

A Cascade of Impacts: The Many Ways Water Affects Child Development

Learn how communities are taking practical steps to support children's development, health, and well-being.

What surrounds us—and goes into us—shapes our biology, including our brain, immune, and metabolic systems. This is particularly true during the prenatal and early childhood periods when our bodies are especially sensitive to outside influences. Water is a critical part of a child's environment, and disruptions in the availability and quality of water can impact young children's development and health, both in the moment and across the lifespan. Climate change is increasing the frequency and intensity of extreme weather events, leading to more disruptions in clean water access, flooding, displacement, and more.

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[A Cascade of Impacts: The Many Ways Water Affects Child Development](#), the latest working paper from the [Early Childhood Scientific Council on Equity and the Environment](#) (ECSCCEE), explores how water affects children's health, learning, and behavior and how ensuring access to safe drinking water is necessary to support the healthy development of all children. **This Solutions Spotlight offers examples of practical solutions communities are taking to address disparities in access to clean water and navigate climate-related threats such as flooding in their communities.**

Improving Access to Clean Water During Pregnancy & Early Childhood

A young child's organs are developing rapidly, so they require more water than adult organs and are more sensitive to what is in that water. These organs absorb everything in the water we drink, from beneficial nutrients and bacteria to toxic metals, chemicals, viruses, and parasites. This can have lasting implications for children's development. Policy and community initiatives that increase access to clean water can help support development and lifelong health.



Protecting Young Children from Lead Exposure in Childcare Centers

Exposure to lead during early childhood can cause a range of negative impacts on health and learning. To protect young children from these potential harms, North Carolina passed a resolution in 2019 requiring all licensed childcare centers to test for lead in tap water, followed by a 2023 requirement for public schools. The NC Division of Public Health partnered with RTI International, NC Child (a community advocacy group), and the Duke Environmental Law and Policy Clinic to make substantive rule changes to protect public health. The RTI-created Clean Water for Carolina Kids program includes mail-out sample kits and an online portal paired with ample training and communication to identify and eliminate exposure to lead at the tap. If lead is detected, the program helps facilities implement low-cost solutions and understand how to practice clean water habits. By 2022, all licensed childcare centers in the state were tested for lead. The expanded Clean Classrooms for Carolina Kids program is now testing taps at every public school across NC and retesting centers, plus provides mitigation for any tap above the state's lead action level. The initiative's success in North Carolina led to a similar Clean Water for Georgia Kids program in Georgia and the creation of [Clean Water for US Kids](#), which aims to eliminate exposure to contaminants in drinking water where people live, learn, and play.



Improving Clean Water Access for Pregnant People

In New Hampshire, the state is working to limit exposure to heavy metals in drinking water during pregnancy. Some chemicals in drinking water can cross through the placenta to affect a fetus, which has lasting implications for children's development. Recognizing that water testing kits and filtration systems are often inaccessible to low-income communities, the [NH Water Well-Ness Initiative](#) provides free, private well water testing to low-income participants of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). After WIC staff connect with qualifying participants and talk to them about water testing, those households are mailed a free water testing kit and a pre-paid envelope to send the test to a lab. If high levels of heavy metals—such as lead or arsenic—are found in the water, the state mails free water filters to those households. This program is notable in recognizing the importance of improving access to clean water during pregnancy.



Increasing Clean Water Access for Children in Indigenous and Rural Communities

Historical disputes over property rights, town borders, and dispossession of Native lands have resulted in significantly less access to affordable, clean water in Indigenous communities and disenfranchised rural areas. [Agua4All](#) is a nonprofit launched in 2014 by the Rural Community Assistance Corporation (RCAC) in partnership with the California Endowment. Agua4All funds water bottle filling stations and provides reusable water bottles in schools and community centers, with a focus on rural and Indigenous populations. Since its launch, Agua4All has installed 913 water bottle filling stations and distributed over 17,000 reusable water bottles in California. By increasing access to clean drinking water, efforts like this can address the impacts of current and historic discriminatory policies, with significant positive effects on the health and well-being of children in these communities.

