The National Environmental Health Association (NEHA) represents more than 7,000 governmental, private, academic, and uniformed services sector environmental health professionals in the U.S., its territories, and internationally. NEHA is the profession's strongest advocate for excellence in the practice of environmental health as it delivers on its mission to build, sustain, and empower an effective environmental health workforce.

Policy Statement on Well Water Quality Testing Regulation

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Over 15% of the population relies on a private well as their primary source of drinking water, for which there are no federal water quality requirements. Furthermore, most states do not regulate private well water quality. This lack of regulation leaves testing the well water and ensuring that it is safe to drink largely up to the homeowner. Unfortunately, many well users do not test their water regularly, putting them at risk for potential health effects from contaminated water (Paul et al., 2015). In fact, while disease outbreaks from public water systems have declined between 1971 and 2008, outbreaks from private water sources, such as private wells, have increased (Farquhar, 2018).

NEHA's Policy Statement

NEHA advocates for national, state, and local policies, regulations, research, and resources that will enhance the abilities of environmental health professionals to ensure the safety of private well users to protect public health.

NEHA supports the following policies and actions:

- Implement state and/or local legislation requiring and regulating routine private well water quality testing and making testing conducted under such regulations free or of low cost to well users.
- Mechanisms for determining private well distribution and private well testing distribution within jurisdictions to determine who could be impacted by federally unregulated drinking water.
- Inclusion of local contaminants of concern, either naturally occurring or resulting from land-use activities, in state and local regulations.
- Increased collection of data on contaminants within jurisdictions and assessment of contaminant exposures and water quality issues affecting the community of private well users to better calculate the risks that private well water users are facing in their areas.

- Support federal and state funding for locally operated testing and education programs.

Analysis

Well water can become contaminated from septic systems, agricultural activities, industrial land use such as mining, naturally occurring contaminants in bedrock, and many other sources (Barringer & Szabo, 2006; Bunnell et al., 2006; Cappello et al., 2013). Research has demonstrated the impact of harmful contaminants in water, such as arsenic, which includes elevated risk for certain types of cancer such as bladder, skin, lung, and colorectal cancer (Baris et al., 2016; Mayer & Goldman, 2016; Schullehner et al., 2018; Shiber, 2005). Drinking water contaminated with arsenic, atrazine, and nitrate- nitrite has been associated with adverse birth outcomes such as preterm delivery and low birthrate (Almberg, 2016; Stayner et al., 2017). While there are several strategies to improve voluntary testing rates, they may not be equally available to different populations of well users across state and local regulations, especially those offered for free or at a reduced cost.

The water that most people in the U.S. drink every day from public systems is required to be tested for more than 90 contaminants under the Safe Drinking Water Act and some states require additional water quality testing (U.S. Environmental Protection Agency [U.S. EPA], 2020). Overall, 1 in 9 people in the U.S. drink water that is not regulated at the federal level and might not be regulated or tested at all (Centers for Disease Control and Prevention, 2019). More than 13 million households rely on private wells as their primary source of drinking water, for which there are no federal water quality requirements and most states do not regulate private well water quality (U.S. EPA, 2021). This lack of regulation leaves the responsibility of testing the safety of well water to the homeowner. According to Paul et al. (2015), however, many well users do not test their water on a regular basis even though drinking contaminated water can have serious health consequences.

Examples of health issues manifesting in private well users are plentiful. Well users in northern New England, an area where arsenic-based pesticides were widely used, have a higher risk of bladder cancer. The entire region, including Maine, New Hampshire, and Vermont, has a 20% higher incidence rate than the U.S. overall (Baris et. al., 2016). Similarly, residents living within 1 mile of arsenic contaminated wells in Florida were more likely to be diagnosed with pancreatic cancers than those just 3 miles from the exposure sites (Liu-Mares et al., 2013). Wells owners living in rural areas may face unique contamination risks. When private wells near abandoned mines in rural Washington were tested, the results showed contamination from arsenic, lead, cadmium, and selenium, with concentrations peaking during snowmelt. Rural wells may also have a higher risk of nitrate contamination mainly due to agricultural runoff. In a study conducted in the Sumas-Blaine aquifer in Washington, 29% of wells sampled over the past three decades exceeded the U.S. Environmental Protection Agency's (U.S. EPA) maximum contaminant level (MCL) for nitrate, and in nine counties within North Central and West Central Texas, about 50% of the wells sampled exceeded the MCL (Pennino et al., 2017). Additionally, 20% of private wells in rural areas across the U.S. and Canada were found to have bacteriological contamination that may be associated with an increased risk of acute gastrointestinal illness (Strauss et al., 2001). Federally unregulated drinking water poses different but severe health risks to private well users in the U.S. and a lack of testing makes residents unaware of what their particular risks could be.

