NEBRASKA

Good Life. Great Roots.

DEPARTMENT OF AGRICULTURE

FOCUS ON **FOOD SAFETY**

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CONTENTS

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DEPARTMENT OF AGRICULTURE

Nebraska Department of Agriculture
Food Safety and Consumer Protection

301 Centennial Mall South
P.O. Box 94757
Lincoln, Nebraska 68509

Phone: (402) 471-3422
Website: nda.nebraska.gov/fscp

INTRODUCTION: FOOD SAFETY

It is a shared responsibility of the employee and the manager to ensure that food provided to the consumer is safe and does not become a vehicle in a disease outbreak or in the transmission of communicable disease. This shared responsibility extends to ensuring that consumer expectations are met and that the food is pure and prepared in a clean environment.

Food Safety Support

Seminars in food safety are available. Contact your area sanitarian to arrange a seminar. If you have questions or require more information, call 402-471-3422.

Resources

Looking for more information? Visit the Nebraska Department of Agriculture's website (under Food Safety and Consumer Protection) to learn more: www.nda.nebraska.gov/fscp

- Changes to the Nebraska Food Code, July 2016
- FDA Recall Website
- Focus on Food Safety
- Food Safety & Regulation Requirements for Farmers Markets & Craft Shows
- USDA Recall Website
- Handouts
    - Manual Dishwashing Sign
    - No Smoking Sign
    - Wash Your Hands Sign
- Quick Start Food Emergency Response Job Aids
- Requirements for Food Establishment Operations
    - Items to Prepare for an Inspection When Opening a New Food Establishment
- Safe Food Handler Practices and Conditions
- Temporary Food Establishment Requirements
- Time/Temperature Control For Safety Food Temperature Guide

FOOD SAFETY

Foodborne Illness Estimates, Risk Factors and Interventions

From the 2013 FDA Food Code

Foodborne illness in the United States is a major cause of personal distress, preventable illness and death, and avoidable economic burden. Scallan et al. (2011a,b) estimated that foodborne diseases cause approximately 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths in the United States each year. The occurrence of approximately 1,000 reported disease outbreaks (local, regional, and national) each year highlights the challenges of preventing these infections.

Most foodborne illnesses occur in persons who are not part of recognized outbreaks. For many victims, foodborne illness results only in discomfort or lost time from the job. For some, especially preschool age children, older adults in health care facilities, and those with impaired immune systems, foodborne illness is more serious and may be life threatening.

The annual cost of foodborne illness in terms of pain and suffering, reduced productivity, and medical costs are estimated to be $10 - $83 billion. As stated by Meade et. al., the nature of food and foodborne illness has changed dramatically in the United States over the last century. While technological advances such as pasteurization and proper canning have all but eliminated some disease, new causes of foodborne illness have been identified. Surveillance of foodborne illness is complicated by several factors. The first is underreporting. Although foodborne illnesses can be severe or even fatal, milder cases are often not detected through routine surveillance. Second, many pathogens transmitted through food are also spread through water or from person to person, thus obscuring the role of foodborne transmission. Finally, pathogens or agents that have not yet been identified and thus cannot be diagnosed cause some proportion of foodborne illness.

Identifying Common Foodborne Illnesses

Bad Bug Book: Handbook of Foodborne Pathogenic Microorganisms and Natural Toxins

The Bad Bug Book 2nd Edition, released in 2012, provides current information about the major known agents that cause foodborne illness.

www.fda.gov/food/foodborneillnesscontaminants/causesofillnessbadbugbook

FOOD SAFETY **RISK FACTORS**

The Center for Disease Control and Prevention (CDC) has identified five major risk factors related to employee behaviors and preparation practices in food service establishments that contribute to foodborne illness:

1. Improper holding temperatures

- Employees not monitoring hot-holding or cold-holding of food.

2. Inadequate cooking

Such as undercooking raw eggs

- Employees need to properly cook food, being particularly careful in cooking those foods known to cause severe foodborne illness and death.
- Employees need to use proper methods to rapidly cool time/temperature control for safety foods that are not held hot or are not for consumption within 4 hours.

3. Contaminated equipment

- Employees need to properly clean and sanitize multiuse equipment and utensils before they are reused.

4. Food from unsafe sources

- Employees need visibly observe foods as they are received to determine that they are from approved sources, delivered at the required temperatures, protected from contamination, unadultered and accurately presented.

5. Poor personal hygiene

- Employees need to properly clean their hands
- Employees need to avoid working when they are sick.