Enhancing Climate Resiliency Today & Preventing Future Harm from Climate Change

Climate change is making extreme weather events, like hurricanes and extreme rainstorms, more frequent and more intense. Flooding can affect children's access to clean drinking water by overwhelming the infrastructure we depend on to treat and manage our drinking water and by washing more pollutants into our lakes, rivers, and aquifers. Extreme weather can also displace families or lead to unpredictability and job loss. This can cause anxiety, depression, and post-traumatic stress disorder (PTSD) for children and their caregivers, making it difficult for adults to provide basic needs, like food or housing, as well as responsive caregiving. The following community and policy initiatives can help safeguard children and caregivers from the effects of extreme weather.



Adapting Infrastructure to Reduce the Effects of Extreme Weather

The City of New Orleans and a neighborhood of nonprofit partners called [Umbrella](#) worked together in a low-elevation, low-income neighborhood to install green infrastructure and reduce the threat of flooding. The initiative began by talking to residents in this neighborhood about their needs, hesitations, and the impact green infrastructure could make. With these conversations in mind, the coalition installed 125 trees and 16 rain barrels and replaced 1,300+ square feet of pavement with permeable pavers and gardens. Trees absorb rain primarily through their roots; Rain barrels collect water that runs off roofs; and permeable pavers and gardens allow water to enter the soil below. This installation by Umbrella is enough to prevent 30,000 gallons of water per hour from entering the drainage system. By taking steps to reduce flooding in a community, this coalition is helping to safeguard water infrastructure and prevent children and their caregivers from experiencing flood-related displacement or trauma.



Addressing the Root Causes of Climate Change and Working Toward Fair, Reliable Water Access

In 2021, the Mayor of San Francisco pledged that the city would be carbon neutral by 2040. To create the [2021 climate plan](#), the city hosted 11 public workshops and 11 community presentations, and 1,400 comments were submitted through an online "open house." Now, the city is demonstrating its commitment to drawing energy from renewable sources, including through CleanPowerSF, which provides thousands of businesses and residents with electricity that is approximately 98% greenhouse gas-free. In September 2023, San Francisco added a [water addendum](#) to its climate pledge, recognizing that climate change is affecting water supplies, and that the city needs to take action to ensure a high-quality and reliable water supply into the future. Actions include recycling wastewater from large parks and golf courses and investigating alternative water supplies (including desalination). The city also recognizes that water is a human right and can be unaffordable in many communities. To address this, the city provides [water bill subsidies](#) for low-income residents. Through these efforts, San Francisco is addressing the immediate water needs of residents and working to prevent future harm from climate change, both of which are critical to safeguarding the health and well-being of young children and their caregivers.

→ Read the full paper

For the full paper on which this guide is based, see [A Cascade of Impacts: The Many Ways Water Affects Child Development](#)

[Additional sources consulted in the creation of this Solutions Spotlight:](#)

[Agua4All: Access to safe drinking water in schools and communities](#) – Rural Community Assistance Corporation (RCAC)

[Agua4All program expands to schools and Tribes across California](#) – RCAC

[Agua4All](#) – Rural Community Assistance Partnership Incorporated (RCAP)

[A Green Lining to New Orleans Storm Clouds: How a new nonprofit coalition is teaching neighbors how they can create solutions for flooding in their community](#) – Southeast Sustainability Directors Network

[Case Study Brief: The NH Water Well-Ness Initiative to Protect Pregnant WIC Participants from Contaminants in Private Well Water](#) – Harvard T.H. Chan School of Public Health

[Clean Water for US Kids: Eliminating Lead in Drinking Water Nationwide](#) – RTI International

[‘Clean Water for Carolina Kids’ Program Wins Harvard’s Roy Award for Environmental Partnership](#) – Harvard Kennedy School

[Reduce Regular Flooding and Puddling on your Property](#) – Umbrella

[San Francisco Named Top U.S. Clean Energy City](#) – SF.Gov

[San Francisco’s Climate Action Plan 2021](#) – ClimateSF

[San Francisco Releases Updated Climate Action Plan With A New Chapter Focusing On Water Supply And Conservation](#) – San Francisco Water Power Sewer

[Why NH provides free private well testing for pregnant WIC participants](#) – New Hampshire Bulletin