

Information for Community Leaders on Disinfection By-Products in Drinking Water



Disinfection By-Products (DBPs) are chemicals that can be formed when chlorine is used for disinfecting drinking water to prevent waterborne disease. The chlorine reacts with naturally occurring organic matter such as decaying leaves or vegetation in the source water, forming DBPs. The two most common types of DBPs found in chlorinated drinking water in Canada are trihalomethanes (THMs) and haloacetic acids (HAAs).

Many communities of all sizes across Canada use chlorine as a disinfectant and have organic matter in their water. At certain times during the year, these communities may encounter elevated THMs and HAAs, for example, during the fall months.

How are people exposed to DBPs?

Exposure to THMs and HAAs can come from drinking or bathing in affected water or breathing in steam when showering.

Are there health risks?

The use of chlorine to treat drinking water has virtually eliminated waterborne diseases such as typhoid fever, cholera, dysentery, and other gastrointestinal diseases in developed countries.

Some studies have suggested that long-term exposure (over many years) to high levels of THMs and/or HAAs might increase the risk of bladder cancer and some birth-related outcomes. The slight increased risk of cancer occurs only after decades of drinking water with elevated levels of DBP such as THMs and HAAs; and the known risks of consuming water that has not been disinfected and the benefits of chlorinating drinking water are much greater than potential health risks associated with exposure to elevated THMs and HAAs. This is why all public health services in Canada recommend that water treatment system operators should never compromise the chlorination (disinfection) of drinking water in order to reduce DBP levels.

What can I do if my community's water shows elevated THMs or HAAs?

Disinfection of drinking water should not be compromised in an attempt to lower DBP levels.

Finding micro-organisms in water at the same time as high levels of DBP indicates a potentially serious issue, as it shows a gap in the disinfection process. In such cases, boiling the water could actually increase exposure to DBPs; however, continued disinfection of water is key to preventing waterborne illness.

It is recommended that water treatment plant operators make every effort to meet the *Guidelines for Canadian Drinking Water Quality* (the Guidelines) and maintain THM and HAA concentrations as low as reasonably achievable without compromising the effectiveness of disinfection.

If your water system has elevated levels of THMs, your water treatment plant operator should work with technical resources, such as the Circuit Rider Training Program, to check that all treatment processes in your water treatment plant are producing the best water they can. If this doesn't lower DBPs to an acceptable level, then further investigation is needed. Community leaders can work with the Indigenous Services Canada's (ISC) regional office to discuss options, which could include a needs assessment. It is important to work together on the investigation so that any proposed system changes are included in the region's Long Term Capital Plan if needed. Your EHO can provide advice on DBPs and other water quality issues, and the Engineering Service provided by ISC's First Nations and Inuit Health Branch is available, through your EHO, to assess proposed options from a Public Health perspective.

While working on lowering DBPs in the system, consumers can reduce their exposure by ensuring that the bathroom is well ventilated when bathing or showering, and using point-of-entry (for THMs or HAAs) or point-of-use (for HAAs only) treatment devices designed to eliminate either THMs or HAAs. A point-of-use device is a filter that treats the water from one tap. If households choose to purchase a treatment device, it is important they follow the manufacturer's instruction on installation, use and maintenance. All treatment devices have on-going maintenance costs. Since the sale of water treatment devices is not regulated in Canada, you should preferentially select devices such as activated carbon filters certified to the appropriate NSF standard for removal of THMs or HAAs.

For more information

For more information on Disinfection By-Products please contact your Environmental Health Officer.

Useful links

It's Your Health: Drinking Water Chlorination:

https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/hl-vs/alt_formats/pacrb-dgapcr/pdf/iyh-vsv/environ/chlor-eng.pdf

Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Trihalomethanes:

<https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-trihalomethanes.html>

Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Haloacetic Acids:

<https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-haloacetic-acids.html>