

Temperature  
Danger  
Zone

Salmonella  
E. Coli

# FBI: Food Safety Agents of Investigation

(Foodborne Illness):

GEORGIA  
4-H

 LifeSmarts  
Learn it. Live it.



# LifeSmarts

*Learn it. Live it.*

LifeSmarts, the nation's premier consumer program, has never been more relevant. For 30+ years, LifeSmarts has provided real-world education for students who learn about core consumer topics and develop critical thinking skills. Participants focus on five key topic areas: consumer rights and responsibilities, the environment, health and safety, personal finance, and technology. The goal of LifeSmarts is to create consumer savvy young people who will be well equipped for adult life in today's complex, global marketplace.

**This lesson was developed in collaboration with LifeSmarts and 4-H. For more information and LifeSmarts resources, checkout: [www.lifesmarts.org](http://www.lifesmarts.org)**





# Welcome, Detectives!

01. Foodborne Illnesses
02. Cross-Contamination
03. Food Safety Practices
04. Crack the Case!





## Case Notes - - - - -

Foodborne illnesses often caused by consuming food/drinks that are contaminated with:

- bacteria
- their toxins
- parasites
- viruses
- chemicals
- or other agents



## Case Notes - - - - -

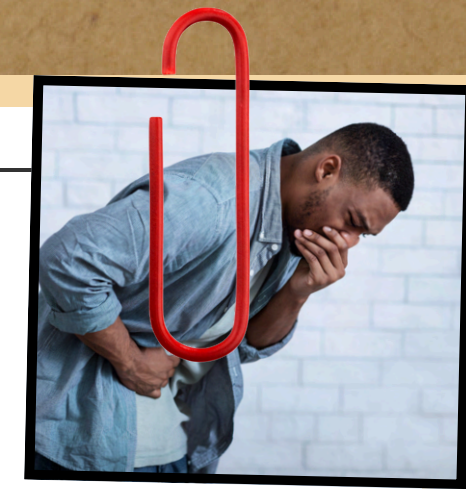
Common pathogens:

- *Campylobacter*
- *E. coli*
- *Listeria*
- *Norovirus*
- *Salmonella*
- *Clostridium perfringens*



[FoodSafety.gov](https://www.foodsafety.gov)

## Campylobacter



<b>Sources</b>	Unpasteurized (raw) milk, chicken, shellfish, turkey, contaminated water.
<b>Incubation period</b>	2 to 5 days
<b>Symptoms</b>	Diarrhea, cramps, fever, and vomiting; diarrhea may be bloody.
<b>Duration of illness</b>	About one week
<b>What to do</b>	<p>Drink plenty of fluids and get rest. If you cannot drink enough fluids to prevent dehydration or if your symptoms are severe, call your doctor.</p> <p>Antibiotics are recommended only for patients who are very ill or are more likely to develop a serious illness, such as people with weakened immune systems.</p>
<b>Prevention</b>	<ul style="list-style-type: none"><li>• Drink pasteurized milk. Do not drink raw milk.</li><li>• Do not drink untreated water.</li></ul>

Date Last Reviewed November 15, 2024



E. coli

Sources	<ul style="list-style-type: none"><li>• Contaminated food, especially undercooked ground beef, unpasteurized (raw) milk and juice, soft cheeses made from raw milk, and raw fruits and vegetables (such as lettuce, other leafy greens, and sprouts).</li><li>• Contaminated water, including drinking untreated water and swimming in contaminated water.</li><li>• Animals and their environment, particularly cows, sheep, and goats.</li><li>• Feces of infected people.</li></ul>
Incubation period	3 to 4 days for most people, can be 1 to 10 days
Symptoms	<ul style="list-style-type: none"><li>• Severe diarrhea that is often bloody, severe stomach pain, and vomiting. Usually little or no fever is present.</li><li>• Symptoms of hemolytic uremic syndrome (HUS) include decreased urine production, dark or tea-colored urine, and losing pink color in cheeks and inside the lower eyelids.</li></ul>

