

Immunization Education: Everything You Need to Know About Vaccines Before and During Pregnancy

Melissa, pregnant for the first time, live chatted with MotherToBaby through our website: “Hi, I’m 29 weeks pregnant and wondering about vaccines. I have seen so many different things online and I am worried about getting really sick while I’m pregnant. Can you help?”

Melissa is not alone. Many people contact MotherToBaby to find the most up-to-date information about **vaccines** during pregnancy. Protecting yourself from circulating viruses can also help protect your developing baby. Infections such as influenza, pertussis, rubella, chicken pox, and COVID-19 can cause serious problems in both a pregnant woman and her developing baby. Let’s navigate through the current recommendations.

Plan to Receive Some Vaccines Prior to Pregnancy

You may have heard there are some vaccines, like measles, mumps, and rubella (MMR) and chickenpox (varicella), you should not receive during pregnancy. These “live” vaccines are avoided as they are made from viruses or bacteria that have been weakened, but not killed. Due to the small chance that a live vaccine might cause the disease itself, live vaccines are not routinely given to pregnant women.

So how can you protect yourself and your developing baby from viruses like **measles, mumps, rubella (MMR) and chicken pox** if it is not recommended (also known as contraindicated) to receive the vaccines during pregnancy? The Centers for Disease Control and Prevention (CDC) consider people who have received one or more doses of MMR vaccine during their lifetime to be protected for life. Adults who never got the MMR vaccine should get at least 1 dose (or 2 doses for some people at higher risk of infection) before pregnancy. Those who have never had chickenpox or received a chickenpox vaccine should get 2 doses of varicella vaccine, at least 4 weeks apart, before pregnancy. If you aren’t sure if you ever got vaccinated for MMR or chickenpox or unsure if you had chickenpox in the past, you can safely receive the necessary live vaccines before that positive pregnancy test! Out of an abundance of caution (small possibility of that infection) **it is advised to wait at least one month before becoming pregnant after these vaccines.** This is just one reason why it is beneficial to have a pre-pregnancy health checkup and to discuss any future conception plans with your provider!

Keep Up with Recommended Vaccines During Pregnancy and Encourage Others to Do So, Too

So, which vaccines should you receive during pregnancy?

CDC recommends all women who are pregnant receive the **flu shot** and updated **COVID-19 vaccine** each year, a **Tdap**

(tetanus diphtheria pertussis) vaccine in each pregnancy, and an RSV (respiratory syncytial virus) vaccine (if you have not received one in a previous pregnancy). These vaccines are not live vaccines and have not been associated with an increased chance for birth defects or pregnancy complications. (A nasal spray vaccine is also available against influenza, but it is a live vaccine and not recommended in pregnancy).

Influenza vaccine (flu shot)

The flu shot usually becomes available in September and is offered throughout flu season. CDC recommends **getting a flu shot by the end of October** despite flu seasons varying in their timing each year. This timing helps protect a pregnant woman before flu activity begins to increase. Protection begins about two weeks after you get the flu shot and lasts at least six to eight months. It is necessary to receive the seasonal flu shot each year to be protected in the current flu season. Getting vaccinated during your pregnancy may also help protect your baby from **getting sick** during the first 6 months of life! This is especially important because infants less than 6 months of age cannot receive the flu vaccine.

COVID-19 vaccine

It is well known that pregnant women are more likely to get very sick from **COVID-19** compared to those who are not pregnant. This is why it is so important to receive an updated COVID-19 vaccine every year, any time before or during pregnancy, for the best protection against severe illness. CDC recommends staying up-to-date with COVID-19 vaccines every year: <https://www.cdc.gov/covid/vaccines/stay-up-to-date.html>.

Tdap vaccine

"I just had a Tdap vaccine a couple years ago – so I don't need another one, right?" Melissa asked a very common question we receive regarding the Tdap vaccine during pregnancy. Although this vaccine is recommended for adults every 10 years, for women who are pregnant, receiving the shot in the 3rd trimester (specifically 27-36 weeks gestation) can help the baby get as many of the mother's antibodies as possible. After delivery, these antibodies provide some protection against **pertussis, also known as whooping cough** (a very contagious respiratory infection), until the baby can receive his/her own dTAP vaccine (starting at 2 months of age). Additionally, if everyone who lives with you and any caregivers get the vaccine, it can lower the chance for the baby to be exposed to pertussis.

