PREVENTION Report
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FOCUS

Safe Drinking Water is Fundamental to Public Health

Over the last several years, waterborne disease outbreaks, aggressive advertising of filters and home water treatment units, as well as new Federal regulations and information, have all led to greater public awareness and concern about the safety of drinking water in the United States. Levels of contaminants in drinking water that would not affect the health of average, healthy persons, can increase the health risks of those undergoing chemotherapy, very young infants, or the frail elderly. In 1999, 10 percent of the population was served drinking water that had violated Federal health standards.

Microbial Risks

Although water treatment and sanitation methods continue to improve, the threat of waterborne disease outbreaks persists. Animal feeding lots, sewer overflows, and development can all put sources of pathogens into close proximity to drinking water sources.

Drinking water comes from surface sources (lakes, rivers, reservoirs), or groundwater (wells or springs). Untreated surface water often contains waterborne pathogens; they can also be found in groundwater sources. Transmission of pathogens can also occur because of contaminated food and person-to-person or animal-to-person contact.

In 1900, typhoid and other diarrheal and enteric diseases were the third leading cause of death in the United States. After drinking water filtration and chlorination were introduced in the United States, the incidence of typhoid and other waterborne enteric diseases declined dramatically.

More recently, two waterborne pathogens, *Cryptosporidium* and *Giardia intestinalis*, have been associated with severe illness. Neither *Cryptosporidium* nor *Giardia intestinalis* multiplies in water, but chlorination is not effective against *Cryptosporidium*. However, modern methods of filtration such as membrane filtration have been effective in removing the parasite.

Giardiasis, an infectious diarrheal disease, has been linked to municipal drinking water contaminated with *Giardia intestinalis*, a microscopic parasite transmitted by water contaminated with fecal matter from humans or animals. Untreated mountain streams and rivers contaminated by feces also carry the parasite.

Giardia intestinalis is now known as one of the most common causes of waterborne disease in the United States. Giardiasis attacks three times as many children as adults. In 1989, the Environmental Protection Agency's (EPA's) Surface Water Treatment Rule required filtration and/or strict protection of surface water sources to protect

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SPOTLIGHT

Safe Groundwater: Who's Minding the Wells?

People who live in cities and towns rely on their water system or local government to monitor their drinking water and ensure its potability, or suitability for drinking, but people whose water comes from private wells must monitor their own water for contaminants. About 23 million people, mostly in rural areas of the United States, obtain their drinking water from groundwater sources such as private wells.

One potential contaminant of groundwater is the chemical methyl tertiary butyl ether (MTBE). MTBE is added to gasoline to boost octane and reduce carbon dioxide emissions under the reformulated gasoline program of the Clean Air Act Amendments. Sources of potential contamination include leaking underground storage tanks, leaking pipelines, emissions from older marine engines, and to a

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consumers from *Giardia intestinalis* in municipal water supplies.

Cryptosporidium, like *Giardia intestinalis*, is a microscopic parasite that affects the gastrointestinal tracts of humans and animals. It is introduced into the drinking water supply from fecal matter. Before 1993, few people had heard of *Cryptosporidium;* that year Milwaukee, Wisconsin, recorded the largest outbreak of cryptosporidiosis in the history of the United States. *Cryptosporidium* caused more than 400,000 residents in and around Milwaukee to become ill, killed at least 50 people whose immune systems were weakened by AIDS and cancer, and cost Milwaukee more than $55 million.

Since 1998, EPA has issued or proposed three new drinking water rules to protect against these and other microbial contaminants.

Chemical Risks

Waterborne pathogens, like *Giardia intestinalis* and *Cryptosporidium*, are not the only risks to drinking water. Industrial use of thousands of synthetic organic chemicals like PCBs, increased rapidly during World War II. Chemicals such as pesticides, plastics, and radioactive materials found their way into the environment and drinking water sources from waste incinerators, landfills, and even wastewater treatment facilities.

At the time, little thought was given to the risk of contaminating the environment and drinking water sources. Eventually, in 1962, the U.S. Public Health Service acknowledged the risk that natural and synthetic organic compounds pose to the Nation's water supply and issued the first set of National Drinking Water Standards. EPA has since established enforceable drinking water standards for dozens of chemicals.

Regulatory Response

In response to the growing environmental movement, the National Environmental Policy Act became law in January 1970. Forty-four organizations from nine Federal agencies were combined to form EPA in December of that year.

