Pesticides in My Drinking Water?

Individual precautionary measures and community action

By Drew Toher

Pesticides contaminate surface water, groundwater, and drinking water throughout the United States. This problem requires individual precautionary measures and preventive community-based action to protect one's self and ultimately stop ongoing pesticide use that ends up in drinking water from numerous agricultural, public land, and home and garden uses. Beyond Pesticides urges a solution that keeps pesticides out of the water, rather than trying to clean them up after they enter our waterways and drinking water supply.

The cleanup approach –either through expensive enhanced technological fixes for public water utilities, individual private well filters, or consumption of bottled water– is fraught with controversy over (i) acceptable regulatory levels of hazards associated with ingestion or absorption of pesticides from water intake, (ii) issues related to whether the regulatory and enforcement systems are robust enough, (iii) numerous unanswered questions about chemical mixtures, synergistic effects of pesticides and other toxic chemicals found in water, and low level exposure, and (iv) inadequate and expensive removal technologies that are costly for taxpayers. As explained here, individual action is a necessary short-term remediation tactic for reducing exposure that must lead to community-based adoption of land management policies that do not allow hazardous pesticide use. With the growth of organic management practices – including agricultural, public lands, and home and garden, this approach represents a practical and feasible path toward safer drinking water nationwide.

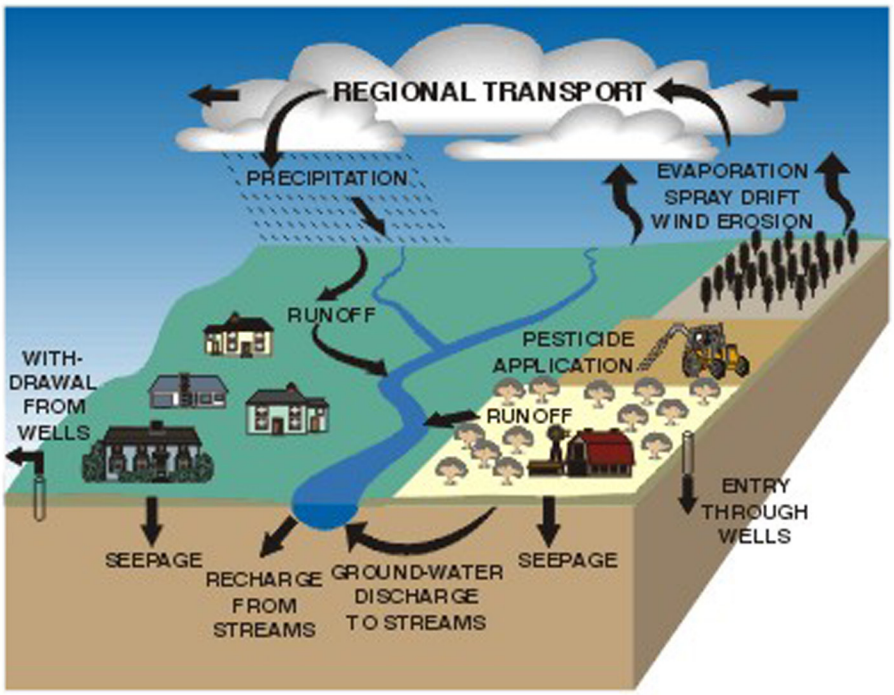
How Do Pesticides Get into My Drinking Water?

Rain or snow melt carries pesticides from agricultural fields, golf courses, parks, and residential properties through storm drains and into local water reservoirs, endangering wildlife and stressing our water treatment facilities. Pesticides also seep into our water table where they can contaminate groundwater and enter private wells. Many pesticides can volatilize and attach to particles and become airborne. These chemicals can drift within a neighborhood, region, or even hundreds or thousands of miles from their application site (some pesticides have even been found in snowpack in remote areas of U.S. National Parks!),[1] carried in fog and rain clouds before being deposited into public drinking water sources. Improperly disposed pesticide products in unlined landfills can also contaminate groundwater and end up in our water supply.

Is My Water Safe?

Widespread concern over drinking water safety in the U.S. compelled the 93rd Congress to craft the *Safe Drinking Water Act of 1974* (SDWA). The act empowered the U.S. Environmental Protection Agency (EPA) to set legally enforceable standards for maximum contaminant levels

BEYOND PESTICIDES
701 E Street, SE ■ Washington DC 20003
202-543-5450 phone ■ 202-543-4791 fax
info@beyondpesticides.org ■ www.beyondpesticides.org



Pathways of pesticide movement in the hydrologic cycle (modified from Barbash and Resek, 1996). http://pubs.usgs.gov/fs/fs03400/#pesticides.

