

Pesticides Implicated in Infertility

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STORY AT-A-GLANCE

- › Human fertility is rapidly declining, and recent studies suggest pesticide exposure via conventional food may be a significant contributor to this disturbing trend, seen in both women and men
- › Compared to women with the lowest pesticide exposure, women with the highest exposure had an 18% lower IVF success rate. They were also 26% less likely to have a live birth if they did become pregnant
- › Modeling suggests exchanging a single serving of high-pesticide produce per day for one with low pesticide load may increase the odds of pregnancy by 79%, and the odds of having a live birth by 88%
- › Research also shows sperm concentration and quality has dramatically declined in recent decades, and the evidence suggests endocrine disrupting chemicals, which includes pesticides, are largely to blame
- › Washing your produce will help remove surface pesticide residues. According to published research, the most effective cleaning method, by far, is to wash your produce using a mixture of tap water and baking soda

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Human fertility is declining, and studies suggested conventional food may be a significant contributor to this disturbing trend, seen in both men and women. Pesticides

have repeatedly been implicated in worsening fertility, and one study further supported this hypothesis.

The study,^{1,2} published in JAMA Internal Medicine, evaluated the influence of factors known to affect reproduction on the reproductive success of 325 women between the ages of 18 and 45 (mean age 35), who underwent in vitro fertilization (IVF). As reported by Time,³ "The women in the study filled out detailed questionnaires about their diet, along with other factors that can affect IVF outcomes, like their age, weight and history of pregnancy and live births."

High Pesticide Exposure Associated With Reduced IVF Success

Using a U.S. government database listing average pesticide residues on food, the researchers estimated each participant's pesticide exposure based on their food questionnaires. On average, women with high pesticide exposure ate 2.3 servings per day of fruits, berries or vegetables known to have high amounts of pesticide residue. Those in the lowest quartile ate less than one serving of high-pesticide produce per day.

Compared to women with the lowest pesticide exposure, women with the highest amounts of pesticide exposure had an 18% lower IVF success rate. They were also 26% less likely to have a live birth if they did become pregnant. Using modeling, the researchers estimate that exchanging a single serving of high-pesticide produce per day for one with low pesticide load may increase the odds of pregnancy by 79%, and the odds of having a live birth by 88%.

Pesticide Regulations Fail to Protect Human Health

Senior investigator Dr. Jorge Chavarro, associate professor of nutrition and epidemiology at Harvard T. H. Chan School of Public Health, told Time:⁴

"I was always skeptical that pesticide residues in foods would have any impact on health whatsoever. So, when we started doing this work a couple of years ago, I thought we were not going to find anything. I was surprised to see

anything as far as health outcomes are concerned. I am now more willing to buy organic apples than I was a few months ago."

Co-author Dr. Yu-Han Chiu, research fellow in the department of nutrition at the Harvard T.H. Chan School of Public Health, added:⁵

"There have been concerns for some time that exposure to low doses of pesticides through diet, such as those that we observed in this study, may have adverse health effects, especially in susceptible populations such as pregnant women and their fetus, and on children. Our study provides evidence that this concern is not unwarranted."

As noted by Dr. Philip Landrigan, dean for Global Health and professor at the Icahn School of Medicine at Mount Sinai since 2010, in an accompanying commentary,⁶ "The observations made in this study send a warning that our current laissez-faire attitude toward the regulation of pesticides is failing us," adding:

"We can no longer afford to assume that new pesticides are harmless until they are definitively proven to cause injury to human health.

We need to overcome the strident objections of the pesticide manufacturing industry, recognize the hidden costs of deregulation, and strengthen requirements for both premarket testing of new pesticides, as well as postmarketing surveillance of exposed populations – exactly as we do for another class of potent, biologically active molecules – drugs."

Male Fertility Rates Have Also Plunged

Research also showed sperm concentration and quality has dramatically declined in recent decades, and the evidence suggested endocrine-disrupting chemicals are largely to blame. While there are many sources, pesticides, including glyphosate,⁷ are known endocrine disruptors as well.

