Montgomery County Health Department
400 Salisbury Street
Montgomery City, MO 63361
573-564-2495

Environmental Health Specialist
Robin Overkamp
573-694-6053

Missouri Department of Health and Senior Services
Presents

Show Me Food Safety

Division of Community and Public Health
Section for Environmental Public Health
Bureau of Environmental Health Services
Food Safety Program

930 Wildwood Drive, Jefferson City, MO 65109
(573) 751-6095
www.dhss.mo.gov/FoodSafety
<table>
<thead>
<tr>
<th>Causative Pathogen</th>
<th>Incubation Time</th>
<th>Length of Illness</th>
<th>Common Symptoms</th>
<th>Foods Involved/Sources</th>
<th>Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacillus cereus</td>
<td>1-16 hours</td>
<td>6-24 hours</td>
<td>nausea, vomiting, cramping, diarrhea</td>
<td>rice and rice dishes, vegetables, sauces</td>
<td>Cook to proper temp. Reheat quickly. Cool foods rapidly.</td>
</tr>
<tr>
<td>Campylobacter</td>
<td>2-5 days</td>
<td>1-4 days</td>
<td>cramping, fever, diarrhea, nausea, headache, vomiting</td>
<td>unpasteurized dairy, poultry and meats, infected food handler</td>
<td>Thoroughly cook all foods. Use only pasteurized dairy products. Proper hand washing.</td>
</tr>
<tr>
<td>Clostridium perfringens</td>
<td>8-24 hours</td>
<td>24-36 hours</td>
<td>abdominal cramping, diarrhea, nausea</td>
<td>meats, poultry, gravy, beans, stews, foods cooked slowly</td>
<td>Cook and reheat foods to proper temp. Cook in small batches. Cool foods rapidly.</td>
</tr>
<tr>
<td>Shiga Toxin-Producing E. coli</td>
<td>12-72 hours</td>
<td>1-4 days</td>
<td>diarrhea-often bloody, severe cramping, nausea, vomiting, fever</td>
<td>raw and undercooked ground meats (esp. ground beef)</td>
<td>Thoroughly cook ground meats. Avoid cross-contamination.</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>10-50 days</td>
<td>1-2 weeks; Severe cases may last several months</td>
<td>mild symptoms, then sudden onset of fever, general discomfort, fatigue, headache, nausea, loss of appetite, vomiting, abdominal pain, and jaundice after several days</td>
<td>water, ice, shellfish, salads, cold cuts, sandwiches, fruits, fruit juices, milk, milk products, vegetables, any food that will not receive a further heat treatment</td>
<td>Obtain shellfish from approved sources. Prevent cross-contamination from hands. Ensure food handlers practice good hand washing and no bare hand contact.</td>
</tr>
<tr>
<td>Listeria monocytogenes</td>
<td>1 day-60 days</td>
<td>Indefinite, depends on treatment, severe</td>
<td>nausea, vomiting, fever, chills, headache, severe; meningitis, miscarriages, death</td>
<td>unpasteurized dairy, cheese, fruits &amp; vegetables, deli meats, seafood, poultry</td>
<td>Use only pasteurized dairy products. Cook properly. Hold refrigerated for limited time.</td>
</tr>
<tr>
<td>Norovirus</td>
<td>24-48 hours Virus</td>
<td>1-2 days</td>
<td>cramping, diarrhea, nausea, vomiting, headache, fever</td>
<td>raw fruit, raw vegetables, prepared salads, raw shellfish</td>
<td>Thoroughly cook foods. Wash hands. Use certified shellfish. No bare hand contact.</td>
</tr>
<tr>
<td>(Staph) Staphylococcus aureus</td>
<td>1-7 hours</td>
<td>1-2 days</td>
<td>onset abrupt and often severe, nausea, vomiting, cramping, sometimes diarrhea</td>
<td>ready-to-eat foods, i.e. sandwiches, salads, ham and other meats, potato salads, custards, warmed-over foods; often from infected foodhandlers-cuts, throat, nose and acne</td>
<td>Practice good hand washing and hygiene. Avoid contamination. Reduce bare hand contact with foods. Exclude foodhandlers with cuts and lesions. Rapidly cool foods.</td>
</tr>
<tr>
<td>Salmonella</td>
<td>6-72 hours</td>
<td>4-7 days</td>
<td>abdominal cramping, headache, nausea, diarrhea, fever, sometimes vomiting</td>
<td>undercooked or raw meats, poultry and shell eggs, poultry and egg salads, egg custards and sauces, protein foods, pets and infected handlers</td>
<td>Avoid cross-contamination. Cool and refrigerate foods immediately. Cook meats/poultry thoroughly. Practice good hand washing.</td>
</tr>
<tr>
<td>Shigella</td>
<td>12 hours-7 days</td>
<td>4-7 days, depends on treatment</td>
<td>diarrhea-often bloody, cramping, fever, nausea, sometimes vomiting</td>
<td>ready-to-eat foods associated with bare hand contact (salads, sandwiches, etc.) Source: humans (feces) and flies</td>
<td>Practice good hand washing after using toilet. Use approved water and foods. Control flies. No bare hand contact.</td>
</tr>
</tbody>
</table>
Risk factors are those practices or procedures that pose the greatest potential for food borne illness. Risk factors are determined by the Centers for Disease Control and Prevention and the U.S. Food and Drug Administration.

