



United States Department of Agriculture  
Food Safety and Inspection Service

## Food Safety Information



USDA Photo

# Ground Beef and Food Safety

Questions about "ground meat" or "hamburger" have always been in the top five food topics of calls to the USDA's Meat and Poultry Hotline. Here are the most frequently asked questions and information about why ground beef requires careful handling.

## What's the difference between "hamburger" and "ground beef"?

Beef fat may be added to "hamburger," but not "ground beef." A maximum of 30% fat is allowed in either hamburger or ground beef. Both hamburger and ground beef can have seasonings, but no water, phosphates, extenders, or binders added. The labeling of meat food products must comply with the Federal Meat Inspection Act (FMIA) and the meat inspection regulations and labeling policies.

Most states and cities set standards for store-packaged ground beef which, by law, cannot be less than Federal standards. If products in retail stores were found to contain more than 30% fat, they would be considered "misbranded" under Federal law.

## Is ground beef inspected and graded?

All meat transported and sold in interstate commerce must be federally inspected. The U.S. Department of Agriculture's (USDA) Food Safety and Inspection Service (FSIS) carries out USDA's responsibilities under the Federal Meat Inspection Act. These laws protect consumers by ensuring that meat products are wholesome, unadulterated, and correctly labeled and packaged.

Many states have their own inspection programs that are applicable for meats produced and sold within their borders only. State inspection programs must enforce requirements at least equal to those of Federal inspection laws.

Ground beef exported to the U.S. from USDA-approved eligible nations must meet all safety standards applied to foods produced in the United States. They must employ equivalent sanitary measures that provide the same level of protection against food hazards as is achieved domestically.

Grades are assigned as a standard of quality only. It is voluntary for a company to hire a Federal Grader to certify the quality of its product. Beef grades are USDA Prime, Choice, Select, Standard, Commercial, Utility, Cutter, and Canner. They are set by the USDA Agricultural Marketing Service. Most ground beef is not graded.

## What kind of bacteria can be in ground beef? Are they dangerous?

Bacteria are everywhere in our environment; virtually any food can harbor bacteria. In foods of animal origin, pathogenic (illness-causing) bacteria, such as *Salmonella*, Shiga-toxin producing *Escherichia coli* (STECs), *Campylobacter jejuni*, *Listeria monocytogenes*, and *Staphylococcus aureus*, cause illness. These harmful bacteria cannot be seen or smelled.

If the pathogens are present when meat is ground, then more of the meat surface is exposed to the harmful bacteria. Also, grinding allows any bacteria present on the surface to be mixed throughout the meat. Bacteria multiply

The Food Safety and Inspection Service (FSIS) is the public health agency in the U.S. Department of Agriculture responsible for ensuring that the nation's commercial supply of meat, poultry, and egg products is safe, wholesome, and correctly labeled and packaged.

**USDA Meat & Poultry Hotline**  
**1-888-MPHotline**  
(1-888-674-6854)

rapidly in the “Danger Zone” -- temperatures between 40 and 140 °F (4.4 and 60 °C). To keep bacterial levels low, store ground beef at 40 °F (4.4 °C) or below and use within 2 days, or freeze. To destroy harmful bacteria, cook ground beef to a safe minimum internal temperature of 160 °F (71.1 °C).

Other bacteria cause spoilage. Spoilage bacteria generally are not harmful, but they will cause food to deteriorate or lose quality by developing a bad odor or feeling sticky on the outside.

### **Why is the *E. coli* O157:H7 bacterium of special concern in ground beef?**

*E. coli* O157:H7 is the most well-known Shiga toxin-producing *E. coli* (STEC), though other STEC strains have also been identified. STECs produce large quantities of a potent toxin that forms in the intestine and causes severe damage to the lining of the intestine. This causes a disease called hemorrhagic colitis, and may also cause Hemolytic Uremic Syndrome, particularly in young children. STECs can colonize in the intestines of animals, which could contaminate muscle meat at slaughter.

*E. coli* O157:H7 bacteria survive refrigerator and freezer temperatures. Once they get in food, they can multiply very slowly at temperatures as low as 44 °F (6.7 °C). While the actual infectious dose is unknown, most scientists believe it takes only a small number of this strain of *E. coli* to cause serious illness and even death, especially in children and older adults. The bacteria are killed by thorough cooking, which for ground beef is an internal temperature of 160 °F (71.1 °C) as measured by a food thermometer.

Illnesses caused by *E. coli* O157:H7 have been linked with the consumption of undercooked ground beef. Other foods, including raw milk, apple cider, dry-cured sausage, fresh produce, and undercooked roast beef, also have been implicated.