Duration of illness	5 to 10 days. Most people will be better in 5 to 7 days. If HUS develops, it usually occurs after about 1 week.
What to do	Drink plenty of fluids and get rest. If you cannot drink enough fluids to prevent dehydration or if your symptoms are severe (including bloody diarrhea or severe stomach pain), call your doctor.
Prevention	<ul style="list-style-type: none"><li>• Avoid eating high-risk foods, especially undercooked ground beef, unpasteurized milk or juice, soft cheeses made from unpasteurized milk, or sprouts.</li><li>• Use a food thermometer to make sure that ground beef has reached a safe internal temperature of 160°F (71°C).</li><li>• Wash hands before, during, and after preparing food, after diapering infants, and after contact with cows, sheep, or goats, their food or treats, or their living environment.</li></ul>

Date Last Reviewed November 15, 2024





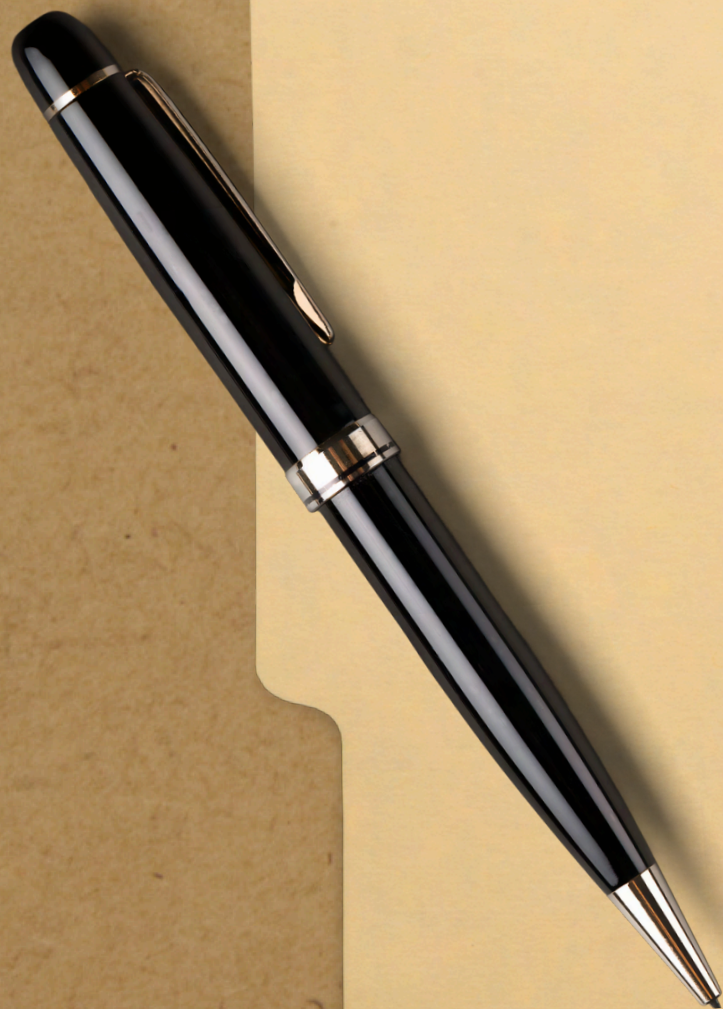
Listeria

Sources	<ul style="list-style-type: none"> <li>• Unpasteurized (raw) milk and dairy products.</li> <li>• Soft cheese made with unpasteurized milk, such as queso fresco, feta, Brie, Camembert.</li> <li>• Raw fruits and vegetables (such as sprouts).</li> <li>• Ready-to-eat deli meats and hot dogs.</li> <li>• Refrigerated pâtés or meat spreads.</li> <li>• Refrigerated smoked seafood.</li> </ul>
Incubation period	Usually 1 to 4 weeks, can be as long as 70 days
Symptoms	<p>Listeria can cause fever and diarrhea similar to other foodborne germs, but this type of Listeria infection is rarely diagnosed.</p> <p>Symptoms in people with invasive listeriosis, meaning the bacteria has spread beyond the gut, include:</p> <ul style="list-style-type: none"> <li>• For pregnant women: fever, fatigue and muscle aches. Pregnant women may also have no symptoms but experience fetal death, pre-term labor, or infection of the newborn.</li> <li>• For all others, stiff neck, confusion, loss of balance, and convulsions in addition to fever and muscle aches.</li> </ul>
Duration of illness	Days to weeks
Who is at risk	<ul style="list-style-type: none"> <li>• Adults age 65 and older</li> <li>• Pregnant women and their newborns</li> <li>• People whose immune systems are weakened due to illness or medical treatment</li> </ul>
What to do	For invasive listeriosis, antibiotics given promptly can cure the infection. In pregnant women, antibiotics are given to prevent infection in the unborn baby.