**FOOD SOURCE:**
- Food from unapproved or uninspected source
- Unsound condition of food, adulterated food
- Shellfish records not maintained properly

**INADEQUATE COOKING:**
- Improper cooking temperatures
- Improper reheating temperatures

**IMPROPER HOLDING:**
- Unsafe cooking
- Lack of date marking
- Improper cold/hot holding temperatures

**CONTAMINATION:**
- Raw meats not separated from ready-to-eat foods
- Species not separated
- Equipment not properly cleaned and sanitized

**POOR EMPLOYEE HYGIENE:**
- Lack of appropriate hand washing
- Bare-hand contact with ready-to-eat foods
- Ill food workers
- Employees eating, drinking or using tobacco outside of designated areas
- Inadequate hand sink
- Lack of soap or paper towels

**ENVIRONMENTAL CONTAMINATION:**
- Improperly storing, labeling, or using chemicals
- Presence of insects or rodents
- Lack of potable water
- Improper sewage disposal

Risk Factors Pose Potential for Foodborne Illness
• Wash hands only in the hand sink-- not in the dishwashing, food preparation or mop sinks

• Ill employees can cause food borne illness (FBI). Norovirus and other highly pathogenic organisms can be easily spread by ill food handlers person-to-person (via the fecal-oral route) or through contaminated airborne droplets, food, water and environmental surfaces. Enforce sick leave policy or reassign duties.

• Eat, drink or use any form of tobacco only in designated areas away from food production

• Do not use a common cloth towel or apron for hand wiping

• No bare-hand contact with ready-to-eat food!

• Wear nails short, clean and unpolished

• Restrict rings to plain bands

• Cover open cuts and burns with finger cots, bandages, or single-use gloves

• Follow single-use glove guidelines

**Does Mr. Yucky work in your kitchen?**

**Good Hygiene is the Responsibility of All Food Workers and Management**
Improper Handwashing or No Handwashing Causes 33% of all Food borne Illness

Hand washing is Important in Preventing Foodborne Illness

Food Workers and Management

• Wash hands FREQUENTLY and EFFECTIVELY
  Twenty (20) second friction wash; adequate soap; warm water; use paper towel to dry

• Keep hand sinks accessible AT ALL TIMES

• Wash hands BEFORE ENGAGING IN FOOD PREPARATION,

Wash Hands After:

- Smoking, eating or drinking
- Handling raw food of animal origin
- Cleaning or handling garbage
- Using a tissue
- Going to the restroom

Improper Handwashing or No Handwashing Causes 33% of all Food borne Illness
When handling ready-to-eat foods, food workers may use:

- Deli tissue
- Spatulas
- Tongs
- Forks
- Dispensing equipment
- Single-use gloves

**Single-Use Glove Guidelines**

- Gloves do not replace the need for good hand washing practices
- Wash hands before putting on gloves
- Put on gloves only when you are ready to handle ready-to-eat food

- Use gloves for only one task, such as ready-to-eat foods, then discard
- If you are interrupted during food preparation, remove gloves
- Wash your hands and use clean gloves when you resume food preparation
- Dispose of gloves as soon as you remove them
- Single-use gloves should not be used around heat or hot fats
- Gloves are susceptible to contamination, so discard when soiled or damaged
- Fabric or reusable gloves may not be used with ready-to-eat food
- Avoid single-use gloves made of natural rubber latex
Restriction

Symptoms:

• Diarrhea
• Vomiting
• Fever
• Jaundice
• Sore throat w/fever
• Infected wound (i.e. cut, lesion or boil)
• Contact with “Confirmed Big 5”

Exclusion

Confirmed Big 5:

• Salmonella typhi
• Shigella
• Shiga Toxin-Producing E. coli
• Hepatitis A
• Norovirus

Food borne Illness Is Not a Menu Item
What are potentially hazardous foods?

A potentially hazardous food is any food or food ingredient (natural or synthetic) capable of supporting rapid growth of microorganisms.