RSV vaccine

The RSV vaccine protects both pregnant women and their babies from **RSV**, a virus that can cause serious breathing problems in babies. CDC recommends a single dose of the Abrysvo® RSV vaccine between 32 and 36 weeks of pregnancy, during the RSV season (September-January). As with the flu and Tdap vaccines, this maternal vaccine helps the pregnant woman create antibodies that can pass to the baby, giving the baby some protection from an RSV infection after birth. By getting this vaccine, pregnant women can help keep their newborns safe from serious health complications. Melissa, being 29 weeks, can now plan an upcoming RSV vaccine appointment!

Pregnant women who receive vaccines can also share their experiences with maternal health researchers, like MotherToBaby. **Our studies** are published in medical journals and product labels, and can help others like you when navigating vaccine decisions in pregnancy.

There are no Vaccines to Prevent Some Infections

Many people are packing their bags for a getaway during the summer months. If you are considering an upcoming vacation or babymoon, it's important to protect yourself from viruses and infections with the appropriate vaccines for that area. Where are you headed? Check with your healthcare provider regarding any specific travel vaccines you might need. CDC recommends discussing any travel plans with your provider at least 4-6 weeks before your trip. Contact MotherToBaby to check the information on any vaccines your healthcare provider recommends.

Viruses like **Zika**, **malaria**, and **Oropouche** can be spread by mosquitos and biting flies (midges). These infections can increase serious risks in pregnancy. Since there are no vaccines to prevent these infections, the safest approach during pregnancy would be to not travel to areas with any possible level of risk. Should you choose to travel, it's important to protect yourself using the recommended **insect repellents** among **other ways** to help prevent bites while traveling.

Although Melissa didn't have any trips planned for the rest of her pregnancy, she was happy to know about these other infections she wasn't even thinking about!

Other Precautions

Although masks are no longer required in most public areas, this is still a great way to reduce the risk for infections while around others! Good hand washing is also the most simple and effective way to prevent the spreading of germs to keep you healthy.

After chatting with Melissa, she decided to make her appointment for her COVID-19 and Tdap vaccines (you can get them at the same time!) and will go in ASAP when the flu vaccine for this season is available. She felt reassured knowing she had decided to give herself and her developing baby the best protection from these illnesses as possible. "Thank you for all this info! I just want to make the best choice for me and my baby – I feel so much better."

Do you have questions about vaccines during pregnancy? Call, chat, text, or email MotherToBaby!

References:

<https://mothertobaby.org/fact-sheets/vaccines-pregnancy/>

<https://mothertobaby.org/pregnancy-studies/>

<https://www.cdc.gov/vaccines/by-age>

<https://www.cdc.gov/vaccine-safety/about/pregnancy.html>

Questions? Call 866.626.6847 | Text 855.999.3525 | Email or Chat at [MotherToBaby.org](https://www.MotherToBaby.org).

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Spring break is often associated with young college students flocking to the beaches to take a break from their studies. However, it is now embraced by a diverse crowd, including families with pregnant and breastfeeding women. Spring break typically takes place between March and April each year, leading to masses of people traveling by planes, trains, and automobiles. Fun times are possible for everyone, and we have guidance to increase the chances that your travels and experiences will be comfortable and safe for you and your baby.

Check-In with Your Doctor

For most pregnant women, traveling by airline, train, car, or bus is generally safe until close to their due date. Regardless of your trimester, a quick check-in with your doctor is essential to ensure you are cleared to travel.

- **First Trimester:** If you are experiencing pregnancy-related **nausea**, prepare ahead with needed medications and a plan to stay hydrated.
- **Second Trimester:** If you are healthy, this is a great time to travel.
- **Third Trimester:** You should be fine to travel, but keep in mind that if you go into early labor, you don't want to be far from high-quality obstetrical care. Check for hospital locations at your destination.