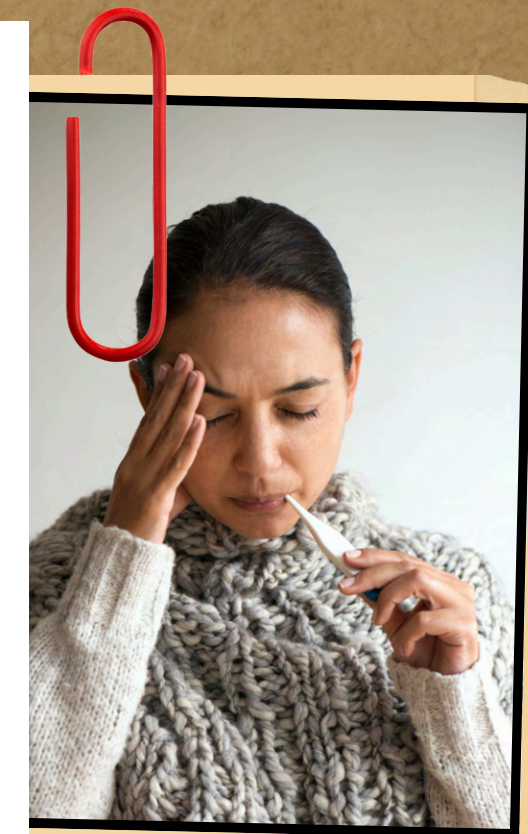
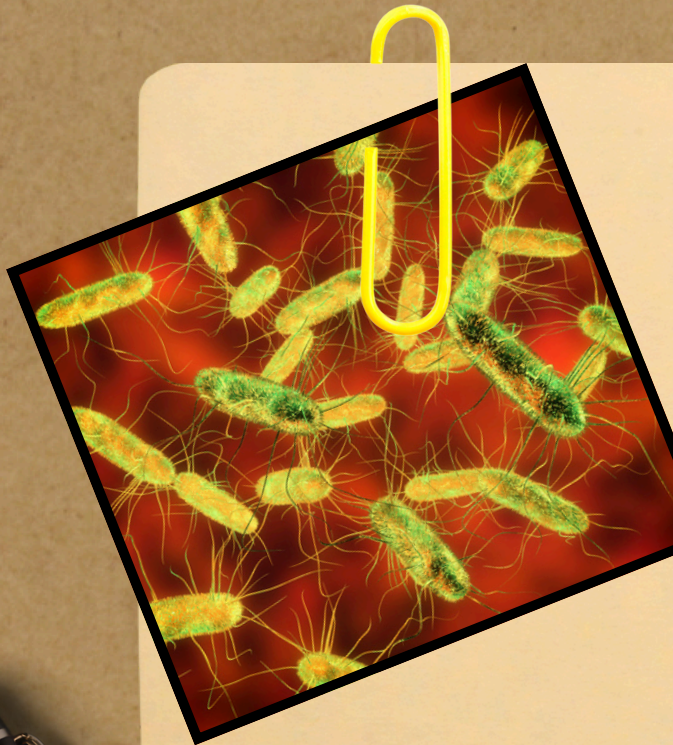
Norovirus