- **MEAT ● DAIRY**
  Cooked or raw animal (protein) products, such as meats, poultry, dairy, milk, cheese, fish and seafood

- **STARCH**
  Heat-treated vegetables and starches, such as cooked rice, beans, potatoes and pasta

- **SPROUTS ● MELONS ● CUT LEAFY GREENS ● RAW CUT TOMATOES**
  Tofu, raw seed sprouts, cut melons, tomatoes, and leafy greens, garlic in oil, raw cut tomatoes, etc.
CROSS-CONTAMINATION
Avoid the Risk

Storing food properly in the refrigeration unit will prevent cross-contamination that can lead to foodborne illness.

Store cooked and ready-to-eat foods above raw protein foods.

Store raw/uncooked protein foods on lowest shelves away from ready-to-eat foods.

Hint: store raw foods according to cooking temperatures;
      poultry below ground meats,
      ground meats below whole muscle meats, eggs and fish.

Store Raw Meats, Poultry, Seafood, etc, on Lower Shelves
Prevent Foodborne Illness by Cooking and Holding Foods at the Proper Temperature

**FOOD PREPARATION CRITICAL TEMPERATURE**

- **165°F**: Poultry, stuffed meats and pasta, reheating
- **155°F**: Ground beef or pork (tenderized or injected meats)
- **145°F**: Whole muscle meat (beef, pork, fish)
- **MINIMUM HOT HOLDING**
- **135°F**: Rare roast beef
- **130°F**: DANGER ZONE
- **41°F**: Maximum cold holding
- **32°F**: Freezing

**Prevent Foodborne Illness by Cooking and Holding Foods at the Proper Temperature**
Cold Foods Must be Maintained at an Internal Temperature of 41°F or Below

- Date mark foods appropriately
- Cover foods after completely cooled
- Cover foods to maintain cold holding temperature
- Keep refrigeration doors closed when possible

Maintain Hot Foods at an Internal Temperature of 135°F or Above

- Use proper equipment for hot holding
- Stir frequently to distribute the temperature
- Cover foods to maintain temperature longer

Proper Holding Temperatures Must be Maintained During Transportation
Cooked foods shall be cooled from 135°F to 70°F within 2 hours, and

To accomplish proper cooling begin by cutting large items into smaller pieces or dividing large batches into smaller ones and utilize an alternate method that will quickly cool the food.

- Place foods in shallow pans,
- Use rapid cooling equipment, such as blast chillers,
- Place the food container in an ice water bath,

Within a total of 6 hours to 41°F or less.

- Use containers that facilitate heat transfer,
- Add ice as an ingredient,
- Stir frequently to distribute the temperature,
- Place in cooling or cold holding equipment,
- Cover foods loosely until cool.

Key Elements:

• Reheat previously cooled foods to an internal temperature of 165°F or above

• Rapid reheating is required (2 hours or less)

• Stir foods frequently to distribute the heat

• Measure the internal temperature with a thermometer

• After reaching 165°F, the food must be held hot at 135°F or above

Reheating Methods:

• Direct heat (stove top) is best… may also use steam cookers, ovens and microwave if reheating achieves 165°F within 2 hours

• Reheating in steam tables and crock pots is unsafe and is discouraged
DATE MARKING

Food Must Be Date Marked If It Is:
• Prepared on-site and refrigerated, or if it is commercially processed and after the original container is opened
• Potentially hazardous
• Ready-to-eat
• Held for more than 24 hours

Mark With the Date To Be Consumed By or Discarded:

• Food can be held for 7 days in adequate refrigeration (41°F or less). Day of preparation or day commercially processed food is opened counts as “day one.”

If Potentially Hazardous, Ready-To-Eat Food is Frozen:

• Mark that it is to be consumed within 24 hours of removal from freezer,

Or

• When food is removed from the freezer, mark with a “consume by” date that is seven days minus the length of time food was refrigerated before being frozen.
Never Thaw Foods at Room Temperature
Thawed Portions on the Outside Will Support Bacterial Growth and Can Result in an Unsafe Product

4 WAYS TO THAW FOOD SAFELY

In a cooler or refrigerator at 41°F or less

In cold (70°F) running water

During the cooking process, continuous cooking with no interruption

By microwaving as the first step in a continuous cooking process
Hold all potentially hazardous food at safe temperatures

Hot foods 135°F or above
Cold foods 41°F or below

• Take food temperatures every 2-3 hours.
• If food is in the temperature danger zone, take immediate corrective action. (*REHEAT, QUICK CHILL or DISCARD*)
• Stir foods frequently to distribute temperature.
• Rotate foods--do not add fresh food to old. (“First In, First Out”)
• Trained food employees must monitor self-service food bars.
• Post signs that remind customers to use clean plates and bowls for return trips to the food bar.
• Protect food from contamination.
• Provide proper serving utensils and sneeze guards.