Check for Infectious Disease Warnings

If you are traveling outside of the U.S., check for disease warnings or recommended vaccines for your destination on the [CDC Travelers' Health page](#). Additionally, if your destination has mosquitoes, use **insect repellants** to reduce the risk of exposure to infectious diseases.

Sun Exposure and Heat

Prolonged sun exposure can lead to overheating and dehydration, and in severe cases, heat stroke. High fever is a potential concern for pregnant individuals in any trimester. Prevention is key:

- Keep hydrated.
- Protect against direct sun for prolonged periods (sit under an umbrella or go indoors).
- Use sunscreen.
- Drink plenty of water.
- Avoid **alcohol** and limit **caffeine**, as they can increase dehydration.

Sunscreen

Everyone, including pregnant and breastfeeding women, should use sunscreen year-round. While there is some evidence that chemical sunscreens can penetrate the body in very small amounts, the American College of Obstetricians and Gynecologists (ACOG) recommends the use of effective sunscreen. For breastfeeding women, remember that sun exposure does not provide enough vitamin D for your baby; the American Academy of Pediatrics recommends 400 IU of vitamin D daily for breastfed babies.

Dietary Concerns

One of the highlights of travel is enjoying local food. For pregnant women, the risks from food-borne illnesses remain the same whether at home or on vacation. Avoid **unpasteurized milk products**, **undercooked meats**, and **fish** from risky categories.

Alcohol

Alcoholic beverages may be a destination goal for many, but pregnant and breastfeeding women are urged to continue following the warnings:

- **Pregnant Women:** It is crucial to avoid **alcohol**, as there is no known safe amount to drink. The risks to the developing baby are significant and can be devastating. Increasingly, restaurants are creating delicious and inviting mocktails (non-alcohol) and other beverages, offering an alternative that does not single out a person from the crowd.
- **Breastfeeding Women:** Limiting alcohol is beneficial as it can decrease the amount of breastmilk produced. It is recommended to breastfeed after two hours per drink to reduce the risk of exposure to the baby and developing brain.

Following these recommendations and reminders can help prevent exposures and experiences that could later cause grief and anxiety. Prepare well and enjoy your holiday! Ideally, a well-planned spring break will lift your spirits, provide a mental health break, allow you to enjoy new or favored foods, and create new and wonderful memories.

References and Additional Information:

CDC:

<https://wwwnc.cdc.gov/travel/page/sun-exposure>

<https://www.cdc.gov/niosh/heat-stress/about/illnesses.html>

<https://wwwnc.cdc.gov/travel/page/sun-exposure>

<https://www.cdc.gov/breastfeeding-special-circumstances/hcp/diet-micronutrients/vitamin-d.html>

<https://wwwnc.cdc.gov/travel>

ACOG

<https://www.acog.org/womens-health/faqs/travel-during-pregnancy>

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You may have heard recently that the Food and Drug Administration (FDA) has banned Federal Food, Drug, and Cosmetic Act (FD&C) Red No. 3. In this blog, we will review details about the ban, including why it was enacted, and the timeline for removing FD&C Red No. 3 from products. Our goal is to equip you with information to help make informed decisions. Be sure to check back, as we'll continue updating this post with the latest developments.

All food dyes, called color additives, must be approved for use by the FDA before manufacturers can use them. Color additives can be synthetic (lab made) or naturally derived from plants, animals and minerals. Manufacturers submit information about safety and manufacturing to the FDA in order to receive approval.

What is Red No. 3?

FD&C Red No. 3., also found on food labels as Red 3 or Red No. 3, is a synthetic food dye that gives foods and drinks a bright, cherry-red color. Red No. 3 can be found in some cake icing, candies, and other food items. Red No. 3 is also used in some oral medications and supplements.