(MCL) in drinking water. MCLs are intended to mark the maximum concentration at which a substance causes no adverse health effects in the general population.

EPA has set MCLs for over 90 contaminants, including some pesticides, but after nearly 30 years since the passage of the SDWA, upwards of 10% of public U.S. water treatment systems do not meet the requirements set by the agency. Moreover, in terms of pesticide contamination, current federal and state MCLs for public water supplies are raising intense scientific controversy within executive agencies due to claims of inadequate regulatory attention.

The U.S. Geological Survey's (USGS) National Water-Quality Assessment Program (NAWQA) has criticized EPA for not setting adequate water quality benchmarks for pesticides. According to NAWQA, "Current standards and guidelines do not completely eliminate risks posed by pesticides in waterways because: (1) values are not established for many pesticides, (2) mixtures and breakdown products are not considered, (3) the effects of seasonal exposure to high concentrations have not been evaluated, and (4) some types of potential effects, such as endocrine disruption and unique responses of sensitive individuals, have not yet been assessed."[2]

Studies of U.S. Rivers and streams currently document:

- 100% of U.S. streams have detectable levels of at least one pesticide,[4]
  - 56% of streams contain one or more pesticides that exceed at least one aquatic-life benchmark;[5]
- 50% of shallow wells have detectable levels of pesticides,[2]
  - 20% of private wells contain at least one contaminant at levels of potential health concern, and;[6]
- 90% of the 139 municipal water systems sampled by EPA in 2003/2004 contained detectable levels of atrazine,[7]
  - 50% of drinking water sites sampled in the Midwest contain levels of atrazine above EPA MCLs.[2]

In 2010, then EPA Administrator Lisa Jackson announced a new Drinking Water Strategy for the agency in an effort to strengthen public health protection from contaminants. To this end, EPA released its new "Human Health Benchmarks for Pesticides" in 2012, setting guidelines for over 350 chemicals' chronic and acute effects in sensitive populations, including women and children.[3] Although the benchmarks are a step forward, because no federal MCLs have been set for these chemicals, enforcement and oversight still need to be strengthened in order for the new benchmarks to have an impact.

Public Drinking Water Safety

Under SDWA, public water systems must provide customers with an annual report of their drinking water quality. The report includes information on contaminants detected during the year and how they compare to state and federal MCLs. Water utilities are required to have this information by July 1 of each year. Some water utilities post their reports online or send them to their customers.

You can request a report from your local utility directly at any time. Contact information is available at bit.ly/drinklocal. With information in hand, talk to your local utility and public health department if pesticides are found in your public water system; discuss pesticide use patterns that contribute to contamination, and the adoption of local policies or an ordinance that facilitates the transition to organic practices not reliant on the contaminants found in water. For assistance in organizing a campaign to eliminate toxics in your community, see Beyond Pesticides' booklet *Pesticide-Free Zones in Your Community* at bit.ly/pesticidefree. You can also contact Beyond Pesticides at 202-543-5450 or info@beyondpesticides.org for a copy of our model municipal policy.

Annual reports are a useful reference, but remember that current MCLs are

under scrutiny for not adequately reflecting hazard, especially to vulnerable populations such as children, elderly, and those with pre-existing illnesses. Additionally, these reports often fail to reflect spikes in contamination levels. Spikes occur most often in agricultural areas during the spring or fall planting season. In more urban areas, they may occur in relation to in-season lawn and garden pesticide use. EPA does not consider temporary spikes a human health hazard, but scientific studies continue to show that even low doses of pesticides below federal MCLs can cause harm.[8] Pregnant women,[9] children,[10] elderly,[11] and the chemically sensitive are particularly vulnerable to these events.

Well Water Safety

According to EPA, approximately 15% of Americans rely on their own private drinking water supplies.[12] However, EPA does not regulate the quality of private well water. Therefore, it is important for those obtaining their drinking water from wells to routinely check the supply for contaminants. People who use older, deteriorating wells or those that are shallow or poorly constructed, or near agricultural areas are most susceptible to pesticide contamination. Any cracks present in the well could allow for the infiltration of pesticides.[13]

Factors to consider when thinking about testing the water in your well for pesticides include:

- Age of the well
- Depth of the well
- Circumference of the well
- Soil type on your property
- Proximity to areas where pesticides are heavily applied, such as golf courses, agricultural fields or natural gas wells
- Proximity to pesticide distributors/ businesses
- If other testing reveals high levels of nitrates (though low levels of nitrates do not ensure that the water is contaminant-free)
- If other wells in your area have detected pesticide residues
- If pesticides have been spilled or mixed near your well
- If you are unsure about the use of pesticides in your area

Generally, new wells drilled deeper than 200 feet below ground with a two inch pipe are safer than most in terms of pesticide contamination. Most local health departments can perform an inspection of your well site to check for any vulnerability. If your well is at risk from any of the factors listed above, consider testing your well for one or more of the pesticides used frequently in your area.