Hold All Potentially Hazardous Foods at the Proper Temperature
CONSUMER ADVISORY

What should a consumer advisory look like?

Menus

Brochures

Deli Case Advisory

Table Tents

The Advisory Must Disclose the Risky Foods and Remind the Consumer of the Risk
CLEANING and SANITIZING

Manual Warewashing Steps:

1. **Wash:**
   - Clean and sanitize sinks and drain boards.
   - Use clean, hot, soapy water.

2. **Rinse:**
   - Use clean hot water.

3. **Sanitize:**
   - Use 50-100 ppm chlorine -- mix with cool water; or
   - 200 ppm quaternary ammonia -- mix with 75°F water;
   - Immersion time -- 10 seconds; and
   - Use appropriate test strips to check concentration.

4. **Air Dry**

Mechanical Dish Machines

**HIGH TEMPERATURE:**
1. **Wash Temperature:**
   - Single-tank, stationary rack, dual temperature machine -- 150°F
   - Single-tank, conveyor machine -- 160°F

2. **Hot Water Sanitization:**
   - 180°F at manifold
   - 160°F at plate/utensil level

**LOW (COOL) TEMPERATURE:**
1. Chemical sanitization required
2. Water temperatures according to manufacturer
3. Chemicals must be auto-dispensed into final rinse water and checked daily
4. Must have a visual or audible low sanitizer indicator
Insect and Rodent Control  
(cockroaches, flies, mice, rats, etc.)

Insects and rodents carry disease and can contaminate food and food-contact surfaces. Take steps to minimize their presence.

• Protect outer openings by keeping outer doors closed, repair screens, maintain tight-fitting doors and openings, and use air curtains.

• Eliminate harborage conditions.

• Exterminate regularly.

TOXIC MATERIALS

These Items Can Be Poisonous or Toxic If Ingested

• Detergents
• Sanitizers
• Polishes and cleaners
• Insecticides
• Rodenticides
• First aid supplies and personal medication

Storing, Labeling and Using

• Store toxic materials separately from foods and food-contact surfaces.
• Never store above foods or food-contact surfaces.
• Label all toxins.
• Use only approved chemicals in food areas.

NEVER store chemicals ABOVE food or on food work surfaces. ALWAYS store BELOW food.

Take Steps to Minimize the Presence of Insects and Rodents
<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved source/sound condition</td>
<td>- Food from unapproved source/unsound condition</td>
</tr>
<tr>
<td>• Food from unapproved source/unsound condition</td>
<td>• Discard/reject/return</td>
</tr>
<tr>
<td>Hand washing</td>
<td>• Employee should be instructed when and where to wash hands</td>
</tr>
<tr>
<td>• Food employee observed not washing hands at appropriate time</td>
<td></td>
</tr>
<tr>
<td>Cold holding</td>
<td>• Discard</td>
</tr>
<tr>
<td>• Potentially hazardous food held above 41°F MORE than 4 hours</td>
<td>• Use immediately or cool rapidly</td>
</tr>
<tr>
<td>• Potentially hazardous food held above 41°F LESS than 4 hours</td>
<td></td>
</tr>
<tr>
<td>Cooking</td>
<td>• Continue cooking to proper temperature</td>
</tr>
<tr>
<td>• Potentially hazardous food is undercooked</td>
<td></td>
</tr>
<tr>
<td>Hot holding</td>
<td>• Discard</td>
</tr>
<tr>
<td>• Potentially hazardous food held below 135°F MORE than 4 hours</td>
<td>• Rapidly reheat to 165°F in LESS than 2 hours or discard</td>
</tr>
<tr>
<td>• Potentially hazardous food held below 135°F LESS than 4 hours</td>
<td></td>
</tr>
<tr>
<td>Two-stage cooling process</td>
<td>• Use alternate cooling method</td>
</tr>
<tr>
<td>• Potentially hazardous food cooled from 135°F to 70°F in MORE than 2 hours</td>
<td>• Use alternate cooling method or discard. Discard if total cooling time is more than 6 hours</td>
</tr>
<tr>
<td>• Potentially hazardous food cooled from 70°F to 41°F in MORE than 4 hours</td>
<td></td>
</tr>
<tr>
<td>Reheating</td>
<td>• Use direct reheating method to achieve 165°F within two hours or discard</td>
</tr>
<tr>
<td>• Potentially hazardous food is improperly reheated</td>
<td></td>
</tr>
</tbody>
</table>

Food Safety is YOUR Responsibility