

# The Overlooked Environmental Trigger Behind Gestational Diabetes

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## STORY AT-A-GLANCE

- › Gestational diabetes now affects nearly 1 in 10 U.S. pregnancies and raises long-term metabolic risks for both mother and child
- › Research shows that exposure to PFAS, common industrial chemicals found in most people's bodies, increases the likelihood of gestational diabetes by disrupting normal blood sugar control
- › PFAS exposure interferes with insulin signaling, increases insulin resistance, and forces your pancreas to work harder even before blood sugar levels appear abnormal
- › Pregnancy magnifies the effects of chemical exposure, with PFAS posing greater risk during specific stages when hormonal and metabolic demands are highest
- › Reducing PFAS exposure and strengthening insulin sensitivity before and during pregnancy lowers metabolic strain and supports healthier blood sugar regulation

You've done everything right — scheduled your prenatal vitamins, researched the best stroller, started that nursery registry. But a single blood test at 24 weeks reveals something you didn't expect: gestational diabetes. What you don't know yet is that the nonstick pan in your kitchen and the greaseproof wrapper from last week's takeout may have tipped the scales.

In the U.S., nearly 1 in 10 pregnant women now receive this diagnosis, a figure that has climbed steadily over time and reshaped how pregnancy risk is understood.<sup>1</sup> For years, the conversation centered on familiar explanations such as body weight, age, or family history.

However, large-scale research published in *eClinicalMedicine* points to an overlooked contributor that reaches far beyond personal health habits: widespread exposure to industrial chemicals that linger in the environment and the human body, namely per- and polyfluoroalkyl substances (PFAS).<sup>2</sup>

These compounds are not rare, not confined to specific jobs, and not limited to isolated communities. They show up in blood samples from nearly everyone. The key variable isn't whether you're exposed — it's when during pregnancy that exposure occurs. Research published in *BMC Pregnancy and Childbirth* reveals pregnancy as an exquisitely vulnerable metabolic window, when even modest environmental pressures carry greater weight.<sup>3</sup>

Subtle disruptions that might pass unnoticed at other life stages take on new significance as the body adapts to support fetal growth. This shifts blame from willpower to water supply, from diet to industrial pollution.

It also raises an urgent question about how everyday chemical exposures interact with pregnancy biology — and why understanding those interactions is essential to protecting long-term metabolic health during pregnancy and in future generations.

## **Evidence Connects PFAS to Disrupted Blood Sugar Control During Pregnancy**

The *eClinicalMedicine* study examined whether exposure to **PFAS** affects blood sugar control and diabetes risk, with a specific focus on pregnancy outcomes.<sup>4</sup> Researchers systematically reviewed 129 human studies and ran formal meta-analyses using data

from up to 111,544 participants, depending on the outcome measured. The goal was to move beyond single studies and see whether consistent patterns emerged across populations, countries, and study designs.

PFAS act as endocrine disruptors – they dock onto cellular receptors meant for natural hormones, sending scrambled signals that disrupt how your body stores fat, responds to insulin, and burns fuel for energy. The paper describes how PFAS activate pathways that regulate fat storage, insulin sensitivity, and energy balance. When these pathways get disrupted, cells burn fuel less efficiently and rely more heavily on insulin-driven control.

- **Gestational diabetes showed the clearest and most consistent signal** – Exposure to eight different PFAS was linked with higher odds of gestational diabetes, with perfluorooctane sulfonate (PFOS) showing a 13% increase in risk for each doubling of exposure. That means as PFAS levels rose, the likelihood of gestational diabetes rose in parallel. For someone planning a pregnancy, this translates into a measurable risk factor that sits completely outside diet or genetics.
- **Insulin resistance increased alongside PFAS exposure** – Several PFAS were also associated with higher **HOMA-IR scores**, a standard measure of **insulin resistance** that reflects how hard your body needs to work to keep blood sugar stable. Insulin resistance means cells stop responding properly to insulin, forcing your pancreas to push out more of it. The analysis found PFOS and another PFAS – PFNA – consistently raised HOMA-IR values in prospective studies.

In practical terms, if you're planning pregnancy with elevated PFAS exposure, your cells are already struggling to use insulin before you conceive, setting up a metabolic collision when pregnancy hormones further reduce insulin sensitivity around week 20.

- **The pancreas responded by overworking** – The review also found higher HOMA- $\beta$  scores linked to PFAS exposure, which signals increased insulin secretion from pancreatic beta cells. Early on, this looks like compensation, not failure.

The pancreas pushes harder to offset insulin resistance. Over time, that pattern leads to beta-cell exhaustion, a known pathway toward [diabetes](#). This explains why PFAS do not just correlate with blood sugar issues but actively strain the system that regulates glucose.

