CHALLENGES IN INITIATING AND CONDUCTING LONG-TERM
HEALTH MONITORING OF POPULATIONS FOLLOWING
NUCLEAR AND RADIOLOGICAL EMERGENCIES IN THE
UNITED STATES

A WORKSHOP

March 12-13, 2019

The Keck Center
Room 100
500 Fifth Street, NW
Washington, DC 20001
The workshop is hosted by the Nuclear and Radiation Studies Board of the National Academies of Sciences, Engineering, and Medicine, and is sponsored by the Centers for Disease Control and Prevention
Agenda

DAY 1: March 12, 2019

PLENARY SESSION: Setting the Stage
Moderated by Jonathan Fielding, UCLA Fielding School of Public Health

8:30 AM

Call to order and Welcome (10’)
Jonathan Fielding, UCLA Fielding School of Public Health

About the Study Request (15’)
Armin Ansari, Centers for Disease Control and Prevention

The Need to Prepare for Population Monitoring (15’)
Kevin Yeskey, Office of the Assistant Secretary for Preparedness and Response

Environmental Consequences and Dose Impacts of Radioactive Material following a Nuclear or Radiological Incident (15’)
Steve Musolino, Brookhaven National Laboratory

Radiation Dose Reconstruction (15’)
John Till, Risk Assessment Corporation

Biodosimetry Tools to Support Long-Term Health Monitoring After a Large-Scale Radiological Event (15’)
David Brenner, Columbia University

10:00 AM

Questions and Discussion for Plenary Session

10:20 AM

BREAK
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<tr>
<th>Time</th>
<th>Session 1: Existing Radiation Registries and Population Monitoring</th>
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| 10:35 AM | Follow-up of the Atomic Bombing Survivors (15’)  
            Eric Grant, Radiation Effects Research Foundation, Hiroshima |
|        | The Chernobyl State Registry (15’)  
            Andrei Cheshyk, Republican Research Center for Radiation  
            Medicine and Human Ecology, Belarus |
|        | Dosimetry During the Radiological Accident in Goiânia (15’)  
            Luiz Bertelli, Los Alamos National Laboratory |
|        | The Fukushima Health Management Survey (15’)  
            Koichi Tanigawa, Fukushima Medical University |
| 11:40 AM | Questions and Discussion for Session 1 |
| 12:00 PM | LUNCH  
            Speakers and session moderators please proceed to the E Street  
            Conference Room for buffet lunch.  
            All other participants can purchase lunch at refectory on 3rd floor.
SESSION 2: Health Screening
Moderated by Tener Veenema, Johns Hopkins University School of Nursing

1:00 PM

Radiation Screening/Decontamination (10’)
Angela Leek, Iowa Department of Public Health

Medical Management of Radiation Incidents (15’)
Carol Iddins, Radiation Emergency Assistance Center/Training Site

The Principles of Screening (15’)
Steven Woolf, Virginia Commonwealth University

Long-Term Strategies for Thyroid Health Monitoring after Nuclear Accidents (15’)
Kayo Togawa, International Agency for Research on Cancer

Mental Health Screening (15’)
Robert Ursano, Uniformed Services University School of Medicine

Health Care Resources (15’)
Cullen Case, Radiation Injury Treatment Network

2:35 PM Questions and Discussion for Session 2

3:00 PM BREAK
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<tr>
<th>Time</th>
<th>Session 3: Lessons Learned from Setting up Population Monitoring Registries</th>
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<tr>
<td>3:20 PM</td>
<td>Moderated by Lorna Thorpe, NYU Langone Health</td>
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<td></td>
<td><strong>The World Trade Center Health Registry (15’)</strong></td>
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<td>Mark Farfel, New York City Department of Health and Mental Hygiene</td>
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<td><strong>Katrina, Sandy, and Deepwater Horizon (15’)</strong></td>
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<td>Jonathan Sury, Columbia University</td>
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<td><strong>The Las Vegas Mass Shooting and Patient Tracking Registry (15’)</strong></td>
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<td>Jeff Quinn, Southern Nevada Health District</td>
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<td></td>
<td><strong>U.S. Zika Pregnancy and Infant Registry (15’)</strong></td>
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<td>Peggy Honein, Centers for Disease Control and Prevention</td>
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<th>Day 1 Closing Remarks</th>
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<td>5:00 PM</td>
<td>Lorna Thorpe, NYU Langone Health</td>
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<th>Time</th>
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DAY 2: Wednesday, March 13, 2019

8:00 AM
Welcome Remarks
Jonathan Fielding, UCLA Fielding School of Public Health

SESSION 4: Operational Considerations for Setting up and Maintaining a Radiation Registry
Moderated by Meghan McGinty, Johns Hopkins Bloomberg School of Public Health

PANELISTS

International Perspectives
- Eduardo Herrera, International Atomic Energy Agency
- Kayo Togawa, International Agency for Research on Cancer (speaking on behalf of the World Health Organization)

Federal Perspectives
- Daniel Sosin, Centers for Diseases Control and Prevention
- John Koerner, Office of the Assistant Secretary for Preparedness and Response
- Oleg Muravov, Agency for Toxic Substances and Disease Registry

State and Territorial Perspectives
- Tess Konen, Minnesota Department of Health
- Jennifer Beggs, National Alliance for Radiation Readiness
- Betsy Kagey, Georgia Department of Public Health
- Andrew Pickett, Pennsylvania Department of Health

Local Perspectives
Richard Kozub, Middlesex County Office of Health Services

8:05 AM

9:50 AM BREAK
SESSION 5: Communications  
Moderated by Brooke Rogers, Kings College London

10:05 AM

Communicating about the Event and What to Do (15’)
Jessica Wieder, Environmental Protection Agency

Considerations for Long-term Communications Planning: What about the non-immediate aftermath? (15’)
Vivi Siegel, Centers for Disease Control and Prevention

Setting Expectations: How Enrollees and Epidemiologists May View the Role of a Radiation Registry Differently (15’)
Monica Schoch-Spana, Johns Hopkins Bloomberg School of Public Health

Communicating Inclusion and Exclusion Criteria for a Registry (15’)
Eddie Olivarez, Hidalgo County Health and Human Services Department, Edinburg, Texas

Communicating Health Monitoring Following the Salisbury Nerve Agent Attack (15’)
Brooke Rogers, King’s College London

Social Media Monitoring (15’)
Tamer Hadi, NYC Department of Health and Mental Hygiene

11:40 AM
Questions and Discussion for Session 4

12:05 PM
Key Themes Emerged During the Workshop
Jonathan Fielding, UCLA Fielding School of Public Health

12:20 PM
General Discussion

12:35 PM
Closing Remarks
Jonathan Fielding, UCLA Fielding School of Public Health

12:40 PM
Adjourn Day 2
Statement of Task

The National Academies will establish an ad hoc planning committee that will organize a workshop to discuss challenges and considerations for setting up a registry for long-term health monitoring of populations following nuclear or radiological emergencies in the United States. Workshop participants will discuss the following topics:

- Existing international inclusion criteria for such registries and possible alternative approaches, including a dose-tiered approach.
- Challenges associated with communicating inclusion criteria for a registry with the affected population.
- Considerations regarding health screening of the affected population, such as thyroid screening.
- Operational considerations for setting up and maintaining a registry, taking into account practicality and implementation issues.

The workshop presentations and discussions will be summarized in National Academies proceedings of a workshop authored by a rapporteur.
Committee Member and Staff Biographies

CHAIR

Jonathan E. Fielding, MD, is a professor of health policy and management and pediatrics at UCLA Fielding School of Public Health. His areas of expertise include the development of preventive services guidelines and priorities, prevention economics and financing, evidence based public health methods and practice, and health promotion for children, adults and families in community, clinical and occupational settings. As the founding co-director of the UCLA Center for Health Enhancement, Education and Research, he helped develop the first comprehensive university-based center to focus on clinical and worksite prevention opportunities. Dr. Fielding served as director of public health and health officer for Los Angeles County for over 16 years where he was responsible for the full range of public health activities for over ten million county residents. Dr. Fielding’s awards include the Porter Prize, given for his national impact on improving the lives of Americans; The Milton and Ruth Roemer Prize for achievements in local public health, the Sedgwick Medal for contributions to the field of public health, and elected membership in the National Academy of Medicine. He received an MD, MA, and MPH from Harvard University, and an MBA from the Wharton School of Business Administration.

COMMITTEE MEMBERS

Betsy T. Kagey, PhD, is the academic and special projects liaison at the Georgia Department of Public Health’s Office of Emergency Preparedness and Response. The primary focus of her current work is on emergency preparedness planning for vulnerable populations and developing guidance for Georgia’s public health response to radiation incidents. Dr. Kagey is a member of the Council for State and Territorial Epidemiologists (CSTE)’s environmental and disaster epidemiology workgroups and she is CSTE’s representative on the National Alliance for Radiation Readiness. Dr. Kagey is a member and past president of the Society for Environmental Geochemistry and Health. Dr. Kagey received a BS in chemistry from Carnegie Mellon University, an MSPH in environmental epidemiology from University of North Carolina School of Public Health, and a PhD in environmental health and toxicology from the State University of New York School of Public Health.

Meghan McGinty, PhD, is a faculty associate in health policy and management at the Johns Hopkins Bloomberg School of Public Health. Her research examines public health preparedness and response to disasters, allocation of scarce resources during emergencies, risk management and communication, and resilience. Prior to joining Hopkins, Dr. McGinty served as the deputy director of the Big Cities Health Coalition at the National Association of County and City Health Officials (NACCHO). In this role, she convened leaders of America’s largest metropolitan health
departments to exchange strategies and jointly address issues to promote and protect the health and safety of the 55 million people they serve. Over the course of her career, Dr. McGinty has prepared for, responded to and conducted research to improve our national resilience to disasters and public health emergencies. She served as director of continuity of operations planning at the New York City Department of Health and Mental Hygiene, where she was responsible for developing plans to sustain essential public health services in the event of a disaster. She also supported preparedness and response initiatives of the U.S. National Response Team, the U.S. Environmental Protection Agency, the U.S. Coast Guard, the Federal Emergency Management Agency and the U.S. Public Health Service. She has responded to disasters including Hurricanes Katrina and Rita and the 2009 H1N1 pandemic. Dr. McGinty is committed to improving our collective ability to learn from prior disasters. To this end, she has served on the National Institute of Environmental Health Sciences’ Best Practices Working Group for the development of special considerations for Institutional Review Board review of disaster and emergency related public health research, and is a member of National Health Security Preparedness Index’s Advisory Panel for the development of local measures. Dr. McGinty earned an MPH and a PhD from the Johns Hopkins Bloomberg School of Public Health, an MBA from Johns Hopkins Carey Business School, and a BA from Georgetown University.

