**TREATMENT OF DRINKING WATER**

**Introduction**
Illness caused by contaminated water is common in developing countries. Diseases such as cholera, typhoid polio, hepatitis A, and travelers diarrhea are spread by contaminated water. Thus, before drinking water in developing countries one should be aware of the available treatment methods. This short chapter should be considered for field expedient use only. For a definitive discussion of food service, water supply sanitation and waste disposal in the field, refer to the Manual of Preventive Medicine NAVMED P-5010-9, Virtual Naval Hospital on CD or the VNH web site at [www.vnh.org](http://www.vnh.org).

**Boiling**
Boiling is the most reliable method of treating contaminated water. Water should be brought to a vigorous boil then allowed to cool. At high altitudes chemical disinfection may also need to be used since boiled water may not attain high enough temperatures. Do not add ice of uncertain quality to the boiled water. Beverages made from boiled water such as coffee and tea are generally considered safe.

**Chemical disinfection with chlorine**
Chlorine is available in 2 forms: tablets (Halazone) and liquid (household bleach). The tablets become unstable 7 days after the package is opened thus, they are not generally recommended. Household bleach contains sodium hypochlorite usually at a concentration of 4-6%. Two drops of household bleach is added to a quart of clear water alternatively, 4 drops should be added to cold or cloudy water and mixed. The water should be left to stand for 2 hours before drinking to allow time for the chemical to kill the bacteria. The chlorine taste may be changed by dissolving vitamin C tablets in the water.

**Chemical disinfection with iodine**
Iodine is available in 3 different forms: crystals, tincture, and tablets. Iodine crystals are not recommended since they result in variable concentrations and oxidized with metal and plastic. Tincture of iodine (2%) is available at most pharmacies. Five drops of the tincture should be added to a quart of clear water alternatively, 10 drops should be added to cold or cloudy water. Iodine tablets which are available at camping stores may also be used to decontaminate water. Again, one should wait for 2 hours after mixing the chemical with the water before drinking.

**Bottled water**
Bottled water is safe if it was processed after it was place in its container. The container seal should be intact. Private entrepreneurs have been known to refill water containers with untreated
water.

**Carbonated beverages**
The carbonation in soda, beer, etc. renders the beverage safe from bacterial contamination because of the high acidic concentration (Low pH). Remember that non carbonated alcoholic drinks of high alcohol content may still contain disease causing bacteria.

**Water treatment devices**
There are several varieties of water filter and purification devices on the market. Presently, studies are being conducted to evaluate the effectiveness of these devices.

**Other hints**
Ice may not have been made from treated water, therefore, do not use ice for direct food or beverage contact.

Beverage containers such as cans or bottles should be cleaned at the area of contact prior to consumption. Drinking directly from the beverage container is safer than using a cup or glass of questionable sanitary quality.

Treated water should also be used for brushing teeth. If this is not possible one could use hot tap water that is allowed to cool in a clean container. Although not totally safe, the hot tap water may have less pathogens than cold tap water.