



Creating The Healthiest Nation: Water and Health Equity



THE CLEAN WATER ACT

The Clean Water Act establishes the regulations for pollutant discharges into U.S. waters, as well as sets quality standards for surface waters. The Clean Water Act is designed to control sources of pollution, including sewage treatment plants, industrial discharges, stormwater runoff and animal waste lagoons. We know that inadequate protections can lead to increased contaminants, such as microorganisms, nitrates, heavy metals and organic chemicals. These contaminants have been linked to gastrointestinal illnesses, cancer and damage to kidneys and the nervous and reproductive systems. Those most vulnerable to water pollution include infants and young children, pregnant women, the elderly and the immunocompromised.

Safe, accessible water is essential to health. Communities across the United States rely on all levels of government to provide them with clean water and properly treated wastewater. Not only do people need clean drinking water to survive, they also depend upon clean water for recreation, bathing, cooking and cleaning. Unfortunately, our nation's environmental health system does not meet these demands for all people.

Lack of coordination, out-of-date or inadequate policies and regulations and limited funding devoted to water infrastructure, workforce development and retention provide challenges. These problems significantly affect our nation's health and put some communities at a greater disadvantage for achieving their optimal potential. Vulnerable populations, such as children, older adults, communities of color and low-income populations bear a higher burden of water-related health issues.

WATER SOURCE CONTAMINATION

Drinking water can become contaminated and harm human health in various ways. Pollution, poor maintenance and lack of investment in water infrastructure and water management can negatively affect water quality and safety. Water contamination can come from point sources, such as sewage treatment plant discharges, and from non-point sources, such as agricultural runoff.

Lead/lead poisoning

- Incidences of lead in drinking water have increased due to corroding water systems. Lead exposure is linked to developmental and neurological damage. Groups suffering disproportionate lead exposure include children, pregnant women, low-income communities and communities of color. People living in older housing, and those served by delivery systems with lead pipes — especially in areas with soft water — are most at risk for ingesting significant amounts of lead through their drinking water.¹

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Legionella/Legionnaires' disease

- The *Legionella* bacterium is commonly found in lakes and rivers. It can be a cause of concern when found in water building systems, like shower heads, hot tubs or cooling towers.ⁱⁱ People can develop a form of pneumonia known as Legionnaires' disease, as well as Pontiac fever, when they breathe contaminated water — often through droplets of water from large building air conditioning systems or from water used in showering.^{iii,iv}
- Nine out of 10 outbreaks can be avoided by effective water management.^v *Legionella*-contaminated drinking water can be the result of inadequate and aging water systems and water stagnation. Most healthy people do not get sick when exposed to the bacteria. However, those who are older, current or past smokers and with weakened immune systems may be more likely to get sick.^{vi}

PFAS

- Most people have been exposed to per- and polyfluoroalkyl substances (PFAS) — a large class of man-made persistent chemicals, which resist decay, and can accumulate over time — found in industry and consumer products.^{vii,viii,ix}
- PFAS are used in military and industrial sites and at airports and pass through wastewater treatment plants. Releases of PFAS from these sources can contaminate water by surface water runoff, stormwater discharge and leakage — leaching into groundwater that can further contaminate surface water and drinking water wells.^{x,xi}
- Many studies suggest links between PFAS and fetal and childhood developmental delays, decreased fertility, cancer and many other harmful health effects.
^{xii} Infants and children are also especially vulnerable due to their smaller body weight and hand-to-mouth contact with PFAS-contaminated food and dust.^{xiii}
- People who work at or live near military sites, airports, industrial sites and wastewater treatment plants are at higher risk of exposure to PFAS through drinking water. Such sources of contamination are often located in low-income communities.^{xiv}