Sources	Produce, shellfish, ready-to-eat foods touched by infected food workers (salads, sandwiches, ice, cookies, fruit), or any other foods contaminated with particles of vomit or feces from an infected person.
Incubation period	12 to 48 hours
Symptoms	Diarrhea, vomiting, nausea, and stomach pain. Diarrhea tends to be watery and non-bloody. Diarrhea is more common in adults and vomiting is more common in children.
Duration of illness	1 to 3 days. Among young children, older adults, and hospitalized patients, it can last 4 to 6 days.
What to do	Drink plenty of fluids and get rest. If you cannot drink enough fluids to prevent dehydration, call your doctor.
Prevention	<ul style="list-style-type: none"><li>• Wash hands frequently with soap and running water for at least 20 seconds, particularly after using the bathroom and before, during, and after preparing food.</li><li>• If you work in a restaurant or deli, avoid bare-hand contact with ready-to-eat foods.</li><li>• Clean and disinfect surfaces contaminated by vomit or diarrhea (use a bleach-based household cleaner as directed on the label). Clean and disinfect food preparation equipment and surfaces.</li><li>• If you are ill with diarrhea or vomiting and for two days afterwards, do not cook, prepare, or serve food for others.</li><li>• Wash fruits and vegetables and cook oysters and other shellfish thoroughly before eating them.</li><li>• Wash clothing or linens soiled by vomit or fecal matter immediately. Remove the items carefully to avoid spreading the virus. Machine wash and dry.</li></ul>



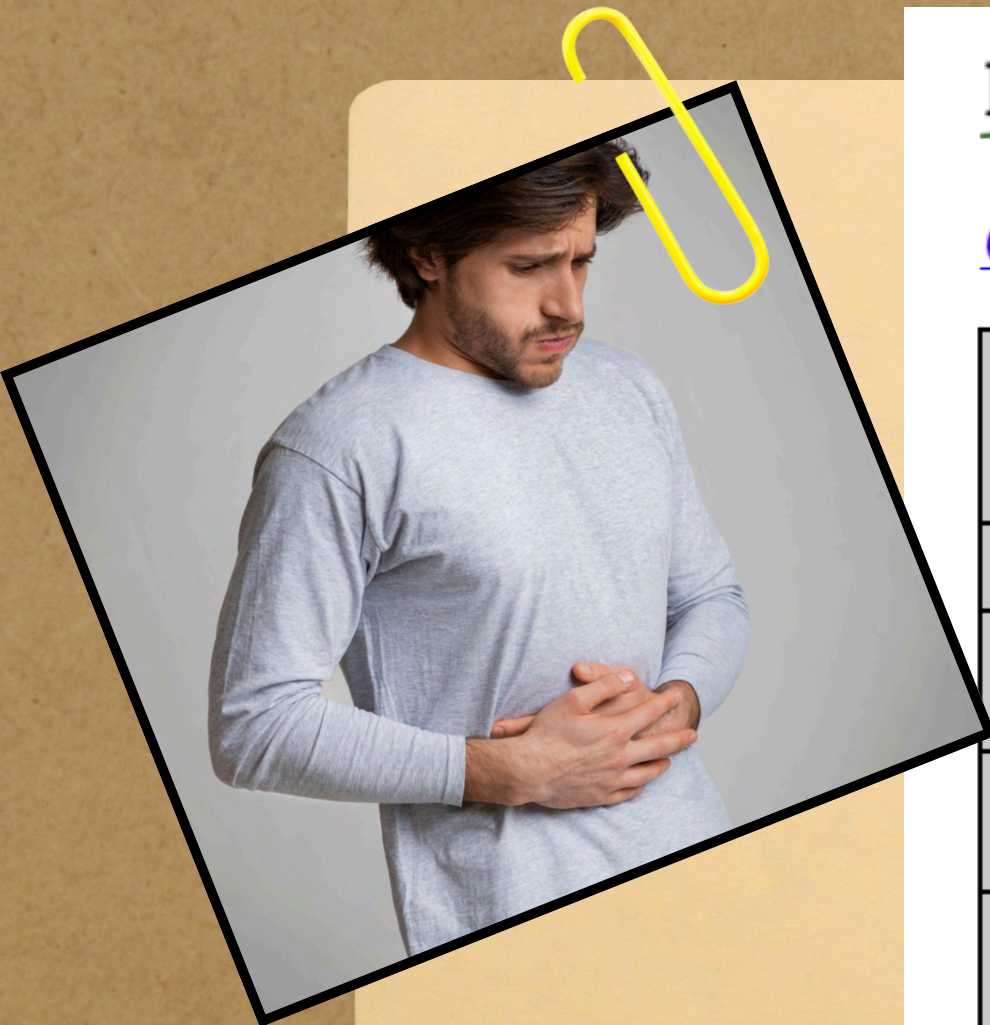
[Salmonella](#)

