



FOOD SAFETY

Food Safety During Pregnancy

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by J. Dean and P. Kendall¹

Quick Facts...

During pregnancy, changes in hormones cause a woman's immune system to become suppressed, so that it is harder to fight off infections.

The 6.5 million women who are pregnant each year in the U.S. are at increased risk for some types of food-borne illness.

Some food-borne illnesses can cause a woman to have a miscarriage, stillbirth or serious health problems for the baby after birth.

Pathogens are organisms (bacteria, virus, parasite) that can cause illness in humans.

Pregnancy is an exciting, yet critical time in a woman's life. Because a mother's health behaviors have direct effects on the health of her baby, expectant mothers receive a lot of health information. Along with nutrition concerns, a growing topic of importance is food safety during pregnancy. Pregnant women are at increased risk for getting some food-borne infections because of the hormonal changes that occur during pregnancy. While such changes are necessary for survival of the fetus, they also suppress the mother's immune system, thereby increasing the chance of infection from certain food-borne pathogens.

Examples of pathogens of special concern to pregnant women are *Listeria monocytogenes*, *Toxoplasma gondii*, *Brucella* species, *Salmonella* species and *Campylobacter jejuni*. Certain organisms can cross the placenta and increase the fetus's risk of becoming infected. Infection can result in miscarriage, stillbirth, premature labor or severe complications for the baby. Certain organisms, including *Listeria monocytogenes*, *Toxoplasma gondii*, *Salmonella typhi* and *Campylobacter jejuni*, can have adverse consequences for the fetus if they cross the placenta.

Listeriosis

Listeriosis is a form of infection that may result when foods containing the bacteria *Listeria monocytogenes* are consumed. *L. monocytogenes* is widely distributed in nature and is found in soil, ground water, plants and animals. *L. monocytogenes* is often carried by humans and animals, and has the ability to survive unfavorable conditions, including refrigeration temperatures, food preservatives (salt), and conditions with little or no oxygen. It is, however, easily destroyed by cooking.

Infection from *L. monocytogenes* typically occurs in individuals with a weakened immune system, including pregnant women. There is an estimated 14-fold increase in the incidence of listeriosis among pregnant women compared to non-pregnant adults. Pregnant women make up 27 percent of all cases of listeriosis. Once in the bloodstream, *Listeria* bacteria can travel to any site, but seem to prefer the central nervous system and the placenta. The fetus is unusually prone to infection from *L. monocytogenes*, which can lead to a miscarriage, stillbirth, or infection of the neonate and health problems following birth.

Gastrointestinal symptoms may appear within 2 to 3 days of exposure. If the body does not clear itself of the pathogen and the infection becomes invasive, symptoms such as fever, chills, headache, muscle aches and back aches may develop in 11 to 70 days after exposure. A blood test can determine if symptoms are caused by *Listeria* infection and if confirmed, the patient can then be treated with antibiotics.

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Foods typically associated with listeriosis have a long shelf life and are eaten without further cooking. Outbreaks have involved foods such as coleslaw, Mexican-style soft cheeses, milk, pâté, pork tongue, hot dogs, processed meats and deli salads. Examples of foods that may harbor this pathogen include unpasteurized milk, raw milk products, raw and smoked seafood, and any ready-to-eat processed foods, such as hot dogs, luncheon meats or deli meats, that have not been heated to proper temperatures before serving.

To avoid infection from *L. monocytogenes*, pregnant women are advised to practice safe food handling procedures, such as storing all perishable foods at or below 40 degrees F and using perishable or ready-to-eat foods as soon as possible. If a potentially hazardous perishable food cannot be eaten within four days, it is best to freeze or discard it. Kitchen surfaces, cutting boards and utensils should be washed before and after food preparation (especially after contact with raw meat or poultry). Pregnant women are advised to avoid eating soft cheeses made from raw milk (e.g., Feta, Brie, Camembert, blue-veined cheeses, queso fresco, queso blanco and Panela), unpasteurized milk and foods made from raw milk, raw or undercooked seafood, refrigerated smoked or precooked seafood, deli seafood salads, and hot dogs, luncheon meats, deli meats and pâté unless reheated to steaming hot before serving or reformulated to prevent *Listeria*. Leftover foods should be reheated to 165 degrees F before eating.

Toxoplasmosis

Toxoplasmosis, the infection caused by the parasite *Toxoplasma gondii*, can be passed to humans by water, dust, soil, or through eating contaminated foods. Cats are the main host for *T. gondii*, and the only host where the parasite can complete its life cycle. *T. gondii* may be carried in the fur or feces of cats and then passed to other animals and people. If an animal becomes infected and its meat is then eaten raw or undercooked, the parasite is passed to the human or animal that consumes the meat.