PRIVATE WELLS

- About one in nine U.S. residents gets drinking water from private wells, yet private wells are not regulated by federal and, oftentimes, state laws. A study released in 2009 by the U.S. Geological Survey found that nearly a quarter of over 1,350 private wells sampled had at least one contaminant that exceeded EPA drinking water standards. (National Conference of State Legislatures. (2018 February). *Unregulated Drinking Water Systems*. Retrieved from: <http://www.ncsl.org/research/environment-and-natural-resources/unregulated-drinking-water-systems.aspx>) and (DeSimone, L.A., Hamilton, P.A., Gilliom, R.J., 2009, *Quality of water from domestic wells in principal aquifers of the United States, 1991-2004, Overview of major findings*: U.S. Geological Survey Circular 1332, 48 p.)
- Private wells are especially susceptible to contamination by chemicals such as nitrates, arsenic and radon, which can be harmful to health and are linked to cancer (U.S. Environmental Protection Agency. (2018, February 23). *Potential Well Water Contaminants and Their Impacts*. Retrieved from: <https://www.epa.gov/privatewells/potential-well-water-contaminants-and-their-impacts>) Exposure to the contaminants can result in gastrointestinal illness, neurological disorders and reproductive problems. (Centers for Disease Control and Prevention. (2015 July 2). *Overview of Water-related Diseases and Contaminants in Private Wells*. Retrieved from: <https://www.cdc.gov/healthywater/drinking/private/wells/diseases.html>)
- According to a study conducted in Wake County, North Carolina, African American neighborhoods that were historically excluded from municipal services in Southern towns remain excluded from nearby community water services. Instead, they receive poorer-quality drinking water from private wells. Residents of these neighborhoods may face an increased risk of gastrointestinal illnesses requiring emergency care. (Stillo, F. and MacDonald Gibson, J. (2017). *Exposure to Contaminated Drinking Water and Health Disparities in North Carolina*. American Journal of Public Health. 107, 180-185. <https://doi.org/10.2105/AJPH.2016.303482>)

AGRICULTURAL RUNOFF

- Agricultural runoff is water that leaves farm fields. Polluted agricultural runoff is a leading cause of pollution in our waterways, groundwater and drinking water.^{xv}
- Agricultural activities that lead to an increase in contaminated runoff include poorly managed animal feeding operations; overgrazing; overworking the land; and ineffective application of pesticides and fertilizer, such as through application of large quantities that cannot fully be absorbed by crops.^{xvi}
- Nutrients, such as nitrogen and phosphorus, are crucial for agriculture, but they also can cause algal blooms, making water unusable for fishing, recreation and drinking and proving fatal for fish.^{xvii}
- Nitrate exposure from fertilizers in runoff has been linked to many negative health outcomes and cancer. Farm workers, rural communities and communities served by private water wells are especially at risk of harmful nitrate health effects.^{xviii}

WATER ACCESS

- About 1.6 million U.S. residents do not have running water or basic plumbing. Communities most at risk are American Indians/Alaska Natives, Latinx living in the rural Southwest, African Americans in the rural South, those living in Appalachia, migrant and seasonal farmworkers and low-income communities.^{xx,xxi}
- Many rural communities of low-income and color do not have access to municipal wastewater systems and are required to pay for and install their own onsite wastewater system, creating barriers to accessing water.^{xxii} For example, approximately 1 in 20 AI/AN households lack working indoor plumbing.^{xxiii} These basic plumbing issues can lead to sewage exposure as it backs up and overflows in yards, streams or houses.^{xxiv} Sewage exposure can lead to many serious waterborne diseases, such as gastroenteritis and infectious hepatitis.^{xxv}
- Increasing costs for water utilities can cause barriers to accessing water, especially in economically distressed cities with declining populations. Those who can't afford the rising costs may have their water shut off or house foreclosed.^{xxvi}
- Past experiences with lack of safe drinking water access can lead people to distrust tap water, particularly in communities of color and low-income communities. Tap water distrust is linked to more bottled water and sugary beverage consumption, which can have negative financial and health impacts.^{xxvii,xxviii}
- Children are particularly vulnerable due to the lack of access to and trust in drinking water in schools. Up to a half of schools in the U.S. do not provide free water for students in cafeterias, and those that do may provide a limited amount.^{xxix}
- Schools are not required by federal law to test their drinking water for lead or other contaminants, which can increase the risk of lead poisoning and other illnesses in children.^{xxx}

