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ON BEHALF OF THE AMERICAN ACADEMY OF PEDIATRICS

ENVIRONMENT AND PUBLIC WORKS COMMITTEE
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Department of Federal Affairs
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Good morning. I appreciate this opportunity to testify today before the Committee on Environment and Public Works regarding safe drinking water and children's health. My name is Jerome A. Paulson, MD, FAAP, and I am proud to represent the American Academy of Pediatrics (AAP), a non-profit professional organization of more than 60,000 primary care pediatricians, pediatric medical sub-specialists, and pediatric surgical specialists dedicated to the health, safety, and well-being of infants, children, adolescents, and young adults. I currently serve on the AAP's Council on Environmental Health, and I co-direct the Mid-Atlantic Center for Children's Health & the Environment, a Pediatric Environmental Health Specialty Unit based at Children's National Medical Center here in Washington, D.C.

The safety of our nation's drinking water is of primary importance to child health. The general water supply is used for drinking, cooking, preparation of infant formula for children who are not breastfed, and bathing. Contamination of the water supply has obvious implications for children who may swallow, inhale, or have skin contact with pollutants. The fundamental importance of safe drinking water has long been recognized as a public health issue; in fact, the field of public health is traditionally considered to have begun with clean water, when in 1854 Dr. John Snow traced a deadly cholera outbreak to the Broad Street water pump in London.

The passage of the Safe Drinking Water Act of 1974 (SDWA) marked a significant public health victory in underscoring the importance of clean water and establishing federal standards. While much progress has been made in improving the safety and

cleanliness of water supplies, major challenges remain. A variety of systemic issues present barriers to further progress, and a range of specific pollutants must be addressed.

Children Are Vulnerable to Water Contaminants

As with many types of exposures, children are more vulnerable than adults to adverse effects from water contamination. Children drink more water per pound of body weight than do adults. Drinking water is consumed in a number of forms: as water, as a liquid used to reconstitute infant formula, in juice and other drinks, and in cooking. Household water supplies can lead to inhalation exposures if volatile substances or gases (e.g. organic solvents, radon gas) are present in the water and when water vapor from showering is inhaled. It has been estimated that 50 percent of the total exposure to volatile organic compounds in drinking water is via this inhalation route. Contaminated bathing water can result in exposures via ingestion or dermal contact as well. Young children are particularly at risk because they swallow more water when bathing than do older children and adults.[i]

The effects of exposure on children's health may vary widely depending upon the nature of the pollutant, its concentration, duration of exposure, and other factors. In general, however, their developing minds and bodies place children at disproportionate risk to toxins of any kind. Exposure during sensitive windows of development or periods of growth may have even more serious adverse health consequences. Because children live longer than adults, those outcomes which take years to manifest themselves have ample time to become apparent as the individual, exposed as a child, becomes an adult.

Congress Should Address Systemic Issues on Safe Drinking Water

Under the SDWA, the U.S. Environmental Protection Agency (EPA) is responsible for setting national standards for both naturally-occurring and man-made contaminants that may be found in drinking water. EPA works in partnership with states, localities, and water systems to monitor safety and ensure compliance.

As is the case with many public health programs, however, the costs and benefits of providing safe drinking water accrue to different parties. While water systems, schools, or individual consumers bear the various costs of installing, maintaining, or upgrading systems, the financial benefits of those outlays are most often seen in other areas, such as lower health care costs. Policymakers have the responsibility of balancing the many competing interests and ensuring that public health and children's health are protected.

