



NHMRC Statement: Per- and polyfluoroalkyl substances (PFAS) in drinking water

Public consultation advice

Based on human health considerations, the concentration of the following PFAS in drinking water should not exceed the specified health-based guideline values*:

PFOA: 200 ng/L

PFOS: 4 ng/L

PFHxS: 30 ng/L

PFBS: 1000 ng/L

GenX chemicals: no health-based guideline value can be derived at this time.

* Note that the proposed guideline value are intended to reduce risks to health from PFAS in drinking water over a lifetime, not short periods of time.

The National Health and Medical Research Council (NHMRC) has reviewed the available scientific evidence and public health advice for per- and polyfluoroalkyl substances (PFAS) in drinking water from international agencies similar to Australia to determine whether a change to NHMRC advice is warranted or not. This update to the PFAS Fact Sheet (currently out for public consultation) in the [Australian Drinking Water Guidelines](#) (the Guidelines) is part of NHMRC's commitment to keeping the Guidelines current and scientifically sound.

The PFAS reviewed as part of this update include:

- perfluorooctanoic acid (PFOA)
- perfluorooctane sulfonic acid (PFOS)
- perfluorohexane sulfonic acid (PFHxS)
- perfluorobutane sulfonic acid (PFBS)
- hexafluoropropylene oxide dimer acid ammonium salt plus hexafluoropropylene oxide dimer acid (GenX chemicals).

All of these chemicals except GenX chemicals have been detected in Australian drinking water supplies. Other PFAS of emerging concern may be present in Australian drinking water supplies; however, NHMRC had a defined scope for undertaking the review based on the United States Environmental Protection Agency (US EPA) health advisories¹ proposed at the time of

commencing the NHMRC review. Additional PFAS may be reviewed in the future as part of the rolling revision of the Guidelines. However, limited toxicological information is available for most PFAS and further research is required to understand the health risks from other individual PFAS or PFAS mixtures.

It is important to note that drinking water is not the only potential source of PFAS exposure in Australia and the contribution from other sources might be significant. The public can be exposed to PFAS through the food supply and household products (e.g. personal care products, food packaging, clothing, furniture, air, dust). Exposure to PFOS and PFOA from drinking water has been previously estimated to be approximately 2-3% of total PFAS exposure² in areas with low levels of contamination. The Australian Government recommends reducing exposure to PFAS as much as possible, and while managing exposure to PFAS through drinking water supplies is

¹ [2022 Interim Updated PFOA and PFOS Health Advisories; 2022 Final Health Advisories for GenX Chemicals and PFBS](#)

² Thompson J, Eaglesham G, Mueller J (2011). Concentrations of PFOS, PFOA and other perfluorinated alkyl acids in Australian drinking water. *Chemosphere* 83; 1320-1325.

currently the focus of public and media attention, a broader approach to managing PFAS contamination and limiting exposure is required across multiple sectors.³

Proposed changes to health-based guideline values

The findings of the NHMRC review have resulted in proposed changes to health-based guideline values based on new evidence, including key studies considered by the US EPA. The proposed guideline values are summarised below.

PFOA - The health-based guideline value is proposed to be lowered from 560 ng/L to **200 ng/L** based on new health concerns (cancer effects).

PFOS - The health-based guideline value is proposed to be lowered from 70 ng/L to **4 ng/L** based on new health concerns (bone marrow effects).

PFHxS - A new, separate health-based guideline value for PFHxS of **30 ng/L** is proposed, based on thyroid effects.

PFBS - A new, separate health-based guideline value for PFBS of **1000 ng/L** is proposed, based on thyroid effects.

GenX chemicals - A health-based guideline value for GenX chemicals could not be set at this time due to a lack of data.

All of the guideline values were calculated using a threshold approach as outlined in Chapter 6 of the Guidelines. This means that based on the findings of the review, NHMRC considers that concentrations of PFAS below the proposed guideline values would not be expected to result in any significant risk to health over a lifetime of consumption. Short-term exposures to higher levels of PFAS are unlikely to change this risk. This approach is consistent with the approach used by NHMRC and other national and international agencies for assessing risks from chemicals, including potential carcinogens.⁴ It is noted that the US EPA uses a different approach for assessing risks from potential carcinogens.

The health-based guideline values included in this update are underpinned by high quality animal studies that have examined the effect of PFAS exposure in animals. The observed effects have been extrapolated to humans and used to derive health-based guideline values for drinking water. Unlike some other international agencies, NHMRC did not consider the available studies in humans to be sufficiently reliable or appropriate to derive Australian health-based guideline values for drinking water.⁵ Several limitations of these studies were identified, such as a small sample size, limited dose-response information and potential confounding by other chemicals (i.e. exposure to other chemicals might have caused the observed effects).