According to the first of two published papers,⁸ a meta-analysis of 185 studies and the largest of its kind, sperm counts around the world declined by more than 50% between 1973 and 2013, and continue to dwindle.

The most significant declines were found in samples from men in North America, Europe, Australia and New Zealand. (Men suspected of infertility, such as those attending IVF clinics, were excluded from the study.) Overall, men in these countries had a 52.4% decline in sperm concentration and a 59.3% decline in total sperm count (sperm concentration multiplied by the total volume of an ejaculate).

As it stands, half of the men in most developed nations are now near or at the point of being infertile. Lead author Dr. Hagai Levine, who called the results "profound" and "shocking,"⁹ worries that human extinction is a very real possibility, should the trend continue unabated.¹⁰

Microwave Exposure – Another Invisible Contributor to Infertility

Exposure to electromagnetic fields (EMFs) is another major contributor to infertility. In fact, I believe this may be the most significant factor for the observed decrease in male sperm count.¹¹ During World War II, it was well-known that radar operators could easily create sterility by exposing the groin to radar waves. Radar is microwave radiation and was the precursor to cellphones that use similar frequencies.

Modern research also suggested microwave radiation may play a significant role in male reproductive health. While evaluating studies showed you can radically reduce biological microwave damage using calcium channel blockers, Martin Pall, Ph.D., discovered a previously unknown mechanism of biological harm from microwaves emitted by cellphones and other wireless technologies.¹²

Embedded in your cell membranes are voltage-gated calcium channels (VGCCs). It turns out these VGCCs are activated by microwaves, and when that happens, about 1 million calcium ions per second are released.

This massive excess of intracellular calcium then stimulates the release of nitric oxide (NO) inside your cell and mitochondria, which combines with superoxide to form peroxynitrite. Not only do peroxynitrites cause oxidative damage, they also create hydroxyl free radicals – the most destructive free radicals known to man.

Hydroxyl free radicals decimate mitochondrial and nuclear DNA, their membranes and proteins, resulting in mitochondrial dysfunction. During a 2013 children's health expert panel on cellphone and Wi-Fi exposures,¹³ it was noted, "The testicular barrier, that protects sperm, is the most sensitive of tissues in the body ... Besides sperm count and function, the mitochondrial DNA of sperm are damaged three times more if exposed to cellphone radiation."

In addition to male testes, the tissues with the highest density of VGCCs are your brain and the pacemaker in your heart. What the research tells us is that excessive microwave exposure can be a direct contributor to conditions such as infertility, Alzheimer's, anxiety, depression, autism and cardiac arrhythmias.¹⁴

Indeed, other studies have linked low-level electromagnetic radiation exposure from cellphones to an 8% reduction in sperm motility and a 9% reduction in sperm viability.^{15,16} Wi-Fi-equipped laptop computers have also been linked to decreased sperm motility and an increase in sperm DNA fragmentation after just four hours of use.¹⁷ So, if you care about your reproductive health, the most important strategies to implement are to:

- Avoid carrying your cellphone in your pockets or on your hip
- Avoid using portable computers and tablets on your lap
- Turn off your cellphones at night, as even if you are not talking, they can damage you up to 30 feet away
- Turn off your Wi-Fi at night (ideally in the day also)
- Most importantly, turn off the electricity to your bedroom at the circuit breaker. This typically works for most bedrooms unless you have a room or rooms adjacent to your bedroom, in which case you might need to shut that off, too. This will radically lower electric and magnetic fields while you sleep. If you need a clock, you can use

a battery-operated one. Even better — a talking clock with no light that can be picked up on Amazon

Study Revealed Shocking Increase in Glyphosate Levels

In related news, researchers from the University of California, San Diego School of Medicine reported there's been a shocking increase in glyphosate exposure in recent decades and, subsequently, the level found in people's urine.

For this study,¹⁸ the researchers measured excretion levels of glyphosate and its metabolite aminomethylphosphonic acid in 100 participants from the Rancho Bernardo Study of Healthy Aging, which ran for 23 years, starting in 1993, the year before genetically engineered (GE) crops were introduced in the U.S.

