Every day more than 240 million of us in this country turn on our faucets in order to drink, bathe, and cook. And as we brush teeth, wash hands, fill glasses, and prepare meals, we often take the purity of our tap water for granted. The truth is, we shouldn’t. Before it comes out of our taps, in most cities our water undergoes a complex, elaborate, and often antiquated process of treatment, likely including filtration and disinfection designed to protect public health. But as good as our municipal water infrastructures can be—and sometimes they can be very good—they also can fail, sometimes with tragic results. The experts at the Centers for Disease Control and Prevention (CDC) have recorded hundreds of waterborne disease outbreaks caused by U.S. water supplies in the past 25 years. The worst was in 1993, when more than 400,000 citizens in Milwaukee, Wisconsin, were made violently ill by a tiny parasite in their tap water called Cryptosporidium. Several thousand Milwaukeeans were hospitalized and as many as 100 died. More recently, in 1999, more than 1,000 people at a county fair in upstate New York were stricken by an extremely virulent strain of E. coli (the same bacteria that we have come to associate with bad meat). On that occasion, a three-year-old girl and an elderly man died of acute kidney failure when their bodies could not fight off the pathogen.

So, just how safe is our drinking water? In a careful and independent study, NRDC evaluated the quality of drinking water supplies in 19 cities around the country. We reviewed tap water quality data, Environmental Protection Agency (EPA) compliance records, and water suppliers’ annual reports (material required by law in order to inform citizens of the overall health of their tap water; also called “right-to-know reports”). In addition, we gathered information on pollution sources that may contaminate the lakes, rivers, or underground aquifers that cities use as drinking water sources. Finally, we evaluated our findings and issued grades for each city in three areas: water quality and compliance, right-to-know reports, and control of threats to source water. NRDC found that although drinking water purity in most cities has improved slightly during the past 15 years, overall tap water quality varies widely from city to city. Some cities like Chicago have excellent tap water; most cities have good or mediocre tap water; yet several cities—such as Albuquerque, Fresno, and San Francisco—have water that is sufficiently contaminated so as to pose potential health risks to some consumers, particularly to pregnant women, infants, children, the elderly, and people with compromised immune systems, according to Dr. David Ozonoff, chair of the
NRDC found that although most urban dwellers can drink their water without acute health threats, in most cities more needs to be done to improve water quality. Furthermore, there is one overarching truth shared among all U.S. cities: unless we take steps now, our tap water will get worse. Two factors pose imminent threats to drinking water quality in America. First, we are relying on pipes that are, on average, a century old. Significant parts of Atlanta’s water system, for example, were built toward the end of the 19th century. Not only is our water supply infrastructure breaking down at alarming rates (the nation suffered more than 200,000 water main ruptures in 2002), but old pipes can leach contaminants and breed bacteria in drinking water. Without immediate and significant investment in America’s tap water infrastructure and treatment, drinking water quality will continue to worsen. Trillions of dollars have been spent to construct, treat, and deliver water to city taps, but there is great need for improvement. Credible estimates found that a staggering $500 billion in upgrades and repairs are needed nationally to ensure the safety of drinking water for years to come. Even the usually conservative Congressional Budget Office (CBO) estimated in May 2002 that $232 to $402 billion in investments will be needed over the next two decades to upgrade and repair the nation’s drinking water systems. Second, regulatory and other actions by the Bush administration threaten the purity of American tap water. These actions include weakening legislative protections for source waters, stalling on issuing new standards for contaminants, delaying the strengthening of existing standards, and cutting and even eliminating budgets for protective programs.

NRDC’s study demonstrates that in order to improve water quality and protect public health, we must invest in infrastructure, upgrade treatment and distribution facilities, improve public understanding through the efficacy of right-to-know reports, and safeguard source water. Furthermore, we must enlist our elected officials in the solution: we must urge them to invest in infrastructure and treatment, strengthen and enforce existing standards, and fund programs that improve tap water quality.

WATER QUALITY AND COMPLIANCE

THE “WATER TREATMENT TRAIN”

Typically, large U.S. cities that tap into surface waters (rivers or lakes) for drinking water supplies use the following treatment steps, which have generally been used since before World War I—some are centuries old:

Coagulation. The first step, after screening any large objects from the water (such as sticks or leaves), is the addition of a coagulant such as alum (aluminum sulfate). The coagulant makes the particles of suspended solids stick together in clumps.