LOOK OUT FOR **FOODBORNE ILLNESSES**

Is “looking clean” enough to prevent foodborne illnesses?

Foodborne Illness Agents

- **Biological hazards**: bacteria, viruses, parasites, yeast, mold
- **Physical hazards**: glass, toothpicks, fingernails, jewelry
- **Chemical hazards**: cleaners and sanitizers, pesticides, medications
- **Naturally occurring chemical hazards**: fish toxins, plant toxins

Foodborne Illness Sources

- **Human/food workers**: contaminated hands, illness
- **Foods**: contaminated food, food that has been time/temperature abused

Foodborne Illness Symptoms

- **Common symptoms (onset 12 to 36 hours)**: diarrhea, cramping, nausea, vomiting, low-grade fever, body aches
- **Rare symptoms**: system shutdown, coma, death

ILL FOOD WORKERS

Don't let employees work around food if they display any restriction symptoms. Have employees stay home if they have been diagnosed with a foodborne illness.

Restrictions

Restrict employees from working around food if the employee has any of these symptoms:

a. Vomiting
b. Diarrhea
c. Fever
d. Jaundice
e. Sore throat with fever, or
f. A lesion containing pus such as a boil or infected wound that is open or draining and is:
    i. On the hands or wrists, unless an impermeable cover such as a finger cot or stall protects the lesion and a SINGLE-USE glove is worn over the impermeable cover.
    ii. On exposed portions of the arms, unless the lesion is protected by an impermeable cover.
    iii. On other parts of the body, unless the lesion is covered by a dry, durable, tight-fitting bandage.

Exclusions

Do not allow employees to come to work if they have been diagnosed with any of these foodborne Illnesses:

a. Norovirus
b. Hepatitis A virus
c. Shigella spp
d. Shiga toxin-producing Escherichia coli
e. Salmonella typhi
f. Non-typhoidal Salmonella

TIME/TEMPERATURE CONTROL FOR SAFETY

"Time/temperature control for safety food" means a food that requires time/temperature control for safety (TCS) to limit pathogenic microorganism growth or toxin formation. This includes:

- Animal foods (meats, poultry, dairy, milk cheese, fish and seafood) that are raw or heat-treated
- Plant food (vegetables and starches, such as cooked rice, beans, potatoes, and pasta) that are heat-treated
- Raw seed sprouts
- Cut melons
- Cut leafy greens
- Cut tomatoes or mixtures of cut tomatoes that are not mixed with an acidic ingredient, such as vinegar, pathogenic microorganism growth or toxin formation
- Garlic-in-oil mixtures

Bacteria needs the correct conditions to grow:

- There must be an adequate food source (protein or starch)
- There must be adequate time at the ideal temperature
- There must not be too much acid
- There must be the correct amount of moisture
- Available oxygen can be good or bad: some bacteria grow with oxygen, some grow without it

Time and Temperature Principle

- Holding time and temperature is critical
- Temperature danger zone is from 41°F to 135°F, the range in which rapid growth occurs.
- TSC foods should not be exposed to the danger zone for more than four hours total, including time spent in preparation, cooling and reheating.

TAKING **TEMPERATURES**

Use a metal stem thermometer, digital thermometer or thermocouple.

Instructions For Taking Food Temperatures

1. Before taking the temperature, sanitize the thermometer with alcohol swab or sanitizer water at the appropriate concentration.
2. Sanitize thermometer between uses on different foods.
3. **NEVER** probe raw food then cooked food without a sanitizing procedure in-between.
4. To measure the **internal temperature** – insert the probe into the center or thickest part of the food item and leave it there for at least 10 seconds to ensure the reading has stabilized.
5. To measure the **surface temperature** – place the probe between two vacuum packed or frozen items and leave it there for at least 10 seconds to ensure the reading has stabilized, then take the surface temperature.
6. To measure liquids (eg. soups, sauces) stir first before taking readings.

Calibrate thermometer frequently

- Fill a glass with ice cubes, and then top off with cold water.
- Stir the water, insert the thermometer into the glass, making sure the sensing area is covered and the thermometer is not touching the sides.
- Allow the indicator to stabilize. The temperature should read **32°F (0°C)**.
  - If it does not, adjust the calibration nut to 32°F while still in the ice slush.

OBSERVE **GOOD HYGIENE**

Good hygienic practices are the responsibility of both the food worker and the management.

Do ...

