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Children and Drinking Water Standards



There's been a lot of talk lately about drinking water. You may have seen features in the newspaper, on television news and in popular magazines, even in movies and television specials. This media coverage, combined with the new annual reports on drinking water quality that water systems are sending directly to their customers, is making many people think more about their drinking water. A question many people have on their minds is: Should I be concerned about the tap water that my children are drinking? This booklet explains how national standards contribute to drinking water safety, and helps readers make informed, reasonable choices about the water they and their children drink.

Most tap water is safe for healthy adults and children.

The United States has one of the safest water supplies in the world. Although drinking water often picks up low levels of some contaminants as it flows in rivers and collects in aquifers, these materials usually are not detected at harmful levels. Public water suppliers must monitor their water to make sure it complies with science-based public health standards. The United States Environmental Protection Agency (EPA) sets these maximum allowable levels of contaminants in drinking water under the Safe Drinking Water Act. EPA has set standards for 90 contaminants, seven of which are new standards that will be enforceable before January 1, 2002. People at the federal, tribal, state and local levels work together to protect public water supplies. Federal standards do not include private wells (individual wells serving fewer than 25 persons). Therefore, people receiving water from private wells are responsible for making sure their

own drinking water is safe. Some states do set standards for private wells, so well owners should check their state requirements. “Additional Information for Private Well Owners” on page 8 of this booklet can help locate resources for well owners.

Problems with drinking water can, and do, occur.

Actual events of serious drinking water contamination are infrequent and usually of short duration. However, treatment problems or extreme weather events may allow contaminants to enter water supplies. In most situations, contaminants are found at levels that do not pose immediate threats to public health. Microbial contaminants (such as bacteria and viruses) are of special concern because they may cause immediate, or acute, reactions, such as vomiting or diarrhea. Long-term exposure to some contaminants (such as pesticides, minerals, and solvents) at levels above standards may cause gastrointestinal problems, skin irritations, cancer, reproductive and developmental problems, and other chronic health effects. If a public water system obtains water from a highly contaminated river, lake, or ground water well, it may have difficulty treating the water to meet current safety standards. If contamination poses an immediate health threat, water suppliers are required by law to notify customers right away. Any violation of a drinking water standard requires public notice.

How drinking water standards protect children.

EPA's current drinking water standards are designed to protect children and adults. The standards take into account the potential effects of contaminants on segments of the population that are most at risk. When EPA sets each standard, the agency conducts a risk assessment, in which scientists evaluate whether fetuses, infants, children, or other groups are more vulnerable to a contaminant than the general population. The standard is set to protect the most vulnerable group.

Often, children are *not* the most vulnerable group. For example, even though children may be more vulnerable to microbial contaminants than the general public, people with weakened immune systems are *even more* at risk. People with weakened immune systems include those who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, such as lupus or Crohn's disease, or those under-going chemotherapy. (For more information see the EPA/Centers for Disease Control and Prevention's joint guidance on the microbial pathogen, *Cryptosporidium*, called "Guidance for People with Severely Weakened Immune Systems." It is available by calling the Safe Drinking Water Hotline or at www.epa.gov/safewater/crypto.html.) If EPA finds that children are the most vulnerable, their risk becomes the most important factor considered in developing the standard. Standards for lead, nitrates, and nitrites are specifically based on risk to children because they are the most vulnerable to these contaminants. If a group other than children is the most sensitive, children are automatically protected.

For most drinking water contaminants EPA regulates, there is little data to indicate whether children are more sensitive than the general public. However, EPA is undertaking research to address this important issue. Children, especially infants, drink more fluid per pound of body weight than adults. Very young children's immune systems are not yet fully developed, making them less able than healthy adults to fight microbes in drinking water. These microbes may induce diarrhea and vomiting, which may cause children to become dehydrated more quickly than adults. Children may also be more susceptible to chemical contaminants that affect learning, motor skills, and sex hormones during important stages of growth.

Despite high confidence in existing standards, EPA is conducting additional research regarding possible impacts of various contaminants on children and other vulnerable populations, and on new and emerging contaminants. For example, EPA is conducting risk assessments that will consider infants' and children's sensitivity and exposure to certain pesticides. EPA is committed to using the best available, peer-reviewed science and data in developing new standards and reevaluating existing ones. Also, EPA continues to monitor localized health problems, including outbreaks caused by microbial contaminants in drinking water and other health problems that may be associated with other contaminants (e.g., solvents and other industrial chemicals).