Prechlorination. Some water systems also add chlorine or another oxidant early in the process to start disinfection and oxidize some chemicals in the water to ease their removal later. (This early use of chlorine can substantially increase the levels
of chemicals called chlorination by-products, which, as discussed later, are probable human carcinogens, or cancer-causing agents, and may, according to recent studies, cause problems in fetuses exposed to them in the womb.)

**Sedimentation.** The water is mixed and then allowed to sit in a large basin where the coagulant takes effect, and the mud and solids gradually settle to the bottom. The clarified water is then ready for filtration.

**Filtration.** Next, the water is run through large filters usually made out of sand or crushed anthracite coal. This filtration process removes many of the smaller particles, including some larger microbiological parasites. Sand and anthracite are not effective for removal of many dissolved organic and inorganic chemicals (such as pesticides, many industrial chemicals, and arsenic).

**Primary Chemical Disinfection, Usually Using Chlorine.** Chlorine in gaseous form or in a liquid bleachlike form (hypochlorite) generally is added to kill many bacteria and viruses. Chlorination by-products start to form at this point or earlier (if chlorine was added prior to sedimentation). Some cities are now using “chloramines”—essentially chlorine plus ammonia—as a primary disinfectant because chloramines produce modestly lower levels of undesirable chlorination by-products.

**Corrosion Inhibitor.** Many cities add a chemical, such as lime or zinc orthophosphate, to inhibit the ability of the water to corrode the city’s pipes and household plumbing. Corrosion inhibitors increase the pH (that is, decrease the acidity) of the water and often help form a film to coat the inside of the pipes so that the pipes do not corrode as quickly and so that less lead is leached from the pipes and plumbing fixtures.

**Fluoride and Secondary Disinfection.** Most cities add fluoride, and virtually all U.S. cities add a second dose of disinfectant, usually chlorine or chloramines (a combination of chlorine and ammonia). The secondary disinfectant is added to keep the water from becoming recontaminated with bacteria in city and household pipes after the water leaves the water treatment plant. Disinfection by-product levels generally continue to increase as the water travels through the pipes and the chlorine reacts with natural organic matter dissolved in the water.

This treatment train has served most cities fairly well for decades. It has essentially eliminated cholera and typhoid in U.S. cities and reduced levels of many other bacteria and viruses in our drinking water, saving countless lives. But as discussed below, it leaves many contaminants untouched.

**HOW THE TREATMENT TRAIN FAILS**
We now know that this pre–World War I–era treatment train does not remove many of the contaminants that are in our water and pose serious public health risks. For example, these antiquated treatments often do little or nothing to remove:
many inorganic chemicals that are by-products of industry and manufacturing, such as:
- arsenic
- chromium
- cyanide
- perchlorate, a rocket fuel
- many other chemicals, such as:
  - dry-cleaning solvents like perchloroethylene (“PERC”)
  - industrial solvents, such as trichloroethylene (TCE) and dichloroethylene (DCE)
  - pesticides, such as ethylene dibromide (EDB) and atrazine
  - petroleum components, such as benzene, toluene, and xylene
- many waterborne parasites, such as Cryptosporidium (Crypto), the chlorine-resistant protozoan that sickened 400,000 people and killed as many as 100 in Milwaukee

THE ROLE OF FILTRATION IN TREATMENT TRAIN EFFECTIVENESS
Water engineers have found that adjustments to treatment trains can, in some cases, improve removal of certain contaminants. For example, recent evidence indicated that improved operation of city water filters can reduce the amount of Cryptosporidium that gets through them, so the EPA modestly strengthened the rules for cities that filter their water. Similarly, modest operational changes in some types of water treatment plants have been shown to reduce arsenic levels. (Serious arsenic contamination necessitates installation of new treatment technologies.)

Several of the nation’s largest cities have water systems that remain unfiltered. These cities—including Boston and parts of San Francisco and Seattle—generally get their water from sources that are (or at least were) relatively well protected from housing, development, and industrial pollution. Increasingly, many of these unfiltered water systems are facing serious development pressures in their watersheds (the areas of land that drain into the water source). With increasing development comes greater risk of microbiological and chemical pollution. As a result, either the EPA or state government has ordered some cities with unfiltered water systems to filter their water or to improve water treatment through use of advanced disinfection technologies (such as ozone or ultraviolet light). Some experts fear that the mandate of additional treatment will result in a weakened resolve on the part of local officials to protect source water—leading to serious degradation of the cities’ source water quality and ultimately even worse tap water. Balancing these concerns is a highly controversial exercise.