### **How is beef treated in a USDA-inspected plant to reduce bacteria?**

The following methods have been extensively studied and found effective in reducing bacterial contamination on a beef carcass: organic acid washes, water washes, steam pasteurization, steam vacuuming, and other antimicrobials.

### **Why is beef ground in a USDA-inspected plant safer than beef ground in a store or at home?**

Hearing about recalls of ground beef products contaminated with *E. coli* O157:H7 or *Salmonella* might cause some consumers to consider grinding beef at home; however, this is not a safer alternative to purchasing ground beef at a retail store. In fact, USDA cautions against grinding beef at home.

In a USDA-inspected plant, trimmed beef destined for grinding is tested for the presence of *E. coli*. However, primal cuts, such as steaks and roasts, are usually not tested. When stores or consumers grind these primal cuts, it's possible that pathogens may be present on the raw beef, and either you nor meat market employees can see, smell, or taste dangerous bacteria.

In addition, USDA-inspected plants have Sanitation Standard Operating Procedures that cover policies such as the cleaning of grinding machines and the handling and chilling of ground beef. Consumers and stores might not follow such stringent sanitary procedures.

### **How do you know if ground beef sold in a store is from a USDA-inspected establishment?**

Ground beef produced at a USDA-inspected plant will have a USDA establishment number on the package written as “EST.” (for “establishment”) followed by a number. Much of the ground beef sold in stores today was ground in a USDA-inspected plant; sometimes the store will print that establishment number on its packaging. If you don't see an “EST.” number, ask the store about its source for ground beef.

## Why are there recalls of ground beef?

Live cattle can harbor various bacteria, including Shiga toxin-producing *E. coli* (STEC) and *Salmonella*. In 1994, the USDA declared *E. coli* O157:H7 as an adulterant in ground beef. In 2012, USDA declared six additional most common STECs as adulterants in raw ground beef as well. Before 1996, the inspection of beef carcasses was by sight, touch, and smell. With the passage of the 1996 Final Rule on *Pathogen Reduction; Hazard Analysis and Critical Control Point (PR/HACCP) Systems*, FSIS began requiring microbial testing in slaughter plants for *E. coli*. If *E. coli* O157:H7 is detected, recalls are initiated by the manufacturer or distributor of the meat, sometimes at the request of FSIS.

## From what cuts of beef are ground beef and hamburger made?

Generally, ground beef is made from the less tender and less popular cuts of beef. Trimmings from more tender cuts may also be used. Grinding tenderizes the meat and the fat reduces its dryness and improves flavor.

## What is the significance of the "Sell-By" date on the package?

"Sell-By" dates are a guide for retailers. Although many products bear "Sell-By" dates, product dating is not a Federal requirement. While these dates are helpful to the retailer, they are reliable only if the food has been kept at a safe temperature during storage and handling. USDA suggests that consumers cook or freeze ground beef within 2 days after purchase for maximum quality.

## What is the safe food handling label on ground beef packages?

A safe food handling label should be on all raw or partially pre-cooked (not ready-to-eat) meat and poultry packages. The label tells the consumer how to safely store, prepare, and handle raw meat and poultry products in the home.

### Safe Handling Instructions

This product was prepared from inspected and passed meat and/or poultry. Some food products may contain bacteria that could cause illness if the product is mishandled or cooked improperly. For your protection, follow these safe handling instructions.

-  Keep refrigerated or frozen. Thaw in refrigerator or microwave.
-  Keep raw meat and poultry separate from other foods. Wash working surfaces (including cutting boards), utensils, and hands after touching raw meat or poultry.
-  Cook thoroughly.
-  Keep hot foods hot. Refrigerate leftovers immediately or discard.

## What is the Country of Origin Label on ground beef packages?

The Country of Origin Label (COOL) is not a food safety issue. It is a law requiring that package labels of certain foods bear the names of the country or countries where the food came from. FSIS enforces the labeling of ground beef.

To find information about COOL, go to <http://www.ams.usda.gov/AMSV1.0/cool>.

If you have a food labeling complaint about a country of origin, send your complaint to:

Country of Origin Labeling Division  
USDA-AMS  
Room 2620-S, Stop 0216  
1400 Independence Avenue, SW  
Washington, DC 20250-0216  
Email: [Cool@ams.usda.gov](mailto:Cool@ams.usda.gov)

### **Can bacteria spread from one surface to another?**

Yes. It is called cross-contamination. Bacteria in raw meat juices can contaminate foods that have been cooked safely or raw foods that won't be cooked, such as salad ingredients. Bacteria also can be present on equipment, hands, and even in the air.