- **Fasting insulin levels rose even before glucose levels changed** – Several PFAS were linked with higher fasting insulin in prospective studies, even when fasting glucose and hemoglobin A1c (HbA1c) – a blood test that reflects your average blood sugar level over the previous two to three months – stayed within normal ranges.

This detail matters because insulin rises first when metabolism breaks down. Blood sugar often looks "normal" until much later. The findings show PFAS exposure shifts metabolism in a hidden way long before standard labs flag a problem.

- **Cellular stress and inflammation amplify the damage** – PFAS increase oxidative stress and inflammatory signaling in metabolic tissues. Oxidative stress is cellular wear-and-tear caused by unstable molecules, while inflammation disrupts insulin signaling inside cells. Together, these processes make tissues less responsive to insulin, forcing the pancreas into overdrive and pushing the body closer to metabolic failure.

The review emphasizes that PFAS exposures are widespread, persistent, and cumulative. You can't feel them, taste them, or detect them without testing. Yet the data show they influence insulin resistance, pancreatic workload, and pregnancy-related glucose control. But here's the key nuance that changes how we think about prevention: PFAS don't affect pregnancy uniformly. The same exposure has radically different effects depending on when it occurs.

## **Pregnancy Magnifies the Effects of Chemical Exposure**

A study published in BMC Pregnancy and Childbirth examined whether PFAS levels measured at different stages of pregnancy influenced gestational diabetes risk.<sup>5</sup> Researchers measured blood PFAS levels in early pregnancy around 14 weeks and again in mid-pregnancy around 20 weeks.

Participants included Hispanic, Asian/Pacific Islander, White, and Black participants, with a mix of first-time and experienced mothers. This diversity matters because PFAS exposure and metabolic risk differ across populations, making the findings more relevant to everyday pregnancies.

- **PFAS increase gestational diabetes risk across pregnancy stages** – Higher blood levels of certain PFAS were associated with higher gestational diabetes risk when measured in early pregnancy, mid-pregnancy, and across both time points combined. Risk rose by roughly 15% to 40%, depending on the compound and timing. This shows that repeated exposure, not just a single spike, drove risk upward.
- **Timing affected risk for some compounds** – Some PFAS did not raise risk in a straight line across pregnancy. PFOS was linked to higher gestational diabetes risk only in mid-pregnancy, not earlier, while another PFAS – PFUnDA – showed the opposite pattern, with lower risk early and higher risk later. This shows that pregnancy is not metabolically static – the same exposure can have very different effects depending on when it occurs, as hormone levels and insulin demands shift over time.
- **Hormonal shifts during pregnancy amplify chemical effects** – Mid-pregnancy brings rising insulin resistance driven by placental hormones. PFAS exposure during this window intensified that natural resistance, pushing glucose regulation past a breaking point.

These forces worsen glucose control precisely when pregnancy already demands metabolic flexibility. Translation: The contaminated water you drank in week 14 may affect your baby differently than the same water in week 20. This knowledge

supports practical prevention strategies focused on reducing exposure before and during pregnancy rather than waiting for abnormal glucose tests to appear.

## **Steps to Reduce PFAS Exposure and Protect Against Gestational Diabetes**

If you are pregnant, planning a pregnancy, or supporting someone who is, this is where action matters most. The evidence shows PFAS exposure adds metabolic strain at the exact time your body already works harder to control blood sugar.

Addressing the source of that strain first lowers pressure on glucose regulation instead of reacting after problems show up. PFAS are called "forever chemicals" because they resist breakdown in both the environment and your body. The average elimination half-life ranges from two to five years for common PFAS like PFOS and PFOA.

This means if you reduce exposure today, blood levels will drop by only 50% after two to five years. For women planning pregnancy, this timeline matters: starting PFAS reduction at least 12 months before conception allows blood levels to drop meaningfully before the metabolically vulnerable window of pregnancy begins. If you're already pregnant, start reducing PFAS immediately – every reduction in ongoing exposure matters, even in trimester two or three.

- 1. Filter your drinking water to reduce daily PFAS intake** – Many municipal [water supplies](#) contain PFAS from industrial runoff and firefighting foam contamination. Using a high-quality water filtration system designed to remove PFAS reduces a steady background source that accumulates over weeks and months.
- 2. Reduce contact with grease-resistant food packaging** – PFAS are commonly used in fast-food wrappers, takeout boxes, microwave popcorn bags, and other oil-repellent materials. To cut your exposure, choose fresh foods over fast food and takeout, focusing instead on cooking meals at home. Avoid items packaged in grease-resistant paper, since this is a common source of PFAS.

