

foodborne bacteria

There are two kinds of foodborne bacteria: one that spoils your food and one that makes you sick. It's good to be familiar with both . . . but it's critical that you follow safe food handling practices to keep the second one at bay.

Spoilage Bacteria

Spoilage bacteria are bacteria that cause food to go bad — in other words, to “spoil.” With spoilage bacteria, the food looks or smells funny or bad, so you know to throw it out. These bacteria can grow at lower temperatures — even in the refrigerator. But while they can make food unappealing and inedible . . . they do *not* usually cause illness.

Pathogenic Bacteria

These are the ones you need to watch out for — in fact, it's pathogenic bacteria that the food safety precautions throughout this handbook are intended to prevent. You can't see, smell, or taste these pathogens — and this makes them difficult to detect. What's more, they cause a variety of foodborne illnesses — and can make you really, really sick.

Foodborne Illness

Often called “food poisoning,” foodborne illness comes from a food you eat. It's caused by ingesting *pathogenic bacteria*.

Pathogenic Bacteria: The Cause of Foodborne Illness

Pathogenic bacteria cause illness — and they can get in food in a number of ways. Sometimes these bacteria occur naturally and are destroyed by cooking food to safe temperatures. Pathogenic bacteria can also end up contaminating food when proper guidelines for cleaning hands, surfaces, and utensils and for avoiding cross-contamination are not followed.

- Different bacteria are present in different foods . . . and some are more common in certain situations.

For example, *Salmonella* is most often found in poultry or eggs, whereas *E. coli* is more typically found in or on meats and vegetables. Meanwhile, *Staphylococcus aureus* and *Clostridium perfringens* frequent people's hands — and even buffet lines.

- Throughout this *Handbook*, you'll find effective strategies for preventing illness from pathogenic bacteria. Food safety is extremely important and should be practiced with every meal you eat or prepare. The *Major Pathogens* chart (on pages 6-7) gives greater detail regarding the most common foodborne bacteria . . . where they are found . . . and what they can do if ingested.

About Mold on Food

Molds are *not* bacteria. To learn about mold on food, visit www.fsis.usda.gov/fact_sheets/molds_on_food/index.asp.

Foodborne Illness: Know the Signs and Symptoms . . . and Take Action

The signs and symptoms of foodborne illness range from upset stomach, diarrhea, fever, vomiting, abdominal cramps, and dehydration to more severe illness — even death. If you become ill and believe your illness is due to a food product:

- **Seek treatment as necessary.** Contact your doctor — especially if symptoms persist or become severe (bloody diarrhea, excessive nausea and vomiting, or high fever). For victims in an at-risk group (pregnant women and their unborn babies, newborns, young children, older adults, and people with weakened immune systems), seek medical care immediately.
- **Call your local health department** if the suspect food was served at a large gathering, at a restaurant or other food service facility, or if it is a commercial product.

Foodborne Illness in the United States

The food supply in the United States is safe. However, when certain disease-causing bacteria or pathogens contaminate food, they can cause foodborne illness.

According to the U.S. Centers for Disease Control and Prevention, approximately 76 million persons get sick, 325,000 are hospitalized, and 5,000 people die from foodborne illness and infection each year. Many of these are very young, very old, or have weakened immune systems and may not be able to fight infection normally.

Since foodborne illness can be serious — or even fatal — it is important for you to know and practice safe food handling behaviors to help reduce your risk of accidentally getting sick from contaminated food.



shopping for food

For consumers, food safety most likely begins in the supermarket aisle. Whether you're doing a quick trip to pick up dinner ingredients . . . or tackling a week's worth of grocery shopping all at once, there are a few easy steps you can follow to ensure that the food you bring home will arrive there safely.