Stephen V. Musolino, PhD, is a scientist and in the Nonproliferation and National Security department at the U.S. Department of Energy’s (DOE) Brookhaven National Laboratory (BNL). With more than 30 years of experience in health physics, his current research interests are in nonproliferation, counterterrorism, and planning for response to the consequences of radiological and nuclear terrorism. Since 1981, he has been part of the DOE Radiological Assistance Program as a team captain/team scientist and has been involved in developing radiological emergency response plans and procedures, as well as participating in a wide range of radiological and nuclear exercises and field deployments. During the Fukushima crisis, he was deployed in Japan as an assessment scientist with the DOE response team that was measuring the environmental consequences of the radioactive material released from the damaged nuclear power plants. He is a member of the National Council on Radiation Protection and Measurements (NCRP) and served on the scientific committee that developed NCRP Report No. 165, Responding to a Radiological or Nuclear Terrorism Incident: A Guide for Decision Makers. and co-Chaired the committee for Report No. 179, Guidance for Emergency Reponses Dosimetry. Dr. Musolino was a member of the team with the Department of Homeland Security that published, Radiological Dispersal Device (RDD) Response Guidance Planning for the first 100 Minutes. Earlier in his career at BNL he was a member of the Marshall Islands Radiological Safety Program and participated in numerous field missions to monitor the populations living on islands affected by nuclear testing. Dr. Musolino earned a BS in engineering technology from Buffalo State College, an MS in nuclear engineering from Polytechnic Institute of New York University, a PhD in health physics from the Georgia Institute of Technology and is certified by the American Board of Health Physics.

Brooke Rogers, PhD, is a Professor of Behavioural Science and Security in the Department of War Studies at King’s College London. She is a social psychologist interested in risk and crisis communication, perceptions of risk, and health outcomes in response to extreme events. The majority of her projects investigate public and practitioner responses to chemical, biological, radiological or nuclear (CBRN) terrorist incidents. She is the chair of the Cabinet Office Behavioural Science Expert Group for the National Risk Assessment and National Security Risk Assessment. She maintains membership on various working groups and committees including
the UK Government’s Scientific Advisory Group for Emergencies; the Cabinet Office Community Resilience Programme Steering Group; the Home Office Science Advisory Council; the Home Office, Office for Security and Counter Terrorism Science, Technology, Analysis and Research Programme Challenge Board; the Cabinet Office Community Resilience Programme Steering Group; the Cabinet Office Practitioner Guidance Advisory Group; and Public Health England’s Emergency Response Development Group’s Psychosocial and Behavioural Issues Sub-Group. She has also been involved in teaching and training for NATO, the International Atomic Energy Agency, Home Office, Metropolitan Police, Police National CBRN Centre, Department of Homeland Security, and others. Professor Rogers has a BA (Cum Laude) in psychology from Rollins College in Winter Park, Florida and a PhD in psychology from Royal Holloway University, University of London.

Lorna Thorpe, PhD, MPH, is a professor of epidemiology, director of the Division of Epidemiology, as well as vice chair of strategy and planning in the Department of Population Health at NYU. Dr. Thorpe is a leading expert in population health surveillance and performing population-based studies. Her current research focuses on the intersection between epidemiology and policy, particularly with respect to chronic disease prevention and management and improving modern forms of public health surveillance. Before coming to NYU School of Medicine, she served as chair of the Department of Epidemiology and Biostatistics at the City University of New York’s School of Public Health for seven years. Prior to that, Dr. Thorpe spent nine years at the New York City Department of Health and Mental Hygiene, including five as deputy commissioner of epidemiology. In her time at the Health Department, Dr. Thorpe led the growth of the Epidemiology Division and oversaw a large portfolio of innovative scientific studies aimed at understanding the health of New York City residents. She also supervised birth and death registration, injury surveillance, epidemiologic consultancies throughout the agency, public health training, and workforce development. Dr. Thorpe serves as chair of the steering committee for the CDC-funded Prevention Research Center Network, which includes 26 academic institutions around the nation. She has served on National Academies committees and as an advisor to the CDC on population health surveillance issues. Dr. Thorpe completed a BA at Johns Hopkins University, an MPH at University of Michigan, and a PhD in epidemiology at the University of Illinois at Chicago.

Tener Goodwin Veenema, PhD, MPH, MS, RN, FAAN, is Professor of Nursing and Public Health at the Johns Hopkins School of Nursing and the Johns Hopkins Bloomberg School of Public Health. As an internationally recognized expert in disaster nursing and public health emergency preparedness, she has served as senior scientist to the DHHS Office of Human Services Emergency Preparedness and Response (OHSEPR), DHS, FEMA and the Veterans Affairs Emergency Management Evaluation Center (VEMEC). An accomplished researcher, Dr. Veenema is a member of the American Red Cross National Scientific Advisory Board and is an elected Fellow in the American Academy of Nursing, the National Academies of Practice, and the Royal College of Surgeons Faculty of Nursing and Midwifery, Dublin, Ireland. She is editor of Disaster Nursing and Emergency Preparedness for Chemical, Biological and Radiological Terrorism and Other Hazards, 4th Ed., the leading textbook in the field. Dr. Veenema was awarded the Florence Nightingale Medal of Honor (International Red Crescent, 2013) the highest international award in Nursing for her professional service in disasters and public health emergencies and was the recipient of a Fulbright U.S. Scholar Award (2017). She served as the National Academy of Medicine (NAM) 2018 Distinguished Nurse Scholar-in-Residence and has been a member of several NAM committees including the CDC Standing Committee for the Strategic National Stockpile, CDC Committee on Evidence-Based Practices for Public Health
Staff

Ourania (Rania) Kosti, Ph.D., is a senior program officer at the National Academies of Sciences, Engineering, and Medicine Nuclear and Radiation Studies Board (NRSB). Dr. Kosti’s interests within the NRSB focus on radiation health effects, and she is the principal investigator for the Academies’ Radiation Effects Research Foundation Program that supports studies of the atomic bombing survivors in Japan. Prior to her current appointment, she was a postdoctoral fellow at the Lombardi Comprehensive Cancer Center at Georgetown University Hospital in Washington, D.C., where she conducted research on biomarker development for early cancer detection using case-control epidemiological study designs. She focused primarily on prostate, breast, and liver cancers and trying to identify those individuals who are at high risk of developing malignancies. Dr. Kosti also trained at the National Cancer Institute (2005–2007). She received a B.Sc. in biochemistry from the University of Surrey, UK, an M.Sc. in molecular medicine from University College London, and a Ph.D. in molecular endocrinology from St. Bartholomew’s Hospital in London, UK.
Speaker Biographies

Armin Ansari is the Radiological Assessment Team Lead at the Centers for Disease Control and Prevention. He received his B.S. and PhD degrees in radiation biophysics from the University of Kansas and completed his postdoctoral research at Oak Ridge and Los Alamos National Laboratories. He has led the development of key national guidance documents including guides for population monitoring and operation of public shelters after radiation emergencies. He is a fellow and past president of the Health Physics Society and is certified in comprehensive practice by the American Board of Health Physics. He is also an elected member of the National Council on Radiation Protection and Measurements, and serves as member of the United States delegation to the United Nations Scientific Committee on the Effects of Atomic Radiation.

Jennifer C. Beggs, MPH, represents the Council of State and Territorial Epidemiologists on the Executive Board of the National Alliance for Radiation Readiness (NARR). She has worked for the Michigan Department of Health and Human Services (MDHHS) for 16 years and is the emergency preparedness epidemiologist for the State of Michigan. Her current areas of focus include planning and response for biological, chemical, radiological, and natural disaster incidents. She serves as the lead for the EPIDESK Unit position in the MDHHS Community Health Emergency Coordination Center and has responded to such incidents as SARS, 2009 influenza pandemic, MERS, Embridge oil spill, Ebola, Flint water contamination, and hepatitis A outbreak. Ms. Beggs is a graduate of Michigan State University with a BS in Human Biology and the University of Michigan with a Master in Public Health. She is a subcommittee member and workshop planner for the Council of State and Territorial Epidemiologists- Disaster Epidemiology Subcommittee.

Luiz Bertelli worked in internal dosimetry modeling and interpretation of monitoring of radiation workers in Brazil for 18 years. He was responsible for calculating all internal doses and evaluating initial efficacy of Prussian Blue for all age groups due to the Goiania radioactive accident. He worked as an internal dosimetrist at Argonne National Laboratory for 1.5 years and has worked at LANL as an Internal Dosimetry Team member since October 2003. He is a member of the Task Group on Dose Calculations of the International Commission on Radiological Protection since 1995; member of the ICRP Committee 2 from 2013 to 2017; and is a member of NCRP.

David Brenner is the Director of the Columbia University Center for Radiological Research, which is the oldest and largest radiation biology center in the US. He is also P.I. of the Center for High-Throughput Minimally-Invasive Radiation Biodosimetry, a multi-institute consortium to develop high-throughput biodosimetry technology to rapidly test individual radiation exposure after a radiological incident. He is also Director of the Columbia Radiological Research Accelerator Facility (RARAF), which is a national facility dedicated to probing the mechanisms of radiation induced cancer. Brenner’s research focuses on mechanistic models for the effects of ionizing radiation on living systems. He divides his research time between the effects of high doses of ionizing radiation (relating to radiation therapy) and the effects of low doses of radiation.
(relating to radiological, environmental, and occupational exposures). At low doses, he was the first to quantify the potential risks associated with the rapidly increasing usage of CT scans in the US. At high doses, his proposal to use large-fraction radiotherapy for prostate cancer (hypofractionation) is increasingly being used in the clinic. He is a recipient of the Failla gold medal, the annual award given by the Radiation Research Society for contributions to radiation research.