Red No. 3 is a complicated formula for those of us not in the food manufacturing business. Specifically, the FDA reports that the color additive FD&C No. 3 is monohydrate of 9-6-hydroxy-2,4,5,7-tetraiodo-3H-xanthen-3-one, disodium salt, with smaller amounts of lower imidinated fluoresceins.

Why is Red No. 3 being banned?

Red No. 3 food dye is being banned because studies found that at high doses, the dye caused cancer in male laboratory rats. Studies in other animals or in humans did not show an increased chance for cancer.

The way that the food dye causes cancer in laboratory rats involves a mechanism not present in humans, so it is not known if this could also be a risk for humans.

Has Red No. 3 been associated with birth defects or problems with breastfeeding?

Studies have not been done to research this.

When is the ban taking effect?

On January 15, 2025, the FDA announced that Red No. 3 will be banned from all products, including medications and foods. However, this ban allows manufacturers time to phase out the use of Red No. 3. Manufacturers who use Red No. 3 in food will have until January 15, 2027 to remove it from their products. Manufacturers of oral medications and supplements will have until January 18, 2028 to remove it.

Is FD&C Red No. 3 used in cosmetics or topical medications?

Red No. 3 has not been allowed in cosmetics, or topical medications, by the FDA since at least 1990.

How can I confirm if my food has Red No. 3?

To learn if your food has Red No. 3, look at nutrition facts on the product's label. The nutrition facts label lists calories and serving size, as well as other information. Below the nutrition facts, you will find an ingredients list. Ingredients are listed in order of those found in highest amounts to those found in smallest amounts in the product. For example, if the first ingredient is water, this means that most of the product is water, and each ingredient listed after that is found in the product in smaller amounts.

Here is a sample of a products' ingredients. Red No.3 is listed as less than 2% of the product.

INGREDIENTS: SUGAR, VEGETABLE SHORTENING (PALM, SUNFLOWER AND HYDROGENATED COTTONSEED OILS), WATER, CORN SYRUP, CONTAINS LESS THAN 2% OF THE FOLLOWING: SORBITOL, YELLOW 6 LAKE, RED 40 LAKE, RED 3, METHYL PARABEN, PROPYL PARABEN, PHOSPHORIC ACID, MODIFIED CORNSTARCH, SALT, CORNSTARCH, NATURAL AND ARTIFICIAL FLAVOR, POTASSIUM SORBATE (PRESERVATIVE), CITRIC ACID, SUNFLOWER OIL, ROSEMARY EXTRACT (PRESERVATIVE), TOCOPHEROLS, MONO- AND DIGLYCERIDES, POLYSORBATE 60.

You can learn more from the FDA announcement here: [FDA Consumer Announcement](#)

FDA Red No 3

FDA Red No 3 composition

FDA Color Additives for Consumers

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In recent years, plant-based diets have become more and more popular. People choose to go vegetarian for a variety of reasons including health benefits, sustainability concerns, and ethical motivations. Whatever the reason, this type of diet can be **healthy and nutritionally adequate**, even during the reproductive years. However, during pregnancy, a bit of planning may be required to make sure the developing baby is getting all the nutrition necessary from a plant-based mom.

First, let's talk about different plant-based diets. Some people choose to avoid meat on occasion such as those who participate in "Meatless Mondays." Others commit fully to a vegetarian lifestyle, which means avoiding all forms of meat. Lacto-vegetarians also exclude eggs from their diet, while ovo-vegetarians also avoid dairy. Vegans have more restrictions, avoiding any products that come from animals such as eggs, dairy, gelatin, and honey. The good news is that there are still many food groups available to vegetarians and vegans. Fruit, vegetables, grains, nuts, legumes, meat substitutes, and dairy alternatives are all still on the table.

During pregnancy, nutritional requirements change to meet the needs of the developing baby. Most women can easily meet these new requirements by taking a prenatal vitamin with 100% of the daily value (DV) to get all the important vitamins and minerals. However, vegans and vegetarians may require a different approach to keep mom and baby as healthy as possible.