At the Store

- **Select cold food last.** Picking up perishable food like meat, poultry, and eggs at the end of your shopping trip ensures that they stay refrigerated until right before checkout.
- **Read the label.** Don't buy food that is past the "Sell-By," "Use-By," or other expiration dates. (See *About Food Labels* on page 10.)
- **Check the packaging.** Never choose meat or poultry with packaging that is torn or leaking. Make sure frozen food is frozen solid and refrigerated food feels cold.
- **Buy clean eggs.** At the store, choose refrigerated Grade A or AA eggs with clean, uncracked shells before the "Sell-By" or "EXP" (expiration) date on the carton. When purchasing egg products or egg substitutes, look for containers that are tightly sealed.
- **Inspect fresh produce.** Don't buy fresh fruits or vegetables that are bruised or damaged. Make sure fresh-cut fruits and vegetables are displayed in refrigerated cases at the store. If not . . . don't buy them.
- **Place meat, poultry, and seafood in plastic bags.** By bagging these foods before placing them in your cart, you'll

Cross-Contamination

Cross-contamination is the transfer of harmful bacteria to a food from other foods, cutting boards, utensils, surfaces, or hands.

It is prevented by keeping food separated and by keeping hands, utensils, and food handling surfaces clean.



guard against cross-contamination — which can happen when raw meat or poultry juices drip on other food, spreading bacteria from one food to another.

- **Separate foods in your grocery cart.** Keep raw meat, poultry, seafood, and their juices away from other food to further prevent the possibility of cross-contamination. Keep them separated during checkout and in your grocery bags, too.

Transporting Groceries

Once your groceries are packed for the trek home, there are some easy "timing" tips you should follow to continue to maintain their safety.

- **Go straight home.** Plan to drive directly home from the grocery store. Don't leave groceries in the car while you run other errands. The key is to **always refrigerate perishable food within 2 hours**. This is true of all perishable food and in all situations — and is known as the "2-Hour Rule."
- **Do a "Weather Check."** When the outside temperature reaches 90 °F, you should refrigerate your purchased perishables more quickly — **within 1 hour**. If your grocery store is more than a half hour away from home, bring a cooler when you go shopping. Pack your meat, poultry, seafood, and eggs in a cooler for the drive home.

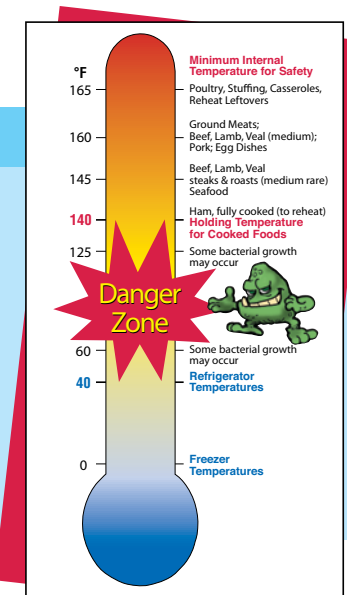
Arriving Home

When you get home, don't get caught up reading the mail! Unload your groceries right away to keep them safe, and refrigerate or freeze all perishables.



Focus on: The "Danger Zone"

Throughout the **Kitchen Companion**, there are references to keeping food out of the "Danger Zone." Understanding the "Danger Zone" is critical — because bacteria can multiply rapidly in any perishable food that is left in the "Danger Zone" (between 40 and 140 °F) for more than 2 hours. (See *Remember the 2-Hour Rule* on page 35.) The "Danger Zone" is a potential risk for cold food that goes above 40 °F and hot food that falls below 140 °F. However, it's easy to avoid the "Danger Zone": just keep hot food hot and cold food cold!



About Food Labels

Product Dating

The dates on labels have different meanings. Here's how to decipher them:

“Sell By” date: Tells the store how long to display the product for sale. You should buy the product before the date expires.



“Best If Used By” (or Before) date: Recommended for best flavor or quality. It is *not* a purchase or safety date.

BEST IF USED BY
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“Use-By” date: The last date recommended for the use of the product while at peak quality. The date has been determined by the manufacturer of the product.

Closed or Coded dates: Packing numbers for use by the manufacturer. If a product is not “dated,” consume perishable ready-to-eat food soon after purchasing it, and no more than 3 to 5 days after opening it.

What is “Organic”?