- Use only the hand sink to wash your hands. Do not wash hands in sinks used for dishwashing, food preparation or mop water.
- Avoid bare hand contact with ready-to-eat food.
- Keep your fingernails short, clean and unpolished.
- Restrict rings to plain bands.
- Cover open cuts and burns with bandages and a finger cot or a single-use glove.

Do not ...

- Work when you are sick. Employees who are ill can cause foodborne illness.
- Eat, drink or use any form of tobacco in food production areas. Only eat, drink or use tobacco in designated non-food production areas.
- Use a common cloth towel or an apron for hand wiping or drying.

FOOD SAFETY IS IN YOUR HANDS

When To Wash Hands

- Before starting to work with food, utensils or equipment.
- During food preparation, as needed.
- When switching between raw foods and ready-to-eat foods.
- After eating and drinking.
- After touching bare human body parts.
- After handling animals.
- After coughing, sneezing, using a tissue or using tobacco products.
- After handling soiled utensils and equipment.
- After using the toilet, wash hands at a handsink in the bathroom; and again when returning to work.

Correct Way to Wash Hands - Follow These 6 Steps!

Remove jewelry before washing your hands. Only wash your hands in sinks designated for handwashing. Do not wash your hands in utensil, food preparation or service sinks.

1. Roll up sleeves and wet hands with warm water.
2. Using soap, not a hand sanitizer solution, work up a soapy lather that covers hands and forearms.
3. Rub hands together for at least 20 seconds; make sure to wash palms, back of hands, between fingers and forearms.
4. Use a fingernail brush to clean under fingernails and between fingers.
5. Rinse hands and forearms in warm water. Keep fingertips pointed down while rinsing.
6. Dry hands with single-use paper towels or cloth roller towel. Turn off the faucet with paper towels to prevent re-contamination of hands.

MINIMIZING **BARE HAND CONTACT**

Effective handwashing practices may not be enough to prevent the transmission of pathogens from the hands to **ready-to-eat (RTE) foods**. Bare hand contact with RTE food is discouraged. Use a suitable utensil such as scoops, spoons, forks, spatulas, tongs, deli tissue, single-use gloves or dispensing equipment when handling these food items.

Hand Sanitizers

Hand sanitizers are not intended to replace soap in the handwashing process. They are not effective in removing dirt or other organic materials. However, if used after proper handwashing procedures, they can reduce the number of bacteria and viruses that may remain on your hands.

Single-Use Gloves

Single-use gloves can provide additional food protection, but are only effective if placed on properly washed hands and changed at appropriate times during the food operation.

When Single-Use Gloves Are Used:

- Wash hands thoroughly before and after wearing gloves, and when changing to a new pair of gloves.
- Change gloves between handling raw foods and cooked or ready-to-eat foods.
- Discard gloves when torn, contaminated or removed for any reason.
- Change gloves when interruptions occur in the food operation.
- Change gloves frequently, at least once per hour.
- Never reuse gloves under any circumstances.

CROSS-CONTAMINATION: AVOID THE RISK

When refrigerating food:

- Place raw meat, poultry and seafood on bottom shelves to prevent their juices from dripping onto other foods. Raw juices often contain harmful bacteria.
- Store eggs in their original carton below any ready to eat food.

When preparing food:

- **Keep it clean**
  - Wash hands often. Harmful bacteria can spread throughout the kitchen and get onto cutting boards, utensils and counter tops.
  - Clean and sanitize cutting boards, utensils, equipment and counter tops after preparing each food item and before you go on to the next item.
- **Cutting boards**
  - Always use a clean and sanitized cutting board.
  - If possible, use one cutting board for fresh produce and a separate one for raw meat, poultry and seafood.
  - Once cutting boards become excessively worn or develop hard-to-clean grooves, replace them.
- **Fruits and vegetables**
  - Rinse fresh fruits and vegetables in running tap water to remove visible dirt and grime.
  - Remove and discard the outermost leaves of a head of lettuce or cabbage.
  - Because bacteria can grow well on the cut surface of fruit or vegetables, be careful not to contaminate these foods while slicing them up on the cutting board, and avoid leaving cut produce at room temperature for many hours.

When preparing food:

- Never place cooked food back on the same plate or cutting board that previously held raw food.

MINIMUM **INTERNAL TEMPERATURES**

Maintain these minimum internal temperatures for safety.