Sources	<p><b>Food:</b> A variety of foods have been linked to Salmonella, including vegetables, chicken, pork, fruits, nuts, eggs, beef and sprouts.</p> <p><b>Animals and their environments:</b> Particularly reptiles (snakes, turtles, lizards), amphibians (frogs), birds (baby chicks) and pet food and treats.</p>
Incubation period	6 hours to 6 days
Symptoms	Diarrhea, fever, stomach cramps, vomiting
Duration of illness	4 to 7 days
What to do	<p>Drink plenty of fluids and get rest. If you cannot drink enough fluids to prevent dehydration or if your symptoms are severe, call your doctor.</p> <p>Antibiotics are recommended only for patients who have a serious illness (such as severe diarrhea, high fever, or bloodstream infection), or are more likely to develop a severe illness or complications (infants, adults over 65 years old, and people with weakened immune systems).</p>
Prevention	<ul style="list-style-type: none"><li>• Avoid eating high-risk foods, including raw or lightly cooked eggs, undercooked ground beef or poultry, and unpasteurized (raw) milk.</li><li>• Wash your hands after contact with animals, their food or treats, or their living environment.</li></ul>



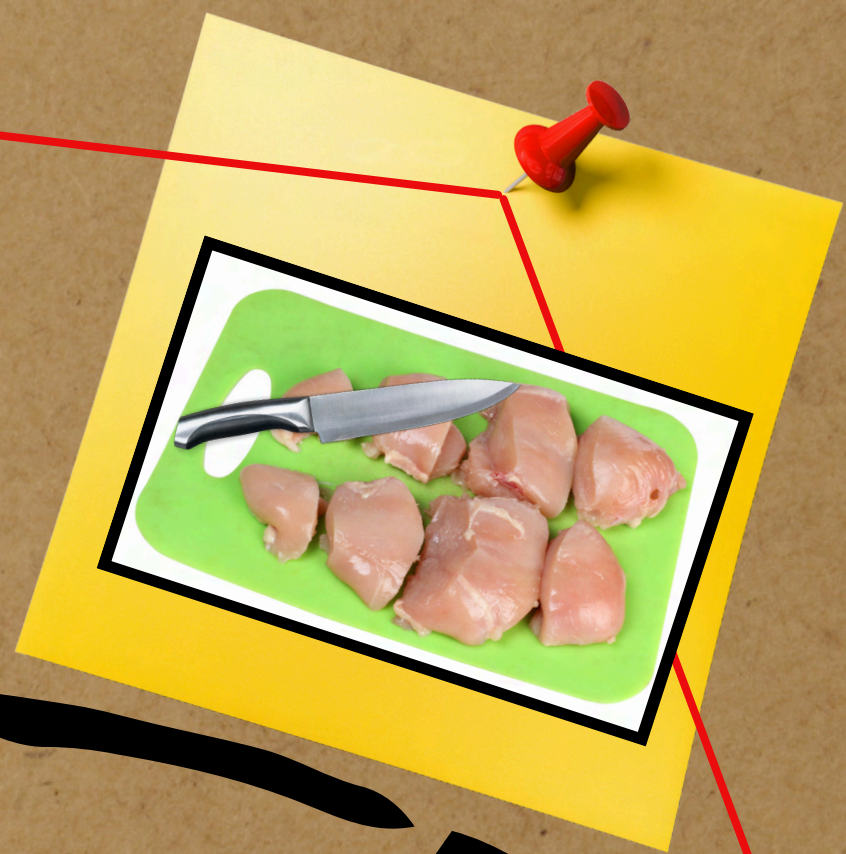
[Clostridium perfringens](#)