To avoid cross-contamination, wash your hands with soap and warm water for at least 20 seconds before and after handling ground beef to make sure you don't spread bacteria. Don't reuse any packaging materials. Use soap and hot water to wash utensils and surfaces which have come into contact with the raw meat. Utensils and surfaces can be sanitized with a solution of 1 tablespoon of unscented, liquid chlorine bleach per gallon of water. Don't put cooked hamburgers on the same platter that held the raw patties or use utensils that touched the raw meat unless you wash the platter or utensils first.

### **What's the best way to handle raw ground beef when shopping?**

At the store, choose a package that feels cold and is not torn. If possible, place the package in a plastic bag so leaking juices won't drip on other foods. Make ground beef one of the last items to go into your shopping cart. Separate raw meat from ready-cooked items in your cart. Have the clerk place the raw ground beef in a separate bag.

Plan to drive directly home from the grocery store. You may want to bring a cooler with ice for perishables.

### **How should raw ground beef be stored at home?**

Refrigerate or freeze ground beef as soon as possible after purchase. This preserves freshness and slows the growth of bacteria. It can be refrigerated or frozen in its original packaging if the meat will be used soon.

If refrigerated, keep at 40 °F (4.4 °C) or below and use within 1 or 2 days.

For longer freezer storage, wrap in heavy duty plastic wrap, aluminum foil, freezer paper, or plastic bags made for freezing. Ground beef is safe indefinitely if kept frozen, but will lose quality over time. It is best if used within 4 months. Mark your packages with the date they were placed in the freezer so you can keep track of storage times.

### **What is the best way to thaw ground beef?**

The best way to safely thaw ground beef is in the refrigerator. Keeping meat cold while it is defrosting is essential to prevent the growth of bacteria. Cook or refreeze within 1 or 2 days.

To defrost ground beef more rapidly, you can defrost in the microwave oven or in cold water. If using the microwave, cook the ground beef immediately because some areas may begin to cook during the defrosting. To defrost in cold water, put the meat in a watertight plastic bag and submerge. Change the water every 30 minutes. Cook immediately. Do not refreeze raw ground meat thawed in cold water or in the microwave oven unless you cook it first.

Never leave ground beef or any perishable food out at room temperature for more than 2 hours (1 hour at 90 °F and above).

### **Is it dangerous to eat raw or undercooked ground beef?**

Yes. Raw and undercooked meat may contain harmful bacteria. USDA recommends not eating or tasting raw or undercooked ground beef. To be sure all bacteria are destroyed, cook meat loaf, meatballs, and hamburgers to a safe minimum internal temperature of 160 °F (71.1 °C). Use a food thermometer to check that they have reached a safe internal temperature.

### **Are there people who are more at risk from eating ground beef that is undercooked or mishandled?**

The very young, the very old, and those with immune systems that have been weakened by cancer, kidney disease, and other illnesses are most at risk and vulnerable to illnesses associated with contaminated food. The symptoms of foodborne illness -- such as diarrhea or vomiting, which can cause dehydration -- can be very serious. Safe food handling practices at home or anywhere food is served is especially important for those in the "at-risk" group.

### **Are microwaved hamburgers safe?**

Yes, if they were cooked properly to destroy harmful bacteria. Since microwaves may not cook food as evenly as conventional methods, covering hamburgers while cooking will help them heat more evenly. Turn each patty over and rotate midway through cooking. Allow patties to stand 1 or 2 minutes to complete cooking. Then use a food thermometer to check that the internal temperature is 160 °F (71.1 °C).

### **Is it safe to partially cook ground beef to use later?**

No. The partial cooking of food ahead of time allows harmful bacteria to survive and multiply to the point that subsequent cooking cannot destroy them.

### **Can I refrigerate or freeze leftover cooked hamburgers? How should they be reheated?**

If ground beef is refrigerated promptly after cooking (within 2 hours; 1 hour if the temperature is above 90 °F), it can be safely refrigerated for about 3 or 4 days. If frozen, it should keep its quality for about 4 months.

When reheating fully cooked patties or casseroles containing ground beef, be sure the internal temperature reaches 165 °F (73.9 °C).