Cullen Case Jr. is the Program Manager for the Radiation Injury Treatment Network (RITN) where he leads the preparedness activities of 73 hospitals preparing for the medical surge from a radiological incident. He has additional responsibilities for the National Marrow Donor Program to ensure organizational preparedness, lead crisis response, business continuity, emergency communications, and the exercising of all related plans for the NMDP. He has experience leading technical teams in Silicon Valley, teaching computer aided design, providing engineering design services and was a logistics officer in the U.S. Army. While in the U.S. Army he managed the logistical response to Hurricanes Bertha and Fran in North Carolina ('96) and Hurricane Mitch in Nicaragua ('98). Cullen has an Executive Master of Public Administration, a Bachelor’s of Science in Industrial Engineering, is a Certified Emergency Manager (CEM), a Certified Business Continuity Professional (CBCP), a Certified Healthcare Emergency Professional (CHEP), is a Stanford Certified Project Manager (SCPM), and a Minnesota Certified Emergency Manager.

Dr. Andrei Cheshyk, is the Head of the Department of the State Register of Belorussian persons exposed to radiation due to the Chernobyl accident of Belarus in The Republican Research Centre for Radiation Medicine and Human Ecology. The main directions of scientific activity are the following

1. Collection and analysis of medical and dosimetry information on people affected by Chernobyl disaster.
2. Public health and health care: the health of population residing in the areas affected by the Chernobyl accident.
3. Scientific and epidemiological analysis of health indicators of the population affected by the Chernobyl accident.
4. The study of the structure, nature, dynamics and morbidity and disability trends, outcomes of the diseases within the population affected by the Chernobyl accident.

Mark Farfel ScD. has served as the Director of the World Trade Center Health Registry in the Division of Epidemiology, New York City Department of Health since 2005. He has overseen expansion of the scope and comprehensiveness of the Registry's intramural and collaborative extramural research. He has also guided efforts to encourage Registry enrollees to seek 9/11-related healthcare through the federal WTC Health Program. Prior to joining the Registry, he served for 18 years on the faculty of the Johns Hopkins Bloomberg School of Public Health conducting epidemiological and applied research focused on urban environmental health issues. He also received his doctoral degree from the Hopkins School of Public Health.

Eric Grant is the Associate Chief of Research at the Radiation Effects Research Foundation (RERF) in Hiroshima and Nagasaki, Japan. Eric was originally trained in engineering and holds a BSEE from the University of Michigan. Eric earned his PhD in Epidemiology from the University of Washington and has worked as a research scientist at RERF for many years. Eric’s primary research interests include cancer incidence, indirect effects, and trans-
generational effects of radiation exposure. Eric was the program co-chair for last year’s Conference on Radiation and Health in Chicago and was recently nominated to be a member of the National Council on Radiation Protection and Measurements.

**Tamer Hadi** is the Director of Strategic Technology for the Office of Emergency Preparedness and Response at the New York City Department of Health and Mental Hygiene, where he is responsible for managing technology projects that aim to improve the agency’s ability to prepare for, respond to, and recover from emergencies. In 2012, Tamer was responsible for creation and development of a Social Media Monitoring Team that has been integrated into the ICS structure of the agency and used during every emergency response. Over the past 12 years, Tamer has served as ICS Liaison Officer for several agency responses including H1N1, Hurricane Sandy, Ebola, Legionnaires’ outbreaks and Zika. Tamer has a master’s degree in Bioinformatics from New York University and bachelor’s degree in biology from the University at Buffalo.

Dr **Eduardo Herrera** is a Medical doctor, specialist in nuclear medicine. Working since 2012 in the Incident and Emergency Centre at the International Atomic Energy Agency as the Medical Emergency Preparedness Specialist, expert in radiopathology and topics related to medical management of internal contamination, internal dosimetry, biological dosimetry and occupational medicine. Author of several IAEA publications and training materials related to the medical management of persons involved in nuclear and radiological emergencies. He has been Technical Officer for more 23 Regional and National Projects under the IAEA Technical Cooperation. Responsible for the medical preparedness and response activities in the IAEA for radiological and nuclear emergencies. International expert and coordinator of training/workshops and international meetings for more than 120 Members States, with more than 1,000 healthcare professionals trained. Leader of 8 international IAEA Missions in the medical field and important work with stakeholders and international networks.

**Margaret (Peggy) Honein**, PhD, MPH is an epidemiologist and Director of CDC’s Division of Congenital and Developmental Disorders. Her research interests include congenital infections, substance exposure and medication use during pregnancy, and longer-term outcomes associated with birth defects and infant disorders. Dr. Honein served as the co-lead for the Pregnancy and Birth Defects Task Force throughout over 20 months of CDC’s Emergency Zika Response; in this capacity, she developed and directed work to advance understanding of and mitigate the impact of Zika virus infection during pregnancy.

Dr. **Carol Iddins** is the Director of the Radiation Emergency Assistance Center/Training Site (REAC/TS), a US Department of Energy emergency response asset for radiological/nuclear (R/N) incidents. She routinely consults on calls regarding radiation exposures; evaluates and participates in R/N exercises; and consults on cases involving cutaneous radiation injuries. Dr. Iddins has deployed overseas to examine and consult on patients with radiation injuries secondary to radiotherapy overdose errors for International Atomic Energy (IAEA)/Pan American Health Organization (PAHO) Radiation Assistance Network (RANET). She has been at REAC/TS since 2009 and has become a nationally and globally known subject matter expert in the medical management of radiological injuries and incidents. Dr. Iddins is a Fellow of the American Academy of Disaster Medicine with 25 years of experience in civilian and military medicine and a decorated US Air Force Veteran.
Mr. John Koerner is CBRNE Advisor in the Office of the HHS Assistant Secretary for Preparedness and Response (ASPR) for matters related to National medical preparedness and response to CBRNE incidents. In that role, John leads the development of innovative, evidence-based interventions and guidance to support the Nation’s medical and public health response to catastrophic disasters and terrorist incidents. He is broadly published and an internationally recognized expert in medical preparedness and response to radiation and other CBRNE incidents. He is a combat veteran and serves as Board Member and Triage Chief during medical missions for a charitable organization. John received his Master’s Degree in Public Health from the Johns Hopkins School of Public Health and is a Board Certified Industrial Hygienist. He has spent more than two decades operating, researching, and advising in the field of medical and public health response to terrorism.

Tess Konen graduated from the University of Michigan, School of Public Health with a master’s degree in Occupational Environmental Epidemiology. She completed a CSTE/CDC Epidemiology Fellowship at the Minnesota Department of Health (MDH) in the Minnesota Tracking program. Currently, she is an environmental epidemiologist in the Minnesota Tracking program focusing on acute poisonings surveillance, climate change indicators, and disaster epidemiology. She is the chair of the CSTE Disaster Epidemiology Subcommittee and works on post-disaster, long-term surveillance planning.

Richard F. Kozub currently serves as the Management Specialist for the Middlesex County NJ, Office of Health Services; Special Operations Unit. He oversees the County Health’s emergency preparedness operations, Medical Needs Shelters operations, Radiation Response program, and oversees coordinating equipment and logistics for disaster response operations. Richard serves as the Medical Reserve Corps Coordinator for the County. Richard has been an Adjunct Faculty member at Rutgers University for 34 years and is an Instructor for the NJ State Police Hazmat Program. He also is a member on the Northern New Jersey Urban Area Security Initiative Program. Prior to his current position he was the Chief of the County Hazardous Materials Unit from 1979 thru 2002. Richard also is a member of his hometown volunteer fire department for 35 years, serving in all officer positions.

Angela Leek is the bureau chief for Radiological Health at the Iowa Department of Public Health where she is responsible for all aspects of radiation protection in Iowa, including programs with oversight of radioactive materials, radiation machines, and radon. Angela is also responsible for coordinating dose assessment and providing technical advice, control and tracking for public and worker doses and protection throughout radiation emergency response. In addition to her responsibilities in Iowa, Angela is also active in supporting the development and implementation of the Radiological Operations Support Specialist (ROSS) program. Angela currently serves as Iowa’s state liaison officer to the Nuclear Regulatory Commission, serves on the CRCPD Board of Directors, is a voting member for the Organization of Agreement States, and is Councilor for the North Central Chapter of the Health Physics Society. Angela earned an MS in Radiation Health Physics from Oregon State University.

Oleg I. Muravov is Medical Epidemiologist at the Agency for Toxic Substances and Disease Registry (ATSDR). Dr. Muravov has expertise and 33-year experience in planning, managing and supervising epidemiological, public health surveillance and registry programs, including Congressionally mandated national surveillance programs; research, analytical, and applied health surveillance programs. He was a Visiting Scientist/Senior Science Fellow with ATSDR
Eduardo “Eddie” Olivarez has been involved in healthcare for over 30 years. In addition, he has a background in psychiatric & drug addictions treatment; encouraging an improved community. Eduardo's primary objective is to promote healthier lifestyles and promote stronger families. He has been a hospital administrator and overseen each aspect of operating a successful inpatient and outpatient facility. Eduardo has also led a private non-profit Drug treatment / prevention organization which provided services across the Rio Grande Valley. He is currently the Chief Administrative Officer of Hidalgo County Health and Human Services and is responsible for the implementation of various public health & human services programs in indigent health care, preventative health care, environmental health, infectious diseases & prevention, and homeland security preparedness & response. Eduardo is a U.S. Public Health Service Primary Care Policy Fellow from the U.S. Department of Health and Human Services. He served as the President of the U.S. / Mexico Border Health Association representing all ten bi-national states on the U.S. / Mexican Border, and Past President of the Texas Association of Local Health Officials' (TALHO). He is a Chairman of Texas DSHS Preparedness Coordinating Council which oversees public health homeland security; in addition to serving on several boards and committees focusing on public health needs.

Andrew “Andy” Pickett is currently the Director of the Bureau of Public Health Preparedness with the Pennsylvania Department of Health, having been appointed to the position in April, 2015. In this role, he oversees the implementation of the Public Health Emergency Preparedness (PHEP) and Hospital Preparedness Program (HPP) federal cooperative agreements, and manages public health and medical preparedness and response efforts across the commonwealth. Previously, he worked for 7 years in local public health preparedness for the City of Detroit, and in county emergency management. Academically, he holds a Bachelor of Science degree in Geographic Information Science from Central Michigan University, and a Master of Science degree in Technology Studies with a concentration in Public Safety and Emergency Management from Eastern Michigan University. He has also participated in the Executive Leaders Program through the Center for Homeland Defense and Security at the Naval Postgraduate School.

