WATER & HEALTH SERIES

Bottled Water Basics

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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Advice for people with severely compromised immune systems

Some people may wish to take special precautions with the water they drink. In particular, people with immune systems that are weakened by AIDS, chemotherapy or transplant medications are more vulnerable to microbial contaminants in drinking water such as *Cryptosporidium*.

Cryptosporidium is a microscopic parasite that lives in the intestine of infected animals and humans. It passes in the stool in its dormant oocyst form. The oocyst is protected by and outer shell that allows it to survive outside the body for long periods of time and makes it very resistant to chlorine-based disinfectants. It occurs mainly in surface water sources, such as lakes, streams and rivers. In healthy adults, *Cryptosporidium* can cause illness, but for people with weakened immune systems, it can cause severe illness and even death.

Those who wish to take extra measures to avoid waterborne cryptosporidiosis can bring their drinking water to a boil for a full minute. ***Boiling water is the most effective way of killing Cryptosporidium***. As an alternative to boiling water, people may use the following measures:

Bottled water basics

Bottled water is the fastest growing drink choice in the United States, and Americans spend billions of dollars each year to buy it (Beverage Marketing Corporation, 2004) Some people drink bottled water as an alternative to other beverages; others drink it because they prefer its taste or think it is safer than their tap water.

Whether it travels through a pipe to your home or comes packaged in a bottle, safe drinking water is essential to good health. All our drinking water comes from similar sources, either from sources we can see, such as rivers and lakes, or from sources we can't see, such as underground aquifers.

In the same way that tap water's taste and quality may vary from place to place, so too does bottled water's taste and quality vary among and even within brands. The taste and quality of both bottled water and tap water depend on the source and quality of the water, including its natural mineral content and how, or if, the water is treated.

Drinking water (both bottled and tap) can reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. For example, minerals such as magnesium and calcium give water a distinctive flavor, and are essential to the body. At high levels, however, these and other contaminants, such as pesticides or microbes from human wastes, can cause adverse effects or illness.

To make sure that all water is safe to drink, the U.S. Environmental Protection Agency (EPA) and the U.S. Food and Drug Administration (FDA) set drinking water standards. EPA sets standards for tap water provided by public water suppliers; FDA sets standards for bottled water based on EPA standards. Bottled water and tap water are both safe to drink if they meet these standards, although people with severely weakened immune systems or other specific health conditions may wish to further treat their water at home or purchase high quality bottled water.

FDA regulates bottled water as a packaged food under the Federal Food, Drug and Cosmetic Act and has established standards of identity and quality for bottled water. FDA has also established good manufacturing practice requirements for processing and bottling drinking water.

EPA encourages all Americans to learn more about the quality of their drinking water, both tap water and bottled water, before deciding whether to drink tap water, bottled water, or both. If your water comes from a public water system, the best way to learn more about tap water is to read your water supplier's annual water quality report. If your water comes from a household well, EPA recommends testing the water regularly for bacteria, nitrates, and other contaminants. The best way to learn more about bottled water is to read its label, or contact the producer directly.

Point-of-use filter

Consider only point-of-use (personal use, end-of-tap, under sink) filters that remove particles one micrometer or less in diameter. Filters that use reverse osmosis, those labeled as "absolute one micron filters," or those certified by an American National Standards Institute (ANSI) - accredited organization to ANSI/NSF Standard 53 for "Cyst Removal" provide the greatest assurance of removing *Cryptosporidium*. As with all filters, follow the manufacturer's instructions for filter use and replacement.

Bottled water

Treatment of bottled water by reverse osmosis, distillation, ultraviolet light, or filtration with an absolute one micron filter before bottling protects against *Cryptosporidium*. Bottled waters derived from protected well and spring water sources are less likely to be contaminated by *Cryptosporidium* than those containing untreated municipal drinking water from less protected sources such as rivers and lakes.

Those who choose to take these precautions should remember that they can be exposed to waterborne pathogens through water used for brushing teeth, making ice cubes, and washing fruits and vegetables – not just through water they drink.

Know what you're buying

Bottled water is much more expensive, per gallon, than tap water. Because of this, consider whether you are buying it as a healthy alternative to bottled beverages, for its taste, or for other reasons.

Bottled Water Terms

The following terms are frequently used on bottled water labels to describe the water's characteristics, sources, and methods of treatment.