CLIMATE CHANGE

- Climate change is predicted to significantly reduce water access and increase flooding, which elevates the risk of water-related diseases and deaths.^{xxxi}
- Frequent droughts may lead to dangerous situations, like dust storms and a higher risk of drought-related infectious disease and pathogens.^{xxxii,xxxiii}
- Increased flooding can overwhelm a region's drainage and wastewater treatment systems and be toxic to people, animals and plants. Sewer overflows are anticipated to increase, and the aging water infrastructure may not be able to withstand the extreme participation, leading to leaching of sewage in the ground.^{xxxiv} After flooding has occurred, people may be exposed to health hazards in the home or businesses. For example, mold growth is likely and drinking water may be contaminated.^{xxxv}
- Those most affected by the impacts of climate change on drinking water include communities of color, low-income rural communities, migrant farm workers and the homeless as these populations currently have unequal access to water infrastructure. Children, pregnant women and the elderly are also vulnerable to the health effects of contaminated water.^{xxxvi,xxxvii}

POOR WATER QUALITY AFFECTS SOME MORE THAN OTHERS

VULNERABLE POPULATION		VULNERABILITY
	COMMUNITIES OF COLOR	<ul style="list-style-type: none"> • Structural racism • Inadequate infrastructure • Health disparities • Lack of social capital • Language barrier in communities where English is a second language
	CHILDREN	<ul style="list-style-type: none"> • Breathe more air and drink more water per body weight than adults • Developing organs and low immunity • Dependent on adults • More time spent outdoors • Play on the floor and put hands and objects in their mouths
	OLDER ADULTS	<ul style="list-style-type: none"> • Low immunity • Pre-existing conditions • Limited mobility
	LOW-INCOME COMMUNITIES	<ul style="list-style-type: none"> • Limited resources and means to evacuate • Inadequate infrastructure

Other groups that are particularly vulnerable to the health impacts of poor water quality include: pregnant women; immigrant groups; the uninsured; American Indians and Alaska Natives; occupational groups, such as workers exposed to extreme weather; and people with disabilities, pre-existing or chronic medical conditions.

RECOMMENDATIONS

Federal agencies

- Develop a national water action plan to address health inequities, climate change and coordination efforts.^{xxxviii}
- Provide necessary capacity-building support through funding or technical assistance to local health and environmental departments to anticipate, recognize, evaluate and remediate high-risk infrastructure and contamination sources.^{xxxix}

Federal, state and local agencies

- Ensure adequate investment in water infrastructure: An estimated \$1 trillion in the next 25 years needs to be invested in water infrastructure just to maintain today's water service levels.^{xl}
- Review, update and systematically enforce primary drinking water standards at all levels of government.^{xli}
- Identify and promote innovative water efficiency programs.^{xlii} These programs would better prepare the nation for droughts and water shortages — two major impacts of climate change.
- Encourage collaboration among health departments and health care providers. To ensure protection at the individual and population levels, primary prevention interventions must be coordinated between health agencies and health care providers, and an evaluation system to monitor environmental hazards must be established.^{xliii}

Local agencies

- Upgrade community water and wastewater treatment systems. Prioritize investments in remediation where the water or wastewater infrastructure poses health risks.
- Actively and continuously engage with community members to identify and plan resources, needs and environmental health priorities.

CONCLUSION

Safe, accessible water and sanitation are human rights that we all need in order to achieve our highest level of health. Yet, some groups of people in the U.S. are less likely to have these rights than others, making them especially vulnerable to serious health conditions, such as neurological disorders, gastrointestinal disease, decreased fertility and cancer. All levels of government and public health organizations must ensure the safety and quality of our water infrastructure to protect the health of all people across our nation.

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