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Contaminants to Which Children May Be Particularly Sensitive

Children are particularly sensitive to the contaminants in the table on the following pages. EPA sets standards at levels that protect them. In most circumstances, these contaminants do not present problems, because they do not occur in the drinking water source or because they are reduced, removed or rendered harmless during treatment. If you are concerned about a particular contaminant in your tap water, you should first ask your public water system about the concentration in your tap water, check your annual water quality report (also called Consumer Confidence Report), or have your well water tested. Health effects discussed on this table are specific to children. General information about the contaminants and their potential health effects is listed at www.epa.gov/safewater/mcl.html and is available from the Safe Drinking Water Hotline, (800) 426-4791. For personal health advice, you should contact your health care provider.

CONTAMINANTS TO WHICH CHILDREN MAY BE PARTICULARLY SENSITIVE

Contaminant and Drinking Water Standard	Likely Sources of the Contaminant in Drinking Water	Ways that Children are Exposed Other Than Drinking Water	Children's Potential Health Effects from Ingesting the Contaminant in Water at Levels Above EPA Drinking Water Standards	What To Do If You Have High Levels in Your Drinking Water?
Nitrate¹				
<p>10 parts per million</p> <p>Nitrite</p> <p>1 part per million</p>	<p>Runoff from fertilizer use; leaching from septic tanks, cesspools, sewage; erosion of natural deposits</p>	<p>Infants most often get blue baby syndrome when they are already sick, consume food that is high in nitrates, such as spinach, broccoli and cured meats, and drink formula mixed with water that is high in nitrates.</p>	<p>"Blue baby syndrome" in infants under six months — life threatening without immediate medical attention. Symptoms: Infant looks blue and has shortness of breath.</p>	<p>Do NOT boil water to attempt to reduce nitrates. Boiling water increases nitrate concentration and the potential risk. Talk to your health care provider about alternatives to using boiled water in baby formula.</p>
Lead				
<p>Public water systems must sample tap water from a percentage of sites with lead pipes or copper pipes with lead in solder and/or service lines. Treatment steps must be taken if lead levels exceed 0.015 parts per million in at least 10 percent of samples, or if copper levels exceed 1.3 parts per million.</p>	<p>Corrosion of household plumbing systems²; erosion of natural deposits.</p>	<p>Paint chips and dust from lead paint in old buildings are the primary routes of children's exposure to lead.</p>	<p>For both infants and children, continuous exposure to high levels of lead may lead to delays in physical or mental development. Children could show slight deficits in attention span and learning abilities.</p>	<p>Do NOT boil the water to attempt to reduce lead. Flush your pipes by running the water before using it for drinking or cooking and use only water from the cold water tap for cooking, drinking, and preparing baby formula. Allow the water to run until it's cold (this water can be used for plants to reduce waste). If you have high lead levels, talk to your health care provider about alternatives to using boiled water in baby formula.</p>
Copper				
<p>See standard for lead, above.</p>	<p>Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives.</p>	<p>Children may be exposed to copper in food, but not usually at high enough levels to pose a health risk. If food is improperly stored in a copper container, ingestion may lead to nausea or vomiting.</p>	<p>High levels of copper in drinking water may cause nausea or vomiting in children.</p>	<p>Same procedure as lead, above.</p>
Microbial Contaminants³				
<p>Standards vary by contaminant. For details, see www.epa.gov/safewater/mcl.html or call EPA's Safe Drinking Water Hotline, (800) 426-4791.</p>	<p>Human and animal fecal waste (e.g., animal feedlots); leaking from septic systems and cesspools.</p>	<p>Food; unsanitary diaper changing practices; person-to-person contact.</p>	<p>Exposure may cause gastro-intestinal problems. Those with weakened immune systems are most vulnerable. Diarrhea and vomiting may cause children to become dehydrated more quickly than adults. However, in most healthy children, problems are temporary. Contact your health care provider and be sure children drink enough water (from a safe source) to prevent dehydration.</p>	<p>Boil your water vigorously for one minute before using it. Alternatively, purchase bottled water treated by distillation or reverse osmosis.</p>
Disinfectants and Disinfection Byproducts (DBPs)⁴				
<p>Total Trihalomethanes: 0.10 parts per million. In 2002, more stringent standards will be enforceable. See footnote.</p>	<p>While disinfectants are effective in controlling many microorganisms, they react with matter in water to form disinfection byproducts. Unchlorinated private well water is unlikely to contain any DBPs.</p>	<p>Not known.</p>	<p>Varies depending on the DBP. Some epidemiological studies may indicate a link between certain DBPs and a slight increased risk of reproductive and developmental effects.</p> <p>For a new regulation that will be implemented in 2002, EPA has evaluated the environmental health or safety effects of DBPs on children and concluded that the public health goals are protective.</p>	<p>Drinking lots of water during pregnancy is important. If you are notified of a violation, follow instructions from your public water system. For personal health advice, you should contact your health care provider regarding using bottled water.</p>

Notes

¹ Standards for nitrate and nitrite are based on annual averages of 1–4 samples. Requirements differ among systems.

