



Naples
Community
Health
Awareness

An important Public Health Evaluation is underway under the guidance of the Navy and Marine Corps Public Health Center. The Public Health Evaluation is designed to evaluate the potential short and long-term health risks associated with living in the Naples area as a result of inadequate trash collection, uncontrolled open burning of uncollected trash, and widespread dumping of waste, including chemical and other hazardous waste.

Launched in 2008, the Public Health Evaluation involves the collection of air, water, soil and soil gas samples from throughout the region to identify whether there are potential health risks.

For details and background information, visit the website listed at the bottom of this page.

Your Health: Facts for Navy Families in Naples

About: Drinking Water Disinfection

The U.S. Navy is committed to ensuring our families are safe while serving our country at home or overseas. The following information is provided as part of a wide-ranging effort to understand the health risks of our personnel and families living in Naples, Italy. Currently underway is a comprehensive Public Health Evaluation to assess potential short and long-term health risks associated with living in the Naples area (see sidebar). In line with our commitment to continually share important health information, we encourage you to review the following information.

What is drinking-water disinfection?

Drinking-water disinfection is a step in the treatment of most public drinking water systems that removes disease-causing bacteria, fungi and viruses (e.g., E. coli).

How is drinking-water disinfected?

In Italy and much of Europe, chlorine dioxide is the preferred chemical for disinfecting drinking water. Other facilities use sodium hypochlorite or ultraviolet (UV) light. See the fact sheet, "Water Quality" on the Naples Community Health Awareness website, <https://www.cnic.navy.mil/Naples/Programs/HealthAwareness/FactSheets/index.htm>.

What type of disinfection is used in the United States for water treatment?

According to 1998 data from the American Waterworks Association, the majority of water system operators in the United States (serving more than 10,000 persons) use chlorine gas or sodium hypochlorite. However, no single disinfection method is right for all facilities. The U.S. Environmental Protection Agency (USEPA) sets minimum standards for protection against microbes (e.g., a microorganism, especially a bacterium that causes disease) and limits levels of byproducts. Disinfection byproducts are chemical substances that can form during a reaction of a disinfectant with naturally present organic matter in the water. An example of disinfection byproducts are a class of chemicals called "trihalomethanes." The USEPA does not dictate which disinfection methods to use. Each disinfection technology has unique benefits, limitations and costs. Individual water system operators consider all these factors and choose disinfection methods based on local water quality conditions and the needs and resources of the communities they serve.

Is drinking-water in the Naples area disinfected?

Drinking-water in the Naples area that is supplied by an authorized municipal water supplier is disinfected prior to distribution to the public. However, tap water testing conducted as part of Phase I of the Naples Public Health Evaluation shows low levels of contamination from volatile organic compounds and bacteria in some off-base rental homes serviced by the city water supply. There are a few potential causes for this contamination:

- There may be illegal connections from private wells to the city water system. These illegal connections allow for contaminated well water to mix with city water and can potentially contaminate the city water system.
- Improper maintenance and disinfection of a home's water holding tank may contaminate the in-home plumbing system with bacteria.
- Age of the Italian water system infrastructure, water supply outages, seasonal demand and other issues create low pressure in the city water system. When combined with the widespread lack of backflow prevention devices common in Italy, this can result in backflow of contaminated water from a home into the public drinking water system.

Although public drinking water is disinfected, the circumstances described above could lead to contaminated water inside a home, even if it's serviced by the city water supply. As a precautionary measure, the Commander, Navy Region Europe, Africa, Southwest Asia (CNREURAFSWA) issued an All-Hands bottled water advisory in 2008 to use only bottled water for drinking, cooking, brushing teeth, making ice, and for pets.



For more information contact:

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Does the Navy offer any additional disinfection at their facilities?

Yes. At some installations, the Navy provides "booster" disinfection of incoming municipal water. This ensures that incoming water is free from disease-causing organisms, especially for water that has traveled a long distance from the supplier's plant.

The table below shows the various water sources and disinfection methods used by the water suppliers and the Navy in Naples.

Water Sources and Disinfection Methods			
Navy Site	Water Source & Purveyor	Purveyor Disinfection Method	Navy Disinfection Method
NSA Capodichino	Serino & Campano Aqueducts/Aziende Risorse Idriche di Napoli (ARIN)	Chlorine dioxide	Sodium hypochlorite Sand filter, carbon absorption, and Reverse Osmosis (RO) treatment are also provided
Support Site Gricignano	West Campania Aqueduct/Mirabella	Chlorine dioxide	Sodium hypochlorite at Naval Hospital
Carney Park	City of Pozzuoli/Aziende Risorse Idriche di Napoli (ARIN)	Chlorine dioxide	Sodium hypochlorite and UV light
NSA Gaeta	Capodacqua wells & Mazaoccolo spring/Acqualatina	Sodium hypochlorite & UV light	None

Does one disinfection treatment provide safer water than the other?

No. Regardless of which disinfection treatment a water purveyor chooses, the drinking water they provide must meet minimum standards for microbial protection and cannot exceed set levels for disinfectant byproducts.

Chlorine dioxide and sodium hypochlorite are both very effective at killing bacteria and fungi. Chlorine dioxide is effective in deactivating chlorine-resistant pathogens like Giardia and Cryptosporidium, while sodium hypochlorite is not effective against these pathogens. Chlorine dioxide is also more effective in deactivating viruses than sodium hypochlorite.

If chlorine dioxide has these advantages over sodium hypochlorite, why doesn't the Navy use it?

As mentioned previously, the choice of which disinfectant is right for a given application is up to the drinking water purveyor. Secondary factors unrelated to disinfection weigh into the decision as to which disinfection method is chosen. The effect of the disinfectant chemical on the removal of other non-pathogenic compounds in the water (e.g., metals and

volatile compounds); maintenance of systems; formation of disinfection byproducts; personnel safety related to the handling of chemicals; ease of use; and cost are all factors that influence which product is right for a particular application. In Italy, chlorine dioxide cannot be legally transported because of safety reasons. It can be only used on sites where it is manufactured. In the end, the drinking water must meet minimum standards for microbial protection and cannot exceed set levels of disinfectant byproducts.

What is UV (ultraviolet) light disinfection and does it work?

UV purification is a proven technology (and USEPA approved) that eliminates waterborne disease-causing microorganisms, such as bacteria, viruses, algae and fungi, from water. UV disinfection works by delivering concentrated amounts of UV energy to the reproductive mechanism of the microbe, effectively killing it. As water passes through the UV chamber, UV instantly disinfects the water. UV disinfection systems leave no objectionable taste and odor, and UV does not react with naturally occurring organic matter in water to form byproducts such as trihalomethanes.

UV does have limitations, however. It is not suitable for water with high amounts of suspended solids, color or organic matter. One of the main drawbacks is the lack of residual disinfection. This means that unlike chlorine dioxide and sodium hypochlorite, UV water purification only kills microbes at the water treatment facility. It does not kill microbes that may enter the water system as it moves away from the facility. This is why UV is used along with chemicals, such as sodium hypochlorite, for proper disinfection.