSmkrUT09 Meeting ID: 927 1070 2069 Password: 856260

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Also in the agenda:

Pointers to Speakers (See individual agenda items.) Speaker Biographies Statement of Task

December 9, 2021

	Joe Gray, Committee Chair
1:40 PM – 2:40 PM	 Lessons learned from research in air pollution Daniel Krewski, University of Ottawa Jonathan Samet, Colorado School of Public Health Francesca Dominici, Harvard T.H. Chan School of Public Health Are there methods developed and applied in low-level air pollution research that would be useful for low dose radiation research? What might be some of the challenges? Are there other (not air pollution) epidemiologic and biostatical methods that may contribute to further understanding the risks of low dose radiation? What are some data science opportunities and challenges that low dose radiation research could explore and how? The committee is interested in your views and perspectives on its statement of task What are your views on research priorities for low dose radiation research? What are some data science opportunities that low dose radiation research?
2:40 PM – 3:00 PM	Q+A and Discussion
3:00 PM – 3:40 PM	Consortium for Risk Evaluation with Stakeholder Participation (CRESP): Lessons learned in community outreach and communications <u>David Kosson</u> , Vanderbilt University Kathryn Higley, Oregon State University
	 Michael R. Greenberg, Rutgers University Steve Krahn, Vanderbilt University History of CRESP and its mission Relationship with DOE (operationally and in terms of funding); DOE's role in deciding on specific projects. Current projects related to engagement and communication and process for identifying those; nature of project oversight Successes and lessons to be learned on effective engagement and communication with the stakeholders Process for evaluating effectiveness and implementation of CRESP recommendations to DOE and field offices
3:40 PM – 4:00 PM	 Michael R. Greenberg, Rutgers University Steve Krahn, Vanderbilt University History of CRESP and its mission Relationship with DOE (operationally and in terms of funding); DOE's role in deciding on specific projects. Current projects related to engagement and communication and process for identifying those; nature of project oversight Successes and lessons to be learned on effective engagement and communication with the stakeholders Process for evaluating effectiveness and implementation of CRESP recommendations to DOE and field offices
3:40 PM – 4:00 PM 4:00 PM – 4:20 PM	 Michael R. Greenberg, Rutgers University Steve Krahn, Vanderbilt University History of CRESP and its mission Relationship with DOE (operationally and in terms of funding); DOE's role in deciding on specific projects. Current projects related to engagement and communication and process for identifying those; nature of project oversight Successes and lessons to be learned on effective engagement and communication with the stakeholders Process for evaluating effectiveness and implementation of CRESP recommendations to DOE and field offices

Speaker Biographies

Francesca Dominici, PhD is the co-Director of the Harvard Data Science Initiative, at the Harvard University and the Clarence James Gamble Professor of Biostatistics, Population and Data Science at the Harvard T.H. Chan School of Public Health. She is an elected member of the National Academy of Medicine and of the International Society of Mathematical Statistics. She is an expert in causal inference, machine learning, Bayesian statistics. She leads an interdisciplinary group of scientists with the ultimate goal of addressing important questions in environmental health science, climate change, and biomedical science. Her productivity and contributions to the field have been remarkable. Dominici has provided the scientific community and policy makers with robust evidence on the adverse health effects of air pollution, noise pollution, and climate change. Her studies have directly and routinely impacted air quality policy. Dominici has published more than 220 peer-reviewed publications and was recognized in Thomson Reuter's 2019 list of the most highly cited researchers-ranking in the top 1% of cited scientists in her field. Her work has been covered by the New York Times, Los Angeles Times, BBC, the Guardian, CNN, and NPR. In April 2020 she has been awarded the Karl E. Peace Award for Outstanding Statistical Contributions for the Betterment of Society by the American Statistical Association. Dominici is an advocate for the career advancement of women faculty. Her work on the Johns Hopkins University Committee on the Status of Women earned her the campus Diversity Recognition Award in 2009. At the T.H. Chan School of Public Health, she has led the Committee for the Advancement of Women Faculty.