² Lead: It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested. To locate a state certified laboratory, see <http://www.epa.gov/safewater/faq/sco.html>, or call the Safe Drinking Water Hotline at (800) 426-4791.

³ Microbial Contaminants: In 1998, EPA established the Interim Enhanced Surface Water Treatment Rule, which strengthens control over microbial contaminants, including the pathogen, *Cryptosporidium*. By 2002, public water systems using surface water (or ground water under the direct influence of surface water) and serving more than 10,000 people must comply with the rule. States must adopt the new standards by 2001. EPA is conducting research in several areas including: analyzing occurrence data on microbial contaminants at more than 500 utilities nationwide; collecting data on the incidence of pathogens in water and the effectiveness of techniques for removing pathogens to understand potential exposure of adults and children; a variety of studies on incidence of diarrhea in adults and children and its possible association with drinking water. This research will be used for determining priorities for the drinking water program, including guidance, future standards and reevaluation of existing standards.

⁴ Disinfectants and Disinfection Byproducts: In 1998, EPA established the Stage 1 Disinfectants and Disinfection Byproducts Rule, which strengthened protection from DBPs. In 2002, new standards, all listed in parts per million, will be enforceable: Disinfectant Residuals: *Chlorine – 4.0; Chloramine – 4.0; Chlorine Dioxide – 0.8. Disinfection Byproducts: Total Trihalomethanes – 0.080; Haloacetic Acids – 0.060; Chlorite – 1.0; Bromate – 0.010.* EPA is conducting research in several areas including: analyzing occurrence data on DBP levels at more than 500 utilities nationwide; examining factors that contribute to the formation of DBPs; evaluating the effectiveness of treatment technologies to remove materials from water that react with chlorine to form DBPs; and conducting health effects research to better understand the potential risk associated with exposure. Due to the length of time required to conduct large scale epidemiology studies, the results of some new research will not be completed until after the 2002 statutory deadline for the Stage 2 Disinfectants and Disinfection Byproducts Rule. However, a number of these important studies that are evaluating potential risks to pregnant women will be completed in time for the rulemaking.

Information for Private Well Owners

Private water supplies are not regulated by EPA, although some states and municipalities have standards that apply to these wells. If you have a private well, you are responsible for testing your water to make sure it is safe. This is especially important in areas where homes and nearby businesses are on septic systems. Since many contaminants are colorless and odorless, testing is the only way to determine whether your well water is safe to drink. EPA drinking water standards and health information are good guidelines for you in protecting your own drinking water.

Wells should be tested annually for nitrate and coliform bacteria to detect contamination problems early. Test more frequently and for more potential contaminants, such as radon, pesticides or industrial chemicals if you suspect a problem. Contact your state laboratory certification office for a listing of certified drinking water laboratories in your state. In addition, you can help protect your water supply by carefully managing activities near the water source. The organization, Farm*A*Syst/ Home*A*Syst, (608) 262-0024, provides fact sheets and worksheets to help farmers and rural residents assess pollution risks and develop management plans geared towards their circumstances.

The Safe Drinking Water Hotline, (800) 426-4791, can provide you with the phone numbers for these organizations. Resources are also available on the Internet:

- State Certification Officers,
www.epa.gov/safewater/faq/sco.html
- Farm*A*Syst/ Home*A*Syst,
www.wisc.edu/farmasyst/
- Wellhead Protection Program,
www.epa.gov/safewater/protect.html

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Many layers of protection ensure tap water quality.

Federal, state and tribal governments, in partnership with public water systems, are continuously working to ensure tap water safety. In fact, 1999 marks the 25th year of public health protection under the Safe Drinking Water Act. This statute gives EPA the authority to set enforceable drinking water standards for public water systems. EPA has set standards for 90 chemical, microbiological, radiological, and physical contaminants in drinking water. Public water systems must monitor water according to specific schedules, and deliver water that meets all standards. EPA is required by the Safe Drinking Water Act to focus on the contaminants that pose the greatest public health risk, in setting national standards. The Agency must ensure the standards protect public health, are technically feasible, and are cost-effective.

When setting new drinking water standards, EPA does extensive peer-reviewed research and analysis to ensure the standards will protect public health. States can either adopt and enforce these standards or set and enforce even stricter ones. EPA also establishes guidance, which some states chose to adopt and enforce, to control contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. Public water systems are responsible for controlling the level of contaminants in drinking water to meet these standards.