- **Organic meat, poultry, eggs, and dairy products** come from animals that are given no antibiotics or growth hormones.
- **Organic foods:** To be labeled “organic,” a Government-approved certifier must inspect the farm where the food is grown to make sure all the rules necessary to comply with USDA organic standards are met.

For more information, visit www.ams.usda.gov/nop.



Ready to Eat ... or Not?

Check labels carefully. Some products may appear to be precooked or browned, but are raw and not ready to eat. These foods must be fully cooked for safety. Unless a product is labeled as “fully cooked,” the food should be handled and prepared no differently than raw products.







Safe Handling Instructions

These guidelines on raw meat and poultry provide specific information for handling and preparation. Following these instructions is particularly important for consumers in at-risk groups.

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.

storing food

The food you store falls into three basic “storage categories.”

- **Perishable food:** in the refrigerator (read the label if you're not sure)
- **Frozen food:** in the freezer
- **Shelf-stable food:** in a clean, dry place

Refrigerated Perishable Food

Food safety is the best reason ever to “chill out”! Follow these basic guidelines to protect your perishables — and yourself and your family. And remember: always refrigerate perishable food within 2 hours (1 hour when the temperature is above 90 °F).

- **Raw Meat, Poultry, and Seafood:** Place in containers or sealed plastic bags to prevent their juices from dripping onto other food in the refrigerator. This could cause cross-contamination (see inset box, page 8). If you're not planning to use the food within a day or two, freeze it.
- **Cooked, Whole Stuffed Poultry:** See page 26 for storing cooked poultry.
- **Eggs:** Store in the original carton and place in the main compartment of the refrigerator — not in the door. When ready to use, do not wash them. (Read more about *Eggs* on page 28.)
- **Produce:** Store perishable produce in the refrigerator. Throw away fresh fruits and vegetables that have not been refrigerated within 2 hours of cutting, peeling, or cooking. If any fruit or vegetable has touched raw meat, poultry, or seafood and will not be cooked immediately, do not eat it. Throw it away.

It's a Date!

- As you store your food, **check dates** on the labels.
- If a product does not have a date on it, **write the purchase date on it** before you refrigerate or freeze it.
- Place newer items in the back of the refrigerator or freezer. That way, you'll **use the older ones first**.
- **Leftovers:** Refrigerate (or freeze) leftovers within 2 hours in clean, shallow, covered containers to prevent harmful bacteria from multiplying. (See more on *Leftovers* on page 30.)



Frozen Food

For long-term storage of many perishable foods, rely on the freezer. Food stored constantly at 0 °F or below will always be safe. Only the quality suffers with lengthy freezer storage.

Freezer Facts

- **Preventing Freezer Burn:** Freezer burn — white, dried-out patches on the surface of meat — won't make you sick, but it *does* make meat tough and tasteless. Here's how to avoid it:
 - Wrap freezer items in heavy freezer paper, plastic wrap, freezer bags, or foil.
 - Date all freezer packages. Use the oldest food first.
 - Place new items toward the back of the freezer — that way, older items are easier to access and you'll use them first.
- **Refreezing Thawed Food:** If food is thawed in the refrigerator, it is safe to refreeze it without cooking. (See *Thawing* section on page 16.)



However, there may be a loss of *quality* due to the moisture lost through defrosting.

- **Freezing Cooked Food:** After cooking raw food that was previously frozen, it is safe to freeze the cooked food. In addition, if previously cooked food were frozen and then thawed in the refrigerator, you may refreeze the unused portion.
- **Prevent Moisture Loss:** To maintain quality when freezing meat and poultry in its original packaging, overwrap the package with foil or plastic wrap that is recommended for use in the freezer.

Your Refrigerator and Freezer: Take Their Temperatures!

It's common to assume that your refrigerator's temperature control dial keeps food cold enough — but this isn't necessarily true. "Built-in" temperature control dials may not be effective, and if your refrigerator isn't cooling to 40 °F or below, you're providing a haven for bacteria to grow.

- Instead, use a separate appliance thermometer to check the internal refrigerator temperature and help keep food safe. They are available in grocery, hardware, and kitchen specialty stores.
- If the refrigerator thermometer shows a temperature that's too high (above 40 °F), adjust the refrigerator's control dial.
- Use the thermometer to check the freezer, too. It should read 0 °F or below. If not, adjust the dial.