Jeff Quinn, MPH is the Public Health Preparedness Manager with Southern Nevada Health District in Las Vegas, Nevada. The Office of Public Health Preparedness is responsible for managing multiple, federal cooperative agreements, sub-granted to local health authority from the State of Nevada. Mr. Quinn served in the Clark County Multi-Agency Coordination Center immediately following 1 October 2017 MCI in ESF-8 and provided support to healthcare system through the Medical Surge Area Command in weeks following this incident. Mr. Quinn most recently served as the Chair for the Southern Nevada Healthcare Preparedness Coalition. He is also an active member of Southern Nevada’s Type 3 Incident Management Team, Vegas

**Monica Schoch-Spana**, PhD, a medical anthropologist, is a Senior Scholar with the Johns Hopkins Center for Health Security and a faculty member in the Department of Environmental Health and Engineering at the Johns Hopkins Bloomberg School of Public Health. Her research and policy interests include community resilience to disasters, crisis and emergency risk communication, and public engagement in policymaking. Working in the field of public health emergency preparedness for the last 20 years, Dr. Schoch-Spana has led research, education, and advocacy efforts to encourage authorities to enlist the public’s contributions in epidemic and disaster management. National advisory roles include serving on the Homeland Security Subcommittee of the Board of Scientific Counselors for the US Environmental Protection Agency; the Resilient America Roundtable of the National Academies of Sciences, Engineering and Medicine; and, the National Research Council’s Committee on Increasing National Resilience to Hazards and Disasters. She received her PhD in cultural anthropology from Johns Hopkins University.

**Vivi Siegel**, MPH, is the acting Associate Director for Communications for the Centers for Disease Control and Prevention's Division of Environmental Health Science and Practice in the National Center for Environmental Health. Her focus is on using risk communication principles to help stakeholders understand and deal with health uncertainties surrounding environmental events and exposures, and to take actions to protect themselves and others. She helps lead CDC communications responses for natural, chemical, and radiological emergencies, including the 2011 Fukushima response and 2017 national Gotham Shield exercise; and recently, Hurricanes Harvey, Irma, Maria, Florence, and Michael. She holds a BS in Journalism from Northwestern University in Evanston, IL and an MPH in environmental toxicology from the University of Alabama at Birmingham.

**Daniel Sosin** is the Deputy Director and Chief Medical Officer for the Office of Public Health Preparedness and Response (OPHPR) at the Centers for Disease Control and Prevention (CDC). In his current role, Dr. Sosin is the lead science advisor and provides scientific representation for preparedness on behalf of the OPHPR Director and CDC. He serves as a liaison to CDC programs and external partners and assures strategy and program coordination for OPHPR in medical and public health preparedness and response. He is board certified in preventive medicine and internal medicine and a fellow of the American College of Physicians. He received his medical degree from Yale University School of Medicine, his master’s degree in epidemiology from the University of Washington School of Public Health, and his bachelor’s degree in biology from the University of Michigan.

**Jonathan Sury** is a Project Director for Field Operations and Communications at the National Center for Disaster Preparedness, Earth Institute, Columbia University. He has a keen interest in Geographic Information Systems (GIS) and their use in disaster preparedness and recovery. He has over ten years of experience in qualitative and quantitative research with significant experience field research and study design, implementation, management, and data architecture and analysis. He has been responsible for mobile solutions deployment, management, and data flow on over 8 waves of cohort studies. He has led NCDPs use of GIS in combination with wireless data collection methods utilizing centralized server applications in both off-line and on-line scenarios.
Prof. Koichi Tanigawa is vice president of Fukushima Medical University and director at Fukushima Global Medical Science Center. He is a graduate of Faculty of Medicine, Kyushu University in 1982, trained in emergency and critical care medicine in Fukuoka, Japan and Pittsburgh, USA. Prof. Tanigawa has been contributing to the development of the Japan’s radiation emergency medical system when he was Professor and Chair of the Department of Emergency and Critical Care Medicine at Hiroshima University. In response to the 2011 earthquake, tsunami, and nuclear crisis, Prof. Tanigawa led a radiation emergency medical team dispatched to Fukushima, and later became Vice President of Fukushima Medical University. Dr. Tanigawa reported the important issues learned from Fukushima Accident in the Lancet, and has edited a book titled “Radiation Disaster Medicine” (Springer, 2013).

John E. Till, Ph.D. is President of Risk Assessment Corporation (RAC), a research and development organization focusing on environmental risk analysis and dose reconstruction. Dr. Till is a graduate of the U.S. Naval Academy and served in the U.S. Navy Nuclear Submarine Program, retiring as a Rear Admiral in the U.S. Naval Reserve. He has published widely in the open literature editing the first textbook on radiological risk assessment published by the U.S. Nuclear Regulatory Commission in 1983 followed by an updated version in 2008, Radiological Risk Assessment and Environmental Analysis, published by Oxford University Press. He was the recipient of the E.O. Lawrence Award from the U.S. Department of Energy in the field of Environmental Science and Technology in 1995 and presented the Lauriston S. Taylor Lecture at the annual meeting of the NCRP in 2013. Dr. Till and the RAC team have performed historical dose reconstructions at twelve former or current Department of Energy sites as well as other facilities where radionuclides have been released to the environment and raised public concerns.

Kayo Togawa, PhD, MPH is an epidemiologist in the Section of Environment and Radiation at the International Agency for Research on Cancer (IARC), the World Health Organization’s specialized cancer research agency. Her current work primarily involves the coordination of the Thyroid Monitoring after Nuclear Accidents (TM-NUC) project, where an international, multidisciplinary Expert Group convened by IARC developed recommendations on long-term thyroid health monitoring after nuclear accidents. Dr. Togawa also works on research projects at IARC, such as the consortium of agricultural cohort studies (AGRICOH) and the African Breast Cancer – Disparities in Outcomes (ABC-DO) study. Her current research interests are in occupational cancer epidemiology and early detection of cancer. Dr. Togawa received an MPH and a PhD in Epidemiology from University of Southern California.

Dr. Robert Ursano is Professor of Psychiatry and Neuroscience at the Uniformed Services University School of Medicine and founding Director of the Center for the Study of Traumatic Stress. Dr. Ursano completed twenty years of service in USAF medical corps. He is a Distinguished Life Fellow of the American Psychiatric Association. He has received the Department of Defense Humanitarian Service Award, the Lifetime Achievement Award of the International Traumatic Stress Society, William C. Menninger Memorial Award of the American College of Physicians and APA’s Bruno Lima Award in Disaster Psychiatry. He is senior editor of the Textbook of Disaster Psychiatry and was the first Chairman of the APA’s Committee on Psychiatric Dimensions of Disaster. His work focuses on the interface of psychiatry and public health in times of disaster and terrorism.
Jessica Wieder is the Director of the Center for Radiation Information and Outreach at the United States Environmental Protection Agency. She has worked in the field of radiation communication for 14 years and serves as the senior public information officer for EPA’s Radiological Emergency Response Team. Ms. Wieder leads the United States Nuclear/Radiological Communication Working Group and is a member of the National Council on Radiation Protection and Measurements.

Steven H. Woolf, M.D., M.P.H, is Director Emeritus of the Center on Society and Health at Virginia Commonwealth University, where he is Professor of Family Medicine and Population Health. He holds the C. Kenneth and Dianne Wright Distinguished Chair in Population Health and Health Equity. Dr. Woolf has edited three books. Over a period of 16 years in his early career, Dr. Woolf served as scientific advisor to, and a member of, the U.S. Preventive Services Task Force. He is author of Health Promotion and Disease Prevention in Clinical Practice and has published more than 200 articles in a career that has focused on raising public awareness about the social, economic, and environmental conditions that shape health and produce inequities. Dr. Woolf was elected to the Institute of Medicine in 2001.

Kevin Yeskey, M.D. currently serves as the Principal Deputy Assistant Secretary to the Assistant Secretary for Preparedness and Response (ASPR) at the Department of Health and Human Services (HHS). The office leads the nation in preventing, responding to and recovering from the adverse health effects of manmade and naturally occurring disaster and public health emergencies. Dr. Yeskey spent more than 24 years as a physician in the U.S. Public Health Service (USPHS) and retired as CAPTAIN. In his PHS career, he served in various agencies in HHS, to include the Indian Health Service, Health Services and Resources Administration, and Centers for Disease Control and Prevention. From 2007 to 2012, he was the Deputy Assistant Secretary for Preparedness and Response and the Director of the Office of Preparedness and Emergency Operations. From 1986 to 1999, Dr. Yeskey was a member of the HHS Disaster Medical Assistance Team of the National Disaster Medical System (NDMS), serving as the Team Commander from 1993-1999. He was the Chief Medical Officer for the NDMS program from 1998-1999. Dr. Yeskey also served as the Medical Policy Advisor to FEMA Operations prior to retiring from the USPHS. Dr. Yeskey received his bachelor’s degree from Brown University and his medical degree from the Uniformed Services University of the Health Sciences. He has been board certified in Emergency Medicine for over 30 years.
Abstracts

PLENARY SESSION: Setting the Stage
*Moderated by Jonathan Fielding, UCLA Fielding School of Public Health*

**About the Study Request**
*Armin Ansari, Centers for Disease Control and Prevention*

Nuclear and radiological emergencies can cause deaths, injuries, and increase the risk of long-term health effects. The affected population, which includes emergency responders as well as members of the public, may require short- and long-term surveillance to identify adverse physical and mental health impacts. The Nuclear/Radiological Incident Annex to the Response and Recovery Federal Interagency Operational Plans identifies the Department of Health and Human Services (HHS) as the responsible agency to “conduct of epidemiological surveillance to detect symptoms consistent with exposure to radioactive materials, collect exposure histories, or identify public health needs”. The Centers for Disease Control and Prevention (CDC) is the responsible agency within HHS for establishing these epidemiological surveillance activities. Other federal, state, local, and tribal entities will likely be involved in carrying out these activities according to law and regulations concerning data ownership, analysis, and communication. Monitoring of long-term health effects following nuclear and radiological emergencies can be challenging, however, and it can benefit from advanced planning. The experience from the 2011 Fukushima nuclear accident, and most recently the findings following the 2017 Gotham Shield National Level Exercise, led the CDC to ask the Academies to organize this workshop. The purpose of the workshop is to identify issues, challenges and considerations in establishing and setting up criteria for including people in a registry for long-term health effects following nuclear and radiological emergencies, with the goal of providing the best care of people, taking into account implementation and practicality issues. Information and perspectives provided in this workshop will inform planning and preparedness activities for HHS/CDC and its public health partners.