These and similar congressional actions in the 1970s provided many of the basic laws needed to protect the water quality and the environment. The Safe Drinking Water Act (SDWA), for example, authorizes EPA to protect drinking water in the United States by establishing safety standards for drinking water and requiring all public water utilities to comply with these standards. (A public water supply is defined as one that serves more than 25 persons or has more than 15 service connections.) Currently, EPA regulates 90 drinking water contaminants and has established practices to ensure that public water systems have the capacity and training necessary to ensure delivery of safe water.

EXAMPLES OF FEDERAL SAFE WATER PROJECTS

- The Centers for Disease Control and Prevention (CDC), in collaboration with the U.S. Environmental Protection Agency (EPA), conducts surveillance for waterborne disease outbreaks. When outbreaks occur, CDC often joins with State health departments and other Federal agencies to conduct investigations.
- CDC's National Center for Infectious Diseases and EPA are conducting studies to determine the incidence of illnesses from drinking water. Laboratory tools being developed at CDC are being used to better understand sources of water contamination and causes of waterborne outbreaks.
- CDC's National Center for Environmental Health (NCEH) is conducting a multiphase project to assess the extent of human exposure to naturally occurring toxins (e.g., neuro- and hepatotoxins produced by blue-green algae) in drinking water and to identify potential human health outcomes associated with these exposures.
- NCEH is conducting studies that focus on the public health impact of disinfection by-products. Disinfection by-products are produced when disinfectants are used to reduce microbial contamination in drinking water (e.g., chlorine). Epidemiologic studies have found associations between exposure to high levels of disinfection by-products and subsequent bladder cancer, spontaneous abortion, and birth defects.
- The National Institute of Environmental Health Sciences (NIEHS) National Toxicology Program (NTP), in collaboration with EPA, is also conducting toxicity and carcinogenicity studies of the potential public health impact of disinfection by-products. NTP studies also study disinfection by-products for their reproductive effects, birth defects, immunotoxicity, and neurotoxicity.
- NTP is collaborating with the Chemical Industry Institute of Toxicology (CIIT) to evaluate disinfection by-products by inhalation since some of these chemicals are volatile and exposure may occur during showers or during cooking.
- NTP is collaborating with EPA to evaluate chemical contaminants and naturally occurring toxins found in drinking water sources, which are not removed by standard drinking water treatment processes.

The latest amendments (1996) to SDWA contains a new focus on source water protection and the consumer's right to know. Source water protection means preventing initial contamination (thereby reducing the reliance on treatment of drinking water supplies) by managing potential sources of contamination.

Between now and 2003, States will examine the sources of the Nation's 170,000 public water supply systems to determine how susceptible they are to contamination. The results of these source water assessments must be made available to the public. Through these assessments, communities can learn about potential threats to their water supply and develop protection measures to lessen those threats.

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IN THE LITERATURE

Select Safe Drinking Water Resources

American Water Works Association
http://www.awwa.org/

Association of Metropolitan Water Agencies
http://www.amwa-water.org/

Association of State Drinking Water Administrators
http://www.asdwa.org/

Centers for Disease Control and Prevention (CDC), *Morbidity and Mortality Weekly Report*
http://www2.cdc.gov/mmwr/

CDC, National Center for Environmental Health
http://www.cdc.gov/nceh/ncehhome.htm

CDC, National Center for Health Statistics
http://www.cdc.gov/nchs/default

U.S. Environmental Protection Agency

Frequently Asked Questions
http://www.epa.gov/OGWDW/faq/faq.html

Children and Drinking Water Standards
http://www.epa.gov/safewater/kids/health.html

Office of Ground Water and Drinking Water
http://www.epa.gov/ogwdw/

Safe Drinking Water Hotline
1-800-426-4791

Local Drinking Water Information
http://www.epa.gov/safewater/dwinfo

healthfinder®, U.S. Department of Health and Human Services' free gateway to reliable consumer health and human services information
http://www.healthfinder.gov/

National Institutes of Health, National Institute of Environmental Health Sciences
http://www.niehs.nih.gov/

New York City Department of Environmental Protection
http://www.ci.nyc.ny.us/html/dep/home.html

New York State Department of Health
http://www.health.state.ny.us/

Tobacco Use

Cigarette Smoking and Invasive Pneumococcal Disease. J.P. Nuorti, et al. *New England Journal of Medicine,* 342(March 2000) 681-689.

Lowering the prevalence of cigarette smoking from 25 to 15 percent could prevent annually about 4,000 cases of invasive pneumococcal disease in adults aged 18 to 64.