Michael Greenberg is distinguished professor of the Edward J. Bloustein School of Planning and Public Policy, Rutgers University. He studies environmental health and risk analysis. Professor Greenberg has been a member of National Research Council Committees that focus on the destruction of the U.S. chemical weapons stockpile and nuclear weapons; chemical waste management; and the degradation of the U.S. government physical infrastructure, sustainability and the U.S. EPA, and served on the EPA Science Advisory Board environmental justice committee. He chaired a committee for the U.S. Senate and House Appropriations Committees examining the U.S. DOE's prioritization of human health and safety in its environmental management programs. Professor Greenberg served as area editor for social sciences and then editor-in-chief of *Risk Analysis: An International Journal* during the period 2002-2013, and continues as associate editor for environmental health for the *American Journal of Public Health.* He has written more than 30 books and more than 300 articles. He was dean or associate dean of his school for 19 years.

Kathryn Higley's interests include environmental transport and fate of radionuclides, radioecology, radiochemistry, radiation dose assessment, neutron activation analysis, nuclear emergency response, and environmental regulations. She has held both reactor operator and senior reactor operator's licenses, and is a former reactor supervisor for the Reed College TRIGA reactor. Higley has been at Oregon State University since 1994 teaching undergraduate and graduate classes on radioecology, dosimetry, radiation protection, radiochemistry, and radiation biology. She spent fourteen years with Battelle, Pacific Northwest Laboratories as an environmental rediation monitoring at the Trojan Nuclear Power Plant in Oregon. Dr. Higley and her students have done research in radiologically contaminated environments around the globe.

Dr. <u>David Kosson</u> is the Gass Family Chair in Energy and the Environment, a Distinguished Professor of Civil and Environmental Engineering, and former Cornelius Vanderbilt Professor of Engineering at Vanderbilt University (2011-2021), where he has appointments as Professor of Civil and Environmental Engineering, Chemical Engineering, and Earth and Environmental

Sciences, and is the Director of the Environmental Engineering Laboratory. Professor Kosson is the principal investigator of the multi-university Consortium for Risk Evaluation with Stakeholder Participation (CRESP) supported by the Department of Energy to improve the risk-informed basis for remediation and management of nuclear waste from former defense materials production and nuclear energy. Dr. Kosson's research focuses on management of nuclear and chemical wastes, including process development and contaminant mass transfer applied to groundwater, soil, sediment and waste systems. His research in collaboration with the Energy Research Centre of The Netherlands on leaching of contaminants from wastes and construction materials is currently providing the foundation for environmental regulation of these materials at USEPA, the Netherlands Ministry of Environment and the European Union's Directorate General for the Environment. Professor Kosson has participated in or led many external technical reviews on nuclear waste processing for the Department of Energy including for tank wastes and a range of technology approaches at Hanford, Savannah River and Idaho sites.

Dr. Steve Krahn is Professor of the Practice of Nuclear Environmental Engineering in the Department of Civil and Environmental Engineering at Vanderbilt University, where he teaches courses in nuclear environmental engineering and performs research into nuclear technology as applied in the systems engineering of the nuclear fuel cycle, including: risk assessment, project and risk management; operational readiness and technology insertion in nuclear facilities. Immediately prior to joining Vanderbilt, he served as the Deputy Assistant Secretary of Energy for Safety & Security in the U.S. Department of Energy, Office of Environmental Management (DOE-EM), where he provided senior technical leadership to this \$6B/year nuclear program. Previously, Dr. Krahn was the Deputy Technical Director of the Defense Nuclear Facilities Safety Board, where he provided technical direction and leadership to a technical staff of approximately 75 individuals providing nuclear safety oversight of the U.S. Nuclear Weapons Complex. He is an internationally recognized expert in nuclear engineering and was recently certified as an Expert Witness to provide evidence in the United Kingdom (UK) in front of Her Majesty's High Court of Technology and Constriction in the largest nuclear construction case in UK history. In 2015, he was selected by the U.S. Secretary of Energy to serve on a congressionally-mandated review of the use of risk-informed decision-making in the DOE's management of nuclear projects nation-wide. Dr. Krahn has more than 40 years of nuclear technical and project management experience in positions of increasing responsibility in government, private industry, the military, and academia.