Artesian water, ground water, spring water, well water - water from an underground aquifer which may or may not be treated. Well water and artesian water are tapped through a well. Spring water is collected as it flows to the surface or via a borehole. Ground water can be either.

Distilled water - steam from boiling water is recondensed and bottled. Distilling water kills microbes and removes water's natural minerals, giving it a flat taste.

Drinking water – water intended for human consumption and sealed in bottles or other containers with no ingredients except that it may optionally contain safe and suitable antimicrobial agents. Fluoride may be added within limitations set in the bottled water quality standards.

Mineral water - Ground water that naturally contains 250 or more parts per million of total dissolved solids.

Taste considerations

Many people prefer bottled water because of its taste. The taste of all water has to do with the way it is treated and the quality of its source, including its natural mineral content. Most bottled water comes from a ground water source, where water quality varies less from day to day, or is treated and immediately bottled. Bottled water from a dedicated source or plant may have a more consistent taste than tap water, which mostly comes from surface source and must travel through pipes to reach homes.

One of the key taste differences between tap water and bottled water is due to how the water is disinfected. Most tap water is disinfected with chlorine or chloramine to kill disease-causing germs. Water systems us these disinfectants because thery are effective and inexpensive, and they continue to disinfect as water travels through pipes to homes and businesses. Bottled water that is disinfected is typically disinfected using ozone or other technologies such as ultraviolet light or chlorine dioxide. Ozone is preferred by bottlers, though it is more expensive than chlorine, because it does not leave a taste and because bottlers do not need to worry about maintaining post-treatment disinfectant levels for water sealed in a container. Untreated water, whether from a bottle or from a tap, will have the characteristic taste of its source.

Purified water - water that originates from any source but has been treated to meet the U.S. Pharmacopeia definition of purified water. Purified water is essentially free of all chemicals (it must not contain more than 10 parts per million of total dissolved solids), and may also be free of microbes if treated by distillation or reverse osmosis. Purified water may alternately be labeled according to how it is treated.

Sterile water - water that originates from any source, but has been treated to meet the U.S. Pharmacopeia standards for sterilization. Sterilized water is free from all microbes.

Note: Carbonated water, soda water, seltzer water, sparkling water, and ***tonic water*** are considered soft drinks and are not regulated as bottled water.

Begin by reading the label

To learn about the quality of bottled water, begin by reading the label. In addition to the volume of water, any pertinent nutritional claims, any contact information for the bottler, the label may include the type of bottled water, its source, and the way in which it is treated. For more specific information, you may need to contact the bottler directly.

Type of water and source:

Bottlers use standard identifiers, prescribed by FDA regulations, to describe their water (Bottled water terms, pgs 4 and 5), but the meanings may be different than you expect. These terms refer to both the geological sources of the water and the treatment methods applied to the water. The terms don't necessarily describe the geographic location of the source or determine its quality.

For instance, "spring water" can be collected at the point where water flows naturally to the earth's surface or from a borehole that taps into the underground source. Other terms used on the label about the source, such as "glacier water" or "mountain water," are not regulated standards of identity and may not indicate that the water is necessarily from a pristine area. Likewise, the term, "purified," refers to processes that remove chemicals and pathogens. "Purified water" is not necessarily free of microbes – though it may be.

Common Bottled Water Treatments

Distillation - water is boiled, and the steam is condensed to remove salts, metals, minerals, asbestos, particles, and some organic materials.

Microbes are killed, including ***Cryptosporidium.***

Micron Filtration - water is filtered through screens with microscopic holes. The smaller the filter holes, the more contaminants the filter can remove. Good filters can remove most chemical contaminants and microbes. Filter holes are measured in microns, the period at the end of this sentence is 500 microns. When considering filter size, look for an ***absolute*** (the largest hole), not nominal (the average hole) rating. An absolute one micron filter is needed to remove ***Cryptosporidium.***

Ozonation - water is disinfected using ozone, which kills most microbes, depending on dosage applied.

Reverse Osmosis - water is forced under pressure to pass through a membrane, leaving contaminants behind. This process removes all microbes, minerals, color, turbidity, organic and inorganic chemicals.

Ultraviolet (UV) light - water is passed through UV light, which kills most microbes, depending on dosage applied.