Water Systems

Public Water Supplies. According to EPA, approximately 90 percent of Americans receive their drinking water through public systems that draw and filter water from underground or from surface sources like rivers, lakes, and reservoirs.[ii] The approximately 155,000 water systems across the nation vary widely. Under the Government Performance and Results Act, a number of goals were set for providing water that complies with health-based drinking water standards for over 80 contaminants to over 90 percent of people served by 90 percent of water systems by the year 2011.[iii]

While EPA regulates public water systems and has the power to enforce safe drinking water standards, the patchwork nature of water systems across the nation poses a significant challenge. Traditionally, EPA and state regulators have emphasized efforts to bring systems into compliance rather than punish infractions; however, this has unfortunately meant that in some cases, significant violations have not been pursued aggressively in order to prevent recurrences. Recent investigative reports by the *New York Times* and others have underscored the human cost of allowing such violations to persist.[iv]

Noncommunity Water Systems. Approximately 15 percent of households in the United States obtain their water from private wells.[v] Private wells are not subject to EPA regulation and are minimally regulated by states. These water systems are vulnerable to many of the same issues and pollutants as public systems, but they usually involve no monitoring, meaning that consumers are almost universally ignorant of contamination when it occurs. The American Academy of Pediatrics issued a new policy statement and accompanying technical report on well water issues in mid-2009.[vi,vii]

Drinking Water in Schools

Schools that receive water from public systems and schools that meet the definition of a public water system are regulated under the SDWA. Although a variety of pollutants may be present in school water supplies, the presence of lead has been the subject of specific attention from the media, Congress, and EPA.

The 1986 SDWA Lead Ban requires the use of "lead-free" pipe, solder and flux in public water systems or in plumbing in a residential or nonresidential facility providing water for human consumption. However, "lead-free" as defined by Congress allows 0.2% lead in solder and flux and up to 8% in pipes and pipe fittings.[viii] This contradiction may allow small amounts lead to be present in drinking water in schools.

In 1988, Congress passed the Lead Contamination Control Act (P.L. 100-572) in an attempt to reduce lead levels in drinking water in schools. The law requires monitoring of water in schools and replacement of fixtures if excess lead is found. The law contains two key weaknesses, however. First, the law requires remediation to take place only after a problem is detected, and after children may have been exposed, rather than attempting to deal prospectively with the problem. Second, there are no enforcement provisions in the law. Compliance is voluntary and requires local and state government entities to cooperate in order for effective implementation to take place. As with many other environmental health hazards in schools, no one is "in charge;"[ix] not surprisingly, therefore, it has been documented in numerous reports in the press and medical literature that lead continues to be found in drinking water in schools.[x,xi,xii,xiii] Without enforcement authority, EPA is forced to rely upon voluntary programs such as "3Ts -Training, Testing, and Telling." While this is certainly a commendable effort, its effectiveness is limited because the agency is unable to compel action in those cases where violations persist.

Concerns Associated with Specific Contaminants

Certain contaminants are known to pose specific health hazards for children. Below is a table that outlines some of the most common pollutants in drinking water and their health impact on children.

Table 1: Potential Types of Chemical Contamination of Well Water

Chemical	Source	Effects
Nitrates	Sewage Fertilizer	Methemoglobinemia Possible promoter of carcinogenesis
Volatile organics and pesticides	Dry cleaning agents, gasoline, etc. Often source cannot be identified	Compound-specific effects
Lead	Leached from the brass in a submersible pump, from solder, or from old lead pipes	Impairs neurocognitive development
Arsenic	Occurs in specific rock formations, (e.g., the "slate belt" in the southeastern United States, Nevada, Alaska, and other areas in the western United States)	Acutely toxic carcinogenic (bladder, skin, and lung) in humans
Chromium VI	Used in the electroplating and other industries	Toxic and carcinogenic in laboratory animals
Radon	Naturally occurring radioactive gas	Carcinogenic (lung) in humans
Fluoride	Naturally in water in a few parts of the United States	Accepted preventive for dental caries, supplement if low concentrations Too much can cause dental fluorosis
Uranium	Naturally occurring in western mountains in the United States and in areas that have granite outcrops in the eastern United States	High dose is acutely toxic A source of ionizing radiation, which causes cancer
Methyl tertiary butyl ether	Partially oxidized hydrocarbon fuel additive used to oxygenate gasoline	Carcinogenic in laboratory animals
Perchlorate	Oxidizing agent used in rocket fuels, fireworks, and airbag	Inhibits synthesis of thyroid hormone

	inflators, among other applications Can occur naturally	

Source: Committee on Environmental Health and Committee on Infectious Disease. Drinking Water from Private Wells and Risks to Children. *Pediatrics*. Jun 2009; 125:1599-1603.