It is estimated that 1.5 million people in the U.S. become infected with *T. gondii* each year. Most individuals do not experience recognizable symptoms, and will develop a protective resistance to the parasite. However, if a woman not previously exposed to *T. gondii* first acquires the parasite a few months before or during pregnancy, she may pass the organism to the fetus. This could result in stillbirth, early prenatal death, or serious health problems for the baby after birth such as eye or brain damage. Symptoms in the baby may not be visible at birth, but can appear months or even years later.

If symptoms of infection with *T. gondii* do appear in the pregnant woman, they usually appear about 10 days after exposure to the parasite and include a low grade fever with rash, muscle aches, headache and possibly swelling of the lymph nodes. Infection may be confirmed by a blood test and treated with antibiotics. Prompt treatment of the mother with antibiotics reduces the risk of passing the parasite to the fetus, but cannot change the course of the disease once the fetus has been exposed.

Toxoplasmosis most often results from eating raw or undercooked meat, eating unwashed fruits and vegetables, cleaning a cat litter box or handling contaminated soil.

To avoid infection from *T. gondii* it is important that pregnant women practice safe food handling procedures such as washing all surfaces, cutting boards and utensils with hot, soapy water, especially those that come in contact with raw meat. Pregnant women should wash hands often, especially after handling animals or working in the garden, avoid eating raw or undercooked meat (particularly mince meat, mutton and pork), and if they own or take care of a cat, make sure the litter box is changed every day, preferably by a friend or family member.

For additional safe food handling guidelines, please see Colorado State University Extension fact sheet 9.300, Bacterial Food-Borne Illness.

Salmonellosis

Salmonellosis is a common form of food infection that may result when foods containing *Salmonella* bacteria are eaten. The bacteria are spread through direct or indirect contact with the intestinal contents or waste of animals, including humans. It is estimated that 2 million cases of salmonellosis occur each year in the United States. *Salmonella* bacteria do not grow at refrigerator or freezer temperatures and are easily destroyed by heating foods to 165 degrees F.

Pregnant women are not at an increased risk for getting salmonellosis; however, one type of Salmonella bacteria, called Salmonella typhi may be passed to the fetus. S. typhi is rare in the United States, but if transmitted to the fetus, can cause abortion, stillbirth or premature labor.

Symptoms of salmonellosis include headache, diarrhea, abdominal pain, nausea, chills, fever and vomiting; these usually appear within 12 to 36 hours after eating the contaminated food. Foods most often involved include raw (unpasteurized) milk and raw milk products, raw or undercooked meat and poultry, raw or undercooked eggs, raw sprouts (alfalfa, clover, radish, broccoli), salads (including chicken, tuna, potato), and cream desserts and fillings.

To avoid infection from *Salmonella* bacteria, pregnant women should follow general safe food handling practices, including washing hands often with hot, soapy water, especially after using the bathroom and before and after handling food. Hands and working surfaces should be thoroughly washed after contact with raw meat, fish, poultry, and foods that will not undergo further cooking. Fresh fruits and vegetables should be rinsed well before eating, and food such as raw milk and raw milk products, raw or undercooked eggs, raw sprouts, raw or undercooked meat and poultry, and unpasteurized fruit juices should be avoided.

Campylobacteriosis

Consuming food or water that contains the bacteria *Campylobacter jejuni* causes an infection called campylobacteriosis. *C. jejuni* is found in the intestinal tracts of animals (especially chickens) and in untreated water. It's a very common cause of diarrhea accompanied by fever in the United States. This organism thrives in a reduced oxygen environment and is inhibited by acid, salt and drying. *C. jejuni* also is easily destroyed by heat (120 degrees F).

Although pregnant women are not at an increased risk of campylobacteriosis, infection from this bacteria can result in transmission to the placenta. Consequences of fetal infection include abortion, stillbirth or preterm delivery. Symptoms usually appear within 2 to 5 days after eating the contaminated food and include fever, stomach cramps, muscle pain, diarrhea, nausea and vomiting. Infection from *C. jejuni* may be treated with antibiotics.

C. jejuni is most often found in raw (unpasteurized) milk and raw milk products, raw or undercooked meat and poultry, and raw shellfish. To avoid campylobacteriosis, pregnant women are advised to consume only pasteurized milk and milk products and to thoroughly cook meat, poultry and shellfish. Hands, surfaces, cutting boards and utensils that come in contact with raw meat, poultry or fish should be washed well with hot, soapy water.