Bottled water must be tested and meet regulatory standard before it can be sold in the U.S. See page 8 for details. Bottled water, like tap water, can come from a ground water source, such as a well or spring, or a surface water source, such as a river or stream. Most bottled water comes from a ground water source. Ground water is typically less vulnerable to contamination than water from surface sources. However, ground water can still contain naturally high amounts of certain contaminants, including radioactive elements, arsenic, and nitrates, or be vulnerable to contamination from human activities, such as industrial waste, faulty septic systems, and underground gas or chemical tanks.

Some bottled water comes from surface water sources. This water typically comes from a public water system and receives additional treatment, such as filtration and disinfection, before it is bottled.

Bottlers must list on the label the type of bottled water (such as spring water, mineral water, or drinking water). If the water comes from a public water system and has not been treated to meet FDA's definition of "purified" or "sterile" water, the label must state that the source is from a community water system.

Contaminants and methods of treatment:

If you are concerned about a particular contaminant in your drinking water, consider the following questions: Is the source water likely to contain the contaminant? Has the water been treated to remove the contaminant?

Water that originates from a protected ground water source is less likely to contain certain contaminants (such as disease-causing microbes), but not all ground water is protected, and no water is guaranteed to be completely free of contaminants.

If you use a water cooler, remember to clean and sanitize it regularly according to the manufacturer's instructions.

The best way to know if the water you are drinking is free from the contaminant(s) you are concerned about is to contact the bottler and ask for the latest testing results and whether the water has been treated to remove the contaminant.

Many public water systems add fluoride to their water; most bottlers do not. If bottled water is fluoridated, it must indicate so on the label, though bottled water and tap water both can contain naturally occurring fluoride. Check with your public water system or bottler to find out if the water you drink contains fluoride.

Certification

Neither EPA nor FDA certify bottled water. However, consumers may notice a logo or seal from two other organizations on the label.

The International Bottled Water Association (IBWA) is a trade organization for water bottlers. IBWA members must meet the organization's "model code" and are subject to annual inspections by an independent third party. Bottlers belonging to IBWA frequently indicate membership on their labels.

NSF International - Bottled water certified by NSF undergoes additional testing unannounced by annual plant inspections. NSF certifications mean that the bottler complies with all applicable FDA requirements, including good manufacturing practices.

Underwriters Laboratories, Inc. (UL) is an independent, accredited testing and certification organization that tests bottled water to FDA, state, and IBWA model code requirements.

FDA Bottled Water Standards

Any bottled water sold in interstate commerce in the United States, including products that originate overseas, must meet the following minimum federal standards (check with your state health department to see what bottled water standards exist for brands produced, bottled, and sold entirely in one state):

Bottled water must meet FDA standards for physical, chemical, microbial, and radiological contaminants. When EPA sets a new standard for a contaminant in tap water, FDA must establish a new standard for the same contaminant in bottled water or find that EPA's new standard is not applicable to bottled water.

Bottlers must include the name of the product and type of water; the name and address of the manufacturer, packer, or distributor; and the net content on their labels.

New bottled water sources must be approved by a state or local jurisdiction. Bottlers must also test their sources and finished bottled water products at least once a week for microbiological contaminants and at least once a year for physical, chemical, and radiological contaminants. If bottled water is found to be adulterated or hazardous to health, it is subject to FDA enforcement action, such as seizure of domestic products and refusal of entry of imports.

Bottlers must operate their plants in accordance with FDA's good manufacturing practices to ensure that their bottled water products are safe and produced under safe and sanitary conditions.

Contact EPA for standards for the tap water provided by public water systems, or see www.epa.gov/safewater/mcl.html.

For more information on bottled water:

Contact the bottler directly, ask for its latest testing results, and compare these results with EPA's tap water standards (www.epa.gov/safewater/mcl.html) or FDA's bottled water standards to determine its quality.

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For more information about tap water:

To learn about the quality of your tap water, contact your water supplier and ask for the annual consumer confidence report. This report will list what contaminants have been detected in the water, and how those levels compare with EPA's standards.

EPA's Safe Drinking Water Hotline
1 (800) 426-4791
www.epa.gov/safewater *- includes drinking water standards, state certification officers for water testing, and information for household well owners.*

www.epa.gov
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