

Purpose

This document is intended to inform discussions between clinicians and families who live in an area where the drinking water has been contaminated with PFAS or who have had a substantial exposure to PFAS from another source.

What are the concerns about PFAS and immune health?

Vaccinations protect adults and children from many preventable illnesses. There is strong evidence that exposure to PFAS can suppress the ability of the immune system to produce antibodies in response to vaccinations. Doctors can check vaccine effectiveness by measuring antibody levels (titer) and may consider additional boosters if antibody levels are low. Research on the need for additional boosters in PFAS-exposed people is ongoing. In general, current medical guidance from the Centers for Disease Control and Prevention (CDC) does not recommend revaccination in response to low antibody levels.

A note about low antibody levels

In the general population, 2-10% of healthy individuals fail to mount the expected antibody response to routine vaccines for unknown reasons (Wiedermann 2016).

How to discuss PFAS exposure with your doctor

Consider discussing whether exposure to PFAS may have impacted the effectiveness of your vaccinations.

- Prior studies have found that people with higher levels of PFAS in their bodies also have lower production of antibodies after receiving routine vaccinations (see below).

Ask about an “antibody titer” test, to determine whether your levels of antibodies are within the normal range.

- For routine and well-established vaccinations, like tetanus and measles, you can compare your results to normal antibody ranges provided by the laboratory. For COVID-19, scientists do not yet know exactly what level of antibodies is considered protective against COVID-19 illness.

Following an antibody titer test, find out whether revaccination is the right option for you.

- Revaccination is a personal decision to discuss with your clinician. It is not clear that low levels of antibodies would mean that you are more likely to get sick, and it is also not clear whether a booster would raise antibody levels. The current standard of care does not call for revaccination based on low titer test results.

Discuss continued monitoring of your health.

- Ask your clinician about monitoring for health problems and early signs of health effects that have been associated with PFAS exposure. The PFAS-REACH study has developed medical screening [guidance](https://www.pfas-exchange.org/resources) for clinicians (available at www.pfas-exchange.org/resources).

What is the evidence that PFAS can harm the immune system?

- A systematic review by the National Toxicology Program concluded that two PFAS chemicals, PFOS and PFOA, “are presumed to be an immune hazard to humans” (NTP 2016).
- A 2012 study found lower levels of tetanus and diphtheria antibodies in children ages 5 to 7 with higher levels of PFAS exposure (Grandjean 2012). Other studies have similarly also found lower levels of antibodies for rubella, mumps, and influenza in children with higher levels of exposure (Abraham 2020, Granum 2013, Stein 2016).
- Controlled laboratory studies have also found lower levels of antibody production among animals dosed with PFAS (DeWitt 2008, Dong 2009).

Frequently asked questions

1. How do I know if my vaccinations are still effective given their exposure to PFAS?

You can talk with your doctor about performing an **antibody titer test**, which measures the levels of specific antibodies in your body. For example, you can measure antibodies to the measles virus. The results of this test can help determine if the levels of antibodies in your body following previous immunizations fall within the normal range for protecting against that disease.

2. What is an antibody?

An antibody is what the immune system makes when it encounters a foreign substance like a virus inside the body. The surfaces of viruses, bacteria, and other pathogens have markers called antigens. A vaccine works by telling your body to create antibodies that work against a particular antigen, so that if you are exposed to that pathogen, your body can quickly overcome it, often with little to no symptoms of illness.

3. Where can I get an antibody titer test?

Typically, antibody titer tests can be ordered by your healthcare provider. This requires taking a blood sample and having it tested in a medical lab. Ask your healthcare provider for more information on how to get the test.

For more information on the testing process, visit the MedlinePlus resource center at: <https://medlineplus.gov/ency/article/003333.htm>.

4. Are antibody titer tests covered by health insurance?

A titer test is often not covered by health insurance unless you have certain symptoms that would prompt a clinician to order these tests. Talk with your doctor to see whether the test would be covered by insurance, and confirm with your insurance provider's billing team prior to agreeing to the blood draw.

5. Is there evidence that PFAS exposure will affect the efficacy of the COVID-19 vaccine?

Because PFAS can interfere with the immune system, scientists are concerned that exposure to these contaminants could make populations more vulnerable to infectious diseases and may reduce the effectiveness of routine vaccinations. The U.S. Centers for Disease Control and Prevention (CDC) has recognized that there is concern about how PFAS exposure may affect risk of COVID-19 infection in contaminated communities (CDC 2020). Early evidence from a study in Denmark suggests that COVID-19 may be more severe in adults who have had higher PFAS exposure (Grandjean 2020). No studies to date have examined the impact of PFAS exposure on the effectiveness of the COVID-19 vaccine, but research is underway to answer these questions.

There is no evidence that anyone should refrain from being vaccinated against COVID-19 due to prior PFAS exposure. All groups are strongly advised to follow updated CDC advice on COVID-19 vaccinations, which is based on up-to-date research findings.

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