Clearly, the ideal scenario is to have both strong source water protection and state-of-the-art treatment. However, most cities have neither.

THE UNIQUE PROBLEM OF GROUNDWATER WELLS
A small number of cities—such as Albuquerque, Fresno, and most cities in Florida—rely primarily upon groundwater wells for drinking water supplies. In addition, many cities that depend on surface waters use groundwater wells as reserve sources of water for times of peak demand or in case of an emergency or drought. Groundwater wells pose their own set of health risks: they are rarely treated (except for
chlorination) because they have been presumed to be largely immune to the types of pollution that get into surface water.

We now know that groundwater can be and often has been contaminated by people’s aboveground activities; Fresno’s groundwater is a vivid example. The city’s groundwater supply—through agriculture, development, industrial, and other activities above the aquifer—has become infiltrated by many pollutants, including inorganic contaminants (like nitrates from agriculture and human or animal waste) and organic contaminants (including pesticides and industrial chemicals). The aquifer is also becoming seriously depleted.

Furthermore, many groundwater wells contain naturally occurring contaminants, including radioactive contaminants like uranium and radon, as well as inorganic contaminants like arsenic. It is critical that those cities relying on groundwater—either as a primary water source or as a backup—treat their water in order to eliminate these contaminants.

**INFRASTRUCTURE: OFTEN AGING AND OUTDATED**

The science of drinking water treatment is an old one, but technological advances in recent decades have made delivery of pure, safe, and good-tasting water to city taps a readily achievable goal. In many cities, the water infrastructure—that is, the water collection devices, treatment plants, pumps, water mains, service lines, and other equipment that deliver water to your home—has been in place for decades; quite often, components of these systems (such as the mains) are more than a century old. As the water infrastructure outlives its useful life, it can corrode and deteriorate, and we have witnessed the results: a nationwide epidemic of burst water mains, unreliable pumps and collection equipment, and aging treatment plants that fail to remove important contaminants. With age and increased demands due to population growth, the water infrastructure problems in many cities are growing more serious, and public health is at risk.

Most cities’ water supplies are in dire need of repair and upgrading. The problems associated with decay are grave: old pipes not only leak (many cities lose 20 percent or more of their water to leaks) but they can also burst, causing water pressure loss and risking serious contamination of the water supply. When water pressure drops due to pipe breaks or big leaks, bacteria and other contaminants can get into the water. Bacteria can also grow in old or poorly maintained pipes, which may harbor pathogens that can make people sick. In addition, older distribution systems often used lead in the service lines (pipes that take water from the water main to homes) or other components of the system.

Outdated drinking water treatment plants also cause serious water quality problems. For example, not only do old-fashioned treatment plants allow many contaminants to slip through, but they also add contaminants. Traditional chlorine primary disinfection can produce high levels of disinfection by-products when the chlorine reacts with naturally occurring organic matter in the water. These disinfection by-products have been linked to cancer and, in a series of preliminary studies, to miscarriages and birth defects.
WHO’S IN CHARGE?
For the most part, the business of water collection, treatment, and distribution is a government-run operation in this country; in most cities, it is headed by the city itself or by a public water authority. (A public water authority generally is a government entity, often created under state law, run by a board of directors that was appointed by local or state elected officials.) Some cities purchase their water from large, publicly owned wholesale water authorities. Private investor-owned companies represent a relatively small percentage of large city water systems in the United States. However, that may change: The American Water Works Company now serves 15 million people in 27 states and has recently been acquired by a German investor-owned corporation, RWE AG. In many European nations, including France and the United Kingdom, several huge multinational private water companies own virtually all the water systems. A few years ago, Atlanta privatized its water system’s operation and maintenance (O&M), but after major controversies over the adequacy of service by its private O&M contractor, United Water (owned by the huge French concern Suez Lyonnaise des Eaux), the city cancelled the private contract in early 2003. New Orleans also considered O&M privatization but, after accepting bids from several private concerns and inciting enormous local controversy, decided against it in 2002. Other cities like Seattle have turned to private companies to design, build, and operate new water treatment plants.