Sources	Beef, poultry, gravies, food left for long periods in steam tables or at room temperature, and time and/or temperature abused foods.
Incubation period	6 to 24 hours
Symptoms	Diarrhea and stomach cramps (no fever or vomiting),
Duration of illness	Less than 24 hours. In severe cases, symptoms may last for 1-2 weeks.
What to do	Drink plenty of fluids and get rest. If you cannot drink enough fluids to prevent dehydration, call your doctor.
Prevention	<ul style="list-style-type: none"><li>• Thoroughly cook foods, particularly meat, poultry, and gravies, to a <a href="#">safe internal temperature</a>.</li><li>• Use a food thermometer to make sure.</li><li>• Keep food hot after cooking (at 140°F (60°C) or above) and serve meat dishes hot, within 2 hours after cooking.</li><li>• Microwave leftovers thoroughly (to 165°F (74°C) or above).</li><li>• Refrigerate leftovers within two hours of preparation (at 40°F (4°C) or below).</li><li>• Divide large amounts of food, such as roasts or big pots of chili or stew, into shallow containers and refrigerate immediately. It is OK to put hot foods directly in the refrigerator.</li></ul>



**MENU**  
Salad of the Day: Chicken Caesar

Raw Meat



Chopped Romaine



# Cross-Contamination



Fresh Lettuce



## Four Steps to Keep Food Safe for Young Children:



**1 CLEAN**

- Wash hands with running water and soap for at least 20 seconds.
- Rub vigorously and clean around nails.
- Rinse well and dry on a clean paper towel or with a hot air dryer.
- Use hot water and soap to clean counters, food prep surfaces, utensils and equipment or use a dishwasher when possible.
- Sanitize with 1 tablespoon chlorine bleach per gallon of water.
- Wash fresh fruits and veggies with clean running water before you use them and dry with a clean paper towel.
- Wash tops of cans and dry with a clean paper towel.



**2 SEPARATE**

- Use separate cutting boards for raw meats and ready-to-eat foods. If the same cutting board must be used for multiple types of food, properly wash, rinse, sanitize, and air dry the board between foods.
- Don't let raw meat juices drip on other foods. Store raw foods below produce, infant formula, and other foods that are ready-to-eat in the refrigerator.



**3 COOK**

- Always use a food thermometer to make sure foods have reached a safe internal temperature.
- Cook beef, fish and pork steaks, roast, filets and chops to at least 145°F and allow to rest 3 minutes before carving or serving.
- Cook ground beef, pork, and fish, and egg dishes to at least 160°F. Cook chicken and turkey (whole, pieces or ground) to at least 165°F. Reheat foods to at least 165°F.
- Cover, stir and rotate microwave-cooked foods and cook foods that require time-temperature control for safety to 165°F.



**4 CHILL**

- Refrigerate promptly.
- Use thermometers in refrigerators and freezers.
- Keep refrigerators at 40°F or colder.
- Keep freezers at 0°F or colder.
- Cool foods quickly by placing large pots in ice baths and stirring, stirring with ice paddles, and/or dividing into shallow containers.
- Discard perishable foods that have sat at room temperature for more than 2 hours or 1 hour at temperatures above 90°F.

VISIT FOR MORE INFO



[www.fcs.uga.edu/extension/food](http://www.fcs.uga.edu/extension/food)  
[www.agr.georgia.gov/recalls.aspx](http://www.agr.georgia.gov/recalls.aspx)

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## Case Notes - - - - -

### 4 Steps to Food Safety:

1. Clean
2. Separate
3. Cook
4. Chill

**\*\*CDC, USDA, FDA & More**

Extension Food Safety Specialist

Personal Hygiene matters!  
Clothes  
Aprons  
Hair  
Jewelry  
Fingernails

Sanitize...

FDA U.S. FOOD & DRUG ADMINISTRATION



## STEP 1: CLEAN

# FOOD SAFETY QUICK TIPS



### Lather up

Before eating, wash your hands with soap and running water for at least 20 seconds. Count to 20 slowly or sing the "Happy Birthday" song to yourself twice.



