



Massachusetts Department of
Environmental Protection

f a c t s h e e t

Haloacetic Acids In Drinking Water Information for Consumers

1. [What is HAA5?](#)
2. [Why Are Disinfectants Added?](#)
3. [What Is the Drinking Water Standard for HAA5 and How Is Compliance Determined?](#)
4. [How Can Consumers Be Exposed to HAA5 In Drinking Water?](#)
5. [What Are the Health Risks Associated with Using Water Containing HAA5?](#)
6. [What Should Mothers Who Are Breastfeeding Infants Know?](#)
7. [If You Are Concerned and Would Like to Reduce Exposures to HAA5, What Can You Do?](#)
8. [Where Can I Get Additional Information?](#)

What is HAA5?

Haloacetic acids (HAA) are a group of disinfection byproducts (DBP) that form when water disinfectants such as chlorine or ozone react with other naturally occurring chemicals in the water. There are five significant regulated HAA potentially found in disinfected drinking water. Their combined concentration is referred to as HAA5.

Levels of HAA5 can be affected by seasonal changes in source water quality or by changing amounts of disinfectant added. Water systems often can experience temporary increases in HAA5 due to short-term increases in disinfectants which can occur when there is a water main break, water systems are under repair, or there is a potential microbial (example: bacteria) problem or threat.

All water systems that disinfect the water with chlorine or ozone are required by federal and state law to sample for HAA5 on a regular basis (quarterly, or once every three months).

Why are disinfectants added?

Disinfection of water supplies with chlorine or ozone is necessary to prevent illness. The practice of disinfection has nearly eliminated most acute waterborne diseases in the United States.

Reducing the levels of byproducts of disinfection while maintaining effective disinfection of the water is challenging and may require several process and treatment modifications that take time to install and get working effectively. Stopping disinfection is not an option as the risk of illness from drinking untreated surface water and many groundwaters is often greater than the risks from the byproducts.

What is the Drinking Water Standard for HAA5 and how is compliance determined?

Drinking water standards are called maximum contaminant levels (MCLs). The HAA5 MCL is set at a level to protect against the long-term risk of potential adverse health effects and to limit the possibility of bacterial contamination.

The US EPA and MassDEP have set an MCL for HAA5 of 60 ug/L (also referred to as parts per billion, ppb)¹ as an annual average. The running annual average of four samples (i.e., quarterly, or once every three months over a year) must not exceed the MCL at each sampling location.

How can consumers be exposed to HAA5 in drinking water?

Drinking water is the main source of exposure to HAA5, followed by ingestion of it in foods and/or ice prepared with the water. It is possible that small amounts of HAA5 could be absorbed through the skin during handwashing and showering. Significant inhalation exposures of HAA5 chemicals during handwashing or showering does not occur as these chemicals do not readily vaporize into the air.

What are the health risks associated with using water containing HAA5?

HAA5 are possibly carcinogenic to humans based on evidence of carcinogenicity in laboratory animals and limited evidence in people.

Other effects have been reported in experimental animals exposed to high levels of HAA5 and other disinfection byproducts. These include effects on the liver, kidneys, and reproductive system and on development. The significance of these effects is uncertain as some studies of people have reported similar effects while others have not. Scientists are working to address these differences.

Pregnant women or those who may become pregnant may be more susceptible to effects from chemicals such as those referred to as HAA5. Children (including infants)

¹ µg/L = mg/L / 1000

Massachusetts Department of
Environmental Protection
100 Cambridge St
Boston, MA

Commonwealth of
Massachusetts
Charles D. Baker, Governor
Karyn E. Polito, Lt. Governor

Executive Office of
Environmental Affairs
Bethany A. Card
Secretary

Department of
Environmental Protection
Martin Suuberg
Commissioner

Produced by the
Bureau of Water Resources
Drinking Water Program
Rev. December 2022

This information is available in
alternate format by calling our
ADA Coordinator at
617-556-1057.



are generally considered more sensitive to the effects of chemicals like those of HAA5 than others in the general population and typically also consume more water for their size than adults².

The degree of risk for these effects will depend on the HAA5 level and the duration of exposure. Consumption of water with HAA5 levels somewhat above the MCL for limited durations, for example, while corrective actions are being taken to lower the levels, is not likely to significantly increase risks of adverse health effects for most people.

What should mothers who are breastfeeding infants know?

Breast milk can also be a source of HAA5 exposure for infants. However, those infants will benefit from any exposure reductions experienced by the mother, and they also gain a substantial health benefit from breastfeeding. The Centers for Disease Control and Prevention recommend that nursing mothers continue to breastfeed their babies because of the numerous protective health benefits despite the potential presence of environmental contaminants.

If you are concerned and would like to reduce your exposure to HAA5, what can you do?

Women who are pregnant or may become pregnant and anyone concerned with exposure (including parents of young children) can avoid consuming water containing HAA5 and other DBP exceeding their respective drinking water standards. One option is bottled water.

An effective way to reduce exposures is to also use bottled water for preparing formula, beverages, or food that retains water (e.g., hot cereals, rice, or pasta). This approach also lessens the exposure for bottle-fed infants.

Bottled water sold in Massachusetts must meet all federal drinking water quality standards and, if originating in Massachusetts, must also meet state drinking water quality requirements.

Another option for reducing exposure to HAA5 in drinking water is to use a home filter. Various types of home water filters, including reverse osmosis and granular activated carbon treatment technologies, will reduce exposure to DBP. Look for packaging that indicates that the product will remove haloacetic acids. For consumers who choose to use a home treatment device, it is very important to follow the operation and maintenance specifications carefully to make sure that the device works as intended. For additional general information on home water treatment devices, please refer to: <https://www.mass.gov/service-details/home-water-treatment-devices-point-of-entry-and-point-of-use-drinking-water-treatment>

² <https://www.mass.gov/guides/drinking-water-standards-and-guidelines>

Massachusetts Department of
Environmental Protection
100 Cambridge St
Boston, MA

Commonwealth of
Massachusetts
Charles D. Baker, Governor
Karyn E. Polito, Lt. Governor

Executive Office of
Environmental Affairs
Bethany A. Card
Secretary

Department of
Environmental Protection
Martin Suuberg
Commissioner

Produced by the
Bureau of Water Resources
Drinking Water Program
Rev. December 2022

This information is available in
alternate format by calling our
ADA Coordinator at
617-556-1057.



Where can I get additional information?

If you have questions about your water system's operation, water quality monitoring, or water quality, please contact the system operator directly. If you have questions about the drinking water regulations or health risks posed by these contaminants³, you can contact the MassDEP Drinking Water Program at: program.director-dwp@mass.gov. If you have questions about specific symptoms, you can contact your doctor or other health care provider. If you have general questions about your health, you can contact the Massachusetts Department of Public Health at 617-624-5757.

Massachusetts Department of
Environmental Protection
100 Cambridge St
Boston, MA

Commonwealth of
Massachusetts
Charles D. Baker, Governor
Karyn E. Polito, Lt. Governor

Executive Office of
Environmental Affairs
Bethany A. Card
Secretary

Department of
Environmental Protection
Martin Suuberg
Commissioner

Produced by the
Bureau of Water Resources
Drinking Water Program
Rev. December 2022

This information is available in
alternate format by calling our
ADA Coordinator at
617-556-1057.



³ <https://www.mass.gov/doc/supporting-documentation-for-drinking-water-standards-and-guidelines/download>