**The Need to Prepare for Population Monitoring**
*Kevin Yeskey, Office of the Assistant Secretary for Preparedness and Response*

Following a major radiological incident, the patient population will change over time from those needing care for trauma and emergent issues to those experiencing acute radiation syndrome to a much larger group that will require long-term monitoring for potential stochastic effects of radiation exposure. Related to the latter, we will examine the role of ASPR as coordinator of Emergency Support Function (ESF) #8 – Public Health and Medical Services under the National Response Framework and how the Health Surveillance core functional area under ESF #8 might relate to long-term health monitoring of populations, such as impacted workers and the general population. Currently, responsibilities and authorities for this are ill defined, and while
the Nuclear/Radiological Incident Annex to the Response and Recovery Federal Interagency Operational Plans suggests this is a role for HHS, there is no doctrine to specify how this could be accomplished. That notwithstanding, there are precedents in prior major responses and toxic exposures where various agencies had significant roles in monitoring, such Deep Water Horizon, the World Trade Center, various Superfund sites, and the cohorts of energy, asbestos, and coal mine workers. The prior roles and current capabilities of various HHS agencies and will be discussed as they may apply to this task. Additionally, the roles of HHS-supported coalitions and the Regional Disaster Health Response System (under development) will be discussed as potentially useful constructs, particularly as centers of excellence such the Radiation Injury Treatment Network (RITN) provide examples of what might suggest potential solutions. Just as it has in the past, the conduct of long-term monitoring will require collaboration through the entirety of the US public health and medical infrastructures at all levels from health care facilities, localities, and States through to the Federal government and we seek to establish a trajectory for how this may be accomplished.

**Environmental Consequences and Dose Impacts of Radioactive Material following a Nuclear or Radiological Incident**

*Steve Musolino, Brookhaven National Laboratory*

Four scenarios will be presented to put into context the radiation dose impacts to a population who are exposed to the consequences of a radiological or nuclear incident. The examples include a 10 kT improvised nuclear device surface burst, a 100 kT nation-state weapon high altitude burst at 1,000 feet, a nuclear power plant accident, and a radiological dispersal device. The examples will show the geographical area impacted, projected range of doses, and the relative number of people in the various ranges of dose. Because the timing of issuing protective actions recommendations to the public will be a substantial factor in mitigating their doses, the timeframes to communicate countermeasures to the responders and decision-makers, and what information can be made available and how rapid this information will evolve, will be contrasted.

**Radiation Dose Reconstruction**

*John Till, Risk Assessment Corporation*

Radiation dose reconstruction is a fundamental step in the process of conducting long-term health monitoring of populations following nuclear and radiological emergencies. This presentation discusses three key aspects of dose reconstruction in the context of the workshop: (1) the significant advances in the state of the art of dose reconstruction during the past four decades; (2) key information needed to conduct dose reconstruction following nuclear and radiological emergencies; and (3) how the results of dose reconstruction can be used as a guide in conducting long-term health monitoring of populations exposed. Advances in the science of dose reconstruction have been profound; early studies began in the 1980s to study large populations exposed to nuclear weapons fallout. These studies were followed by historical reconstructions of dose to the public from current and former facilities of the nuclear weapons complex, the Three Mile Island accident in 1979, the Chernobyl accident in 1986, and the Fukushima accident in 2011. Each study was unique in terms of the source term, the environmental transport of radionuclides, the scenarios of exposure, and the resulting estimated doses and uncertainties. The foundation laid by these studies and others have the science
allowing us to use the consider results as the basis for health studies and long term monitoring. In order to use dose reconstruction for making decisions about long term health monitoring, key information is needed. The source must be well characterized in terms of the quantity of radionuclides released to the environment and the chemical and physical form. The transport of material must be determined either through measurement data, mathematical modeling, or a combination of both. In order to estimate dose, credible scenarios of exposure representing exposed persons must be developed. Once dose reconstruction is developed, the results can be used to identify specific organs exposed, the risk of disease, potential pathways of long term exposure, the feasibility for biodosimetry, and to design and implement long-term health monitoring.

Also see:


Till et al., 1995. The Utah Thyroid Cohort Study analysis of the dosimetry result, Health Phys. 1995 Apr;68(4):472-83

### Biodosimetry Tools to Support Long-Term Health Monitoring After a Large-Scale Radiological Event

*David Brenner, Columbia University*

After a large scale radiological event, very large number of individuals will potentially receive significant radiation exposures, and will still survive. For example after a 20 kT ground burst in New York City, and with conventional medical care, it is estimated that more than half a million individuals will receive doses above 3 Gy and will survive the acute effects of the exposure. As improved radiation mitigators become available this number may increase to more than one million. Thus in terms of long-term medical support and also potential radiation epidemiology, it will be important to generate personalized estimates of the absorbed dose for each of these individuals. Radiation biodosimetry offers a practical approach here, in which personalized endpoints such as DNA damage and “omics” changes can be measured in blood or urine, and related to the individual’s absorbed dose.

In terms of the numbers of individual that need to be dose-assessed, two approaches are possible. The first is to use an international biodosimetry network of up to 50 laboratories that can each perform these biodosimetric assays on a comparatively low throughput basis. A best estimate is that the current total international capacity is around 10,000 samples per month. The second approach is to use newer higher throughput technologies in which both sample preparation and sample readout are fully automated. An example is the RABiT (Rapid
Automated Biodosimetry Tool) approach, which currently has a throughput of several thousand samples per day.

In the exposure scenario outlined about, with conventional care we might expect about 100,000 survivors who received very high whole body doses above 7 Gy. As improved radiation mitigators become available this number may increase threefold. These high doses present challenges for most biodosimetric assays, which are generally not useful above around 5 Gy. New approaches are being developed to address this issue.

Finally, a current direction in high-throughput biodosimetry is to move “beyond dose” to develop biomarkers that are predictive of short-and long-term radiation health effects. Results to date are quite promising.

Also see:


SESSION 1: Existing Radiation Registries and Population Monitoring
Moderated by Betsy Kagey, Georgia Department of Public Health

Follow-up of the Atomic Bombing Survivors
Eric Grant, Radiation Effects Research Foundation, Hiroshima

Three cohorts based on the atomic bombings in Hiroshima and Nagasaki have been under long-term surveillance for roughly 70 years. The Life-span study (LSS) of atomic bomb survivors (n=120,000 since 1950), the children of the atomic bomb survivors (n=77,000 since 1946), and fetuses exposed in their mother’s wombs (n=3,600 since 1946). The LSS cohort was sampled from the Japanese National Census of 1950. The Children’s cohort was assembled via active recruitment of pregnant women seeking additional rice rations at city offices as well as passive linking to city records, and the in utero cohort was primarily constructed from city records. Outcomes include cause of death, cancer incidence, and non-cancer morbidity through clinical programs of sub-cohorts. Study results are used world-wide by radiation protection policy makers. Despite the overall success of the studies, researchers have struggled over the years to establish and maintain the trust of the cohort members. Researchers have faced pushback from the subjects through perceptions of being “guinea pigs” due to “study but not treat” policies and poor feedback to the study subjects. Lessons learned include the need to be transparent with study subjects regarding the purpose of the studies, the need to provide feedback of study results to the cohort members in order to keep their interest and cultivate their participation, and the need to be honest about the scope and limits of the research to avoid disappointment through misunderstood expectations.
The Chernobyl State Registry  
Andrei Cheshyk, Republican Research Center for Radiation Medicine and Human Ecology, Belarus  

As the tool on observation of the health status of affected population after accident, USSR Chernobyl register was created. In May 1993 it was transformed to the Belarusian Chernobyl State register of the persons who were affected by radiation. This Decision determined 7 Groups of Primary Registration (GPR) and 3 Groups of Increased Radiation Risk (GiRR) were distinguished. Purpose of the State Registry of persons affected due to the Chernobyl accident: Radiation affected population monitoring; Obtaining the reliable data on the medical and biological effects of the Chernobyl accident; provision of information to support dispensary examination, planning and carrying out therapeutic measures. The objectives of the State Registry: maintenance of a personalized automated records of persons affected by the accident; dynamic replenishment of necessary information about the persons affected by the accident; development of normative-legal acts for the medical monitoring of the various categories of the affected citizens.  

The information in the database for each person included in the State Registry: registration information (full name, date of birth, group of accounting, risk group, passport data, place of residence, identification data of the certificate of the affected person, the benefits article according to the Law, information about presence in area, information about parents (for children included in the State Registry), as well all changes of registration data; data on radiation doses (more than 100 thousand doses of bone marrow, over 119 thousand of absorbed thyroid doses and over 221 thousand of individualized accumulated radiation doses); medical information (data on all diagnoses of diseases and injuries, illnesses connection with the accident at Chernobyl, information on disability, on the annual amount of dispensary examination, on removal, cause of death, group of dispensary follow-up, need and conducted treatment.  

Promising directions of work:  

1. The formation of groups of high radiation risk among the affected population by various nosological forms using data from the State Registry and the results of dose reconstruction for the purpose of optimal medical approach to minimize the consequences of the accident.  
2. Combining data of Registries of Russia, Ukraine and Belarus to more accurate assessment of the health effects of the Chernobyl accident;  
3. Improvement of methods for dose reconstruction of individual organs and tissues, as well as accumulated radiation doses for the entire post-Chernobyl period;  
4. Conducting radiation-epidemiological studies to establish a causal relationship of diseases in individuals who were under 18 years at the time of the Chernobyl accident.
Dosimetry During the Radiological Accident in Goiânia*
Luiz Bertelli, Los Alamos National Laboratory

In late 1985, a private radiotherapy institute located in the city of Goiania, Brazil moved to new premises taking their $^{60}$Co teletherapy unit but leaving in place a $^{137}$Cs unit, without notifying the Brazilian licensing authority as required by law. The old building was then partly demolished and the $^{137}$Cs source became insecure. On September 13th 1987 two people entered, found some scrap metal value, removed the source assembly from the radiation head, took it home and tried to dismantle it. As a result, the source was ruptured causing environmental contamination and external and internal exposure of several persons. Four people died due to very high radiation doses.