Cold Storage Chart

Product	Refrigerator (40 °F or below)	Freezer (0 °F or below)
Eggs — See Page 29		
Salads		
Egg, chicken, ham, tuna & macaroni salads	3 to 5 days	Does not freeze well
Hot dogs		
opened package	1 week	1 to 2 months
unopened package	2 weeks	1 to 2 months
Luncheon meat		
opened package or deli sliced	3 to 5 days	1 to 2 months
unopened package	2 weeks	1 to 2 months
Bacon & Sausage		
Bacon	7 days	1 month
Sausage, raw — from chicken, turkey, pork, beef	1 to 2 days	1 to 2 months
Hamburger & Other Ground Meats		
Hamburger, ground beef, turkey, veal, pork, lamb, & mixtures of them	1 to 2 days	3 to 4 months
Fresh Beef, Veal, Lamb & Pork		
Steaks	3 to 5 days	6 to 12 months
Chops	3 to 5 days	4 to 6 months
Roasts	3 to 5 days	4 to 12 months
Fresh Poultry		
Chicken or turkey, whole	1 to 2 days	1 year
Chicken or turkey, pieces	1 to 2 days	9 months
Soups & Stews		
Vegetable or meat added	3 to 4 days	2 to 3 months
Leftovers		
Cooked meat or poultry	3 to 4 days	2 to 6 months
Chicken nuggets or patties	3 to 4 days	1 to 3 months
Pizza	3 to 4 days	1 to 2 months

Shelf-Stable Food

Food that doesn't need to be refrigerated or frozen must still be stored with care. Follow these basic guidelines and you'll have food safety in the bag (or can)!

- **Where:** Store canned food and other shelf-stable products in a cool, clean, dry place. Never put them above the stove, under the sink, in a damp garage or basement, or any place exposed to high or low temperature extremes.
- **How Long:** In general, you can store high-acid food such as tomatoes and other fruit for 12 to 18 months; low-acid food such as meat and vegetables, 2 to 5 years.
- **Care and Cautions for Cans:** Discard cans that are dented, leaking, bulging, or rusted. Can linings might discolor or corrode when metal reacts with high-acid food such as tomatoes or pineapple — but as long as the outside of the can is in good shape, the contents should be safe to eat. Keep in mind, though, that the taste, texture, and nutritional value of the food can diminish over time. (Also see *In Case of Flood* on page 42.)



Botulism Alert

The greatest danger in canned goods is a toxin produced by the *Clostridium botulinum* bacteria. Never use food from containers that show possible "botulism" warnings:

- Leaking, bulging, or badly dented cans
- Cracked jars or jars with loose or bulging lids
- Canned food with a foul odor
- Any container that spurts liquid when opened.

Play it safe — and *never* taste it. Even a tiny amount of *botulinum* toxin can be deadly. Double bag the cans and jars in plastic bags that are tightly closed. Then place in a trash receptacle for non-recyclable trash outside of the home. Keep out of reach of humans and pets.

food preparation

Food safety doesn't end with buying, transporting, and storing food safely. In fact, once you have food home . . . the safety of your food is, literally, in your hands. Follow these basic guidelines — and remember, safe food preparation always begins with "clean."

Keeping It Clean

Handwashing

- Always wash hands with soap and warm water for 20 seconds before beginning food preparation, after handling food, and after using the bathroom, changing diapers, or touching pets.
- Use gloves to handle food if you have a cut or infection. Do not sneeze or cough into food.

Surfaces and Utensils

- Harmful bacteria can spread throughout the kitchen and get onto cutting boards, utensils, and countertops — causing "cross-contamination." (See inset box on page 8.) Keep raw meat, poultry, fish, and their juices away from other food — especially ready-to-eat food.
- Wash cutting boards, dishes, and countertops with hot, soapy water **after** preparing each food item and **before** you go on to the next item.
 - After cutting raw meat, poultry, and seafood, wash cutting boards, knives, and countertops with hot, soapy water.

