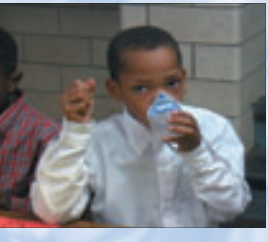
Tap into Prevention



Drinking Water Information for Health Care Providers

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Supplemental Materials:

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Accreditation, Designation, and Disclosure Statements and Learner Participation

The educational activity was developed by the Centers for Disease Control and Prevention (CDC) and the United States Environmental Protection Agency (EPA).

Use of trade names or commercial sources is for informational purposes only and does not constitute an endorsement by the United States Department of Health and Human Services, the Public Health Service, or EPA.

Views expressed by guest participants are not necessarily the views of the CDC or EPA.

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of the CDC and EPA. The CDC is accredited by the ACCME to provide Continuing Medical Education for physicians.

The CDC designates this educational activity for 1.25 Category 1 credit toward the American Medical Association Physician's Recognition Award. Each physician should claim only those credits that he or she actually spent in the activity.

This activity for 1.2 Contact Hours is provided by the CDC, which is accredited as a provider of Continuing Education in Nursing by the American Nurses Credentialing Center's Commission on Accreditation.

The CDC has been approved as an Authorized Provider of Continuing Education and Training programs by the International Association for Continuing Education and Training and awards 0.1 Continuing Education Units.

The CDC is a designated provider of Continuing Education Contact Hours in Health Education by the National Commission for Health Education Credentialing, Inc. This program is a designated event for the Certified Health Education Specialist to receive 1.0 Category I Contact Hour in Health Education, CDC provider number GA0082.

The CDC and our presenters wish to disclose they have no financial interests or other relationships with the manufacturers of commercial products, suppliers of commercial services, or commercial supporters of this Continuing Education activity.

Presentations will not include any discussion of the unlabeled use of a product or a product under investigational use.

Viewers may participate in the learning experience by emailing questions and comments to the organizations and associations listed in the

Resources sections of this booklet, and by using their websites.

CE credit is available only through CDC/ATSDR's website, "Training and Continuing Education OnLine," at *www.phppo.cdc.gov/phtnonline*. See the instructions on the following page to learn how to register for credits.

The origination date of this educational activity is May 13, 2004. Continuing Education Credit for these Enduring Materials will expire on May 12, 2007.

CDC Continuing Education Activity Numbers:
VHS format: VC 0070
DVD format: DV 0001

How to Apply for Continuing Education Credit

Continuing Education (CE) Credits are available for various professions through CDC/ATSDR's Training and Continuing Education OnLine System based on 62 minutes of instruction (1.25 CME, 1.2 CNE, .1 CEU, 1.0 CECH).

Follow these 4 easy steps to obtain CE Credit:

1. Go to the Training and Continuing Education OnLine Website (*www.phppo.cdc.gov/phtnonline*) OR link to the site from *www.epa.gov/safewater/healthcare*. If you have never used this system, you will need to create a Profile and establish a login ID and password. At the home page, *www.phppo.cdc.gov/phtnonline*, click on New Participant and follow the prompts.)

2. One you have created a Profile go to the home page of *www.phppo.cdc.gov/phtnonline* and click on Participant Login. When the yellow box appears, put in your login and password. It will lead you to a Participant Services page with 4 icons that will allow you to move about in the system as you wish.

3. Click on the Search and Register icon and register for this particular course so the system knows what to give you credit for. You can search by 3 different options: using the

title, “Tap Into Prevention: Drinking Water Information for Health Care Providers,” or using the course number VC 0070 or DV 0001, or using the key words “drinking water.”

4. Return to the “icon” page by looking to the left of the screen in the gray shaded area and click on Participant Services. Click on the Evaluation and Tests icon and follow the prompts to complete the evaluation. The system will then give you an opportunity to print out your certificate.

Objectives

After watching this video, you will be able to:

- Name four health problems related to contaminants in drinking water
- Identify the types of patients most sensitive to each health problem
- Describe how contaminants can enter drinking water supplies
- Identify the treatment methods that remove the contaminants
- List clinical findings that should prompt reporting suspicion of a waterborne disease to the local health department
- Describe how patients can learn about the quality of their drinking water
- Describe the role of health care providers in a public health network that identifies and responds to waterborne illness
- List resources for further information on drinking water and health

Key Concepts

The following information represents some contaminants to which certain patients may be particularly sensitive.