The presentation will focus in describing (1) how the accident was discovered, (2) how individuals have been screened, (3) aspects of individual monitoring, followed up, and medical care to the victims with associated difficulties, (4) the radiation dosimetry techniques used and their results, and (5) psychological impacts. Personal experiences by the authors, who participated as lead members of the radiation dose assessments team will also be provided.

Note: The presenter wishes to acknowledge Dunstana Melo (Melohill Technology) for her contributions toward preparing the abstract and presentation.

The Fukushima Health Management Survey
Koichi Tanigawa, Fukushima Medical University

The Fukushima Health Management (FHM) survey was implemented in the wake of the 2011 Fukushima Daiichi Nuclear Power Plant accident. The FHM survey was funded by the Fukushima prefectural government and entrusted to Fukushima Medical University for implementation. The primary purpose of this survey was to monitor the long-term health conditions of residents in Fukushima, promote their health, and investigate whether a long-term low-dose radiation exposure affects health. This survey consists of the basic survey and 4 detailed surveys; the basic survey was to estimate external radiation exposure for all Fukushima residents, the detailed surveys consisted of the thyroid ultrasound examination for children, the comprehensive health check and the mental health/lifestyle survey for evacuees, and the pregnancy/birth survey for pregnant women in Fukushima prefecture. The thyroid ultrasound survey was planned every 2 years until 20 years of age, and every 5 years afterward. Other detailed surveys were scheduled every year. The original duration of the survey was 30 years. The FHM survey was implemented on a voluntary basis.

In the basic survey, a questionnaire about personal behavior for the first 4 months after the accident was sent to all individuals in Fukushima (2.06 millions) and the external dose was estimated by superimposing the personal behavior data (daily time budget and record of movement, obtained by a questionnaire) on the $\gamma$-ray dose rate maps. Overall response rate was 27%. The max, mean and median values in estimated external radiation doses for the first 4 months after the accident were 25, 0.8, and 0.6 mSv, respectively. The thyroid ultrasound examination was scheduled to all children aged $\leq$18 years (381,000). The participation rates were 83%, 71%, 57% in the first (2011-2014), second (2014-2016) and third (2017-2018) round. 116, 71, and 15 participants were diagnosed thyroid cancer or suspected in the first, second and third round examination, respectively. In the mental health/lifestyle survey, a questionnaire
about mental health and lifestyle was sent to all residents of the municipalities ordered evacuation (210,000). The response rates to the questionnaire in 2011, 2013, 2016 were 44%, 26%, 20% and the proportions of evacuees who required support for depressive symptoms (K6 score ≥13) were 14.6%, 9.7% and 6.8%, respectively (Japanese average: 3%). The comprehensive health check targeted the same population as the mental health/lifestyle survey. The participation rates were 35.4% (aged ≤15; 64.5%), 25% (38.7%), 21.5% (26.1%) in 2011, 2013, 2016, respectively. The proportions of obesity, hypertension and hepatic dysfunction increased initially, however, gradually decreased overtime. On the other hand, the proportions of participants aged ≥65 with impaired glucose tolerance increased from 18.7% in 2011 to 25.7% in 2016. In the pregnancy/birth survey, a questionnaire about pregnancy, delivery and mental health was sent to all women in Fukushima prefecture after the accident (16,000). The response rates to the questionnaire in 2011, 2013 and 2016 were 58%, 48% and 52% and the proportions of the respondents with depressive symptoms were 27.1%, 24.5% and 21.1%, respectively.

Although the estimated radiation doses were very low in Fukushima, the results of the thyroid ultrasound examinations caused public anxiety about the health effects of radiation and raised concerns about over-diagnosis. A long-term displacement was associated with an increase of diabetes and a risk of future development of cardio-cerebrovascular diseases. Mental health of evacuees and pregnant women was deteriorated, and individual support took top priority after the accident.

SESSION 2: Health Screening
*Moderated by Tener Veenema, Johns Hopkins University School of Nursing*

**Radiation Screening/Decontamination**
*Angela Leek, Iowa Department of Public Health*

The processes for screening and decontamination of potentially contaminated individuals after a radiation incident are incorporated into most response organization plans and procedures. The plans are typically based off of national population monitoring guidance and varies across jurisdictions, driven by resource capacity as well as the priorities specific to the phase of the incident. Some early phase population monitoring activities are performed by dedicated teams that include radiation subject matter and epidemiological expertise while others are manned by trained first responders who rarely work with radiation specific issues and rely on reach back resources for technical assistance. Later phases of most emergency response plans recognize the need for health physics and epidemiological support to manage and track the data collected by community reception centers (CRCs) and hospitals for exposed individuals. However, a review of most plans would reveal a gap between these early phase data gathering activities and the later phase data management and tracking. Additional planning consideration for how data will be collected and documented for individuals, including those who do not report to a designated CRC or other screening or registration location, would be a valuable review for jurisdictions. It is also important for jurisdictions to know how the data will move from the CRC or hospital to the agency responsible for overall data management and tracking. Early screening and decontamination information is a critical component to the long term population monitoring after radiation emergency response, and it is important to ensure that overall population
monitoring processes allow for collection of this critical data in the early phase without impacting the responders’ ability to accomplish the life-saving and other early response priorities.

**Medical Management of Radiation Incidents**  
*Carol Iddins, Radiation Emergency Assistance Center/Training Site*

Resources That Could Support Acute and Long-Term Health Surveillance  
There are many tools that make the transition from acute health management and surveillance to long-term health surveillance. These include standard medical and diagnostic testing; analysis of the testing; biostatistical analysis; a data repository and data analytics. This can be in response to a particular hazard or may include numerous data points, and may be applied to a myriad of populations. Oak Ridge Associated Universities (ORAU) /Oak Ridge Institute for Science and Education (ORISE) and the Radiation Emergency Assistance Center/Training Site (REAC/TS) have been doing this for many decades. Acute and retrospective health surveillance for radiation accidents, radiation workers, and beryllium workers has been conducted, and many registries have been developed and maintained at ORAU/ORISE. In addition, specialized and unique laboratory testing may translate from the short- and long-term surveillance that are done at the ORAU Beryllium Testing Laboratory and the REAC/TS Cytogenetic Biodosimetry Laboratory (CBL). For radiological/nuclear incidents, many groups of responders, workers, and the public will have a need for acute and retrospective biodosimetry techniques for health surveillance.

The value of these ongoing registries and specialized laboratory capabilities have helped guide treatment and monitor patients with radiation-induced injuries; kept populations safer through monitoring exposures to radiation, beryllium and other chemical agents; and ensured US Department of Energy (DOE) and DOE-related research is tracked and transparent to all.

**The Principles of Screening**  
*Steven Woolf, Virginia Commonwealth University*

Decisions about screening policy in the event of a nuclear incident begin with the core principles of screening, which apply to any condition. Screening, defined as efforts to detect pre-clinical conditions in asymptomatic populations, should be pursued only if early detection is effective in improving health outcomes and the benefits outweigh the harms. Considerations in weighing the evidence include the prevalence of the target condition in the screened population, the accuracy (e.g., sensitivity, specificity, positive predictive value) and reliability of the screening test, and the evidence that detection and treatment of the target condition in early stages will achieve a significant improvement in outcomes in the screened population. These benefits must be weighed against the harms, including those induced by inaccurate screening results (e.g., anxiety, complications from follow-up testing for false-positive results) and by treatments, especially those for indolent disease. The tradeoff between benefits and harms may depend on the pre-test probability of the disease, sometimes making universal screening less appropriate than targeted or selective screening of a high-risk population.

Deliberations over these matters should consider the quality of the scientific evidence. Grading systems and rules of evidence developed by the U.S. Preventive Services Task Force have been used for decades and may be instructive. The composition of the guideline panel can
influence judgments about the evidence and its ultimate recommendations. Studies show that guideline panels composed of specialists and leading investigators (who hold the most content expertise on the target condition but also have experience with skewed patient populations and potential conflicts of interest) produce different recommendations than panels composed of generalists with expertise in the critical appraisal of evidence but no personal stake in the outcomes. Other considerations include whether to consider costs or implementation concerns, or whether to base recommendations only on what is best for population health. Often the evidence is insufficient to recommend for or against screening. It may be useful to distinguish between screening practices that evidence supports and those that the policy body will recommend.

**Long-Term Strategies for Thyroid Health Monitoring after Nuclear Accidents**
* Kayo Togawa, International Agency for Research on Cancer

The recognition of the issues related to overdiagnosis has raised the question of whether and how to implement thyroid health monitoring after a nuclear accident that involves the release of radioiodine, and has also emphasized the importance of establishing guidelines on this topic. In 2017, the International Agency for Research on Cancer (IARC) convened an international, multidisciplinary Expert Group to develop recommendations on long-term strategies for thyroid health monitoring after a nuclear accident, based on the current scientific evidence and previous experiences. The Expert Group recommends against population thyroid screening after a nuclear accident, and it recommends that consideration be given to offering a long-term thyroid monitoring program for higher-risk individuals (defined as those exposed in utero or during childhood or adolescence with a thyroid dose of 100–500 mGy or more) after a nuclear accident. Thyroid monitoring program is defined by the Expert Group as including education to improve health literacy, registration of participants, centralized data collection from thyroid examinations, and clinical management. A thyroid monitoring is an elective activity offered to higher-risk individuals, who may choose how and whether to undergo thyroid examinations and follow-ups. The choice of a thyroid dose range, 100–500 mGy, for an actionable level reflects the option to be more inclusive (lower actionable levels) or to be more efficient (higher actionable levels) in monitoring and identifying radiation-associated thyroid disease. Those recommendations were developed in the context of considerations relevant to exposure to any toxic substances, and preparedness and response to nuclear accidents, such as the establishment of a health surveillance program (e.g. cancer registration), a risk communication program, and dosimetry monitoring and protective actions. The Expert Group also acknowledges the importance of additional considerations for decision–making about thyroid monitoring after a nuclear accident, such as socioeconomic implications, health-care resources, and social values.