Susceptible populations such as infants and young children are at particular risk from well water contamination due to the developmental immaturity of their kidneys and other organ systems, as well as the large quantity of water they consume relative to their body mass. In rural Connecticut a private well connecting to the Brookfield Gneiss, a geologic formation known to contain uranium, resulted in nephrotoxicity in a family's youngest child and elevated uranium levels in 6 of 7 family members. Nearby wells in the area were also found to be contaminated with elevated uranium, arsenic, and radon levels (Magdo et al., 2007). Well water contaminated with nitrate that is used to prepare infant formula is a well-known risk factor for blue baby syndrome, a condition that causes a blue-gray skin color, irritability, lethargy, and can lead to coma or death in serious cases (Knobeloch et al., 2000). Additionally, naturally occurring fluoride in aquifers and bedrock can lead to dental fluorosis in children (Graves et al., 2009).

With 15% of the U.S. population relying on private wells as their primary source of drinking water and approximately 20% of these wells being contaminated at levels above U.S. EPA drinking water standards, ensuring that well water is tested is a critical step to protecting public health (Farquhar, 2018).

Justification

Despite the range of potential health effects, testing behavior among well users varies widely and many do not test their water regularly, if at all (Paul et al., 2015). Specifically, low testing rates have been identified among marginalized African American communities and rural areas where private wells are more frequently used (Fizer et al., 2018; Borsuk et al., 2014). Factors commonly identified as barriers to water quality testing include a lack of awareness about recommended testing guidelines, overreliance on sensory information, and a poor understanding of exposure pathways. A lack of knowledge around the link between septic systems and water contamination and the high cost of testing can also prevent well users from testing their water (Fizer, 2016). Additionally, well users of a lower socioeconomic status are less likely to test due to concerns over the high cost of treating water and potential ramifications for property values if the water is contaminated (Straub & Leahy, 2014). Conversely, knowledge of health risks, available guidance resources, the presence of neighbors who test their water, and existing regulations have been shown to improve the likelihood that well users will voluntarily test (Flanagan et al., 2018; Flanagan et al., 2015). Private water users may be better protected against harmful contaminants if private water testing was regulated in the same manner as private water systems.

The guidance resources offered to well users in different states and localities fluctuate across the country. While some well users might have access to resources such as contaminant fact sheets, maps showing contaminant prevalence, testing schedules, educational programs, and free or reduced cost testing programs, others might not even be aware of the need to test their well water or know how to do so (Schneider, 2019). Even in states and localities that do have strong guidance programs, well users in the community might not receive the information they need for taking appropriate action. In New Jersey, for example, higher testing did occur in areas with a history of testing promotion. The well users in these areas, however, were more likely to test if they had a bachelor's degree and higher income levels (Flanagan et al., 2016). While strong and easily accessible guidance resources are essential to well users who regularly testing their well water, regulations ensure that private wells will be tested at least once and regulations offering free or reduced cost testing would alleviate the financial barriers that keep some well users from testing. NEHA supports efforts to regulate private water and to eliminate barriers to private water testing, such as cost and awareness of the issue, that keep people from testing their private water systems to the extent that they should.

Currently, only 18 out of 50 states have a requirement for well water quality testing. Local regulations vary in type and frequency across the U.S. The most common types of regulations are testing at the time of well construction, at the time of well repair, and before a real estate transaction occurs. For example, New Jersey has a real estate transaction regulation that requires landlords to test the water every 5 years. Michigan requires wells to be tested at the time of construction and after repairs. Other types of regulations can be specific to a certain contaminant and only require wells located in the contaminant zone to be tested. Additionally, local entities such as boards of health may have the authority to require a well to be tested; however, these entities do not frequently use this authority (Schneider, 2019).

Despite their infrequency, private well testing regulations have been shown to make a significant contribution towards exposure reduction among well users (Flanagan & Zheng, 2018). In areas where some well users are not regularly testing their water, well testing regulations could be one of the most useful tools in reaching universal screening. Well testing could also highlight the dangers in drinking water in the U.S. and place a focus on ensuring safe water in affected households (Zheng & Flanagan, 2017). Regulations, coupled with strong guidance programs to ensure regular testing, are a critical way state and local legislatures can protect the health of private well users in their jurisdictions.

The U.S. Geological Survey (USGS) conducts estimates of the number of households relying on private water by a method examining household density with which there is an indirect relationship to the ratio of people using domestic wells. USGS has found that private wells are more likely to be found in rural areas where there is a lower household density and less of a likelihood that households are connected with municipal or public systems. This method was developed due to the lack of a consistent national survey of households that rely on private well water, for which the last survey occurred in 1990 (Johnson et al., 2020). The new method had been developed and relies on U.S. Census Bureau data and as such, USGS has been able to estimate the number of households relying on private wells using 2000 and 2010 census information (Johnson et al., 2020). This lack of a consistent national survey has made not only estimating private well water users a challenge but also locating well water users across the country difficult. A nationally consistent survey of both number and location of private well water users would help to determine where resources and education for the public could be more necessary and in what locations more robust regulation would be necessary.

Access to safe drinking water is provided to many homeowners in the U.S. subject to federal regulation, but a substantial proportion of people get their water from federally unregulated sources. A lack of testing of drinking water poses significant health risks to private well water users and a lack of robust regulation and testing continues to create barriers to safe drinking water access. NEHA advocates for improved mechanisms to determine where such homeowners live and what their particular risks are, as well as supports efforts to improve the health and safety of homeowners who rely on private water systems.

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