Let's take a look at B12 first. Vitamin B12 is involved in the development and function of the central nervous system, formation of red blood cells, and DNA synthesis. During pregnancy the recommended dietary allowance (RDA) for B12 is 2.6 mcg for everyone. However, vegetarians and vegans are at risk of deficiency since this vitamin only occurs naturally in products that come from animals. To ensure that enough is consumed, plant-based moms-to-be should focus on eating foods fortified with B12. Blood work can also help to identify any deficiencies, and if a woman is found to have low B12 during pregnancy, a higher dose supplement may be recommended by the health care provider.

Iron is another vitamin that requires a second look for those with a veggie diet. During pregnancy, iron requirements increase due to a rise in plasma volume and red blood cell concentration. For women who eat meat, an **RDA** of 27 mg is advised. However, for vegetarians the RDA is 1.8 times higher, meaning 48.6 mg per day is needed. Iron can be obtained from plant-based foods but it is not as bioavailable as iron from meat, so supplementation is usually required.

Around 90-95% of pregnant women don't consume enough choline, regardless of what diet they follow. An **RDA** for choline of 450 mg is suggested for every pregnant woman. Soybeans, wheat germ, kidney beans, and eggs are some of the best plant-based forms of choline, but this vitamin can also be obtained from a dietary supplement. Choline has been shown to improve liver health, memory, mood, and other brain and nervous system functions.

What about calcium? Vegetarians who still consume milk, cheese, and yogurt may not be too worried about this one. However, it's known that certain plant foods contain large amounts of oxalates, a naturally occurring compound that can reduce the amount of calcium absorbed from food. For example, a cup of spinach contains about 30 mg of calcium, however because this food has a high oxalate content, the calcium is not well absorbed by the body. Another

interesting point about calcium is that **smaller doses** are better absorbed. This means that spacing out a supplement and calcium rich foods throughout the day may be a better approach than taking it all at once. Lastly, it's important to note that calcium should always be taken with vitamin D since the body needs vitamin D to absorb calcium. An RDA for calcium of 1,000 mg/day is advised for women over the age of 18 during pregnancy, regardless of diet type.

The term “**Omega 3s**” commonly refers to alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA). It is suggested that pregnant women get 1.4 grams/day of ALA, however, there is no official dose for DHA or EPA that has been established for pregnancy. ALA is present in plant oils, such as flaxseed, soybean, and canola oils. Walnuts and chia seeds are also good sources of ALA. The problem is that ALA does not easily convert to DHA in the body, so even when a woman who is plant-based consumes a good amount of ALA they can still have low DHA levels. Although there is no official recommendation in place to take a DHA supplement during pregnancy, vegetarians and vegans can talk to a health care provider to determine if it makes sense to take an algae based one.

A blog about nutrition wouldn't be complete without talking about folic acid, especially during January's **National Birth Defects Awareness Month**. When folic acid is taken for at least one month prior to pregnancy, this important vitamin reduces the chance of neural tube defects (a type of birth defect affecting the baby's brain and spinal cord) by as much as 50-70%! Like everyone else, vegetarians and vegans should get 400 mcg/day prior to pregnancy and 600-800 mcg/day during pregnancy from a supplement.

As a vegetarian myself, if I had a dollar for every time someone asked me about protein I'd be a millionaire by now! For some reason, well intentioned friends and family seem to be very concerned about this topic – especially during pregnancy! A general recommendation of **71 grams of protein/day** is currently in place for everyone during pregnancy. Vegetarians can easily meet this requirement by consuming foods like yogurt, chia seeds, quinoa, beans, eggs, and certain vegetables. Vegans can focus on many of the above foods as well as tofu, lentils, soy milk, and nut butters. Although most women can meet the RDA with the right attention to diet, if you're concerned about not getting enough protein during pregnancy, your health care provider can refer you to a nutritionist to help further.

Pregnancy as a vegetarian or vegan doesn't have to be stressful, but some additional planning may be needed. When possible, focus on getting nutrients from your diet. However, to meet RDAs during pregnancy, or if a deficiency is noted by blood work, supplementation can be beneficial. If you ever have any questions about vitamins, minerals, omega 3s, or protein during pregnancy, **contact** a MotherToBaby specialist to receive individualized counseling. With the right approach, a plant-based mom and baby can get all the nutrients they need!