Immunization

Vaccination Practices, Policies, and Management Factors Associated With High Vaccination Coverage Levels in Georgia Public Clinics. V.J. Dietz, et al. *Archives of Pediatrics & Adolescent Medicine,* 154(February 2000) 184-189.

Personal communication, efficient operations, financial incentives, and staff participation in decisionmaking are among the factors that can improve childhood immunization rates for vaccine-preventable diseases.

Heart

Olive Oil and Reduced Need for Antihypertensive Medications. L.A. Ferrara, et al. *Archives of Internal Medicine* 160 (March 27, 2000): 837-842.

Use of extra-virgin olive oil can reduce the daily dosage requirement for antihypertensive drugs in people with high blood pressure.

Mental Health and Mental Disorders

Adolescent Patients—Healthy or Hurting? Missed Opportunities to Screen for Suicide Risk in the Primary Care Setting. D.L. Frankenfield, et al. *Archives of Pediatrics & Adolescent Medicine,* 154 (February 2000) 162-168.

Training in suicide risk factors and appropriate interventions, together with improved screening tools, can help primary care providers identify and prevent potential suicides among their adolescent patients.

The Potential Role of an Adult Mentor in Influencing High-Risk Behaviors in Adolescents. S.R. Beier, et al. *Archives of Pediatric Medicine*, 154 (April 2000) 327-331.

Adolescents who had an adult mentor were less likely to engage in high-risk behaviors such as carrying weapons, using illicit drugs, smoking five or more cigarettes per day, and having more than one sex partner in 6 months.

Food Safety

Fluoride and Bacterial Content of Bottled Water vs Tap Water. J.A. Lalumandier, et al. *Archives of Family Medicine* 9 (March 2000): 246-250.
Some bottled water lacks fluoride and may be less pure than tap water.

Physical Activity

Physical Activity and Osteoporotic Hip Fracture Risk in Men. U.M. Kujala, et al. *Archives of Internal Medicine* 160 (March 13, 2000): 705-708.

Vigorous to moderate levels of physical activity protect men from future hip fractures.

SAVE THE DATE

HEALTHY PEOPLE 2010

Healthy People 2010 Consortium Meeting

"Implementing Healthy People 2010"
November 11, 2000
Boston, MA

Please call the APHA Housing Bureau at 1-888-244-3021 to reserve your room at the Westin Copley Place Hotel.

For more information, visit www.health.gov/healthypeople/partners/

ACTIVITIES

Meetings

International Conference on Emerging Infectious Diseases 2000. Sponsored by the National Center for Infectious Diseases, Centers for Disease Control and Prevention. Atlanta, GA. Visit *www.cdc.gov/ncidod/iceid2k.htm*. **July 16–19, 2000**.

NACCHO-ASTHO Second Bi-Annual Conference—Spotlight on Teamwork: A Vision for Public Health in the New Century. Los Angeles, CA. Visit *www.astho.org/annual.html*. **July 19–22, 2000**.

16th Annual National Marfan Foundation (NMF) Conference. Omaha, NE. NMF is a partner in the Coalition of Heritable Diseases. (800) 8-MARFAN, or e-mail *marfan2000@unmc.edu*. **July 19–22, 2000**.

29th Annual Meeting of the Association of American Indian Physicians (AAIP). Tucson, AZ. Visit *www.aaip.com*. **August 3–9, 2000.**

Visions 2000: National Conference of The Foundation Fighting Blindness. Orlando, FL. (800) 683-5555, or visit *www.blindness.org*. **August 10–12, 2000**.

2000 Annual Convention and Scientific Assembly of the National Medical Association (NMA). Washington, DC. (202) 347-1895, or visit *www.nmanet.org*. **August 12–17, 2000**.

28th Annual Institute and Conference. Capital Ideas, Monumental Solutions: Nursing in the 21st Century. Washington, DC. (301) 589-3200, e-mail *nbna@erols.com*, or visit *www.nbna.org*. **August 16–20, 2000**.

National Latina Institute for Reproductive Health: Connecting Women, Improving Health. Washington, DC. (202) 326-8970, or e-mail *nlirh@igc.apc.org*. **September 28–October 2, 2000**.