PUBLIC WATER SYSTEMS AND THE SAFE DRINKING WATER ACT
The Safe Drinking Water Act (SDWA), originally enacted by Congress in 1974 and signed into law by President Gerald Ford, vests the EPA with the responsibility for regulating the quality of drinking water served by “public water systems” (PWSs). A PWS is defined to include any water system that serves water to more than 25 people (or 15 service connections), no matter who owns it, so PWSs run the gamut from small trailer parks to the nation’s biggest cities.

MAXIMUM CONTAMINANT LEVEL GOALS
Under the SDWA, the EPA must set “Maximum Contaminant Level Goals” (MCLGs). The aim of these goals is to limit contaminants in drinking water to levels that will have no adverse effect on human health (with a margin of safety). The EPA usually sets the MCLG for cancer-causing agents at 0 because no level of these contaminants is believed to be fully safe. The MCLGs are not directly enforceable.

MAXIMUM CONTAMINANT LEVELS
Once the EPA sets an MCLG for a given contaminant, it then establishes a “Maximum Contaminant Level” (MCL), which is an enforceable maximum allowable level of a contaminant in tap water. The MCL is supposed to be as close to the MCLG health goal as is feasible for large water systems. In a change to the law enacted in 1996 (and opposed by many environmentalists), Congress added a provision that allows the EPA to adopt a weaker MCL for some contaminants than is feasible if the EPA administrator determines that the costs of the feasible standard are not justified by its benefits. The EPA has now used this authority on a few occasions—first for uranium...
and most recently for arsenic. In the case of arsenic, the EPA established a weaker standard (10 parts per billion, or ppb) than was feasible (3 ppb). Thus, it is extremely important to realize that MCLs often are not fully protective of public health. They are set as a result of a political, economic, and technical balancing act, in which the EPA often sets standards that allow significant health risks—sometimes allowing as high as a 1 in 300 cancer risk (in the case of the recent arsenic standard). So while MCLs are sometimes referred to as “health standards,” in fact only MCLGs are based exclusively upon health standards.

MONITORING AND REPORTING REQUIREMENTS
When the EPA sets an MCL, the agency also imposes monitoring and reporting requirements on PWSs; these vary depending on the contaminant. For example, PWSs must frequently monitor for a common contaminant such as coliform bacteria; a water system may have to test only once a year—or once every three years or even less frequently—for other contaminants. Water systems are often required to test for radioactive contaminants like radium or beta emitters only every three years. States are also authorized to waive testing entirely when they find that a contaminant is very unlikely to be found (e.g., dioxin, for which many states do not require systems to test).

TREATMENT TECHNIQUES
In cases in which a contaminant cannot reliably be measured in drinking water, the EPA is authorized to issue a “treatment technique” (TT) instead of an MCL. A TT requires water systems to use a certain type of water treatment to get rid of the contaminant of concern. There are just a few TTs. One (the Surface Water Treatment Rule) requires water systems that use surface water to filter their water with sand or similar media to remove waterborne parasites, or to demonstrate that they are entitled to avoid filtration because their source water is extremely high quality and very well protected from possible pollution sources.

Another TT applies to lead and copper. The lead and copper rule requires water systems to test their water for these contaminants and to treat it to make their water less corrosive (to reduce lead or copper leaching). If the corrosion control does not work and lead levels remain high, the water system must eventually remove lead service lines that contribute to the lead problem.

PRIMACY: RESPONSIBILITY FOR ENFORCING STANDARDS
Once the EPA has established MCLs and TTs, states are given the opportunity to take primary enforcement responsibility (or primacy) for that standard. If, within a prescribed period, a state fails to show to the EPA’s satisfaction that it has adopted the rule and will enforce it, the EPA itself must enforce that rule in that state. To date, all states except Wyoming have obtained primacy for current drinking water standards.