Cutting Boards

Proper cutting board "care-and-feeding" is a key component of preventing cross-contamination. Here's how:

- Always use a clean cutting board for food preparation.
- Try to use one cutting board for fresh produce — and a separate one for raw meat, poultry, and seafood.
- Sanitize cutting boards with a freshly made solution of 1 tablespoon of unscented, liquid chlorine bleach in 1 gallon of water.
- Once cutting boards become excessively worn or develop hard-to-clean grooves, replace them.

Kitchen Cleanup

- Use hot, soapy water and a clean dishcloth (or paper towels) to clean kitchen surfaces and wipe up spills.
- Wash dishcloths often in the hot cycle of your washing machine.

Common Sense Caution

If you're not sure how old a food is, or fear that it may not have been properly refrigerated or has been left out too long, don't taste it! Instead, remember the "golden rule" of food storage:

When in doubt, throw it out!



Preparation Tips for Produce

Fresh fruits and veggies are nutritional mainstays. Here's how to make sure they're safe:

- Before eating or preparing, wash fresh produce under cold running tap water to remove any lingering dirt. This also reduces bacteria that may be present. Firm produce (like apples or potatoes) can be scrubbed with a brush.
- Don't wash fruits and vegetables with detergent or soap. These products are *not approved* for use on food. You could ingest residues from soap or detergent absorbed by the produce.
- Remove and throw away bruised or damaged portions of fruits and vegetables when preparing to cook them or before eating them raw.



Thawing

Going from “frozen to thawed” needs to be accomplished safely! There are three ways to thaw — and because bacteria can multiply rapidly at room temperature, *none* of these methods involve the kitchen counter.

In the Refrigerator: This is the safest way to thaw meat and poultry. Take the food out of the freezer and thaw it in the fridge. Place it on a plate or in a pan to catch any juices that may leak. Normally, it will be ready to use the next day.

In Cold Water: For faster thawing, put the frozen package in a watertight plastic bag and submerge it in cold water; change the water every 30 minutes. The cold water slows bacteria that might be growing in the thawed portions of the meat while the inner areas are still thawing. Once thawed, cook it immediately.

In the Microwave: Follow instructions from the oven's manufacturer or owner's manual. Cook immediately after thawing in the microwave.

Refreezing Tips:

- Meat and poultry that have been fully defrosted in the refrigerator may be refrozen before or after cooking.
- If thawed in cold water or in the microwave, always fully cook before refreezing.

(Also see *Storing Food: Frozen Food* on page 12.)

cooking food safely

*Cooking food to a safe temperature is the best way to ensure safety. That's because when food reaches a **safe minimum internal temperature**, bacteria that may be lurking are destroyed. Sound complicated? It's not. It's as easy as using a **food thermometer**.*

About Food Thermometers

Food safety experts agree: food is safe to eat when it is cooked or reheated to a high enough temperature to kill the harmful bacteria that cause foodborne illness.

The only accurate way to know if food is cooked safely is to measure the internal temperature of cooked meat, poultry, and egg products with a food thermometer. You can't tell by looking — use a food thermometer to be sure. Color and texture are not reliable indicators of safely cooked food.



How to Use a Food Thermometer

1. Place the food thermometer in the **thickest part of the food**.
 - Make sure it's not touching bone, fat, or gristle.
 - For whole poultry, insert the thermometer into the innermost part of the thigh and wing and the thickest part of the breast.
 - For combination dishes, place the thermometer in the center or thickest portion of the food. Egg dishes and dishes containing ground meat or poultry should be checked in several places.
2. Wait the amount of time recommended for your particular type of thermometer (See *Food Thermometers and Temperature Indicators* on page 18).
3. Compare your thermometer reading to the Safe Minimum Internal Temperature Chart (see page 19) to determine if your food has reached at least a safe internal temperature.
4. Clean your food thermometer with hot, soapy water before and after each use!

Tasting Tips

- Don't taste food while it's cooking. To ensure safety, food should not be tasted until it reaches a safe minimum internal temperature.
- No double dipping. Use a clean utensil each time you taste food; otherwise, you may contaminate the batch.



