NATIONAL WATER RESEARCH INSTITUTE

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MARK SOBSEY TO RECEIVE 2016 NWRI CLARKE PRIZE: UNC Gillings School of Global Public Health Professor Honored for Research Contributions to the Microbiological Safety of Water

FOUNTAIN VALLEY, Calif. – The National Water Research Institute (NWRI) is pleased to announce Mark D. Sobsey, Ph.D., will be the twenty-third recipient of the NWRI Athalie Richardson Irvine Clarke Prize for excellence in water research. Sobsey is the Kenan Distinguished Professor of Environmental Sciences and Engineering in the Gillings School of Global Public Health at the University of North Carolina at Chapel Hill (UNC).

Consisting of a medallion and $50,000 award, the NWRI Clarke Prize is awarded each year to recognize research accomplishments that solve real-world water problems and to highlight the importance and need to continue funding this type of research. Sobsey's leadership and contributions to the fields of environmental health microbiology, virology, and water sanitation and hygiene were among the reasons cited for his selection as the 2016 recipient. "Professor Sobsey is an outstanding choice for the Clarke Prize," said Jeff Mosher, Executive Director of NWRI. "His research has resulted in tremendous advancements in the water industry, particularly in minimizing the risk of exposure to waterborne disease."

A microbiologist and environmental health scientist by training, Sobsey has worked nationally and globally for 45 years to improve water quality and protect public health. He has led groundbreaking efforts to understand, detect, and control waterborne viruses (such as norovirus and Hepatitis A and E viruses), bacteria, and parasites, and his work has directly influenced the development of guidance and policies by prominent public health safety organizations like the U.S. Environmental Protection Agency (EPA), Centers for Disease Control and Prevention (CDC), and World Health Organization (WHO).

Among his most notable achievements, Sobsey's work on methods to concentrate and examine viruses (including fecal indicator viruses) in groundwater has become the standard for the water industry. For example, he developed an innovative filtration technique – known as the MDS filter – that was more practical and effective than conventional filters and, ultimately, helped develop a better understanding of the occurrence, concentration, and public health significance of viruses in the environment. His work in this area informed the analytical method used for viruses in the EPA's *Ground Water Rule*, which standardized practices in the U.S. to detect and control the presence of microbial pathogens (particularly viruses) in well water.

In addition, Sobsey's efforts to develop improved methods to detect and control numerous waterborne viruses influenced the *Surface Water Treatment Rule* (SWTR) under the EPA's *Safe*

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Drinking Water Act. A key question during the development of the SWTR was what requirements were needed to inactivate viruses (that is, chemically alter viruses so they cannot cause infection) found in water supplies from sources like lakes and rivers. The answer turned out to be CT values, which describe the disinfectant concentration (C) multiplied by contact time (T) needed to inactivate viruses. CT values were established for virus inactivation within the SWTR and subsequent *Enhanced Surface Water Treatment Rule* and *Long-Term Enhanced Surface Water Treatment Rules*. These values are derived largely from the meticulous experiments and comprehensive studies of various viruses and chemical disinfectants conducted in Sobsey's laboratory.

Among his more recent work, Sobsey was awarded a pilot research grant in 2015 to evaluate waterborne highly antibiotic resistant bacteria (ARBs), considered "superbugs," in Nicaragua and North Carolina. As part of this effort, Sobsey's team is developing simple, direct culture-based methods to detect and quantify fecal ARBs that cause infections and illnesses in hospital patients and are being released into the environment through hospital sewage. These ARBs include types of *E. coli* and *Klebsiella pneumoniae*. The goal is to establish methods to track these ARBs through sewage treatment, in discharged sewage effluents, and into the environment, as the basis of a monitoring system for global surveillance by WHO and other cooperating international health agencies. Dr. Sobsey also was funded by the National Science Foundation (NSF) in 2015 to investigate how long the Ebola virus and other high-risk viruses can survive in feces and raw sewage from hospitals, and the best means to inactivate them onsite by chemical disinfection.

A dedicated humanitarian, Sobsey actively works with governments and NGOs to develop low-cost drinking water treatment options at the household level in rural or less developed areas. In Cambodia, for example, where many lack access to improved drinking water sources and diarrheal diseases are widespread, Sobsey and his team tested and modified several types of ceramic filters for the reduction of waterborne pathogens. As a result, a locally produced, low-cost ceramic filter was implemented by several NGOs, and over 100,000 households in Cambodia now use them for drinking water treatment. Similar efforts are underway in other countries.

Another of Sobsey's innovations was the development of a simple, self-contained, portable test – called the "compartment bag test" – to determine if water is fecally contaminated with *E. coli* bacteria. The test involves placing a water sample and user-friendly bacteriological medium (one that is not boiled or autoclaved, and can be incubated at ambient temperatures typical of tropical environments) within a plastic bag with internal compartments, incubating it overnight, and then examining each bag compartment for a distinct color change to determine the growth and/or concentration of *E. coli*. If bacteria are present at unsafe levels (per the WHO Guidelines for safe drinking water), users either can treat the water or find an alternative water source. The test is designed to be affordable for communities in developing regions and after natural disasters like floods. Notably, the test has influenced the United Nations to include a water quality goal as part of its Sustainable Development Goals to improve the lives of people everywhere.

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The Clarke Prize will be presented to Sobsey on Thursday, November 3, 2016, at the Twenty-Third Annual NWRI Clarke Prize Lecture and Award Ceremony, to be held in Newport Beach, California. He will receive the award from James Irvine Swinden and Morton Irvine Smith, grandsons of NWRI's co-founder, the late Athalie Richardson Irvine Clarke. The award ceremony will precede the annual NWRI Clarke Prize Conference on Urban Water Sustainability, featuring a mix of leading-edge research by academics complimented with practical case studies by industry practitioners.

"The award of the Clarke Prize to Mark Sobsey," said Dr. George Tchobanoglous, Professor Emeritus of the University of California Davis and Chair of the Clarke Prize Selection Committee, "is in recognition of an illustrious career hallmarked by fundamental inquiry, the development of analytical methods and techniques, and the application of research findings and scientific principles to the solution of practical environmental problems."

Established in 1993, the Clarke Prize is one of only a dozen water prizes awarded worldwide and has been distinguished by the International Congress of Distinguished Awards as one of the most prestigious awards in the world. Recent past recipients of the Clarke Prize include environmental engineer Dr. John C. Crittenden of Georgia Institute of Technology (2015) and civil and environmental engineer Dr. David L. Sedlak of the University of California, Berkeley (2014). In addition, fellow UNC professor Dr. Phillip C. Singer – who received the Clarke Prize in 2006 – nominated Sobsey for the award.

"I am thrilled to be the 2016 Clarke Prize recipient," said Sobsey. "It is a great honor to receive this prestigious prize and join such a distinguished group of past recipients. I hold these colleagues in the highest regard for their outstanding research and practice contributions to the water field, and am humbled and pleased to be counted among them."

More information about the NWRI Clarke Prize Conference and Award Ceremony can be found at **www.clarkeprize.com**.

The National Water Research Institute (NWRI) was founded in 1991 by a group of Southern California water agencies in partnership with the Joan Irvine Smith and Athalie R. Clarke Foundation to promote the protection, maintenance, and restoration of water supplies and to protect the freshwater and marine environments through the development of cooperative research work. NWRI's member agencies include Inland Empire Utilities Agency, Irvine Ranch Water District, Los Angeles Department of Water and Power, Orange County Sanitation District, Orange County Water District, and West Basin Municipal Water District. Please visit www.nwri-usa.org for more information.

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