The proposed health-based guideline values are health protective and include assumptions appropriate to the Australian context. The health-based guideline values are very conservative, and include a range of uncertainty factors, which always err on the side of caution. Further information on the evidence review and how the guideline values were calculated are available in the [PFAS Fact Sheet](#) and in the [review reports](#).⁵

³ NEMP 2.0 [PFAS National Environmental Management Plan 2.0 - DCCEEW](#)

⁴ EnHealth (2012) [enHealth guidance - Guidelines for assessing human health risks from environmental hazards | Australian Government Department of Health and Aged Care](#); WHO (2022) [Guidelines for drinking-water quality: fourth edition incorporating the first and second addenda \(who.int\)](#)

⁵ [Guideline development for review of PFAS in Drinking Water](#)

Public consultation is underway on the draft PFAS fact sheet and proposed health-based guideline values. Further information on the public consultation is available [on the consultation page](#).

Comparison with overseas advice

NHMRC does not automatically adopt drinking water guideline values from other jurisdictions. Australian guideline values are determined after carefully evaluating the scientific evidence. Where international advice has been updated, NHMRC and the [Water Quality Advisory Committee](#) consider:

- the quality of the review used to inform the international advice
- the underpinning scientific evidence
- whether the advice is relevant to the Australian context.

This is important because other countries, such as the United States, issue public health advice within their own legislative frameworks that don't apply to Australia. They can also use risk assessment approaches and policies that may differ from Australia's, and these approaches can result in different estimations of risks and differences in the basis for setting target values. It is not unusual for guideline values to vary from country to country due to different methodologies, calculations and the choice of endpoints used.

For example, the US EPA uses a particular approach for setting limits for carcinogens. This led to the setting of non-mandatory goals of zero for PFOS and PFOA which underpinned the regulatory limits established for these two compounds, which needed to be as close as practicably possible to zero. Other agencies such as the World Health Organization (WHO) use a different approach for setting numerical (non-zero) limits for carcinogens. As described in the *Australian Drinking Water Guidelines*, NHMRC applies a similar approach to WHO.

This proposed update has used the best available information to derive health protective guideline values for PFAS in Australian drinking water supplies for the Australian population, using robust methods that are widely accepted by the Australian and international risk assessment community.

Further information on the NHMRC review of PFAS in drinking water is available on the [NHMRC review of PFAS in drinking water](#) page.

Implementation

The proposed changes to the current Australian advice for PFAS in drinking water are available for [public consultation](#). The proposed advice (including any new health-based guideline values) are draft only and will not be considered final until they are published in the [Australian Drinking Water Guidelines](#). This is because NHMRC and the Water Quality Advisory Committee will give due regard to all public comments and any new information published during public consultation. The proposed guideline values might change as a result of this process. Publication of the final advice is expected in April 2025. Until then, the existing PFAS guideline values remain current.

NHMRC is aware that there are ongoing monitoring activities across the country. Publicly available information shows that most water supplies are below the proposed guideline values, but the existence of water supplies with higher PFAS levels cannot yet be ruled out. As for all chemical guideline values, any detections of PFAS higher than the proposed guideline values should be viewed not as a pass/fail measure but should trigger an investigation of potential sources of

contamination in case these can be managed to bring the water supply back under guideline values.

It is expected that it will take time and resources to implement the new PFAS guideline values in Australia, particularly for small water suppliers in areas adjacent to contaminated sites. The US EPA has also acknowledged these challenges,⁶ providing 3 years for monitoring requirements and 5 years to take action to reduce elevated levels of PFAS. Water providers should have discussions with the relevant health authority and/or drinking water regulator on an appropriate implementation plan and how best to supply safe drinking water to communities where drinking water does not meet the new PFAS guideline values.

Monitoring

NHMRC recommends a site-specific, risk-based approach to monitoring chemicals of concern such as PFAS in drinking water supplies, as outlined in the Australian Drinking Water Guidelines risk management framework. The underpinning principle of this risk-based approach is to know your catchment. This includes assessing the potential pollution sources in the catchment and undertaking monitoring of source waters (i.e. raw waters, pre-treatment), not just post-treatment, in order to determine:

- whether catchment management measures are working
- if new pollution sources have appeared
- if system improvements are needed.

The ability of PFAS to move easily through ground and surface waters, the historical (often undocumented) use of PFAS in the environment for fire-fighting purposes and the potential for ongoing/unexpected contamination from landfill and biosolid⁷ applications means that unexpected PFAS detections may sometimes occur. A robust set of background monitoring data and regular catchment/land use risk assessments can provide information about the appropriate frequency of monitoring requirements for a particular water supply. This should be in discussion with state/territory health and/or drinking water regulators, who are responsible for establishing monitoring requirements. Longer term drinking water quality management should focus on selecting the best quality source water (noting the relative risks that may be present from other chemicals), taking into account all constituents, catchment protection, multiple barriers and management of critical control points as outlined in the Framework for Managing Drinking Water Quality (Chapter 3 of the Guidelines).

Given the public interest in PFAS and the need for broader understanding of the risks from PFAS in drinking water, we suggest that water providers regularly share information with the community on the current risks in their catchment and the findings from background testing. This transparency will assist in providing consumers with reassurance about the water coming out of their taps.

Further information on the monitoring of drinking water supplies is available on the NHMRC website at [Australian Drinking Water Guidelines](#).

⁶ US EPA (2024) [Per- and Polyfluoroalkyl Substances \(PFAS\) | US EPA](#)

⁷ Solids recovered from wastewater treatment processes and used as fertilizer in agriculture.