Drinking water standards are part of a “multiple barriers” approach to drinking water safety. This includes: protecting drinking water sources to prevent contamination; controlling the discharge of contaminants underground through injection wells (not used for drinking) or shallow disposal systems; treating water to make sure it meets standards; making sure water systems are run by qualified operators; ensuring distribution systems are functioning properly; and making information available to the public on the quality of drinking water. These protections work together to help ensure tap water in the United States is safe.

New requirements ensure protection to children will increase.

In 1997, President Clinton issued an executive order that specifies that each federal agency “shall make it a high priority to identify and assess environmental



health and safety risks that may disproportionately affect children,” and “shall ensure that its policies, programs,

activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.”

Even before the 1997 executive order, children were a priority for EPA’s drinking water program. The 1996 amendments to the Safe Drinking Water Act require EPA to strengthen protection of children by considering the risk to the most vulnerable popula-

tions when setting standards. The amendments call for better science, including an analysis of the health effects of vulnerable populations, to use when making regulatory decisions. To address these requirements, EPA considers the special needs of children when identifying new contaminants to regulate, includes children in risk assessments to determine public health goal, and conducts research on children's exposure to contaminants. The 1996 amendments also require EPA to reassess all drinking water standards every six years and consider new data, and thus ensure that standards continue to protect public health, including children.

Meeting new challenges is costly and can require technological improvements.

As new standards are set to reinforce public health protection, public water systems sometimes must install new equipment, improve or replace infrastructure, or make improvements in the way they operate water systems. To help with these costs, EPA provides grants to states, which in turn provide low-interest loans to public water systems to help them comply with new standards. There are also significant costs associated with conducting necessary research and protecting drinking water sources.

Protecting drinking water sources.

EPA emphasizes protecting sources of drinking water from contamination. It is more desirable, effective and economical to prevent contamination of drinking water supplies than to pay for treatment,

or to clean up an already-polluted source. States are currently assessing all the drinking water sources within their boundaries. These assessments map the rivers, lakes and ground water wells that supply public drinking water and identify principal threats to water quality. States can also utilize millions of federal dollars to take actions to protect source waters. To learn more about protecting drinking water sources, see www.epa.gov/safewater/protect.html, or call the Safe Drinking Water Hotline.

Once informed about the sources and quality of your local drinking water (*see next page*), you can make the best possible choices about the water you and your children drink.

For More Information

Drinking Water Safety, Sources, and Prevention of Contamination:

EPA Safe Drinking Water Hotline
(800) 426-4791

EPA Safewater Web Site
www.epa.gov/safewater

Other Environmental Issues Affecting Children, Such as Asthma, Sun Exposure, and Safety Measures in the Home

EPA Office of Children's Health Protection Web Site
www.epa.gov/children

EPA Children's Environmental Health Hotline
(877) 590-KIDS

What YOU can do to make sure tap water is safe for the children of today . . . and tomorrow

Water is an essential nutrient – necessary for maintaining body temperature, transporting nutrients throughout the body, keeping joints moist, digesting food, ridding the body of waste products, and cooling the body. The American Medical Association recommends that adults should consume about 2½ quarts of water a day; children about half this much. While the best way to consume this amount is by drinking plain water, food and beverages made with water, such as soup and juice, count for part of this amount. It is important to know how to protect this essential nutrient and vital resource.

Learn about your local drinking water: Start by reading your Consumer Confidence Report to learn whether your water system meets all drinking water standards. This report is available from your water supplier, and may be online at <http://www.epa.gov/safewater/dwinfo.htm>.

Understand how your local water supplier is working to provide your community with safe drinking water. Don't be afraid to ask questions. Your water supplier and EPA's Safe Drinking Water Hotline (800) 426-4791 are there to help.

Consider the source: Get to know the source of your drinking water, and get involved in activities to protect it. Drinking water source protection is a low-cost means to providing a vital resource. Here are a few simple things you can do to help keep pollution out of the river, lake, stream or aquifer that is your drinking water source:

- Take used motor oil to a recycling center. If you let it drain into a storm sewer or bury it in the trash, it can leak into lakes, rivers and wells. Just one pint of used motor oil can expand over great distances and cause adverse effects to human health and the environment.
- Properly dispose of toxic household trash. For example, batteries contain lead and mercury. Some household cleaners also contain substances that contaminate water. Many communities have special collection sites for these items.
- Do not dispose of chemicals into septic systems, dry wells, stormwater drainage wells or other shallow disposal systems that discharge to ground water.
- Find out what your community is doing to protect your water source and get involved. Work with schools, civic groups and others to start a protection program.

U.S. Environmental Protection Agency

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