Management of Legionella in Water Systems

Committee

Joan B. Rose

Chair

JOAN B. ROSE (NAE) is a professor at Michigan State University and holds the Homer Nowlin Chair in Water Research. She serves as the Co-Director of the Center for Advancing Microbial Risk Assessment, which addresses evidence based risk assessments for management of waterborne pathogens. Dr. Rose is an international expert in water microbiology, water quality, and public health safety and has published more than 300 manuscripts. For more than 20 years, she has been involved in drinking water investigations of waterborne outbreaks and is well known for her work on the waterborne outbreak of Cryptosporidium in Milwaukee. She is a pioneer in the emerging science of viral metagenomics—sequencing virus DNA in water sources, discharges, and shipping ballast using next-generation high-throughput technology. Her global activity includes investigation of waterborne disease outbreaks and the study of water supplies, treatment, and reclamation. Her applied research interests include study of microbial pathogens in recreational waters and climatic factors impacting water quality. Dr. Rose recently won the Stockholm Water Prize and is a member of the National Academy of Engineering. She is a member of the Great Lakes Science Advisory Board for the EPA. She has served on numerous boards and committees of the National Academies and is currently a member of the Board on Environmental Studies and Toxicology. Dr. Rose earned her B.Sc. from the University of Arizona, her M.S. from the University of Wyoming, and her Ph.D. from the University of Arizona, all in microbiology.

Nicholas J. Ashbolt

Member

NICHOLAS J. ASHBOLT is the Alberta Innovates-Health Solutions Translational Health Chair in Infectious Diseases at the University of Alberta School of Public Health. He was previously a senior research microbiologist in the Office of Research and Development at the U.S. Environmental Protection Agency. Before that, he was the head of the School of Civil and Environmental Engineering at the University of New South Wales, Sydney, where he was a professor and deputy director of the Centre for Water and Waste Technology. He has also been the principal scientist at the Sydney Water Corporation, Australia. Since 2000 he has specifically worked on detecting Legionella within piped water system biofilms, developed the first quantitative microbial risk assessment (QMRA) model to identify critical concentrations and prioritize research needs for future Legionella risk assessments and management, and is working on drinking water safety plans for Legionella in Alberta. Over the past 20 years, he has worked on joint Australian and European programs to develop methods to interpret pathogen data with the aid of QMRA within an urban water sustainability framework. This work has contributed to the risk-based approach adopted in the most recent Australian and World Health Organization guidelines for recreational water use, drinking water, and water reuse. Dr. Ashbolt received his B.Ag.Sc. and his Ph.D. in microbiology from the University of Tasmania.

Ruth L. Berkelman

Member

RUTH L. BERKELMAN (NAM) is the Rollins Professor in the Department of Epidemiology with joint appointments in the Department of Global Health and the Emory School of Medicine. She is also senior associate faculty in the Emory Ethics Institute. Formerly the deputy director of the National Center for Infectious Diseases at the CDC, she retired in 2000 from the US Public Health Service as an Assistant Surgeon General. She has served on various committees and boards including the Public and Scientific Affairs Board of the American Society for Microbiology, the HHS National Biodefense Science Board, the NRC Board of Life Sciences and the Princeton University Board of Trustees. Since joining Emory University in 2000, she has enjoyed learning and investigating diverse areas of public health. With support from the Alfred P. Sloan Foundation, she worked with others to organize a public health conference on legionellosis in 2016, the first such gathering in 25 years. Following graduation from a public high school in Atlanta, she attended Wake Forest University and then transferred to Princeton University where she received her A.B. degree followed by an MD at Harvard Medical School. She is board certified is pediatrics and internal medicine.

Bruce J. Gutelius

Member

BRUCE J. GUTELIUS is the medical director of the Enterics, Waterborne, and Health Education Unit at the Bureau of Communicable Disease within the New York City Department of Health and Mental Hygiene (DOHMH). Dr. Gutelius has over 10 years of experience in public health at both the state and local level with expertise in infectious disease and chronic disease epidemiology and public policy. In his current role, he oversees disease surveillance and outbreak investigations for foodborne and waterborne diseases including the 200-400 cases of legionellosis that occur in New York City each year. He has led the development of the NYC DOHMH's protocols for disease surveillance and response to legionellosis clusters including standard approaches to data collection, analysis, and reporting; prioritization of interventions; interpretation of clinical and environmental testing; provision of logistical support; and development of communications materials for medical providers, building owners, elected officials, the media, and the public. He oversees the NYC DOHMH's on-going collaboration with the CDC to assess the effectiveness of New York City's cooling tower regulations in preventing environmental contamination and human disease related to Legionella. Dr. Gutelius received clinical training in internal medicine at the University of Rochester and in clinical endocrinology at the University of Pittsburgh. He holds a B.S. in biology from Oberlin College, a M.P.H. from the University of Pittsburgh, and an M.D. from Albany Medical College.