- 3. Avoid nonstick cookware** – Heat increases PFAS migration from nonstick surfaces into food. Cooking with safer materials like stainless steel limits direct transfer into meals, which is especially important during pregnancy when metabolic tolerance narrows.
- 4. Limit stain-resistant and water-repellent household products** – Carpets, furniture, mattresses, and clothing labeled stain-resistant or waterproof often rely on PFAS chemistry. Choosing untreated natural materials and washing new textiles before use lowers ongoing skin contact and household dust exposure, which **compounds over time**.
- 5. Use a broader detox strategy that addresses multiple toxins at once** – PFAS do not act alone. Some enter your body as hitchhikers on **microplastics**, which behave like sponges for environmental toxins.<sup>6</sup> The universal detox solution detailed in my upcoming book, "**Microplastics Cure**," is designed to address far more than plastic particles alone.

The same science-based strategies outlined in the book also support the removal of other persistent pollutants, including PFAS, by reducing overall toxic load and strengthening your body's natural resilience.

"Microplastics Cure" provides a clear, science-based guide for navigating one of today's most overlooked health challenges. Rather than dwelling on what can't be avoided, it shows where meaningful change is possible and how small, informed choices reduce toxic burden. In a world where plastic and chemical exposure have become routine, this approach offers a practical path forward that puts control back in your hands.

- 6. Rebuild cellular energy to restore insulin sensitivity before pregnancy** – Reducing PFAS exposure removes one driver of insulin resistance. But if your cellular energy production is already compromised – often from years of inadequate carbohydrate

intake or seed oil damage – your glucose handling will struggle even with low PFAS levels. Both strategies work together: remove the external toxins while rebuilding internal metabolic capacity.

**Gestational diabetes** develops on a foundation of insulin resistance that often begins years earlier. Insulin allows glucose to enter your cells so it can be used for energy. When cells run low on fuel, that signal weakens and glucose stays in the bloodstream, forcing your body to release more insulin. Restoring cellular energy reverses this breakdown.

For most adults, that means **adequate carbohydrates** rather than restriction – roughly 250 grams per day – which supports thyroid function, metabolic rate, and stable glucose handling. Chronic carbohydrate restriction raises **stress hormones** and worsens insulin sensitivity over time. Removing seed oils is just as important.

**Linoleic acid** (LA) from soybean, corn, canola, sunflower, safflower, cottonseed, and grapeseed oils disrupts mitochondrial energy production and interferes with insulin signaling. Your mitochondria are cellular power plants – when they function well, cells have ample energy and readily accept glucose.

When seed oils damage mitochondrial membranes, energy production drops, glucose builds up in your bloodstream, and insulin resistance follows. Eliminating packaged foods and restaurant meals cooked in seed oils, while using traditional fats like grass fed butter, ghee, or tallow, reduces metabolic strain and lowers the insulin demand placed on your body before pregnancy begins.

## **FAQs About PFAS and Gestational Diabetes**

**Q: What is gestational diabetes and why is it becoming more common?**

**A:** Gestational diabetes occurs when blood sugar rises during pregnancy because the body can't regulate glucose effectively under increased metabolic demand. In the U.S., it now affects nearly 1 in 10 pregnancies, a rise linked not only to traditional factors like age or weight, but also to environmental exposures that interfere with normal glucose control.

**Q: How are PFAS connected to gestational diabetes risk?**

**A:** Large-scale research shows that higher exposure to PFAS aligns with higher odds of gestational diabetes. These chemicals interfere with hormone signaling involved in metabolism, increase insulin resistance, and force your pancreas to work harder to keep blood sugar stable, even before standard lab tests show abnormalities.

**Q: Why does the timing of PFAS exposure during pregnancy matter?**

**A:** Pregnancy is a biologically sensitive window. Studies measuring PFAS in early and mid-pregnancy show that risk changes depending on when exposure occurs. Hormonal shifts during mid-pregnancy naturally increase insulin resistance, and PFAS exposure during this period adds extra metabolic strain, pushing glucose regulation past a tipping point.

**Q: How can PFAS exposure be reduced during pregnancy or before conception?**

**A:** Key steps include filtering drinking water, limiting contact with grease-resistant food packaging, avoiding nonstick cookware, and reducing use of stain-resistant or water-repellent household products. These changes lower daily exposure to PFAS, which are widespread, persistent, and accumulate over time.

**Q: Why is improving insulin sensitivity before pregnancy important?**

**A:** Gestational diabetes often develops on a foundation of insulin resistance that builds for years. Supporting cellular energy production, eating adequate carbohydrates, and removing seed oils that disrupt mitochondrial function strengthen glucose handling before pregnancy begins. Addressing these root causes early reduces metabolic strain during pregnancy and lowers long-term risks for both mother and child.

## Sources and References

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- [1, 2, 4 eClinicalMedicine January 12, 2026](#)
- [3, 5 BMC Pregnancy Childbirth. 2023 Sep 13;23:657](#)
- [6 Journal of Hazardous Materials Advances May 2025, Volume 18, 100740](#)