

ATSDR's Minimal Risk Levels (MRLs) and Environmental Media Evaluation Guides (EMEGs) for Perfluoroalkyls (PFAS)

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ATSDR is a federal public health agency with a role in evaluating whether exposures to contaminants pose a health threat. ATSDR does not have regulatory authority to enforce environmental violations or regulations. ATSDR works closely with its federal partners like EPA, which has the authority and responsibility to establish national guidance and regulatory standards for public drinking water supplies.

ATSDR [Minimal Risk Levels \(MRLs\)](#) are screening levels. ATSDR uses them to identify environmental exposures that might harm people's health. If an exposure is below an MRL, it is not expected to result in adverse health effects. If an exposure is above an MRL, ATSDR conducts further evaluation to determine if the exposure might harm human health.

ATSDR develops MRLs using data from the epidemiologic and toxicologic literature. When the scientific data on a hazardous substance is incomplete, ATSDR applies uncertainty factors as part of the MRL calculation. These uncertainty factors help ensure that MRLs are at a level where health effects in people are not expected by accounting for

- differences between health effects in humans and animals;
- when information about how a chemical may affect a sensitive population (for example, the very young, or people who may have other health problems) is incomplete; or
- when information about the chemical levels that may be associated with health effects is incomplete.

ATSDR sets each MRL well below a value that is likely to cause a health effect.

As described in more detail in [ATSDR's PFAS key messages](#), ATSDR's MRLs are screening values and are not designed or intended to be used as public water standards, but they do provide valuable information about PFAS exposures and potential public health impacts. ATSDR's MRLs are published in terms of dosage amounts [usually in milligrams/kilogram/day (mg/kg/day)] and not in terms of concentration [parts per million (ppm), parts per billion (ppb) or parts per trillion (ppt)]. Doses and concentrations are different concepts. A dose is the amount of a substance to which a person is exposed over some time period. Dose is a measurement of exposure. A concentration is the amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other media.

For drinking water exposures, doses can be used to determine equivalent water concentrations using mathematical equations and information about a person's body weight and how much water they drink each day. ATSDR's calculations are based on the guidelines published in the [Public Health Assessment Guidance Manual](#), and the EPA [2011 Exposure Factors Handbook](#). For example, for an estimate of a child's drinking

water exposure, ATSDR bases this calculation on an infant (age birth to one year old) weighing 7.8 kg and an intake rate of 1.113 liters per day. For an adult's drinking water exposure, ATSDR bases this calculation on a body weight of 80 kg and an intake rate of 3.092 liters per day. Scientists may use different assumptions when calculating concentrations from dosages.

ATSDR has developed MRL screening values for perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorohexane sulfonic acid (PFHxS) and perfluorononanoic acid (PFNA) that can be converted into drinking water concentrations for adults and children. When ATSDR uses an average adult's or child's weight and water intake to convert these MRLs into drinking water concentrations, the individual PFOA, PFOS, PFHxS, and PFNA concentrations are

- PFOA: 78 ppt (adult) and 21 ppt (child)
- PFOS: 52 ppt (adult) and 14 ppt (child)
- PFHxS: 517 ppt (adult) and 140 ppt (child)
- PFNA: 78 ppt (adult) and 21 ppt (child)

These concentrations are compared to concentrations in drinking water to determine if further evaluation is needed.