Chemicals in Drinking Water
Fact Sheet
Florida Department of Health, Bureau of Environmental Health

This fact sheet discusses possible health risks from exposure to low levels of total trihalomethanes typically found in drinking water.

Total Trihalomethanes (TTHMs)

What are Total Trihalomethanes?

Trihalomethanes are a group of chemicals that can form when organic matter in water is treated with halogen disinfectants such as chlorine. The most common of these chemicals is trichloromethane (also called chloroform), but others, such as dibromochloromethane, bromodichloromethane, or bromoform can also be found. The sum of these four chemicals is referred to as total trihalomethanes (TTHMs).

How might exposure to TTHMs in water occur?

TTHMs are present at low levels in most chlorinated water supplies. Chlorine is added to these drinking water supplies to control microbes such as *E. coli* or *Salmonella* that can cause serious illness.

What is the standard for TTHMs in drinking water?

The Florida Department of Environmental Protection's drinking water standard for TTHMs is 80 micrograms per liter (80 µg/L). Utility companies are required to test for TTHMs every quarter and this standard is compared to a one-year running average of samples.

How can TTHMs affect my health?

Depending on risk factors stated below, health effects from drinking high levels of TTHMs can include: liver, kidney, or central nervous system damage. Drinking water every day with concentrations of TTHMs at or below the standard for your entire lifetime is unlikely to cause illness. In addition, any risk from disinfection byproducts is much lower than the risk of illness from drinking water that has not been disinfected.

How likely are TTHMs to cause cancer?

EPA has set standards for TTHMs in water because there is a slight possibility of an increased risk of bladder or colorectal cancer over a lifetime of drinking water with TTHMs above 80 parts per billion (ppb). The slight risk occurs after decades of drinking water with high levels of TTHMs. This risk is small compared to the risk of potentially deadly infectious diseases in drinking water that is not disinfected.

How do scientists determine drinking water standards?

Drinking water standards are set at very low levels. To set drinking water standards, scientists review laboratory experiments and study reports of people exposed to high levels of chemicals when available. Then they use this information to estimate the risk of illness.

For chemicals that cause illness other than cancer, scientists find the level that is not thought to cause any harmful effects. Then, to be on the safe side, they set drinking water guidelines hundreds or thousands of times less than this "no-effect level." For chemicals believed to cause cancer, the technique is different. Scientists use worst-case assumptions to work out the lifetime risk of cancer at various concentrations of the chemical. They then set the level where the risk becomes so small it is practically zero. The worst-case assumptions used ensure that any errors are on the side of safety.

Because the standards are based upon lifetime exposure, drinking water with levels slightly above the standard for a short time does not significantly increase the risk of illness. The risk of illness, however, increases as the level of chemical increases and the length of time you drink the water increases.

How chemical exposures may affect someone can range widely from one person to the next. A number of personal factors also determine health effects. These include:

- How old is the person?
- What gender are they?
- Does the person have other health problems?
- What are their health habits? (For instance, do they drink alcohol or smoke tobacco?)

Is there a medical test for TTHM exposure?

There are special tests that can determine if you have been exposed to TTHMs. There is no reliable test to determine how much you have been exposed to and these tests cannot tell you whether harmful health effects will occur.

Is it safe to keep drinking water with TTHMs in it?

Citizens have the right to know about the quality of their drinking water. They should be aware of problems that may cause an immediate health problem and of those problems that are a concern when exposure occurs over many decades. That being said, levels of TTHMs less than the drinking water standard are not likely to cause illness. Drinking water with levels slightly above the drinking water standard for a short time does not significantly increase the risk of illness either. However, because health risks increase as the levels of a chemical (or how long a person drinks it) increases, it is best to drink water that meets standards.

For additional health information, please call the Florida Department of Health at 850-245-4240 or visit us online at www.floridahealth.gov/environmental-health/drinking-water/Chemicals-HALs.html

For more information about the health effects from exposure to TTHMs and other disinfection byproducts, please see the US CDC Safe Water Page at https://www.cdc.gov/safewater/chlorination-byproducts.html