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National Institutes of Health. October 2024. Iron Fact Sheet for Health Professionals. Available at:
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National Institutes of Health. December 2024. Omega-3 Fatty Acids Fact Sheet for Health Professionals. Available at:
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As an infant, I received the gift of life in the form of a liver transplant. Growing up, I remember taking a multitude of medications that just became part of my daily life. As the years went on, my immune system became stronger, the transplant check-ups became farther and farther in between. As the years went by, I found myself taking an extremely low dose of one immunosuppressant called tacrolimus. Inspired by my personal journey as a transplant patient, I went

to medical school with a passion to care for patients as my healthcare providers had cared for me. During my training as a physician, I began to become interested in how the medicines that a person needs to take can impact pregnancy and breastfeeding.

With this interest in women's health, I pursued a rotation in Breastfeeding and Lactation Medicine. I worked alongside an amazing team of lactation specialists to help patients achieve their breastfeeding goals. I reviewed the medications that new moms were prescribed to make sure that they would address the medical needs of the mom and also have the lowest risk of impacting their developing baby. With a desire for a family of my own, I wanted to learn more about taking tacrolimus while breastfeeding. I saw firsthand how beneficial breastfeeding was and wondered if taking this medication multiple times per day would pose any risk for my developing baby. Would I ever be able to breastfeed?

Tacrolimus (Prograf®, Envarsus®, Astagraf®) is a medicine used by people who have had a transplant, like liver, kidney, or heart transplants. It helps prevent the body from rejecting the new organ. It's usually taken as a pill, but it can also be taken as an IV, as a liquid, or applied to the skin for conditions like eczema.

I found that research studies have shown promising evidence that breastfeeding while taking tacrolimus is most likely not of concern for breastfed children. One study looked at a mom who took tacrolimus twice a day. After one dose, scientists checked her breast milk and found a very small amount of tacrolimus in the milk. The amount was much lower than what is given directly to babies who need the medication.

One study involved a breastfeeding heart transplant patient who took tacrolimus throughout her pregnancy and after birth. When her baby turned one month old, tacrolimus blood levels were measured in both mom and baby. This baby's tacrolimus levels were extremely low.

Another study examined three exclusively breastfed infants and one partially breastfed infant whose mothers took oral tacrolimus. Researchers measured tacrolimus amounts in these infants between age of 15-27 days of life. None of the babies had detectable tacrolimus levels in their blood.

One of the largest studies was performed by the National Transplantation Pregnancy Registry. It looked at 68 mothers who had liver or kidney transplants. The study followed 83 babies, some for as long as 16 years. None of the babies had medical problems related to their mother's use of tacrolimus.

Tacrolimus is also used in cream form for conditions like eczema. The good news is that the risk of this cream affecting a breastfeeding baby is very low because only a small amount of the cream enters the mom's body. However, if the cream is applied to the nipple, it should be cleaned off before the baby nurses. If a topical nipple treatment is needed, some experts recommend pimecrolimus cream over tacrolimus because it does not contain paraffin. Other treatments such as hydrocortisone ointments are better studied and are usually used first.

Breastfeeding while taking tacrolimus has been shown to be a low risk for breastfed babies. Since breast milk has many health benefits for babies, healthcare providers recommend moms who are taking tacrolimus breastfeed their babies. As with any health condition, a discussion with your healthcare provider is needed to weigh risks and benefits to determine the right choice for your family.

After learning more about the safety of breastfeeding while taking tacrolimus, I feel empowered and encouraged to breastfeed my future children, especially since breastmilk is so healthy and nourishing for babies.

References/Resources

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- <https://www.ncbi.nlm.nih.gov/books/NBK501104/>
- <https://pmc.ncbi.nlm.nih.gov/articles/PMC3613954/>
- <https://www.halesmeds.com/monographs/61433?q=tacrolimus>
- <https://www.halesmeds.com/monographs/61171?q=hydrocortison>

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