Cryptosporidium parvum. *Cryptosporidium parvum* is a pathogen found in human and animal fecal waste. It can enter the rivers, lakes and streams and rarely, ground water that contribute to drinking water supplies. Because of it's small size and composition, it is resistant to typical filtration and disinfection methods—though EPA has tightened its standards in recent years requiring public water systems specifically to address this contaminant.

- Exposure to *Cryptosporidium parvum* in drinking water may cause gastrointestinal problems, such as diarrhea, vomiting, and cramps. Patients whose immune systems are weakened by AIDS, chemotherapy, a recent transplant or other reasons are most vulnerable. Diarrhea and vomiting may cause infants and the frail elderly to become dehydrated more quickly. In most healthy adults and children, the problems are temporary. Other, more common routes of exposure to this pathogen are food, unsanitary diaper-changing practices, person-to-person-contact, and swimming in contaminated water.

- Suggested interventions: Sample stools more frequently. Include questions on water sources for patients with diarrhea. Those with questionable water sources require further investigation. Most standard ova and parasite cultures do not automatically test for *Cryptosporidium*. Be sure to specifically request an acid-fast fluorescent test.

Escherichia coli or E. coli. *E. coli* is a type of fecal coliform bacteria commonly found in the intestines of animals and humans. The presence of *E. coli* in water is a strong indication of recent sewage or animal waste contamination. Sewage may contain many types of disease-causing organisms. Although most strains of *E. coli* are harmless and live in the intestines of healthy humans and animals, a particular strain, ***E. coli 0157:H7***, produces a powerful toxin and can cause severe illness.

- Most infections of *E. coli O157:H7* are believed to have come from eating undercooked ground beef. However, some have been waterborne, and people have become sick after drinking contaminated water.

- Infection by *E. coli 0157:H7* is characterized by severe bloody diarrhea and abdominal cramps, although sometimes the infection causes non-bloody diarrhea, often with no fever. **In some people, particularly children under 5 years of age and the**

elderly, the infection can also cause a life-threatening complication called hemolytic uremic syndrome, in which the red blood cells are destroyed and the kidneys fail. Hemolytic uremic syndrome is usually treated in an intensive care unit, and blood transfusions and kidney dialysis are often required.

- Suggested interventions: Encourage patients (or their parents) to have household well water tested annually for nitrates and bacteria by a state-certified laboratory. If a patient's well tests positive for *E. coli*, people in the household should not drink the water without boiling it for at least one minute at a rolling boil—longer if they live at high altitudes. The well may also be disinfected according to procedures recommended by the local health department. Water must be monitored periodically after disinfection to make certain the problem does not recur. If contamination is a recurring problem, patients should investigate the feasiblity of drilling a new well or installing a point-of-entry disinfection unit using chlorine, ultraviolet light, or ozone.

Disinfectants and Disinfection Byproducts (DBPs). Disinfectants, while effective in controlling many microorganisms, react with matter in water to form DBPs. Unchlorinated private well water is unlikely to contain any DBPs.

- While health effects from exposure to disinfectants and DBPs vary by contaminant, some epidemiological studies have shown a link between bladder, rectal, and colon cancers and DBP exposure. Additionally, human epidemiological studies report an association between chlorinated drinking water and reproductive and developmental endpoints such as spontaneous abortion, neural tube defects, pre-term delivery, intrauterine growth retardation, and low birth weight. In August 2003, EPA proposed measures beyond those already required for public water systems.

- Suggested interventions: Drinking plenty of water from a safe source during pregnancy is important. If your patients' public water system has notified customers of a DBP violation, follow instructions from the public water system. For example, your patients might want to consider alternatives to tap water during pregnancy.

Lead. Paint chips and dust from lead paint in old buildings are the primary routes of children's exposure to lead, but EPA estimates that up to 20 percent of a person's background exposure may be due to lead in drinking water—and the percentage is higher for infants drinking formula mixed with contaminated drinking water. Lead may be present in drinking water because of corrosion of household plumbing systems; erosion

of natural deposits. In some communities, lead service lines can also contribute to high levels of lead in drinking water.

- **In infants and young children, continuous exposure to high levels of lead may result in delays in physical or mental development, deficits in attention span, and learning disabilities.**

- For adults, such exposure may result in kidney problems or high blood pressure.