As one would expect, the introduction of Roundup Ready GE crops led to a massive increase in the use of Roundup, the active ingredient of which is glyphosate. [Glyphosate](#) has also become a popular tool for desiccating non-GE grains, legumes and beans.

Data^{19,20} revealed that between 1974 (the year glyphosate entered the U.S. market and just over two decades before GE crops were introduced) and 2014, glyphosate use in the U.S. increased more than 250-fold. Globally, glyphosate use rose nearly fifteenfold since 1996, two years after the first GE crops hit the market.

At the start of the study, very few of the participants had detectable levels of glyphosate in their urine, but by 2016, 70% of them did.²¹ Overall, the prevalence of human exposure to glyphosate increased by 500% during the study period (1993 to 2016), while actual levels of the chemical in people's bodies increased by an astounding 1,208%.

Rising Glyphosate Levels in Urine Is Cause for Concern

Research²² found that daily exposure to ultra-low levels of glyphosate for two years led to nonalcoholic fatty liver disease in rats, and the levels found in people's urine were a hundredfold greater than those in this rat study.

In response to the findings of rising glyphosate levels in people's urine, Monsanto was quick to say that the amounts reported "do not raise health concerns," and that the fact that the chemical is detected in urine is just "one way our bodies get rid of nonessential substances."²³ Speaking to GM Watch, Michael Antoniou, Ph.D., a professor at King's College London had another take on the matter:²⁴

"This is the first study to longitudinally track urine levels of glyphosate over a period before and after the introduction of GM glyphosate-tolerant crops. It is yet another example illustrating that the vast majority of present-day Americans have readily detectable levels of glyphosate in their urine, ranging from 0.3 parts per billion, as in this study, to 10 times higher – 3 or more parts per billion – detected by others.

These results are worrying because there is increasing evidence to show that exposure to glyphosate-based herbicides below regulatory safety limits can be harmful."

Glyphosate Found in Breast Milk

In 2014, the first-ever independent testing for glyphosate in the breast milk of American women found high levels in 30% of the samples.²⁵ The testing, which was not a formal scientific study, was carried out by Moms Across America and Sustainable Pulse. Still, the findings strongly suggest glyphosate bioaccumulates and builds up in your body over time, despite claims to the contrary.

Breast milk levels were found to be 76 to 166 micrograms per liter (ug/l), which is up to 1,600 times higher than the European Drinking Water Directive allows for individual pesticides, but still well below the 700 ug/l maximum contaminant level (MCL) for glyphosate allowed in the U.S. However, the U.S. level was set by the U.S. Environmental Protection Agency (EPA) based on the now-ridiculous premise that glyphosate will not bioaccumulate.

Importantly, many of the participants in this study were familiar with genetically modified organisms (GMOs) and had been actively trying to avoid them for several months to two years. This makes the findings all the more disheartening, and shows just how difficult it is to avoid this chemical unless you're consistently eating an organic diet.

Corporate Machinations Kept Glyphosate on the Market

As noted in an investigation by In These Times,²⁶ in the wake of Moms Across America's findings, Monsanto defended its flagship pesticide with a study that found no glyphosate in breast milk. However, this study, which was purported to be "independent," was actually backed by Monsanto. According to In These Times:

"More and more research suggests [sic] that glyphosate exposure can lead to numerous health issues, ranging from non-Hodgkin lymphoma and kidney damage to disruption of gut bacteria and improper hormone functioning. The Moms Across America episode fits a pattern that has emerged since 1974, when the EPA first registered glyphosate for use:

When questions have been raised about the chemical's safety, Monsanto has ensured that the answers serve its financial interests, rather than scientific accuracy and transparency. Our two-year investigation found incontrovertible evidence that Monsanto has exerted deep influence over EPA decisions since glyphosate first came on the market – via Roundup – more than 40 years ago."

Manipulation of Science Led to Underestimation of Glyphosate's Risks

Suspiciously, archived EPA documents from decades ago, when the agency was initially considering glyphosate for approval, have been heavily redacted.