Water well for the Herkimer House in Danube, Herkimer County, New York. September 2009
Author: Wknight94.

Where Can I Find a Testing Lab?

National Testing Laboratories, Ltd offers a WaterCheck Water Quality Test with Pesticide Option, which tests for bacteria, heavy metals, inorganic chemicals, volatile organic chemicals, plus 20 additional pesticides and PCB's. You collect water samples, ship them overnight to the lab, and they return the results. The kit can be ordered online at http://www.ntllabs.com/residential.html.

State or local agriculture or health departments can also test for pesticides, or help find a private lab that is certified to test drinking water in your area. Find your local agricultural cooperative extension contact information at bit.ly/coopoffices. Healthguide USA is a resource for finding your local health department. Contact information: bit.ly/USAhealth.

Which Tests Should I Request?

Testing for pesticides is more expensive than testing for bacteria or nitrates. Often it is least expensive to "screen" your water sample for a range of chemicals that may be in your area. Speaking with your local health department or agricultural extension office about the pesticides that are applied most often in your region should help you determine which chemicals to "screen." If you live close to an agricultural field and use well water, you may want to contact the farmer and ask directly which chemicals are applied to the land. Likewise, those near golf courses may want to ask the head groundskeeper what pesticides are applied.

Although the "screening" method is less expensive and can identify select hazardous chemicals, a comprehensive pesticide test is more accurate and better able to determine if other pesticides are present. If you do decide to "screen"

your water sample and it detects any pesticides, you will want to follow up with comprehensive testing to determine concentrations of the chemical(s) in questions. You also may want to contact your local health department and alert it to the detection, as officials may want to become involved in any further testing.

Home testing kits can be helpful in identifying the presence of certain chemicals above the MCL, but no home testing kit can completely determine the safety of your drinking water. In order to receive the most accurate results, a certified laboratory is the best place to send your samples. Again, as with the screening, if you detect the presence of any pesticides, you will want to follow up with comprehensive testing from a certified laboratory. Contact Beyond Pesticides at info@beyondpesticides.org if you have any additional questions about the pesticides to look for in your area.

How do I Interpret My Results?

Current drinking water standards can be viewed on EPA's website at bit.ly/waterstandard. Note that your state and county may have adopted stricter drinking water standards than those required by EPA.

Additional questions concerning the health implications of your water testing results can be handled by your testing company, local agricultural extension, or health department. However, the changing nature of federal and state MCL determinations concerning what are considered acceptable levels of pesticide contaminants in water make it difficult to predict the health implications of detections, especially for pesticides found at low levels, as well as concerns about chemical mixtures. Scientific studies have shown that low dose exposure under federal MCLs to certain pesticides can result in serious health problems. Therefore, it is prudent for all homeowners to take proper precautions if they discover any pesticides in their drinking water, even when results show the chemical to be under federal MCLs. To view scientific studies about the potential dangers of low-dose pesticide exposure, see Beyond Pesticides *Pesticide Induced Diseases Database*: bit.ly/pidd.

What if I Find Pesticides in My Drinking Water?

The Short Term Solution

Even when below MCLs, pesticide detection in your drinking water can put your health at risk. If tests determine that your house's drinking water is contaminated with pesticides, there are many filtration options which can be installed to remove the chemicals. The most cost-effective and efficient way to purify your home's water is to treat only the water you plan to consume. This is known as a point-of-use water treatment system. However, note that contaminants

Is Bottled Water the Answer?

The tremendous growth of the bottled water industry over the past 20 years is a good indication that Americans are skeptical about the safety of their drinking water supply. Bottled water is convenient and may taste better, but is it a solution to contaminated water?