### **Why is pre-packaged ground beef red on the outside and sometimes dull, grayish-brown inside?**

Oxygen from the air reacts with meat pigments to form a bright red color which is usually seen on the surface of meat purchased in the supermarket. The pigment responsible for the red color in meat is oxymyoglobin, a substance found in all warm-blooded animals. Fresh cut meat is purplish in color. The interior of the meat may be grayish brown due to lack of oxygen; however, if all the meat in the package has turned gray or brown, it may be beginning to spoil.

### **Why does ground beef release a lot of "juice" while cooking?**

In making ground beef, some retail stores grind the meat while it is still frozen. Ice crystals in the frozen meat break down the cell walls, permitting the release of meat juices during cooking. The same thing happens after ground meat is frozen at home.

### **What causes ground beef patties to shrink while cooking?**

All meat will shrink in size and weight during cooking. The amount of shrinkage will depend on its fat and moisture content, the temperature at which the meat is cooked, and how long it is cooked. Basically, the higher the cooking temperature, the greater the shrinkage. Cooking ground beef at moderate temperatures will reduce shrinkage and help retain juices and flavor. Overcooking draws out more fat and juices from ground beef, resulting in a dry, less tasty product.

### **How can consumers handle ground beef safely in their homes?**

When meat is ground, more of the meat is exposed to the harmful bacteria. Bacteria multiply rapidly in the "Danger Zone" — the temperatures between 40 and 140 °F (4.4 and 60 °C). Refrigerate or freeze ground beef as soon as possible after purchase. This preserves its freshness and slows the growth of bacteria. It can be refrigerated or frozen in its original packaging if the meat will be used soon. To keep bacterial levels low, store ground beef at 40 °F (4.4 °C) or below and use within 2 days, or freeze. Never leave ground beef or any perishable food out at room temperature for more than 2 hours – 1 hour at 90 °F (32.2 °C) and above.

In every step of food preparation, follow the guidelines of the Food Safe Families Campaign to keep food safe. Check your steps for food safety by following four basic rules – Clean, Separate, Cook, and Chill.

**CLEAN. Wash hands and surfaces often.** Unless you wash your hands, utensils, and surfaces the right way, you could spread bacteria to your food and your family.

Wash your hands with soap and warm water for 20 seconds before and after handling ground beef to make sure you don't spread bacteria. Use soap and hot water to wash utensils and surfaces which have come into contact with the raw meat. Utensils and surfaces can be sanitized with a solution of 1 tablespoon of unscented, liquid chlorine bleach per gallon of water.

**SEPARATE. Don't contaminate.** Even after you've cleaned your hands and surfaces thoroughly, raw ground meat can still spread illness-causing bacteria to ready-to-eat foods—unless you keep them separate.

Bacteria in raw meat juices can contaminate foods that have been cooked safely or raw foods that won't be cooked, such as salad ingredients. Bacteria also can be present on equipment, hands, and even in the air. To avoid cross-contamination, keep everything clean. Don't reuse any packaging materials. Don't put cooked hamburgers on the same platter that held the raw patties unless you wash the platter again.

**COOK. Cook to the right temperature.** Did you know that the bacteria that cause food poisoning multiply quickest in the "Danger Zone," the temperatures between 40 and 140 °F (4.4 and 60 °C)?

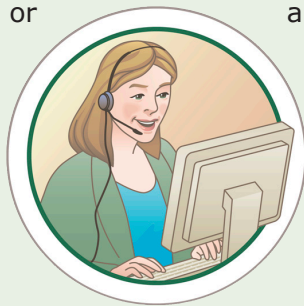
To destroy harmful bacteria, cook ground beef to a safe minimum internal temperature of 160 °F (71.1 °C) as measured with a food thermometer.

**CHILL. Refrigerate promptly.** Illness-causing bacteria can grow in perishable foods within 2 hours unless you refrigerate them.

## Food Safety Questions?

### Call the USDA Meat & Poultry Hotline

If you have a question about meat, poultry, or egg products, call the USDA Meat and Poultry Hotline toll free at **1-888-MPHotline (1-888-674-6854)**. The hotline is open year-round



Monday through Friday from 10 a.m. to 4 p.m. ET (English or Spanish).

Recorded food safety messages are available 24 hours a day. Check out the FSIS Web site at

[www.fsis.usda.gov](http://www.fsis.usda.gov).

Send E-mail questions to [MPHotline.fsis@usda.gov](mailto:MPHotline.fsis@usda.gov).

### Ask Karen.gov

FSIS' automated response system can provide food safety information 24/7 and a live chat during Hotline hours.



Mobile phone users can access [m.askkaren.gov](http://m.askkaren.gov).

[PregunteleaKaren.gov](http://PregunteleaKaren.gov)