Slow Cooking

In today's multitasking world, there's nothing like having dinner cooked for you while you go about your day. That's the beauty of a slow cooker. As you take advantage of this time-saving wonder, here are tips for keeping your "crock o' dinner" safe.

- **How Slow Cookers Work:** As the name implies, the countertop "slow cooker" cooks foods slowly and at a low temperature—generally between 170 and 280 °F.
 - The direct heat from the pot, lengthy cooking time, and steam created within the tightly covered container work in combination to destroy bacteria and make the slow cooker a **safe process** for cooking foods.
 - While food is cooking and once it's done, food will stay safe as long as the cooker is operating.
- **Preparation:** Since the slow cooker may take several hours to reach a safe bacteria-killing temperature, keep perishable ingredients refrigerated right up until preparation time. This keeps bacteria from getting a "head start."
 - Always defrost meat or poultry *before* putting it into a slow cooker.

- If you cut up meat and vegetables in advance, store them separately in the refrigerator.
- Keep the lid in place, removing only to stir the food or check for doneness.

- **Choose Appropriate Recipes:**

- Prepare foods with a high moisture content such as chili, soup, stew, or spaghetti sauce.
- If using a commercially frozen slow-cooker meal, prepare according to manufacturer's instructions.
- Fill the cooker to between half full and two-thirds full.

- **Slow-Cooker Leftovers:** Store leftovers in shallow, covered containers and refrigerate within 2 hours after cooking is finished. Reheating leftovers in a slow cooker is **not recommended**. However, cooked food can be brought to steaming on the stove top or in a microwave oven and then put into a preheated slow cooker to keep hot for serving.

- **If the Power Goes Out:**

- If you are not at home and the power goes out, throw away the food even if it looks done.
- If you *are* at home, finish cooking the ingredients immediately by some other means: on a gas stove, on the outdoor grill, or at a house where the power is on. If the food was completely cooked before the power went out, the food should remain safe up to 2 hours in the cooker with the power off.

■ ■ ■ serving food safely

"Dinner is served!" More than ever, this happens in a wide variety of places, both indoors and out. But no matter where your meal is taking place . . . safety must still be the first item on the menu.

General Guidelines: Whatever or Wherever You're Serving!

- **Keep Hot Food Hot & Cold Food Cold.** Whether you are in your kitchen or enjoying the great outdoors, there are some food safety principles that remain constant. The first is "Keep hot food hot and cold food cold" to keep foods out of the "Danger Zone."

(See *Focus on: The "Danger Zone"* on page 9.)

- **Keep Everything Clean.** It's a fact that bacteria from raw meat and poultry products can easily spread to other foods by hands, utensils, or by juices dripping from packages.

- When **transporting raw meat or poultry**, double-wrap or place the packages in plastic bags to prevent juices from the raw product from dripping on other foods.
- Always **wash your hands** before and after handling food, and **don't use the same platter and utensils** for raw and cooked meat and poultry.
- **Soap and water are essential** to cleanliness, so if you are going somewhere that will not have running water, bring water with you or have disposable wipes on hand.

(See *Cross-Contamination* on page 8.)

- **Remember the 2-Hour Rule:** Perishable food should never be left in the "Danger Zone" for more than 2 hours. This includes both hot food and cold food. If it's been more than 2 hours (or 1 hour in temperatures above 90 °F) — discard the food.
- **Be Cool:** If you are traveling with cold food, bring a cooler with a cold source. It is difficult to keep food hot without a heat source when traveling, so it's best to cook food before leaving home and refrigerate and transport cold.

(See *Transporting Food* on page 38.)



For More Information

USDA Meat and Poultry Hotline

1-888-MPHOTLINE

(1-888-674-6854)

TTY: 1-800-256-7072

E-mail: mphotline.fsis@usda.gov

“Ask Karen”

FSIS’s Web-based automated response system — available 24/7

askkaren.gov

Food Safety and Inspection Service

www.fsis.usda.gov

Kitchen Companion



United States Department of Agriculture
Food Safety and Inspection Service