**Mental Health Screening**
* Robert Ursano, Uniformed Services University School of Medicine

Mental and behavioral health of populations are widely affected by trauma, disaster and would be by a nuclear incident. By far resilience is the expected outcome for most – they will do “ok”. Some, however will develop distress symptoms, changes in health behaviors and or psychiatric illness. The most common distress symptoms after 9/11 were sleep problems. These were the most common presentation to emergency rooms. Increased alcohol use and smoking (of both legal and illegal substances) are see after disasters. Importantly increased alcohol use- not
addiction per se- is of substantial concern due to associated increases in alcohol associated morbidity such as accidents and family violence. PTSD, depression, anxiety and other psychiatric illness increase. After Katrina hurricane there were excellent studies which documented a doubling of psychiatric illness rates in the exposed area. After contamination events (including Chernobyl, Fukushima, Three Mile Island etc.) one can also expect increased reporting of MIPS/MUPS (multiple idiopathic physical symptoms; multiple unexplained physical symptoms). These can present to emergency rooms and primary care. Importantly sustaining first responders is particularly important in planning for and detecting mental health problems after all disasters. Screening can be part of primary care, emergency room and also first responder care. Depression, PTSD and substance use screens have been widely used. Screening requires having resources to provide the individuals who screen positive- for subsequent evaluation and potential treatment. Available resources for these may be limited and consideration of internet based (if available) resources and treatments may expand care, although with decreased efficacy, with increased reach. Considerations for loss of medications, loss of usual physical care (e.g. dialysis, chemotherapy) are important elements in managing population level distress and potential complications of comorbidities.

Health Care Resources
*Cullen Case, Radiation Injury Treatment Network*

The likelihood of a radiological/nuclear disaster may be low for any community. Some communities have higher risk than others, but all communities have a risk of being impacted by the medical surge and surge of evacuees from a radiological disaster in a city 500-1000 miles away. RITN has worked since 2006 to develop resources to help the medical community and public health to prepared for those casualties with acute radiation syndrome.

Since 2006 RITN has developed many resources to assist in preparing for a distant rad/nuke incident, these resources range from ARS treatment guidelines, referral guidelines, web based training courses, exercise materials and more; all of these resources can help a community to prepare for a radiological disaster. Additionally, in 2016 RITN released and tested data collection forms and the web based system to collect them are in place for casualties treated at RITN hospitals.

Session 3: Lessons Learned from Setting up Population Monitoring Registries
*Moderated by Lorna Thorpe, NYU Langone Health*

The World Trade Center Health Registry
*Mark Farfel, New York City Department of Health and Mental Hygiene*

Conceived shortly after 9/11/01 by the NYC Health Department (DOH), the World Trade Center Health Registry received initial financial/administrative support from FEMA, EPA and ATSDR in 2002. Operated by DOH since its inception, the Registry has been funded by NIOSH since 2009. The Registry tracks short- and long-term (20+years) physical/mental health, adverse heath burden, and gaps in care among 71,000 people directly exposed to the WTC disaster who voluntarily enrolled in 2003-04 and completed an initial health interview. The closed cohort
includes responders and people who lived, worked, went to school, or were passers-by in lower Manhattan. The Registry conducts periodic health surveys, administrative data matches (births/cancer/deaths/hospitalizations), nested studies (including independent/collaborative research by external researchers), and surveillance of potential emerging conditions. Additionally, the Registry actively refers enrollees with 9/11-related symptoms to the federal NIOSH WTC Health Program.

Scientific, socio-political, and administrative challenges arose in setting up the Registry. Scientific challenges included the establishment of inclusion and exclusion criteria (e.g., physical boundaries) and the limited documentation of environmental contaminants and exposures early on for relating to long-term health outcomes. Socio-political challenges included distrust of government which impeded gaining input and support from stakeholders (community, labor, city agencies, business entities/employers) for protocol development and recruitment outreach and coordinating research agendas across the 9/11 exposed cohorts. Administrative challenges entailed obtaining timely approvals from three IRBs. Enabling factors for Registry creation included having: a) DOH leadership that understood the need for a Registry, b) political will to secure funds, c) a federal partner with experience creating registries (ATSDR), and the federal government’s ability at the time to quickly secure a vendor for cohort formation. Lessons learned related to these factors will be discussed.

Also see:


Katrina, Sandy, and Deepwater Horizon
Jonathan Sury, Columbia University

Creating thoughtful and pre-planned post-disaster data collection models can result in effective cohort management over time. Various organizations whether academic, non-profit, or governmental will benefit from a thorough examination of their potential use cases where in which they would engage in the creation of a longitudinal cohort study or exposed population registry. The technological landscape has evolved significantly over the past 10+ years with accessible cloud-based tools, cross-platform capabilities, and cheap data storage which previously required significant technological overhead and skilled staff. Management and maintenance of these registries implicitly assumes a customer service focus to keep contact information fresh and maintain respondent rapport. Long-term follow-up with out-of-date contact information can result in significant operational costs. This presentation will explore lessons learned and proposed best practices based on three post-disaster cohort studies which includes the post-Katrina Gulf Coast Child and Family Health Study, the post-Superstorm Sandy Child...
and Family Health Study, and post-Deepwater Horizon oil spill Gulf Coast Population Impact Study/Resilient Children Youth & Communities Project. The presentation will explore study design and sampling, data collection and storage methodologies, technological considerations, staff and operational cost factors, and techniques which may improve retention rates.

**The Las Vegas Mass Shooting and Patient Tracking Registry**
*Jeff Quinn, Southern Nevada Health District*

On October 1, 2017, a well-armed gunman opened fire from his 32nd floor hotel room onto 22,000 concert goers at a country music festival in Las Vegas, Nevada. Ultimately, there were 59 deaths and more than 800 injured following this shooting as people attempted to flee the festival grounds during the barrage of bullets all around them. The magnitude of this incident and patient tracking challenges that followed have far reaching implications to other communities and future Mass Casualty Incidents (MCI). These challenges are only compounded by an increase number of large venue events attended by visitor and tourist populations. While these shared experiences have been repeated in other MCIs from across the country, information sharing is necessary to better assist jurisdictions in mitigating barriers, provide opportunity for planners to integrate best practices and lessons learned in emergency management plans, support continued improvement in response operations, and improve information sharing coordination.

The Southern Nevada Health District addition to this panel’s learning session will focus on a single, operational objective tasked to local Health District and Clark County Office of Emergency Management’s Medical Surge Area Command-Patient Tracking of Injured. This activity started immediately on night of October 1st and continued through more than 33 operational periods following incident. The most significant challenges “Pitfalls” and best practices “Pearls” of patient tracking for this event will be discussed considering immediate, short-term needs of response agencies, healthcare system, and injured. Post-MCI activities and progress made to mitigate identified gaps that contribute to patient tracking will also be shared.

Also see:

Quinn, 2018. #Vegas Strong One year later, Health Security, 16 (5): 350

**U.S. Zika Pregnancy and Infant Registry**
*Peggy Honein, Centers for Disease Control and Prevention*

Zika virus infection during pregnancy can cause serious birth defects, including structural defects of the brain and eye, and has been linked to neurodevelopmental abnormalities. The US Zika Pregnancy and Infant Registry is an innovative surveillance network established during the Centers for Disease Control and Prevention (CDC) emergency response to learn about the impact of Zika virus infection during pregnancy on pregnant women, infants, and children. The US Zika Pregnancy and Infant Registry was established in early 2016 as a collaboration between CDC and state, local, and territorial health departments. Data are protected by an
Assurance of Confidentiality, and the surveillance system includes information on over 7,400 completed pregnancies with laboratory evidence of possible Zika virus infection from December 1, 2015 to March 31, 2018 in U.S. states and territories. Follow up of infants and children has been complicated by movement of families, including some displaced by multiple hurricanes in 2017. Information from the registry was used to inform recommendations for healthcare providers caring for families affected by Zika virus and plan for needed services. Data from the US Zika Pregnancy and Infant Registry were used to estimate that 5-10% of infants from pregnancies with laboratory evidence of possible Zika virus infection have serious birth defects of the brain or eye. Preliminary data from the US territories showed that among children at least one year old from pregnancies with laboratory evidence of possible Zika virus infection, about 9% had a reported neurodevelopmental abnormality. Building on lessons learned from this surveillance network established during an emergency response, CDC is developing a standard approach to surveillance of emerging threats to mothers and babies using longitudinal-linked mother-baby data, standard core variables, and modules to address specific health threats.

SESSION 4: Operational Considerations for Setting up and Maintaining a Radiation Registry
Moderated by Meghan McGinty, Johns Hopkins Bloomberg School of Public Health

No abstracts were submitted for this session.

Panelists provided the following references:


SESSION 5: Communications
Moderated by Brooke Rogers, Kings College London

Communicating about the Event and What to Do
Jessica Wieder, Environmental Protection Agency

Radiation is a difficult subject to address. Radiation units are unfamiliar to the public, there is uncertainty in the scientific community about low-dose health effects, and the topic comes with some inherent fear. An exposure from a radiological emergency fits all the criteria for high-perceived risk; you can’t see radiation, you aren’t in control, the emergency wasn’t natural, there
are long-term consequences, it affects sensitive populations... The fear is real, and it is personal.

Successful public communication about long-term health monitoring following a nuclear or radiological emergency will be determined by our ability to build and maintain public trust from the start of the emergency. Trust-building within communities needs to start early in the response. Ideally, understanding who the community trusts should happen before an emergency occurs. In a world where—based on appearance alone—trustworthiness judgements are made in less than one second, the messages and the messenger need to be thoughtfully planned and practiced.

There are a series of tools that collectively the federal agencies worked on to help with providing early, credible, consistent information to the public after a radiological or nuclear emergency. These tools can be found at https://www.epa.gov/radiation/pag-public-communication-resources. The pre-scripted communication tools provide a jumping off point for effective radiation communications after an incident but there is still work to be done. We must continue to refine our health effects messages for clarity and we are putting an increasing emphasis on empathy, because the person must always come before the science.

**Considerations for Long-term Communications Planning: What about the non-immediate aftermath?**
*Vivi Siegel, Centers for Disease Control and Prevention*

This presentation will focus on some of the challenges of communications during a long-term registry or surveillance situation; including how to maintain trust and consistency over the long run; how audiences and messaging may change; and how to build lasting communications infrastructure. The presentation will also discuss lessons learned from long-term CDC communications about environmental hazards.