Exhibit

Respiratory Diseases

The National Library of Medicine's **"Breath of Life" Exhibit** has been extended, and will now run through March 31, 2001. Two weekly guided tours are offered. The exhibit provides a unique, interactive look at asthma, highlights experiences of people with asthma, and examines efforts to control and understand the disease. For more information, call the Exhibition Educator, Jiwon Kim at (301) 496-5963, or e-mail *jiwon_kim@nlm. nih.gov*.

Online

Environmental Health

The Office of Water Online Reference Library is a series of subject headings linked to lists of online documents. It contains lists of the Policy and Guidance documents in PDF format as part of the Access to Interpretive Guidance (AIG) / Enhanced Public Access task. This ongoing project lists Office of Water documents by subject in addition to current publications lists issued by the Office of Groundwater and Drinking Water, Office of Science and Technology, Office of Wastewater Management, and the Office of Wetlands, Oceans, and Watersheds. Visit *http://www.epa.gov/ow/library/*.

Public Health Infrastructure

The National Institutes of Health launched ***Clinical Trials.gov***, the first phase of a consumer-friendly database. *ClinicalTrials.gov* provides patients, families, and members of the public easy access to information about the location of clinical trials, their design, purpose, criteria for participation, and, in many cases, further information about the disease and treatment under study. The database has information on more than 4,000 federal and private medical studies at more than 47,000 locations nationwide. *Clinical Trials.gov* is a completely confidential Web site. Access the database at *http://clinicaltrials.gov/*.

Mental Health and Mental Disorders

The Internet Resources for Special Children (IRSC) Web site provides information and resources for parents, family members, caregivers, friends, educators, and medical professionals who interact with children who have disabilities. Visit *http://www.irsc.org/*.

Substance Abuse

A new report, **Substance Use in Popular Movies and Music**, sponsored by the Office of National Drug Control Policy and the Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, is based on studies that examined substance use in the 200 most popular movie rentals and 1,000 of the most popular songs of 1996 and 1997. It can be downloaded at *http://www.health.org/mediastudy/new.htm*.

Immunization

The Centers for Disease Control and Prevention announced the **2000 Childhood Immunization Schedule**. It includes changes made during the last year that ensure (1) vaccinations remain current with changes in manufacturers' vaccine formulations, (2) recommendations for the use of licensed vaccines are revised, and (3) recommendations for newly licensed vaccines remain safe and effective. The new immunization schedule may be accessed at *http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/mm4902a4.htm*.

In Video

Environmental Health

A free video, **E-Hazards: They're Out There...**, has the latest information about environmental hazards for kids. The story is told in "X-files" fashion with lots of humor, mystery, and discovery. It is intended for 2nd to 5th grade children. The 15-minute video follows two characters as they carry out their mission to identify environmental hazards or "E-Haz," such as household products and environmental smoke. Kids learn how to protect themselves from environmental hazards in and near their homes. A companion booklet for parents and teachers is also available. For more information, call Paula Flores-Gregg at (214) 665-8123 or email *flores.paula@epa.gov*.

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Under SDWA's new right-to-know rules, water systems must send annual water quality reports (known as consumer confidence reports) to their customers, describing, among other things, levels of contaminants in their drinking water and the likely sources of those contaminants. These reports must be delivered by July 1, each year. EPA has established a Local Drinking Water Information Web site, at http://www.epa.gov/safewater/dwinfo.htm, that allows individuals to get water quality information about their local water supply, including their state source water assessments.

Interagency Effort

Although EPA has primary regulatory responsibility in the Federal effort to protect the Nation's drinking water, many agencies under the U.S. Department of Health and Human Services, such as the Centers for Disease Control and Prevention (CDC) and the National Institute of Environmental Health Sciences (NIEHS), are involved in providing safe drinking water.

CDC works with EPA in coordinating surveillance and recording incidents and characteristics of waterborne disease outbreaks. CDC also joins with State health departments and other Federal agencies to examine unusual occurrences of death and illness, conducts epidemiological studies, and develops tests of human exposure to toxic and infectious agents.

NIEHS oversees multidisciplinary biomedical research programs like the National Toxicology Program (NTP) established in 1978 by the Secretary of Health and Human Services. NTP activities include coordinating toxicology research and testing activities, and informing regulatory and research agencies and the public about potentially toxic chemicals. NIEHS also is involved in prevention and intervention efforts, and community outreach.

Healthy People 2010, officially launched in January, contains several national health objectives that identify threats to a community's supply of safe drinking water and establish goals to prevent these threats. These objectives can serve as a guide for community action and education, and congressional research, program planning, and goal setting.