TESTING AND VOLUNTARY COMPLIANCE
Water is generally tested by the water system itself. Typically, a large water system has an in-house laboratory that tests for bacteria and other contaminants. For
example, major cities are required to test for coliform bacteria more than 100 times per month. Some cities and most smaller water systems take samples of their water and send them to a state-approved laboratory for analysis. This testing and reporting of the results typically is done on the honor system—that is, the state and the EPA trust the water systems to take representative samples of their water and to send them to the lab following EPA protocols for ensuring the integrity of samples. Occasionally, state or EPA spot checks and reviews have uncovered falsified results, where the system operator was making up reported values, for example, or microwaving samples to kill bacteria. In general, states lack the resources to conduct detailed audits of the accuracy and integrity of most samples and reports provided to them; thus, the EPA and states rely primarily upon voluntary compliance.

VIOLATIONS

Each year, states report more than 100,000 violations of EPA standards to the EPA. While most of these violations are failures to test or to report test results (posing potential risks if contamination problems are being overlooked, intentionally or not), more than 16,000 of these are EPA standard (MCL or TT) violations. These MCL and treatment technique violations often affect water systems serving more than 30 million people per year. According to EPA data audits, this figure seriously underestimates the actual number of violations of all types, since states fail to report most violations.

If a water system is reported to be in violation of EPA standards, states are supposed to be the first line of enforcement. If a state fails to take enforcement action, the EPA is required under the SDWA to formally notify the state and the PWS of the violation; the EPA must then initiate enforcement action itself. However, with the vast majority of violations (well over 90 percent)—even those known and reported to the EPA—no enforcement action is taken by the EPA or by states.

Most very large city water systems have not reported serious MCL or TT violations. This could be attributable simply to underreporting of violations, but NRDC’s review of the records found few such cases. (We acknowledge, however, that such violations may exist but may not have been detected.) There are some cases in which large cities have violated MCLs or TTs and in which the EPA or a state has taken enforcement action. For example, several cities including Boston have been sued for violating the Surface Water Treatment Rule, and others occasionally violate other EPA standards—such as Baltimore, which violated the turbidity standard and triggered a citywide boil-water alert in 2000. A few cities have been subject to enforcement actions for violating EPA rules for testing and reporting—Phoenix, for example, which settled an EPA enforcement case for $350,000 for allegedly violating monitoring and reporting rules repeatedly.

RIGHT-TO-KNOW REPORTS

For nearly the past 30 years, concerned citizens have been working through policy avenues to assert their right to know whether their drinking water is safe. The movement began in 1974, when the SDWA included a requirement that a PWS must issue
a public notice to all of its customers when it violates an EPA regulation. A serious
violation that poses an immediate health threat (such as a bacteria-contamination
problem) is subject to virtually immediate public notice. However, a 1992 General
Accounting Office (GAO) study and other information revealed that these public
notices were not being issued. In the rare cases when public notices were issued,
you often appeared only in small print in the “legal notices” section of newspapers. As a result, citizen organizations urged Congress to overhaul the public notice
provision of the SDWA; furthermore, citizens pushed Congress to adopt a right-to-
know provision in the SDWA that would enable citizens to be notified by PWSs
about what was in their drinking water.

During Senate-floor debate on the 1996 SDWA amendments, Senator Barbara
Boxer (D-CA) offered a revolutionary amendment requiring annual right-to-know
reports to be sent directly to each water customer, summarizing contaminants in tap
water and providing other pertinent drinking water–related information. The Senate
version was ultimately defeated, but House Representatives Henry Waxman (D-CA)
and Jim Saxton (R-NJ) urged the adoption of a similar amendment; it was eventually
signed into law. In 1998, after extensive regulatory negotiations with the water
industry, states, and environmental, public health, and other groups, the EPA issued
regulations implementing right-to-know requirements. The final right-to-know rules require specific information on, among other things:

- what contaminants are found in tap water
- what the water source is for the system
- any known pollution sources responsible for detected contaminants
- details on any violations during the past year

Under the SDWA and the EPA’s rules, the water system is responsible for:

- sending the report to all water system customers
- for making a good-faith effort (defined in the rules) to get the report into the
  hands of apartment dwellers and others who do not receive water bills

The reports are intended to be direct and understandable

The rules specifically provide that while systems can add nonrequired information,
that information must be “consistent with, and not detract . . . from the purpose of
the report”

Tables cannot be cluttered with irrelevant information on contaminants not
detected or presented with fractional decimal numbers that are hard to interpret

SOURCE WATER PROTECTION

Drinking water comes from either groundwater sources (underground formations
of rock, saturated soil, or glacial deposits called aquifers that are usually porous
and hold water) or from surface water sources, such as streams, rivers, or lakes.
Groundwater and surface waters have their own particular sets of pollution sources.
Major pollutants of city source waters include the following:

- **Municipal sewage.** Some cities have combined sewer systems, which convey
  stormwater runoff along with sanitary sewage and industrial waste. Runoff from
particularly heavy storms can result in combined sewer overflow (CSO), which occurs when the volume of rain or snow is greater than the capacity of the stormwater management system. In such events, sewage can make its way into drinking water supplies.