Charles N. Haas

Member

CHARLES N. HAAS is the L. D. Betz Professor of Environmental Engineering and head of the Department of Civil, Architectural, and Environmental Engineering at Drexel University where he has been since 1991. He also has courtesy appointments in the Department of Emergency Medicine of the Drexel University College of Medicine and in the School of Public Health. He has served on the faculties of Rensselaer Polytechnic Institute and the Illinois Institute of Technology prior to joining Drexel. He co-directed the U.S. EPA/DHS University Cooperative Center of Excellence – Center for Advancing Microbial Risk Assessment (CAMRA). He is a fellow of the International Water Association, American Academy for the Advancement of Science, the Society for Risk Analysis, the American Society of Civil Engineers, the American Academy of Microbiology, and the Association of Environmental Engineering and Science Professors. He is a Board Certified Environmental Engineering Member by eminence of the American Academy of Environmental Engineers. For over 35 years, Professor Haas has specialized in the assessment of risk from and control of human exposure to pathogenic microorganisms and, in particular, the treatment of water and wastewater to minimize microbial risk to human health. Professor Haas has served on numerous committees of the National Academies and is a past member of the Water Science and Technology Board and the U.S. EPA Board of Scientific Counselors. He has worked on developing risk assessment models for Legionella, occurrence in engineered water systems, and disinfection in water systems. He received his B.S. in biology and his M.S. in environmental engineering from the Illinois Institute of Technology, and his Ph.D. in environmental engineering from the University of Illinois at Urbana-Champaign.

Mark W. LeChevallier

Member

MARK W. LECHEVALLIER is the principal and manager of Dr. Water Consulting, a part-time consulting business, after retiring from American Water at the end of 2017. Dr. LeChevallier received his Bachelor of Science and Masters degrees in microbiology from Oregon State University, and his Ph.D. in microbiology from Montana State University. He has authored over 300 research papers and has received awards from the American Water Works Association for outstanding contributions to the science of water treatment. Dr. LeChevallier was the recipient of the George Warren Fuller award in 1997 from the New Jersey section of the American Water Works Association, and the Abel Wolman Award in 2012 and the A.P. Black award for research in 2015, both from the American Water Works Association. His research areas have included bacterial regrowth, disinfection of biofilms, corrosion, AOC measurement techniques, biological treatment, Mycobacterium, Legionella, microbial recovery and identification, modeling and impact of pressure transients on water quality, and detection, treatment and survival of Giardia and Cryptosporidium. He is a fellow of the American Academy of Microbiology.

John T. Letson

Member

JOHN T. LETSON is vice president of plant operations at Memorial Sloan Kettering (MSK) Cancer Center. He is a facilities operations executive experienced in all aspects of organizational management, compliance, technical engineering, and operations as they apply to infrastructure, construction, and renovations in research and healthcare environments. He started at MSK in 1999 as manager of plant operations and held multiple positions before being promoted to VP in 2013. He is now responsible for all plant and facilities operations and MSK skilled trade groups throughout the enterprise. Graduating from SUNY Maritime College with a B.E. in naval architecture and marine engineering, he worked for 17 years for a major oil company’s marine transportation department followed by 5 years in construction and property management. While at MSK, he earned an M.B.A. from Hagan School of Business at Iona College. He is a founding member of MSK Green Team–leading energy related initiatives and supporting sustainability. Mr. Letson is the author of MSK’s Legionella monitoring, prevention, and control policies, procedures, and plans.

Steven A. Pergam

Member

STEVEN A. PERGAM is an associate member in both the Clinical Research Division and the Vaccine and Infectious Disease Division of the Fred Hutchinson Cancer Research Center. He is also an associate professor in the Department of Medicine, Division of Allergy and Infectious Diseases, at the University of Washington and an adjunct associate professor in the Department of Epidemiology, School of Public Health, University of Washington. He serves as the Medical Director of Infection Prevention and is an attending physician at the Seattle Cancer Care Alliance. Dr. Pergam focuses his research on the prevention and treatment of infections among immunocompromised patients and has expertise in infection prevention and hospital epidemiology among cancer and transplant patients. He has lectured, published, and mentored students on the prevalence and diagnosis of Legionella infections in this population. He serves on numerous national committees including the CDC's Advisory Committee on Immunization Practices and the National Comprehensive Cancer Network Committee on the Prevention and Treatment of Infections in Cancer. He is an associate editor of Current Opinions in Infectious Disease and BMC Infectious Diseases. In 2014, he was elected to be a fellow of the Infectious Disease Society of America. He received his B.A. from Dartmouth, his M.D. from the University of Nebraska, his infectious diseases fellowship training at the University of Washington, and his M.P.H. from the University of Washington, School of Public Health.