Despite much of it being illegible, the documents revealed that EPA scientists were greatly concerned about a 1983 mouse study showing that glyphosate caused cancer. The documentation also showed that their interpretation of the data was "subsequently

reversed by EPA upper management and advisory boards, apparently under pressure from Monsanto."

"In years to come, that pivotal 1983 mouse study would be buried under layers of misleading analysis to obscure its meaning. Today, the EPA and Monsanto continue to cite that study as evidence that glyphosate poses no public health risk, even though the study's actual evidence indicates otherwise," In These Times reported.

The EPA has also been accused of overlooking other evidence of harm. As mentioned earlier, glyphosate was introduced in 1974, and the earliest example of Monsanto's attempts to downplay evidence of harm dates back to May 1973, the year before its ultimate approval.

At the time, a biologist at the EPA's Toxicology Branch Registration Division recommended including the word "Danger" on the label, due to the chemical's ability to cause eye irritation. Monsanto strongly objected, saying the eye irritation observed was merely the result of "a secondary infection in previously irritated eyes." After three years of deliberations back and forth, the EPA finally agreed to Monsanto's request to replace the word "Danger" with the less attention-grabbing "Caution."

How to Check Your Glyphosate Level

As food has become increasingly adulterated, contaminated and genetically engineered, the need for laboratory testing has exponentially grown. In response to this need, the Health Research Institute (HRI Labs) has created two glyphosate tests for the public – a water testing kit and an environmental exposure test kit.

The environmental exposure test is a urine test that will tell you how much glyphosate you have in your system, which can give you a good idea of the purity of your diet. If your glyphosate level is high, chances are you've been exposed to many other agrochemicals as well.

I had this test done before, and had a glyphosate level below the threshold of detection, which is 40 parts per trillion, likely because I eat primarily organic and homegrown foods, and expel toxins I might come in contact with through exercise and regular sauna use.

Which Foods Are the Most Important to Buy Organic?

Everyone can be harmed by pesticides, but if you're a man or woman of childbearing age or have young children, taking steps to reduce your exposure is especially important. Ideally, all of the food you and your family eat would be organic. That said, not everyone has access to a wide variety of organic produce, and it can sometimes be costlier than buying conventional.

One way to save some money while still lowering your pesticide exposure is to purchase certain organic items, and "settling" for others that are conventionally grown, based on how heavily each given crop is typically treated with pesticides.

Animal products, like meat, butter, milk and eggs are the most important to buy organic, since animal products tend to bioaccumulate toxins from their pesticide-laced feed, concentrating them to far higher concentrations than are typically present in vegetables. Beyond animal foods, the pesticide load of different fruits and vegetables can vary greatly.

In 2015, Consumer Reports analyzed 12 years' worth of data from the USDA's Pesticide Data Program to determine the risk categories (from very low to very high) for different types of produce.²⁷ Their results are featured in the video above. Because children are especially vulnerable to the effects of environmental chemicals, including pesticides, they based the risk assessment on a 3.5-year-old child.

They recommend buying organic for any produce that came back in the medium or higher risk categories, which left the following foods as examples of those you should always try to buy organic, due to their elevated pesticide load.

Another excellent source, which is updated annually, is the Environmental Working Group's (EWG) "Dirty Dozen" and "Clean 15" lists of produce with the greatest and least amounts of pesticide contamination. The EWG's 2024 Shopper's Guide²⁸ to Pesticides in Produce can be downloaded [here](#).

How to Clean Pesticides Off Your Produce

Washing your produce will help remove surface pesticide residues. According to published research,²⁹ the most effective cleaning method, by far, is to wash your produce using a mixture of tap water and baking soda. Soaking apples in a 1% baking soda solution for 12 to 15 minutes was found to remove 80% of the fungicide thiabendazole and 96% of the insecticide phosmet.

The reason thiabendazole was not as effectively removed is because it penetrated the apple to a depth of 80 micrometers. Importantly, the industry standard for cleaning apples – running under tap water or treating with the bleach solution for two minutes – was ineffective in comparison.

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