- **Polluted runoff.** When rainwater or snowmelt runs off roads, farmland, lawns, construction areas, and logging or mining sites, for example, it picks up pollutants such as oil, animal waste, lawn pesticides and fertilizers, and other contaminants, which can end up in drinking water supplies.

- **Pesticides and fertilizers.** Chemicals applied to farmland or by homeowners, golf courses, and commercial establishments can run off into surface water and leach into the groundwater, contaminating supplies.

- **Animal waste.** Animal waste from big animal feedlots, manure piles, and land application of manure can leach into groundwater and run off into surface waters, contaminating supplies.

- **Industrial pollution.** By-products from the manufacturing process can leach into groundwater and pollute surface water, contaminating supplies.

- **Hazardous waste.** Hazardous waste sites contain chemicals than can leach into groundwater or wash into surface water, contaminating supplies.

The health effects related to these contaminants are detailed in Chapter 2. In sum, some of the most common water quality contaminants include:

**Microbiological Contaminants**
- coliform bacteria, microbial contaminants whose presence is a potential indicator that disease-causing organisms may be present in tap water; fecal coliform and *E. coli* are a subset of this category
- *Cryptosporidium* (*Crypto*), a waterborne microbial disease-carrying organism that presents human health concerns, especially to individuals with weakened immune systems
- turbidity, cloudiness of water, which can indicate that water may be contaminated with pathogens presenting human health concerns

**Inorganic Contaminants**
- arsenic, a known and potent human carcinogen linked to a variety of diseases
- lead, which enters drinking water supplies from the corrosion of pipes or faucets and can cause permanent brain, kidney, and nervous system damage, as well as problems with growth, development, and behavior
- nitrates, from fertilizers or human or animal waste, which can cause shortness of breath, nausea, vomiting, diarrhea, and even death in infants
- perchlorate, which usually comes from rocket fuel spills or leaks at military facilities and harms the thyroid and may cause cancer

**Organic Contaminants**
- atrazine, a widely used pesticide, used largely on corn, that can damage major organs and may cause reproductive effects and cancer
dibromochloropropane, a banned but persistent pesticide that can cause cancer, sterility, and other adverse health effects
ethylene dibromide (EDB), a pesticide that can damage the liver, stomach, adrenal glands, and reproductive organs
halocetic acids, by-products of chlorine disinfection that may cause cancer
trihalomethanes, by-products of chlorine disinfection linked with cancer and (in preliminary studies) with miscarriages and birth defects

Radioactive Contaminants
• gross alpha radiation, which can result from the decay of radioactive minerals in underground rocks or as a by-product of the mining or nuclear industries and is known to cause cancer
• gross beta radiation, the product of eroding radioactive minerals or mining or surface disturbances that may mobilize radioactive minerals and a known human carcinogen
• radon, a radioactive gas known to cause lung cancer
• uranium, which is contained in minerals in the ground and sometimes released by mining or the nuclear industry and is radioactive and may cause cancer and kidney damage

ALTERNATIVES TO TAP WATER
WHAT ABOUT BOTTLED WATER?
Bottled water is big business. People who have decided to stop drinking tap water and are instead “voting with their bottles” of water are spending more than $4 billion a year. The trend is troubling: the right to drink healthy water should not be dependent on one’s economic status. Furthermore, bottled water is not a panacea; testing shows that some bottled waters may contain many of the same pollutants that tap water does. In fact, at least 25 percent of the bottled water sold in the United States is derived from tap water—some of which is subject to additional treatment, some not. As NRDC showed in a 1999 study entitled Bottled Water: Pure Drink or Pure Hype? bottled water is not necessarily any purer or safer than tap water. For that study, NRDC hired independent, certified labs to test more than 1,000 bottles of water, including 103 of the most popular brands. Some bottled water contained arsenic, trihalomethanes, bacteria, and a variety of other contaminants. While most of the bottled water was of good quality, about one-third of the bottled waters NRDC tested contained significant contamination (that is, levels of a chemical or bacterial contaminant exceeding those allowed under state or industry standards or guidelines) in at least one test.