Dr. Daniel Krewski is Professor and Director of the R. Samuel McLaughlin Centre for Population Health Risk Assessment at the University of Ottawa, where he is involved in a number of activities in population health risk assessment within the new Institute of Population Health. Dr. Krewski has also served as Adjunct Research Professor of Statistics in the Department of Mathematics and Statistics at Carleton University since 1984. Prior to joining the Faculty of Medicine at the University of Ottawa in 1998, Dr. Krewski was Director, Risk Management in the Health Protection Branch of Health Canada. While with Health Canada, he also served as Acting Director of the Bureau of Chemical Hazards and as Chief of the Biostatistics Division in the Environmental Health Directorate. Dr. Krewski obtained his Ph.D. in statistics from Carleton University and subsequently completed an M.H.A. at the University of Ottawa. His professional interests include epidemiology, biostatistics, risk assessment, and risk management. Dr. Krewski is a Lifetime National Associate, U.S. National Academy of Sciences (2002); Chair, U.S. National Academy of Sciences Committee on Toxicity Testing and Risk Assessment (2004-2007); Chair, U.S. National Academy of Sciences Committee on Acute Exposure Guidelines for Highly Hazardous Substances (1998-2004); Member, U.S. National Academy of Sciences Board on Radiation Effects Research (2002-present); Member, U.S. National Academy of Sciences Committee on the Biological Effects of Ionizing Radiation (BEIR VII, 2000-present; BEIR VI, 1994-1999); Chair, Royal Society of Canada Expert Panel on the

Potential Health Risks of Radiofrequency Fields from Wireless Telecommunications Devices ((1998-1999); Member, U.S. National Academy of Sciences Board on Environmental Studies and Toxicology (1996-2002); Member, Scientific Council of the International Agency for Research on Cancer (1992-1996); Fellow, Society for Risk Analysis (1993); Fellow, American Statistical Association (1990).

Jonathan M. Samet, MD, MS, a pulmonary physician and epidemiologist, is Dean of the Colorado School of Public Health. Previously, Dr. Samet was the Flora L. Thornton Chair for the Department of Preventive Medicine at the University of Southern California and Director of the USC Institute for Global Health. Dr. Samet received a Bachelor's degree in Chemistry and Physics from Harvard College, an MD degree from the University of Rochester's School of Medicine and Dentistry, and a Master of Science degree in Epidemiology from the Harvard School of Public Health. His research focuses on the health risks of inhaled pollutants-particles and ozone in outdoor air and indoor pollutants including secondhand smoke and radon. He has also investigated the occurrence and causes of cancer and respiratory diseases, emphasizing the risks of active and passive smoking. For several decades, he has been involved in global health, focusing on tobacco control, air pollution, and chronic disease prevention. Dr. Samet has served and chaired numerous committees of the National Research Council and Institute of Medicine, and as chair of the Clean Air Scientific Advisory Committee of the U.S. EPA and the FDA's Tobacco Products Scientific Advisory Committee. For the National Research Council, he chaired, among others, the Biological Effects of Ionizing Radiation (BEIR) VI Committee; the Committee on Research Priorities for Airborne Particulate Matter, Board on Environmental Studies and Toxicology; the Committee to Review the Draft IRIS Assessment on Formaldehyde; the Committee to Develop a Research Strategy for Environmental Health and Safety Aspects of Engineered Nanomaterials; the Committee to Review the IRIS Process; and the Committee on Incorporating 21st Century Science into Risk-Based Evaluations. Dr. Samet was elected to the National Academy of Medicine (Institute of Medicine) of the National Academy of Sciences in 1997 and received the David M. Rall Medal for his contributions in 2015.

Statement of Task

The National Academies of Sciences, Engineering, and Medicine will perform a study and provide a report with findings and recommendations on the current status and development of a long-term strategy for low-dose radiation research in the United States. Specifically, the objectives of the study will be to:

- 1. Define the health and safety issues that need to be guided by an improved understanding of low dose and low dose rate radiation health effects.
- 2. Identify current scientific challenges for understanding low dose and low dose rate radiation health effects.
- 3. Assess the status of current low dose radiation research in the United States and internationally.
- 4. Recommend a long-term strategic and prioritized research agenda to
 - address scientific research goals for overcoming the identified scientific challenges in coordination with other research efforts
 - support education and outreach activities to disseminate information and promote public understanding of low-dose radiation.
- 5. Define the essential components of the research program that would address this research agenda within the universities and National Laboratories.
- 6. Address coordination between federal agencies (including the National Institutes of Health, the National Science Foundation, National Aeronautics and Space Administration, and different DOE offices) and with international efforts to achieve objectives.
- 7. Identify and, to the extent possible, quantify, potential monetary and healthrelated impacts to Federal agencies, the general public, industry, research communities, and other users of information produced by such research program.

The National Academies will prepare a report with findings and recommendations that addresses the objectives above.