### Eat clean

Rinse fruits and veggies under running water. Slicing or dicing? Scrub 'em anyway—germs can jump from rinds to the insides during cutting and peeling.



### Rules for tools

Wash cutting boards, knives, and other cooking utensils in hot, soapy water or the dishwasher after each use.



### Create a safe cooking space

Wash countertops, cooking surfaces, and insides of the refrigerator, freezer, and microwave frequently with hot, soapy water.



### Clean it before you crack it open

Wash food packaging, especially lids of cans and jars, before opening.

Find more **Quick Tips on the 4 Steps to Food Safety: Clean, Separate, Cook, Chill** at [www.fda.gov/food](http://www.fda.gov/food)

EVERYDAY FOOD SAFETY



## STEP 2: SEPARATE

# FOOD SAFETY QUICK TIPS



### No touching

Raw meat, poultry, seafood, eggs, and flour should never come into contact with produce or any food that is ready-to-eat—keep them separate while shopping, storing, and cooking.



### Put a lid on it

Place raw meats in sealed containers or plastic wrap on lower shelves of the fridge or freezer.



### No yolking around

Storing eggs on the fridge door can expose them to uneven temperatures. Keep them on lower shelves instead, in their original carton.



### Double up

If you can, use a separate set of cooking tools for raw meat, poultry, seafood, eggs, and flour. If you can't, wash them thoroughly in hot, soapy water between cooking with produce and cooking with meats, eggs, or flour.



### Serve it safely

When grilling, barbecuing, or cooking meat, use different plates for raw and cooked meat.

Find more **Quick Tips on the 4 Steps to Food Safety: Clean, Separate, Cook, Chill** at [www.fda.gov/food](http://www.fda.gov/food)

**EVERYDAY FOOD SAFETY**

*Gloves aren't always the answer...*

*RTE Foods*

*Can cause cross-contamination*



Rest time is important after removing meat from the heat source!



U.S. FOOD & DRUG  
ADMINISTRATION



COOK



### STEP 3: COOK

## FOOD SAFETY QUICK TIPS



#### Heat it before you eat it

Use a food thermometer to check that your food has reached a safe temperature.

**145 °F** for seafood

**145 °F** with a 3-minute rest time for beef, pork, and ham

**160 °F** for ground meat, meat mixtures, and egg dishes

**165 °F** for poultry, microwaved foods, and reheated leftovers



#### Doughs are don'ts

Eggs and flour are not safe to eat unless fully cooked.



#### Turn the tables

When microwaving, make sure to rotate food to allow for even heating. Always follow directions for cooking and standing time.



#### Dish it out

When eating at restaurants, avoid foods that contain raw or undercooked egg, meat, poultry, or seafood. Ask the server if you aren't sure.

Find more **Quick Tips on the 4 Steps to Food Safety: Clean, Separate, Cook, Chill** at [www.fda.gov/food](http://www.fda.gov/food)

EVERYDAY FOOD SAFETY



## STEP 4: CHILL

# FOOD SAFETY QUICK TIPS



### Check the App

**USDA FoodKeeper** can tell you how long foods and drinks are safe to keep in the refrigerator or freezer.



### Shop, and don't stop

At the grocery store, pick up perishable foods last and take them straight home.



### Keep your cool

Chill groceries, leftovers, and food delivery items within 2 hours, or 1 hour if exposed to temperatures above 90 °F. Use an appliance thermometer to set fridge to 40 °F or below and freezer at 0 °F or below.



### Let it breathe

Leave space for air to circulate between containers in your fridge and freezer.



### Stay chill

If bringing cold foods on-the-go, pack them with ice in an insulated container.

Find more **Quick Tips on the 4 Steps to Food Safety: Clean, Separate, Cook, Chill** at [www.fda.gov/food](http://www.fda.gov/food)



# Official Case Files



**Layla  
Adams**



**Jasmine  
Okoro**





**Mark  
DeWitt**



**Mina  
Tran**

**Can you crack the cases?**





# **Final Activity:**

## **Challenge Questions**

Let's put your knowledge of today's lesson to the test with a set of challenge questions!

Temperature  
Danger  
Zone

Salmonella  
E. Coli

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