Bottled water, being a packaged food product, is regulated by the U. S. Food and Drug Administration (FDA) and not EPA. FDA's allowable limits for contaminants generally follow EPA MCL guidelines, but oversight is lacking in many areas.[14] For example, while public water systems are required to undergo quarterly testing from certified labs, bottled water is only required to be tested once a year, and the tests are not required to come from certified labs. Additionally, while public water systems are required to report any violations to state or federal officials, bottled water manufacturers have no such requirement. Therefore, in terms of pesticide contaminants, bottled water, including "spring water" and "artesian well water," is only required to meet minimum federal guidelines.[15]

Given the aforementioned problems with federal MCLs, bottled water is not a 100% safe alternative to normal municipal water supplies. Unless your well water or public water supply has dangerous levels of pollutants, it is not advisable or economical to rely on bottled water for the majority of your drinking water. Bottled water also consumes large amounts of plastics and requires transportation, both of which use fossil fuels that contribute to climate change. Depending on the chemicals removed, a point-of-use water treatment system may be a safer and more economical way of ensuring you and your family has access to pesticide-free drinking water in the short term.

A few examples of point-of-use water treatment systems that remove pesticides:

Reverse osmosis filters (also called ultrafiltration). Reverse osmosis filters are said to remove 99 percent of the toxic chemicals in water, including some pesticides. Reverse osmosis utilizes normal household water pressure to force water through a selective semi-permeable membrane that separates contaminants from the water. Treated water emerges from the other side of the membrane, and the accumulated impurities left behind are washed away. However, the downside of reverse osmosis filters is that they use a great deal of energy and water. Reverse osmosis filters generally can be purchased for $300 to $600.

Carbon water cartridge. Photo Courtesy Emilian Robert Vicol, July 31, 2010.

Distillers. Another device that will remove almost everything from water is a distiller. Distillers electrically heat water until it turns to steam; the steam then condenses and turns back into water in a separate chamber, leaving behind 99 percent of the contaminants. The disadvantage of distillers is that countertop models must be filled manually and they use a lot of electricity and may take several hours to produce one gallon of water. Distillers also do not remove metals such as lead and copper from the water. These products range from $100 to $300.

Activated carbon (AC) Filters. Many AC filters remove pesticides in addition to chlorine, radon, trihalomethanes, and some inorganic chemicals. Check before buying to find out exactly what is removed. It is very important to be vigilant about replacing the filter cartridge because it may accumulate the contaminants it cleans from water, and bacteria may breed in it. Effectiveness of a particular carbon unit is directly related to the amount of activated carbon it contains. Beneath-the-counter systems with dual filters typically cost from $100 to $200. If you rent your home and beneath-the-counter systems are impractical, at the same cost there are now larger, over-the-counter, faucet-attachment carbon filters. Many of the less expensive, 'big-name' faucet-attachment models are only somewhat effective at filtering organic chemicals, so the extra money is worth it. Whole house systems can be installed as well as showerhead models, both of which will also decontaminate water used for bathing.

through the skin, so shower or bath water should be considered a route of exposure. It is important to perform some research before purchasing a point-of-use water device because health and safety claims made by manufacturers can be misleading. Some systems only improve the taste and odor of water, while others go further and actually reduce pesticides and other contaminants' concentrations. When considering a treatment device, make sure to read the data sheets provided by the manufacturer. Also look for independent documentation on the performance of the device for the contaminants of concern.

Ideally, seek out devices that are certified with the independent non-profit organization National Sanitation Foundation (NSF), whose logo should appear on its data sheets. NSF requires annual re-certification, periodic retesting, and also preforms unannounced plant inspections of filtration manufacturers. Use NSF's Certified Drinking Water Treatment Units online database as a guide to find a filter at bit.ly/nsfcertified. If there are certain chemicals of concern in your water, the guide can direct you to products that claim to specifically reduce the contaminant in question.

The Long Term Solution

Precautionary measures at your household faucet are only the first steps toward an end goal of clean water from source to tap. We must consider how the trajectory on which we are headed will impact future generations, and make adjustments so that a reliance on short-term solutions does not become ingrained in how we respond to these problems.

Beyond Pesticides encourages you to get active and speak with members of your community and local government about changing land management practices in order to safeguard local water supplies. Working with your city, county, or town to implement organic land management policies will drastically reduce the pesticides in local waters and also encourage private homeowners to forgo their use of these chemicals. At a time of widespread pesticide contamination in our drinking water sources, inadequate government regulation, and a rampant distrust of tap water, we need, more than ever, land management policies that restore public trust in our ability to manage environmental issues, and safeguard the health of all individuals and communities now and into the future.

A fully cited version of this available at http://bit.ly/pesticidesandyou.

Endnotes

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BEYOND PESTICIDES
701 E Street, SE ■ Washington DC 20003
202-543-5450 phone ■ 202-543-4791 fax
info@beyondpesticides.org ■ www.beyondpesticides.org