**Setting Expectations: How Enrollees and Epidemiologists May View the Role of a Radiation Registry Differently**
*Monica Schoch-Spana, Johns Hopkins Bloomberg School of Public Health*

Long-term health monitoring of a population following a nuclear or radiological emergency will involve observing, documenting, and analyzing the potential effects of radiation exposure, including for those in generations of people to come. With data from the radiation registry, epidemiologists will be working hard to make sense of an incident’s public health impacts over the long run. At the same time, enrollees will be engaged in their own efforts to derive meaning about the event, its potential after-effects, and the experience of being monitored. This talk will address potential scenarios in which the public’s expectations about the radiation registry’s role in their lives may diverge from the original intentions of the designers for a health monitoring system. For instance, where epidemiologists may see the data captured from registrants as a public health good, some enrollees may sense themselves under a kind of microscope, an unwitting subject of research of no personal benefit. Or, some participants may feel that being monitored automatically confers unencumbered access to health care. Still others may feel themselves to be part of a larger community who bears the mark of a terrible tragedy—an identity that deserves public recognition, and for some, even compensation. With these and
other scenarios in mind and drawing from historic analogs, this presentation will help planners think through communication strategies to help honor, yet also help set public expectations about the purpose of a long-term health monitoring system for radiation-exposed populations.

**Communicating Inclusion and Exclusion Criteria for a Registry**

*Eddie Olivarez, Hidalgo County Health and Human Services Department, Edinburg, Texas*

Establishing and implementing a registry for a radiological event is crucial to track and monitor populations that may have been affected by the event. At the forefront, a call center needs to be formed with a 24/7 call-in number readily available to the public. This initial line will act as both a liaison triage for those calling in, grouping those identified as low risk and high risk, based on the predetermined geographical radial threshold. Low risk groups will be transferred to have questions assessed and answered. High risk groups will be transferred to case managers for initial data entry into the registry, and assessed for any immediate medical needs. Local healthcare providers should also be advised to document or code any radiological exposure for future registry inclusion. Local community agencies and partners should be invited to assist in information dissemination. Partnerships should also be established at the local, state and federal levels for effective collaboration. Communication strategies need to account for multi-lingual and multi-cultural barriers, and incorporate Functional Need Support Services (FNSS). Communication of inclusion and exclusion criteria should also consider trans-border populations that may travel frequently and special populations, such as those that are off the grid. Communication will also need to highlight clearly defined exclusion criteria to minimize initial fear and panic among the public. In regards to long term monitoring, social support via a webpage or app, should be interfaced to assist in providing a communicative outlet, tracking signs and symptoms, and connecting clients to any additional social and behavioral health services. Finally, in long term monitoring, registry inclusion will need to be supported with staffing and resources so that program implementation can ensure populations are being tracked efficiently and effectively.

**Communicating Health Monitoring Following the Salisbury Nerve Agent Attack**

*Brooke Rogers, King’s College London*

Public responses can impact the effectiveness of emergency response plans and procedures. Communication with the public before, during, and after extreme events can inform their understanding and perception of the event itself, as well as the official steps taken to mitigate the impacts. In turn, communication informs public behaviour, leading to actions or inaction that increase or decrease the likelihood of negative health outcomes. This presentation will provide evidence to illustrate the potential of public responses to extreme events to impact emergency response, identify the role that risk communication can play in informing public responses, and explore the public communication approaches for two UK-based case studies. The first case study focuses on the poisoning of Alexander Litvinenko in London in 2006. This includes an exploration of the impact of communication on the uptake of health monitoring for potentially exposed members of the public. The second case study reviews the recent Novichok poisonings in Salisbury (4th March 2018) and Amesbury (30th June 2018). This includes identification of the number of individuals assessed and/or treated, discussion of primary public
health concerns, and provides examples of the official and unofficial communication taking place. With this evidence in mind, recommendations will be made with a view to improving the effectiveness of communication about public health and public health monitoring during contamination events.

**Social Media Monitoring**  
*Tamer Hadi, NYC Department of Health and Mental Hygiene*

Social media monitoring is an essential capability for any emergency response and recovery operation. The value of social media lies not only in the capacity to rapidly communicate official and critical incident information, but as a rich source of incoming data that can be gathered to strengthen future risk communication as well as inform leadership decision-making. This presentation will focus on the importance of social media monitoring during the recovery phase of a radiological or nuclear incident and specifically from the initial announcement of a long-term health registry over the course of time. Additional strategies to improve monitoring over time, while strengthening trust with community partners will also be discussed.

Also see:


STATEMENT ON SEXUAL HARASSMENT AND OTHER PROHIBITED TYPES OF HARASSMENT

The purpose of this statement is to define sexual harassment and other types of harassment prohibited by law, communicate the policy of the National Academies and ensure that violations are addressed effectively. This statement applies to all employees of the National Academies at all locations, Academy members and participants engaged in National Academies’ activities, contractors, vendors and sponsors.

STATEMENT

The National Academies are committed to maintaining a workplace that is free of instances of harassment covered by this policy statement. We expect managers, supervisors, employees, volunteers, Academy members and others engaged in the work of the National Academies to understand the responsibility that we have to maintain a work environment free of harassment and intimidation. We all share the institutional responsibility to not commit harassing acts, to not tolerate or ignore those of others and to avoid knowingly placing others in situations where they may be harassed.

Sexual Harassment is unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature when submission to or rejection of this conduct explicitly or implicitly affects an individual's employment, unreasonably interferes with an individual’s work performance or creates an intimidating, hostile or offensive work environment.

Other types of harassment prohibited by law include any verbal or physical conduct directed at a individuals or groups of people because of their race, ancestry, creed, ethnicity, color, national origin, sex, sexual orientation, gender identity, age, religion, physical or mental disability, medical condition, marital status, family responsibilities, genetic information, political affiliation, personal appearance, matriculation, military status, veteran status, or any other characteristic protected by applicable laws, when submission to or rejection of this conduct explicitly or implicitly affects an individual’s employment, unreasonably interferes with an individual’s work performance or creates an intimidating, hostile or offensive work environment.

Compliance with this statement is required in all settings and locations in which work and activities are conducted, including committee meetings, workshops, conferences, and other work and social functions where employees, volunteers, sponsors, vendors, or guests are present. All incidents of harassment or inappropriate sexual conduct must be reported regardless of their seriousness.

REPORTING PROCEDURES

Employees

If an employee believes that he or she has witnessed or been subjected to sexual harassment or any other form of harassment covered by this policy, the employee should:

- If comfortable doing so, feel free to make their unease and/or disapproval directly and immediately known to the harasser; and
- Report the incident to the Office of Human Resources.

Supervisors/ Managers

Supervisors and managers must deal expeditiously and fairly with allegations of harassment within their departments, whether or not there has been a written or formal complaint. Supervisors must:

- Act promptly and report the incident to the Office of Human Resources.
- Supervisors who knowingly allow or tolerate sexual harassment are in violation of this statement and subject to discipline.

Academy Members/Participants in National Academies' Activities

If comfortable doing so, Academy members and participants in National Academies’ activities are encouraged to report any incident of harassment by making their unease or disapproval directly and immediately known to the individual. They are also urged to:
• File a complaint with the Office of Human Resources under the Resolution Procedures section of this statement, or
• Report the incident to an employee involved in the activity in which the member or volunteer is participating, who
  will then file a complaint with the Office of Human Resources.

**Employee Relations Manager, Office of Human Resources**

The Employee Relations Manager, of the Office of Human Resources is responsible for:

• Ensuring that both the employee filing the complaint and the individual accused of engaging in the harassment
  are aware of the seriousness of a harassment complaint;
• Explaining the National Academies’ position as it relates to harassment and investigation procedures to all
  involved in the investigation;
• Exploring means of resolving harassment complaints and
• Arranging for an investigation of the alleged harassment and making recommendations for remedial actions as
  appropriate.

**RESOLUTION PROCEDURES**

All incidents of harassment covered by this policy should be reported. To initiate an investigation into an alleged
violation of this statement, employees may file a harassment complaint with the Office of Human Resources.

Complaints should be filed as soon as possible after an incident of alleged harassment. The Office of Human
Resources will investigate the alleged violation in consultation with the Office of the General Counsel.

To ensure the prompt and thorough investigation of the alleged harassment complaint, the complainant should
provide as much of the following information as is possible:

• Name, department, and role of the person or persons allegedly causing the harassment;
• Description of the incident(s), including the dates, locations and the presence of any witnesses;
• Alleged effect, if any, of the incident(s) on the employee's job title, salary, benefits, promotional opportunities or
  other terms or conditions of employment;
• Names of other employees, if any, who might have been subject to the same or similar harassment;
• Steps the employee has taken to try to stop the harassment and
• Any other information the employee believes to be relevant to the harassment complaint.

If an investigation results in a finding that an individual has violated this statement, the National Academies will take
the actions necessary to protect those involved in its activities from any future harassment, including in appropriate
circumstances the removal of an individual from current National Academies activities and a ban on participation in
future activities.

Employees who violate this statement are subject to appropriate discipline. If an investigation results in a finding that
this statement has been violated by an employee, disciplinary actions will be taken in accordance with the
Progressive Discipline Policy, up to and including termination of employment.

**CONFIDENTIALITY**

All inquiries, complaints, and investigations are confidential, and information is revealed only on a need-to-know
basis. Information contained in a complaint is kept confidential. All individuals involved in the investigation are advised
that retaliation against an employee who has made a complaint is a violation of this statement and applicable law.
Other steps as appropriate may be taken to protect the employee from the potential for further harassment during an
investigation. No record of a complaint is kept in the employee’s personnel file.

All information pertaining to a harassment complaint or investigation is maintained by the Employee Relations
Manager in secure files. The Employee Relations Manager is responsible for explaining the procedures for handling
information related to harassment complaints and investigations to all of the individuals involved in an investigation of
a complaint.

**OTHER AVAILABLE PROCEDURES AND ADMINISTRATION**

At any time, an employee may exercise his or her legal prerogative of filing a formal complaint with the relevant
federal government agencies, the D.C. Office of Human Rights, or both. Nothing in the procedures summarized above
precludes or diminishes the right of formal complaint.
Helpdesk: x3430

Comments, compliments, complaints? Contact us via email

The National Academies of Sciences, Engineering, and Medicine
500 Fifth Street, NW | Washington, DC 20001 | T. 202.334.2000

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