What’s more, bottled water is certainly far more expensive than tap water: NRDC found that bottled water costs from 240 to more than 10,000 times more per gallon than tap water.

Moreover, NRDC found that the regulatory and government oversight program for bottled water is far weaker than the tap water regulatory program. In fact, the Food and Drug Administration (FDA), which has jurisdiction over bottled water, has rules for bottled water that are in many ways weaker than the EPA rules that apply to
city tap water. The FDA interprets its rules as exempting from all federal regulation many brands of bottled water (water that is bottled and sold in a single state, which in some states is the majority of bottled water). Furthermore, the FDA has exempted carbonated water, seltzer water, and many other waters from the specific bottled water contamination standards that do exist, applying only vague general sanitation rules that set no specific contamination limits.

The FDA also told NRDC that it had the equivalent of less than one staff person dedicated to developing and issuing bottled water rules, and the equivalent of less than one staff person dedicated to assuring compliance with these rules. State bottled water programs also are, in most cases, virtually paper tigers, with the equivalent of less than one person’s time dedicated to overseeing this industry.

Drinking bottled water is only one part of the equation. People who drink bottled water exclusively are still exposed to tap water contaminants, which are absorbed through the skin, inhaled, or ingested while showering, bathing, cooking, or washing dishes or clothes. For example, one primary way we ingest trihalomethanes and radon in tap water is not from drinking water but from inhaling air into which these contaminants evaporate—for example, while showering. A study by University of Maine investigators found that a person whose home has high levels of radon in the water inhales huge amounts of radioactivity simply by taking a shower. Similarly, trihalomethanes and other volatile organic chemicals have been shown to volatilize in the shower and be absorbed by the lungs when breathing. While bottled water of independently confirmed high quality may be a temporary solution to known tap water contamination problems or for vulnerable people, the long-term solution to our drinking water woes is to ensure tap water safety. Bottled water is far more expensive per household than the reasonable cost of upgrading and maintaining drinking water systems.

WHAT ABOUT HOME WATER FILTERS?

Many people turn to home water filters to remove contaminants from tap water—either under the sink or on the faucet (called point-of-use filters) or whole-house filters, which are installed where the water comes into the household (called point-of-entry devices). This may make sense for pregnant women, for those especially vulnerable to water contamination, and for those whose tap water problems are exceptionally serious. People who choose to use such filters should take the following steps:

▸ Consult your right-to-know report to identify which contaminants are in your tap water in order to buy a filter that removes those particular contaminants.

▸ Test your home water for lead or make sure your filter removes lead if you have a young child at home or if you are pregnant. (Some faucets release lead, so even an under-the-counter filter may not fix the problem.) To find a state-certified lab to test household water, consumers can check with the EPA’s drinking water hotline at 800-426-4791, or check the EPA’s website at www.epa.gov/safewater/privatewells/labs.html.

▸ Remember that many contaminants are absorbed through the skin or can be inhaled, so a point-of-use device on your sink will not solve the problem for
contaminants that you breathe or absorb when you shower or bathe. Some point-of-use devices do filter water at the showerhead, however.

- Insist on a filter that has been independently certified to remove the specific types of contaminants that you are worried about. For example, NSF International (www.nsf.org) has standards for filters and certifies them.
- Make sure that you maintain your filter at least as frequently as is recommended by the manufacturer. Better yet, buy a contract to have it regularly checked and maintained by a certified professional. Improperly maintained filters can make water contamination problems worse. For example, potentially pathogenic bacteria can build up on some poorly maintained filters, and breakthrough can occur if the filter media are not changed or regenerated often enough, allowing high concentrations of captured contaminants to suddenly break through into the drinking water.

As we concluded with respect to bottled water, home water filters can fulfill important needs for pregnant women and vulnerable people or can serve as temporary solutions to known tap water problems. Nonetheless, the long-term solution is to ensure that tap water is safe for everyone to drink.