SPOTLIGHT

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lesser degree, from storm water runoff and air deposition.

MTBE can travel rapidly through the ground and into the groundwater, where it moves at nearly the same velocity as groundwater itself. Therefore, when gasoline leaks from an underground tank or is spilled, MTBE has a greater potential of contaminating drinking water.

Currently, there is limited information about the health effects of ingesting MTBE in drinking water. Most of the health-related research conducted to date has focused on adverse effects associated with inhaling MTBE. In animal inhalation studies using high doses of MTBE, results have been inconclusive: both cancerous and noncancerous health effects have been observed. In 1997, EPA issued a Drinking Water Advisory setting recommended limits on concentrations of MTBE between 20 and 40 parts per billion (ppb) or lower to protect against adverse taste and odor.

MTBE has been detected in an increasing number of drinking water supplies throughout the Nation (approximately 10% of wells tested). Studies have shown that MTBE is detected in groundwater more often and at higher concentrations in areas where reformulated gasoline is sold (i.e., where there is a fuel oxygenate mandate).

In Maryland, more than 200 well owners have complained of MTBE problems with their well water. The affected wells are generally on top of or near underground gasoline storage tanks. Federal law set 1998 as the deadline for upgrading or removing any storage tanks that leak, but there is evidence that newer tanks are also leaking.

The Maryland Department of the Environment is hoping to receive financing from its State legislature to conduct a study of the effects of MTBE on Maryland's groundwater; a bill has been introduced that would authorize the use of up to $300,000 per year for such a study.

MTBE is detected by a turpentine-like taste or smell in the water. If tests reveal high levels of MTBE, the well water can be filtered through carbon as it enters the home. Testing costs between $85 and $300 and is done by private laboratories.

Well owners can protect their groundwater supply by keeping contaminants such as gasoline and used motor oil away from the well area and out of septic systems and never mixing or using pesticides, fertilizers, degreasers, or other pollutants near the well.

To guard against MTBE and other contaminants, well owners also should periodically inspect the well for cracks or damage, disinfect the well once a year, have the well tested yearly for bacteria and nitrates, and have pumps and septic systems inspected periodically. Testing for nitrate and bacteria typically costs $10 to $20. EPA's Safe Drinking Water Hot-line (800-426-4791) can provide more information and access to its publications.

ETCETERA

The **State of Virginia has been awarded $2.3 million by the U.S. Environmental Protection Agency (EPA) to protect and improve drinking water supplies**. Virginia will contribute a matching share of $767,741. The EPA annually awards funds to States that assume primary enforcement of the Safe Drinking Water Act.

The grant allows the Virginia Department of Health to implement new drinking water regulations, promote the consumers' right to know about the quality of their drinking water, increase protection against contaminants, upgrade databases, and provide assistance to small, struggling public water systems.

The Virginia Department of Health also helps public water systems comply with the Safe Drinking Water Act by providing technical assistance, operator training, water sample analysis, and enforces the law against noncompliant public water systems.

The National Institute on Aging (NIA) has launched **a clinical trial to examine whether treatment with two nonsteroidal anti-inflammatory drugs (NSAIDs) will slow cognitive and clinical decline in patients with Alzheimer's disease**. The two NSAIDs are rofecoxib, a new selective cyclooxygenase (COX-2) inhibitor, and naproxen, a nonselective NSAID.

The Alzheimer's Disease Assessment Scale will be used as a primary outcome measure and will be used to evaluate a participant's memory, attention, reasoning, language, and orientation after 12 months. High scores and positive changes in scores from baseline evaluation in a patient will indicate increased impairment and cognitive decline.

NIA hopes to recruit 320 patients with probable Alzheimer's disease who are otherwise in general good health and randomly assign them to one of three treatment groups. The treatment groups will consist of patients given rofecoxib, patients given naproxen, or randomly select patients in the rofecoxib and the naproxen groups given a placebo. Participants will be followed for 14 months. The study will be conducted at 40 centers throughout the United States.

For more information, call NIA's Alzheimer's Disease Education and Referral Center at (800) 438-4380, or visit *http://www.alzheimers.org*.

OFFICE OF DISEASE PREVENTION AND HEALTH PROMOTION

The mission of the Office of Disease Prevention and Health Promotion (ODPHP) is to provide leadership for disease prevention and health promotion among Americans by stimulating and coordinating prevention activities. *Prevention Report* is a service of ODPHP. This information is in the public domain. Duplication is encouraged.

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

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