

# *Fact Sheet: Human Health Benchmarks for Pesticides - 2021 Update*

## Summary

EPA has updated its Human Health Benchmarks for Pesticides (HHBPs), to reflect the latest scientific information available. HHBPs are levels at or below which adverse health effects are not anticipated from one-day to lifetime exposure to pesticides in water. EPA first developed HHBPs in 2012 to enable states, tribes, water systems, other stakeholders, and the public to better determine whether the detection of a pesticide in drinking water or source waters for drinking water may indicate a potential health risk.

EPA has developed benchmarks for all pesticides for which the agency has received toxicity data through the pesticide registration and registration review processes and for which the agency has not issued a drinking water health advisory or set a drinking water standard. HHBPs are not legally enforceable federal standards.

EPA developed the HHBPs using methods similar to those it used to calculate drinking water health advisories. The agency based the benchmarks on data that were peer-reviewed as part of EPA's pesticide registration and registration review processes. The data supporting these benchmarks were previously published in EPA pesticide risk assessments available online at <https://www.epa.gov/pesticides>.

EPA periodically updates its HHBPs (as it did in 2013, 2017 and 2021) to reflect the latest toxicity and exposure factor information. In this 2021 update, EPA updated toxicity values for 104 pesticides and added 43 pesticides to the HHBP table. All benchmarks were re-calculated with revised exposure (body weight and drinking water intake) assumptions based

on updated exposure factors (Chapter 3 of EPA 2019 Exposure Factors Handbook). While most of the pesticides in the 2021 HHBP table are food use pesticides, we are now able to include values for 24 pesticides that are only registered for non-food uses. The 430 pesticides in the 2021 HHBP table are included because they have the potential to be present in drinking water.

## Background

In 2010, EPA announced a drinking water strategy to expand public health protection in part by using the authority of multiple statutes to more effectively protect drinking water by sharing data collected under different statutes. As an illustration of this strategy, EPA derived the HHBPs by applying the toxicity data from the pesticide registration and registration review processes under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and tolerances under the Federal Food, Drug, and Cosmetic Act as amended by the Food Quality Protection Act (FQPA) to the typical methods used for developing drinking water health advisories under the Safe Drinking Water Act.

EPA provides HHBPs for informational purposes for use by states, tribes, water systems, and the public to help them understand monitoring data for pesticides that have no drinking water standards or health advisories. HHBPs can also be used as reference values to respond to customer inquiries in cases when pesticides are detected through monitoring.

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## Development of Human Health Benchmarks for Pesticides in Drinking Water

The 2021 HHBPs were derived for non-cancer and cancer health endpoints.

*For non-cancer effects*, the HHBPs were established for acute and chronic effects. EPA used the acute and chronic population-adjusted doses (PADs) established for the most sensitive life stage/population based on the available toxicity data from the Office of Pesticide Programs (OPP). EPA updated and applied body weight and drinking water intake assumptions used to calculate the benchmarks based on National Health and Nutrition Examination Survey (NHANES) and Continuing Survey of Food Intakes by Individuals (CSFII) data published in the 2019 EPA Chapter 3 update of the Exposure Factors Handbook, available online at <https://www.epa.gov/expobox/exposure-factors-handbook-chapter-3>.

For the acute HHBPs, the assumption is that all exposure to the pesticide occurred from drinking water.

For the chronic HHBPs, EPA applied a relative drinking water source contribution of 20 percent to calculate drinking water exposure. This assumes that 20 percent of exposure to a given pesticide is from water and additional exposure is derived from other sources such as food, air, or dermal contact.

For pesticide registrations under FIFRA, EPA derives acute or chronic PADs using an FQPA-mandated safety factor that takes into consideration potential prenatal and/or postnatal toxicity and completeness of the data with respect to exposure and toxicity to women of child-bearing age, infants, and children. The FQPA safety factor can also account for other uncertainties such as whether there is uncertainty in the available toxicity information (<https://www.epa.gov/sites/default/files/2015-07/documents/determ.pdf>). In most cases, the PAD and the RfD are the same. When the FQPA safety factor is attributed to residential

uncertainty pertaining to exposure or prenatal and/or postnatal toxicity, the RfD and PAD differ. For this reason, HHBP values were calculated using the PADs.

*For cancer effects*, benchmarks were calculated using publicly available cancer slope factors derived from OPP assessments, standard drinking water exposure assumptions, and a risk range of one in ten-thousand to one in one-million excess cancer risk. A cancer slope factor is the toxicity value for evaluating the probability of an individual developing cancer from exposure to a certain level of a contaminant over a lifetime.

Not all pesticides with cancer effects have cancer slope factors (e.g., threshold type carcinogens, chemicals for which a mode of action has been established and accepted by the agency). In cases where a cancer slope factor has not been calculated, the chronic non-cancer HHBPs are assumed to be protective of cancer health effects.

### How to View the HHBPs and Supporting Information

The table of HHBPs and supporting information is online at: <https://iaspub.epa.gov/apex/pesticides/f?p=HHBP:home>. EPA drinking water health advisories and enforceable drinking water standards for other pesticides are online at: <https://www.epa.gov/sdwa/drinking-water-contaminant-human-health-effects-information>

### For More Information

For information regarding derivation of HHBPs, contact Susan Euling at [euling.susan@epa.gov](mailto:euling.susan@epa.gov). For information regarding the documentation for deriving the reference doses or cancer risk estimation, contact Gregory Akerman at [akerman.gregory@epa.gov](mailto:akerman.gregory@epa.gov).

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