**FOR PEOPLE WITH WEAKENED IMMUNE SYSTEMS**

People who are immunocompromised should consult with their health care providers about drinking tap water. The Centers for Disease Control (CDC) recommends that people with severely compromised immune systems not drink tap water. The CDC has offered detailed recommendations specifically to people with HIV/AIDS, but they are equally applicable to anyone who is seriously immunocompromised:

> You may wish to avoid drinking tap water. Because public water quality and treatment varies in the United States, you should check with your local health department and water utility to see if they have made any recommendations for HIV-infected persons about drinking local tap water. There are three extra measures you may wish to take to ensure that your drinking water is safe: boil your water, filter your water with certain home filters, or drink certain types of bottled water. Processed bubbly drinks in cans or bottles are probably safe also. If you choose to take these extra measures, take them all the time, not just at home. If your local public health office warns you to boil your water, don’t drink tap water unless you make it safe. Here are some extra measures you may wish to take to make sure your water is safe:

1. **Boiling water**: Boiling is the best extra measure you may wish to take to be sure that your water is free of Cryptosporidium and any other germs. You yourself can see that the water was boiled and that it was stored safely. Bring your water to a rolling boil and let it boil for one (1) minute. After your boiled water cools, put it in a clean bottle or pitcher with a lid and store it in your refrigerator. Use the water as you normally would. Ice made from contaminated water can also contain Cryptosporidium. To be safe, make your ice from boiled water. Water bottles and ice trays should be cleaned with soap and water before you use them. Do not touch the inside
of your water bottles or ice trays. If you can, clean your water bottles and ice trays yourself.

2. Filtering tap water: There are many different kinds of home water filters, but not all of them remove Cryptosporidium. If you want to know if a particular filter will remove Cryptosporidium, call NSF at 800-673-8010. NSF is an independent testing group. If you want a list of filters that remove Cryptosporidium, call, write, or fax NSF and ask for their “Standard 53 Cyst Filters” list. You can reach NSF at www.nsf.org.

NOTES


3 Ibid.


5 Five of the 19 cities (Fresno, Los Angeles, San Diego, and San Francisco) were presented in an earlier October 2002 California prerelease of this report.

6 Cities were selected to represent the broadest range of American city water supplies: criteria included a geographic range across the country; large cities (Los Angeles at 1.2 million) and small cities (Manchester, New Hampshire at 128,000); treatment types (unfiltered, such as Seattle, and filtered, such as Atlanta); systems that use primarily groundwater (like Albuquerque) and those that use primarily surface water (like Boston).


9 See note 2.

10 See, e.g., EPA, “Interim Enhanced Surface Water Treatment Rule,” 63 Fed. Reg. 69477 (December 16, 1998), which requires large water systems (serving more than 10,000 people) to upgrade their water filter operations to improve removal of Crypto.


12 “About American Water Works Company” available online at www.illinoisamerican.com/aboutus/about.html.


14 42 U.S.C. §300f et seq.; PWS definition at id. §300g(4).

15 Ibid. § 300g-1(b)(4)(A).

16 Ibid. § 300g-1(b)(4)(A)(D).

17 Ibid. § 300g-1(b)(6).

18 Ibid. § 300g-1(b)(7).

19 See EPA, “Surface Water Treatment Rule,” codified at 40 C.F.R. §§ 141.70-141.75, described in EPA Fact Sheet on Drinking Water Contaminants available online at www.epa.gov/safewater/source/therule.html#Surface.
20 See 40 C.F.R. § 141.80-141.91, described in EPA Fact Sheet on Drinking Water Contaminants, available online at www.epa.gov/safewater/source/therule.html#Surface.


24 42 U.S.C. § 300g-3(a).

25 See note 23.

26 Ibid., and see city-by-city text of this report.

27 42 U.S.C. § 300g-2(c)(1)-(3).

28 GAO, Drinking Water: Consumers Often Not Well-Informed of Potentially Serious Violations (1992); Erik Olson, Think Before You Drink (NRDC, 1993).

29 Ibid.

30 42 U.S.C. § 300g-2(c)(4).

31 40 C.F.R. § 141.151 et seq.

32 Ibid. § 141.153(b)(5).


35 See note 33. Also EPA600/R-00/096, Volatilization Rates From Water to Indoor Air Phase II, October 2000.