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## Supporting Local Health Departments and Partners to Prepare for and Respond to Water Emergencies

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Access to safe water is critical for protecting public health, and the United States is generally recognized as having one of the most reliable and safest drinking water supplies in the world.<sup>1,2</sup> Under the Safe Drinking Water Act, instituted by Congress in 1974, the US Environmental Protection Agency ensures and protects the quality of the public drinking water supplies nationwide by setting standards and regulating contaminants.<sup>3</sup> More than 300 million Americans, approximately 94% of the US population, get their water from a community water system, with an average American family using more than 300 gallons of water per day at home.<sup>4,5</sup>

Although the quality of drinking water in the United States remains high, water contamination can still occur, caused by pathogens, chemicals, toxins, natural disasters, or infrastructure failure. Because of the United States' aging water infrastructure, in addition to severe weather events and accidents, approximately 240 000 water main breaks occur each year, resulting in loss of service and drinking water advisories.<sup>6</sup> Drinking water–associated contamination, outbreaks, and emergencies can lead to adverse health effects, including gastrointestinal and respiratory illnesses, chronic diseases, and neurological disorders; each of these events activates a public health response. It is difficult to quantify the public health impacts related to water emergencies and outbreaks. The Centers for Disease Control and Prevention (CDC) has maintained surveillance for waterborne disease outbreaks since 1971. While these outbreaks are likely underreported, a total of 42 drinking water–associated outbreaks were reported between 2013 and 2014, resulting in 1006 cases of illness, 124 hospitalizations, and 13 deaths.<sup>7</sup>

Local health departments work to ensure the health and well-being of their communities and are in the forefront of preparing for, and responding to, public health emergencies. When water-associated outbreaks and emergencies occur, local health departments work alongside local and national partners, including local governments, water utility companies, and emergency management agencies, to effectively communicate with the public and to assess, prevent, and remediate the potential public health impacts. If these events are

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not preceded by sufficient planning, training, and exercises, the rapidity and efficiency of response by local authorities are compromised. Coordinated emergency response and risk communication between local health departments and community-wide partners is crucial for providing clear guidance on preventive measures and ensuring the health of the population.

Recent events have raised concern about the readiness of local public health agencies and partners to respond to water emergencies that threaten community health. Communities across the United States responded to severe water contamination issues due to lead, cyanotoxins, *Legionella*, perfluorinated compounds (eg, PFOA, PFAS), *Naegleria fowleri* (“brain-eating” ameba), and *Cryptosporidium* that have resulted in residents’ mistrust of the safety of the drinking water. Interruptions in water systems (eg, pipe breaks) of multiple cities caused millions of residents and businesses to lose water access and boil their water for days because of possible contamination. During the 2017 hurricane season, Hurricanes Harvey, Irma, and Maria caused widespread devastation in multiple states and territories, challenging emergency and public health agencies to respond to severe floods, lack and contamination of drinking water, and nonfunctioning wastewater systems. The severity and frequency of these events are expected to increase with a changing climate and aging water infrastructure.

## NACCHO’s Role in Water Preparedness and Response

Recognizing the current challenges in water emergency preparedness and response, the National Association of County and City Health Officials (NACCHO), in collaboration with CDC, established in 2017 the Water, Sanitation and Hygiene (WASH) Emergency Preparedness and Response Workgroup. This group comprised local health departments, academic institutions, and federal agencies that have recently been engaged in complex water emergencies or have worked on water preparedness activities in their jurisdictions. The purpose of this workgroup is to identify common challenges faced in water preparedness and develop tools and resources that can be used to protect the health of community members.

With the support and input of the WASH workgroup, NACCHO developed the WASH Emergency Preparedness and Response Toolkit within NACCHO’s online Toolbox to increase access to tools related to WASH preparedness among local health departments. During the 2018 Preparedness Summit in Atlanta, Georgia, NACCHO, with the support of CDC, organized and conducted an in-person tabletop exercise (TTX) that simulated a major water main break of a city’s drinking water supply to establish a learning environment for participants to exercise their emergency response plans, policies, and procedures for this scenario. During the TTX and the after action discussion, attendees identified challenges in partnering with other agencies involved in water emergency response (eg, water utility companies and emergency management agencies) and the importance of conducting similar practical exercises at local jurisdictions to evaluate existing emergency response plans and engage cross-sectorial community partners. Building on this exercise, a Regional Drinking Water TTX was conducted in 2019 in the Washington, District of Columbia, metropolitan area.

## Regional Drinking Water TTX in the Washington, District of Columbia, Metropolitan Area

The Washington, District of Columbia, metropolitan area includes the District of Columbia and counties in the states of Maryland and Virginia, encompassing an area of more than 6000 square miles with an estimated total population of more than 6.2 million.<sup>8</sup> As the nation's capital and a major urban center, Washington, District of Columbia, suffers many vulnerabilities that could lead to a water-associated emergency, prompting local health officials to issue a drinking water advisory and requiring a coordinated response effort. Understanding this unique situation, NACCHO and CDC partnered with the Metropolitan Washington Council of Governments (MWCOCG) to collaborate in the development and execution of a Regional Drinking Water TTX related to a water emergency in the Washington, District of Columbia, metropolitan area.

The purpose of this exercise was to provide participants the opportunity to assess their preparedness and response protocols, plans, and capabilities for an emergency where a drinking water advisory is issued. A group of 72 representatives from local health departments, emergency management, water utility companies, and other community stakeholders attended the TTX on July 1, 2019, at the MWCOCG headquarters. The TTX used a major water main break of a city's drinking water supply as the scenario to establish a learning environment for participants to exercise their emergency response plans, policies, and procedures focusing on the importance of partnerships and appropriate communication tools.

The exercise included 4 modules that built one upon another and described the progression of the scenario. Each module included a set of questions that fostered discussion and led participants to make decisions about their response activities and next steps. The exercise included separate group discussions organized by state, and 2 report out sessions with the main group where attendees learned how other jurisdictions would approach the same water emergency challenges. The TTX ended with a hot wash where participants discussed lessons learned, challenges, and recommendations for the future.

This TTX reinforced the importance of timely and transparent risk communication to the public following a water emergency to avoid confusion and widespread panic, as well as strong preestablished partnerships across sectors. Since response to water emergencies involves a group of intersectoral partners, including public health, emergency management, local governments, and water utility companies, it is crucial for each organization to understand all partners' roles and responsibilities so that efforts are not duplicated and responses are more efficient. TTXs provide a unique opportunity for stakeholders to learn from one another and put in practice their respective emergency response plans and protocols so that in the event of a real emergency, partners can make well-informed decisions to ensure the health of the population.

## Future of Local Water Preparedness

Water-associated emergencies and outbreaks will continue to challenge public health and response partners as the US water infrastructure ages, pathogens emerge, chemicals and toxins contaminate water supplies, and weather events become stronger and more frequent. To prepare for such events, local health departments need access to the appropriate planning tools and resources, in addition to implementing hands-on training with intersectoral partners. TTXs are an efficient and effective way of preparing communities for a water-associated emergency. They can be customized to address specific challenges in local water preparedness and be a useful tool for bringing together community stakeholders. NACCHO is committed to continue strengthening local health department capacity and capability to prepare for and respond to water-associated emergencies and will continue developing programs and tools to foster interagency and transdisciplinary partnerships.

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