- Suggested interventions: Look for symptoms of lead poisoning in children, and test infants' blood lead levels. If a child's blood lead level is high, consider lead in tap water as a possible factor, in addition to lead paint exposure. Encourage patients to have drinking water tested for lead in homes, schools, and day care centers by a state-certified laboratory. Encourage local schools and day care centers to test their drinking water outlets for lead.

- Use only cold water for drinking, cooking, and especially making baby formula. It's important to consider that foods that absorb all of the water in the pot, such as rice and dried beans, will also absorb all of the lead that is in the cooking water. Soups made or mixed with water will also contain any lead that's in the water. Foods cooked in water

and then drained, such as pasta, meat, or vegetables, also absorb some lead from the water.

- If lead levels in drinking water are high, consider alternatives to using boiled tap water in baby formula.

- Information and brochures are available from the National Lead Information Center, (800) 424-LEAD [5323], *www.epa.gov/lead/nlic.htm*

Nitrates and Nitrites. Nitrates may run off or percolate into water sources from excessive fertilizer use and animal waste; leaching from improperly constructed or maintained septic tanks, cesspools, sewage; or erosion of natural deposits.

- Exposure to nitrates in drinking water at levels above the drinking water standard may result in ***methemaglobinemia, or "blue baby syndrome" in infants under six months***. Blue baby syndrome is life-threatening without immediate medical attention. Infants most likely to get methemoglobinemia are those who are already sick and 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.

- Possible interventions: Encourage patients to have household well water tested annually for nitrates and bacteria by a state-certified laboratory, especially those caring for infants and expectant parents and grandparents. If water has high nitrate levels, consider alternatives to using boiled tap water in baby formula. Boiling water only increases nitrate concentrations.

Drinking Water Security. Events of September 11, 2001, have brought into focus the possibility of intentional contamination of drinking water and wastewater infrastructure. Doctors, nurses, and others in primary care would likely be the first to observe unusual illness patterns or disease trends resulting from intentional biological or chemical contamination.

"Recognizing Waterborne Disease and the Health Effects of Water Pollution: A Physician On-line Reference Guide," by Patricia L. Meinhardt, MD, MPH, MA, includes a section, ***"Physician Preparedness for Acts of Water Terrorism."*** It is available at *WaterHealthConnection.org*.

Recognize, Report, and Prevent Waterborne Illness

- ✔ Report suspicion of waterborne illness to your local health department.
- ✔ Take an environmental health history that includes, "What is the source of drinking water?"
- ✔ Familiarize yourself with your patients water supply. Annual water quality reports are a good first source of information on local public water systems. Household well owners are responsible for making sure their wells are tested regularly and maintained properly. A free booklet, "Drinking Water from Household Wells," is available at *www.epa.gov/safewater/privatewells/booklet/index.html*.

Drinking Water Resources

EPA Office of Ground Water and Drinking Water

Together with states, tribes, and our many partners, the Office of Ground Water and Drinking Water protects public health by ensuring safe drinking water and protecting ground water. EPA's Safe Drinking Water Hotline provides information about drinking water and ground water protection programs authorized under the Safe Drinking Water Act. (800) 426-4791
www.epa.gov/safewater

CDC Division of Parasitic Diseases

The mission of the division is to prevent and control parasitic diseases in the United States and throughout the world and to increase survival of children in developing countries, through surveillance and by conducting laboratory and epidemiological research.
www.cdc.gov/ncidod/dpd/healthywater

Home Water Testing

Your state Certification Officer can provide a list of laboratories certified to test for contaminants in drinking water.
www.epa.gov/safewater/faq/sco.html

Household Wells

Home*A*Syst

Provides information to help farmers and rural residents assess pollution risks and develop management plans to meet their unique needs. *www.wisc.edu/farmasyst*

Wellcare® Hotline

(888) 395-1033
Through wellcare®, the Water Systems Council provides rural well owners, other technical assistance providers, water system operators, and community leaders important information and training on how to properly design, operate and manage well-based systems.
www.watersystemscouncil.org/wellcare

DrinkWell™ Well Water Testing

Underwriters Laboratories' well testing service also has a nurse call center and provides sources of information. For questions regarding ordering, sample collection and shipping, call 888-503-5544. *www.uldrinkwell.com*