Preventing Food-borne Illness During Pregnancy

Preventing food-borne illness is always important, but is especially so during pregnancy when the consequences can adversely affect the mother and the unborn child. Listed below are key behaviors important in ensuring the safety of the food you eat.

Practice Personal Hygiene

- Always wash hands well with soap and warm running water before handling food, after using the toilet, after changing a baby's diaper, and after touching animals.

¹ J. Dean, former graduate student, department of food science and human nutrition; P. Kendall, Colorado State University Extension food safety specialist and professor, department of food science and human nutrition.

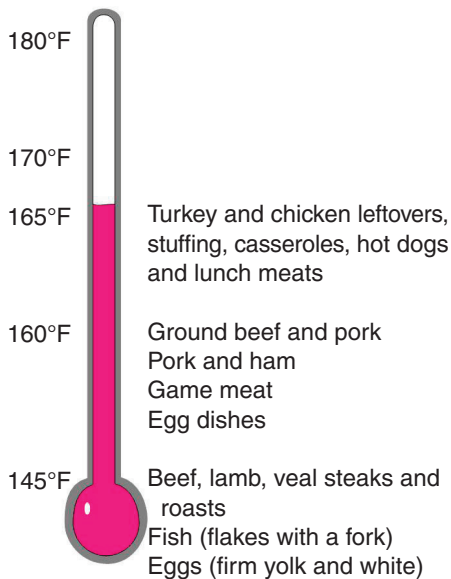


Figure 1. Safe endpoint cooking temperatures. To test the temperature of food, insert thermometer in the middle of the thickest part of the food you're cooking and allow a few seconds for the thermometer to register. When testing the temperature of a hamburger, lift it out of the pan on a spatula and insert the thermometer from the side.

Cook Foods Safely

- Use a food thermometer to make sure meat, poultry (including ground meats) and eggs are cooked to safe endpoint temperatures. See Figure 1.
- Use a thermometer to make sure leftovers are reheated to 165 degrees F.
- Always heat hot dogs to steaming hot before eating. Follow the instructions on the package or simmer for at least 5 minutes.
- Heat lunch meats and deli meats to steaming hot before eating. This includes packaged lunch meats and those purchased at the deli. You can use a microwave, oven or grill. If you prefer lunch meats cold, they can be heated and then cooled before eating.
- Cook shellfish until the shell opens and the flesh is fully cooked; cook fish until flesh is firm and flakes easily with a fork or to 145 degrees F.

Avoid Cross-Contamination

- Wash knives, cutting boards and food preparation areas with hot, soapy water after touching raw poultry, meat and seafood.
- Wash hands with soap and warm running water after handling raw foods.
- Thoroughly rinse fresh fruits and vegetables under running water before eating.
- Keep cooked and ready-to-eat foods separate from raw meat, poultry, seafood and their juices.

Keep Foods at Safe Temperatures

- Store all perishable foods at or below 40 degrees F. Use a refrigerator thermometer to make sure your refrigerator is between 35 to 40 degrees F.
- Store eggs and other perishable foods in the refrigerator.
- Use perishable foods that are precooked or ready-to-eat as soon as possible. If the food cannot be eaten within 4 days, it is best to freeze or discard it.

Avoid Foods from Unsafe Sources

Because pregnant women are at high risk for infection from the pathogens discussed above, they are advised to avoid foods that may be contaminated with these harmful pathogens. See Table 1.

Table 1. Use the following guide to help choose safe foods during pregnancy, while avoiding foods from unsafe sources.

Instead of...	Choose
Cold hot dogs, deli meats and luncheon meats	Hot dogs, luncheon meats and deli meats <u>reheated</u> to steaming hot
Undercooked meat and poultry	Fully cooked meat and poultry
Raw or undercooked seafood	Fully cooked seafood
Refrigerated smoked fish and precooked seafood such as shrimp, crab and deli seafood salads	Tuna, salmon and crab meat in cans or pouches
Refrigerated pâtés and meat spreads	Canned pâtés and meat spreads
Raw sprouts	Fresh vegetables (well-cleaned) and cooked sprouts
Soft cheeses made from raw milk such as Feta, Brie, Camembert, blue-veined cheeses, queso fresco, queso blanco and Panela	Hard cheeses, processed cheeses, cream cheese, cottage cheese, mozzarella, and soft cheeses made from pasteurized milk
Raw or undercooked eggs	Eggs that are cooked until the white and yolk are firm
Raw milk and milk products	Pasteurized milk and milk products
Unpasteurized juice (May be called "fresh squeezed" or "chilled")	Frozen concentrate, canned juices and refrigerated juices that are labeled as pasteurized