

Glyphosate Toxicity, Cause of Disease: Science Used to Regulate Monsanto Roundup Herbicide is Outdated: Study

Environmental health scientists call for expanded research and monitoring of world's most widely used herbicide

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Glyphosate, the active ingredient in Monsanto's Roundup herbicide, is now the world's most widely used weed-killer. First sold to farmers in 1974, its use has increased approximately 100-fold since. Nearly all the corn and soy grown in the United States is now [glyphosate-tolerant](#) and treated with the herbicide. The weed-killer is also used on numerous other food crops and on landscaping plants. Enough glyphosate is now used to [cover nearly every acre](#) of cultivated cropland in the US. The chemical has been found in [streams, wastewater, and in rainwater](#) samples taken from all across the country.

Despite the extensive and increasing use of glyphosate, we know little about how much of the chemical people are actually being exposed to. Here in the US, glyphosate is not among the [pesticide residues](#) for which the US Department of Agriculture (USDA) routinely tests food. It is also not included among the 200-plus chemicals on the [US Centers for Disease Control and Prevention's](#) (CDC) human biomonitoring program.



Photo by [Rob Franksdad](#). Recent science also suggests that glyphosate lasts longer in soil and water than originally anticipated.

In a [paper just published in the journal *Environmental Health*](#), 14 leading environmental health researchers say current safety standards are based on outdated science and inadequate exposure data and that new research into **glyphosate's toxicity should be a government priority**.

"When these chemicals are approved for safety it's based on assumptions of how they'll be used," including "at what time of year and at what quantities," explains paper co-author Laura Vandenberg, assistant professor of environmental health sciences at the University of Massachusetts, Amherst. "Even if this was a completely benign chemical, it's shocking to know how much its use has increased," she says.

Vandenberg and her co-authors point out that to accommodate changes in use, the levels of glyphosate-based herbicides allowed in crops — that include corn, soybeans, canola, and various livestock feeds have been [increased](#). But they also point out that estimates of safe daily limits for *eating* food that might contain glyphosate - both in the US and in Europe -

are based on science that does not reflect how much the chemical is now used. **Recent science also suggests that glyphosate [lasts longer in soil and water](#) than originally anticipated.**

In addition to using glyphosate at planting time, farmers are now using it just before harvest, to dry leaves in order to make the physical harvesting of plants easier. “Late season, harvest aid use of GBHs [glyphosate-based herbicides] is an important new contributor to the increase in residue frequency and levels in some grain-based food products,” the researchers write. Such use was not accounted for when safety limits were set for glyphosate when the herbicide was introduced. In recent [testing done in the United Kingdom](#), **glyphosate residues were found in about one-third of bread samples tested**. And in the US, testing by the USDA in 2011 found glyphosate in about [90 percent of soybeans](#) tested. But the paper points out that since such tests aren’t conducted regularly, there is no information about what people are exposed to through food on an ongoing basis.

In addition, there isn’t any continuous data on human exposure. “Glyphosate is being used way more than anyone ever anticipated and there is no biomonitoring data,” says report co-author Bruce Blumberg, professor of cell biology and biomedical engineering at the University of California, Irvine.

Health concerns

Adding to concerns about glyphosate is the fact that last year, the World Health Organization’s International Agency for Research on Cancer concluded that glyphosate is “[probably carcinogenic to humans](#).” Glyphosate product manufacturers, including [Monsanto](#), dispute this conclusion.

The chemical also presents other health concerns. Among those, the paper notes, are adverse effects on the liver and kidneys. There is also the possibility that glyphosate may impact the function of certain hormones — impacts that could influence a number of body systems, and influence development of chronic diseases. The researchers also point out that we know little about the effect of glyphosate-based herbicides on the immune and neurological systems - information that would be key to understanding potentially profound but subtle health impacts.

“We don’t know a lot but what we do know suggests harm,” says Blumberg.

“Glyphosate,” explains Vandenberg, “is not an overtly toxic chemical, which in part is why glyphosate use has soared.” But she says, “Glyphosate may contribute to more subtle diseases.”

Research on glyphosate’s toxicity, the paper explains, has typically focused on how much of the chemical will kill a lab animal — not to investigate what happens at low and chronic levels of exposure via food or drinking water. Vandenberg also explains that in addition to understanding how glyphosate itself acts on humans and the environment, it is important to understand the behavior of its primary chemical breakdown compound. That, she says, is yet another data gap.

Yet another concern is that glyphosate-based herbicides are often applied in conjunction with other pesticides and little is known about the effects of these mixtures. Safety levels for pesticides are calculated for each active ingredient individually, despite the fact that in most

agricultural operations, a cocktail of them are applied together. Combinations of glyphosate plus other herbicides are now common in agriculture given that many [weeds have developed glyphosate resistance](#) from years of overuse.

Closing the data gaps

To close the many gaps in what is known about glyphosate exposure and toxicity, the researchers call for both new research into glyphosate's biological activity and epidemiological studies. They recommend that the CDC include glyphosate in its biomonitoring program and that the US National Toxicology Program make glyphosate a research priority.

"The main point we were trying to make is that use has gone up and there is a lot of uncertainty about health effects," says Blumberg.

Given that glyphosate is showing up widely in the environment - something not expected when the herbicide was first approved - and that its use has increased so dramatically since initial safety assessments were made, and what has been learned about its health effects since, suggest that a reevaluation is imperative, the researchers write.

"The big take away," says Vandenberg, "is don't throw yours hands up in fear, but that something we've been told is safe hasn't been tested in the way that we can draw that conclusion from."

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