National Ground Water Association

This National Ground Water Association's Wellowner web site offers a variety of information relating to ground water and private water well systems. *www.wellowner.org*

Home Water Treatment Units

Water Quality Association

The Water Quality Association is a not-for-profit international trade association representing the household, commercial, industrial, and small community water treatment industry.
www.wqa.org

NSF International

NSF International's Home Water Treatment Devises web page includes information on selecting and using water treatment devices.
www.nsfconsumer.org/water/dw_treatment.asp

Underwriters Laboratories

Underwriters Laboratories tests and certifies home water treatment units to ensure they meet national standards. *www.ul.com/water*

Bottled Water

International Bottled Water Association

This trade association requires members to adhere to its model code, in addition to meeting federal requirements for bottled water.
www.bottledwater.org

NSF International

NSF International tests bottled water products for compliance with federal guidelines and lists bottled water companies certified through its voluntary certification program.
www.nsfconsumer.org/water/bottled_water.asp

Protecting Drinking Water Sources

EPA's Source Water Protection Program

EPA has information on preventing contamination of streams, rivers, lakes and underground aquifers that supply private wells and public drinking water.
www.epa.gov/safewater/protect.html

Groundwater Foundation

The Groundwater Foundation educates and motivates people to care for and about ground water through water festivals and other activities. Its Groundwater Guardian program encourages communities to begin and enhance ground water awareness and protection activities.
www.groundwater.org

American Ground Water Trust

This educational organization protects ground water and promotes resource sustainability; communicates the value of ground water; showcases science and technology solutions; increases awareness; and facilitates stakeholder participation in water resource decisions.
www.agwt.org

Ground Water Protection Council

The Ground Water Protection Council is a national association of state ground water and underground injection control agencies whose mission is to promote the protection and conservation of ground water resources for all

beneficial uses, recognizing ground water as a critical component of the ecosystem. *www.gwpc.org*

National Ground Water Association

The National Ground Water Association's mission is to enhance the skills and credibility of all ground water professionals, develop and exchange industry knowledge and promote the ground water industry and understanding of ground water resources. *www.ngwa.org*

Water Systems Council

The Water Systems Council is a national non-profit organization, dedicated to promoting the wider use of wells as modern and affordable safe drinking water systems and to protect ground water resources. *www.watersystemscouncil.org*

Additional Resources for Health Professionals

This list is not meant to be exhaustive, but includes opportunites for further continuing education on drinking water and resources on environmental health.

"Recognizing Waterborne Disease and the Health Effects of Water Pollution," an online reference guide; up to 22 Continuing Medical Education credits and continuing education credits for other professions are sponsored by American College of Preventive Medicine. By Patricia Meinhardt, MD, MPH, MA Includes a repository of information on how to detect biological and chemical weapons exposure and respond appropriately. *www.waterhealthconnection.org*

"Waterborne Disease and Water Pollution: What Every Physician in Your Community Needs to Know." This American College of Preventive Medicine Institute contains 10 presentations by various physicians and water professionals in streaming video and audio. Speakers provide a clinical overview of diagnosis and management of waterborne disease and health effects of water pollution, as well as strategies for risk communication to discuss these environmental health issues with patients. The sessions also address challenges facing the water utility

community, tasked with providing safe drinking water in America.
www.acpm.org/ehealth/waterborne.htm
Drinking Water and Disease: What Every Health Care Provider Should Know, Physicians for Social Responsibility
www.envirohealthaction.org/upload_files/dwprimer.pdf

"Environmental Health and Nursing," a developing educational series designed to assist nurses integrating environmental health knowledge and skills in professional practice through distance learning. CEU and graduate credits available.
University of Minnesota School of Public Health,
http://mclph.jawshotel.umn.edu/pubh7201

University of Maryland School of Nursing EnviRN Website
A Virtual Resource for Environmental Health and Nursing
www.envirn.umaryland.edu
EnviRN's gateway to an array of resources including multimedia content:
envirn.umaryland.edu/resources/resources.htm

Environmental Health and Nursing Practice, by Barbara Sattler, RN, DrPH, and Jane Lipscomb, RN, PhD, FAAN, Editors, *www.springerpub.com/store/page 4282_6.html*

National Environmental Education and Training Foundation Health Publications
Includes links to information for health care providers on pesticides, ranging from national strategies to medical and nursing practice guidelines. *www.neetf.org/Health/publications.sthm*

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