Michele Prevost

Member

MICHÈLE PRÉVOST is the Industrial Chair on Drinking Water of the National Science and Engineering Council of Canada at the Department of Civil Engineering of Polytechnique Montreal. Dr. Prévost's research has focused on source water protection, water treatment (including disinfection), and various aspects of distribution systems (lead control, biostability, pathogen regrowth, integrity and intrusion, data mining, and hydraulic and water quality modeling). Recently, she has directed the multi-university utility partnership initiative to reduce lead at the tap through a suite of laboratory, field, and epidemiological studies in Canada. She was a member of the technical advisory committee to the Walkerton Commission and presided the Quebec RESEAU Advisory Committee on Drinking Water Regulations for 12 years. In 2016, Dr. Prévost received the A. P. BLACK Award of the American Water Works Association for outstanding research contributions to water science and water supply rendered over an appreciable period of time. In the last 5 years, Dr. Prévost has secured funding to expand collaborative research activities with health care facilities to assist them with emerging water quality issues caused by premise plumbing. She received her B.Sc. in renewable resources from McGill University, her M.A.Sc. in environmental and civil engineering from Ecole Polytechnique de Montréal, and her Ph.D. in civil engineering from Polytechnique Montréal.

Amy Pruden

Member

AMY PRUDEN is the W. Thomas Rice Professor of Civil and Environmental Engineering at Virginia Tech. Her research focuses on bringing a microbial ecological perspective to understanding and advancing design and management of environmental systems. Pruden is a leading expert on water-based pathogens and antibiotic resistance. In 2012-2013, she led a Water Research Foundation expert workshop and report on Opportunistic Pathogens in Premise Plumbing: Epidemiology, Microbial Ecology, and Engineering Controls, in which a multi-stakeholder framework for public health protection was developed. Her current research, funded by The Alfred P. Sloan Foundation, focuses on how engineering design shapes the composition of the microbiome of tap water and implications for control and spread of Legionella, Naegleria fowleri, and antibiotic resistance genes. She has authored over 100 peer-reviewed scientific journal articles including 30 papers in the previous five years focused on Legionella and other opportunistic pathogens. Dr. Pruden is the recipient of the Presidential Early Career Award in Science and Engineering and the Paul L. Busch Award for innovation in water research. She holds a B.S. in biology and a Ph.D. in environmental science, both from the University of Cincinnati.

Michele S. Swanson

Member

MICHELE S. SWANSON is a professor of microbiology and immunology in the University of Michigan Medical School, where she is also the Director of the Office of Postdoctoral Studies. Dr. Swanson’s primary research interest is investigating the mechanisms that govern the innate and adaptive immune responses when macrophages ingest microbes, using Legionella pneumophila growth in macrophages as a model system. Currently, her lab is investigating whether changes in the chemistry of Flint, MI’s water supply altered persistence or virulence of Legionella pneumophila. She is also investigating Legionella as part of two other projects—one on microbial water quality in domestic hot water supply and recirculation systems and the other on enhanced disease surveillance and environmental monitoring. She was previously a research fellow at the Howard Hughes Medical Institute, Tufts Medical School, and the American Cancer Society. Dr. Swanson was recently elected president of the American Society for Microbiology. She is co-host of the podcast This Week in Microbiology and co-author of the ASM Press textbook Microbe. She received a B.S. in biology from Yale University, her M.S. in genetics from Columbia University, and her Ph.D. in genetics from Harvard University.

Paul W. van der Wielen

Member

PAUL W.J.J. VAN DER WIELEN is a principle scientist at KWR Watercycle Research Institute and guest researcher at the Laboratory of Microbiology at the Wageningen University. As head of the biological activity research group at KWR, he focuses on biological stability of drinking water, growth of opportunistic pathogenic microorganisms in water, (micro)biological processes in drinking water treatment, and microbial ecology in drinking water. He uses the latest state of the art methods like next generation sequencing to resolve microbial interactions in man-made water systems and to study the effect of measures to control microbial processes in these systems. Before working in the field of drinking water microbiology, he investigated the microbial ecology of the gastrointestinal tract, deep hypersaline lakes, and marine sediment. His work on Legionella at KWR focuses on the influence of water quality, pipe materials, and taps on growth of Legionella pneumophila and method development to detect L. pneumophila. He is co-editor of Microbial Growth in Drinking-Water Supplies published by IWA Publishing in 2014. Dr. van der Wielen holds a M.Sc. in microbial ecology from the University of Groningen and a Ph.D. in microbial ecology from the Utrecht University in 2002.

Lan Chi N. Weekes

Member

LAN CHI NGUYEN WEEKES is the director of physical resources at La Cité in Onttawa, Canada. She was previously the senior mechanical engineer and one of the founders of InAIR Environmental Ltd. where she was involved in evaluating Legionella risk and creating management plans for building water systems in Canada, as well as addressing other indoor environmental quality issues such as thermal comfort, biological contaminants, and drinking water quality. Mrs. Weekes has presented on the topic of Legionella in building water systems at the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) and Indoor Air Quality Association (IAQA) conferences as well as publishing articles in ASHRAE and the Canadian Consulting Engineers Journals. She is currently helping to revise sections of the Canada Building Code to address potential Legionella issues in HVAC systems. Mrs. Weekes is an author of the HVAC inspection section of the American Industrial Hygiene Association’s Recognition, Evaluation, and Control of Indoor Mould book. She holds a B.M.E. from L'Ecole Polytechnique of Montreal and a M.A.Sc. (building environment) from Concordia University.