A handful of these pollutants merit special consideration due to their known hazard to child health.

Coliforms. Coliforms refers to a family of bacteria capable of causing gastroenteritis. The most common source of coliforms in drinking water is fecal contamination. Monitoring for fecal coliforms is a standard practice in public water systems. In children, coliforms can cause a wide range of illness, from mild gastroenteritis to sickness requiring hospitalization.[xiv]

Lead. Lead is often not present in groundwater but can be leached from old lead pipes, from brass, or from solder, particularly in cases where the water is naturally acidic or is made acidic by treatment.

There is no "safe" level of lead exposure. Childhood exposure to lead is associated with decrements in IQ;[xv,xvi] attention deficit, reading disabilities, and failure to graduate from high school;[xvii] and increased aggression, commission of crime and antisocial or delinquent behaviors.[xviii,xix,xx,xxi]

Nitrates. The source of nitrates in drinking water is either sewage or fertilizer. Nitrates themselves are not toxic to humans, but can be converted to more reactive and toxic

nitrites by gut bacteria. Nitrates in drinking water above the EPA level of 10 micrograms/liter may cause fatal methemoglobinemia in infants.[xxii]

Volatile Organics and Pesticides. These chemicals and compounds are very mobile and can appear without specific identifiable sources. Examples include formaldehyde, organophosphates, and pyrethroids. For some of these substances, the health effects are well documented; for example, acute exposure to many pesticides can cause nausea, vomiting, seizures, and even death. Frequently, however, low-level, chronic and mixed exposures to volatile organics and pesticides are poorly studied, particularly in infants and children.[xxiii]

Perchlorate. Perchlorate is an oxidizing agent used in rocket fuels, fireworks, and airbag inflators. It also occurs naturally. Perchlorate interferes with the function of thyroid hormone and, thereby, has the potential to cause brain damage.[xxiv] It is now recognized as a water pollutant. There is evidence that perchlorate interferes with thyroid function in adult women in the U.S., even at background exposures.[xxv]

Other drinking water contaminants of concern include arsenic, methylmercury, chromium, radon, fluoride (at high concentrations), uranium, methyl tertiary butyl ether (MTBE), polychlorinated biphenyls and dioxins, disinfectants, and infectious microorganisms other than coliforms.[xxvi]

AAP Recommendations

The American Academy of Pediatrics makes the following recommendations on maintaining and improving the safety of drinking water across the United States.

Safe drinking water must continue to be a priority. Given the fundamental importance of water to human health, we must continue to prioritize drinking water safety among the activities at EPA, state, and local regulatory agencies.

Federal regulators must increase oversight and technical assistance to states and localities. EPA Administrator Lisa Jackson has made encouraging progressive statements about increasing the agency's activities on safe drinking water. The agency must work extensively with state regulators and water systems to improve water safety. Serious and repeat violations should be identified and pursued aggressively.

Congress should increase funding for EPA's efforts on clean water and safe drinking water. EPA's efforts to improve the safety of drinking water are inhibited by low staffing and funding levels. Congress must provide the resources necessary for the agency to perform its work appropriately.

Schools and child care providers need more assistance in assuring the safety of their drinking water. Steps must be taken to establish clear lines of responsibility for testing school and child care center water supplies and correcting deficiencies. Communities should not wait until children are ill before moving to identify and address these issues.

More attention should be paid to the safety of private water supplies, such as wells. Information about local ground water conditions should be readily available, along with resources to assist homeowners in understanding test results and address problems.

EPA should increase funding for Pediatric Environmental Health Specialty Units

(PEHSUs). Pediatric Environmental Health Specialty Units serve a vital function in providing each of the ten EPA regions with direct access to pediatric environmental health experts. The Units could be directed to use a portion of this funding to increase the education of health and education professionals and others about water contaminants and the impact of those contaminants on the health of children.

In conclusion, the American Academy of Pediatrics commends you, Madam Chair, for convening this hearing on the importance of safe drinking water for children's health. I appreciate this opportunity to testify, and I look forward to your questions.

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