165˚ F Poultry, stuffing, casseroles, reheated leftovers

155˚ F Ground meats, beef, lamb, veal (medium), pork, egg dishes

145˚ F Beef, lamb, veal steaks & roast (medium rare); seafood

135˚ F Holding temperatures for cooked foods

DANGER ZONE

If potentially hazardous food remains in the temperature danger zone for four hours or more, pathogenic microorganisms can grow to levels high enough to make someone ill. Most foodborne microorganisms grow well at temperatures between 41°F and 135°F.

41˚ F Refrigerator temperatures

0˚ F Freezer temperatures

INTERNAL TEMPERATURES FOR SAFETY	
135˚ F	Minimum **hot-holding** temperature
41˚ F	Maximum **cold-holding** temperature

SAFE **FOOD THAWING**

4 WAYS TO THAW FOOD SAFELY

1. Thaw food in the refrigerator at 41°F or below.

2. Thaw food under cold (70°F) running water for two hours or less.

3. Thaw food as part of the cooking process (continuous cooking with no interruptions).

4. Thaw food in the microwave, just before it is cooked.

Never thaw foods at room temperature.

SAFE **FOOD HANDLING**

Date marking of food prepared in the food establishment:

- Date marking is required for ready-to-eat (RTE) temperature control for safety (TCS) food that is prepared and held refrigerated for more than 24 hours.
- RTE TCS foods must be marked with the date of preparation, and must be consumed or discarded within seven days, including the day of preparation.
- RTE TCS foods must be maintained at 41°F (5° C) or less for the duration of the seven days (or 45°F for four days).

Cold-holding foods:

- Maintain cold foods at 41°F or below. Keep foods covered.
- Frozen foods must remain frozen.

Hot-holding foods:

- Maintain hot foods at 135°F or above.

Reheating foods:

- Food made in-house and reheated for hot holding must reach an internal temperature of at least 165°F for 15 seconds.
- Food made in a food processing plant, opened in the food establishment, and reheated for hot holding must reach a temperature of 135°F.
- Reheat foods rapidly, within two hours.
- Food that has been cooked and cooled properly may be served at any temperature if it is going to be served immediately.

Microwave cooking and reheating:

- If cooking or reheating foods in a microwave, heat all parts of the food to 165°F. Cover and rotate or stir the food during the process. Afterwards, allow the covered food to stand for two minutes before serving.

Cooling foods:

- Cool hot foods from 135°F to 70°F within two hours and to 41°F within four hours of reaching 70°F.
- The faster foods are cooled, the better.

Cooling Tips:

- Never allow food to set on the countertop (room temperature) to cool.
- Refrigerate or chill the food in an ice bath immediately upon removal from the heat source.
- Use the right type of storage container to chill foods:
  - Divide foods into smaller portions and put into shallow containers.
  - Metal containers chill foods fastest.
  - Glass and plastic containers take longer to cool foods.
- Allow for air circulation because loosely covered or uncovered foods chill faster. Rapidly chill the food, then cover tightly.
- Where possible, substitute ice for water in a recipe. Add the ice at the end of the cooking process to cool the product rapidly.
- Set containers of food in ice baths and stir frequently.
- Use blast chillers when possible.

WHAT IS **SANITIZATION?**

Sanitization is a process whereby the numbers of disease causing organisms are reduced to safe levels. Safe sanitization is accomplished through the use of either heat or chemicals, after proper washing of food handling equipment and utensils.

Three-Compartment Sink

Manual dishwashing utilizes three separate sink compartments to ensure items are clean and sanitized as follows:

Step 1 - Sink #1
Wash in hot soapy water. Proper washing may require scraping, preflushing, presoaking or scrubbing.

Step 2 - Sink #2
Rinse in clean water. Rinsing removes the detergents and remaining food particles.

Step 3 - Sink #3
Two options exist to sanitize items as follows:

Option 1 - Hot Water Sanitization
Sanitize by immersion in hot water maintained at 171º F or higher by means of an approved heating device.

Option 2 - Chemical Sanitization
To sanitize with chemicals, items must be immersed for a specified amount of time in an approved sanitizing solution at the proper concentration. Some examples of proper time and concentration levels are:

- Chlorine at a concentration of 100 ppm with a contact time of at least 10 seconds.
- Iodine at a concentration between 12.5 - 25 ppm with a contact time of at least 30 seconds.
- Quaternary ammonium at a concentration of 200-400 ppm with a contact time of at least 30 seconds.

Chemical test strips or test kits are required to verify the chemical concentration of the sanitizers being used. Concentrations below minimum levels will not sanitize effectively, while sanitizers used in concentrations above the recommended levels can leave toxic residues.

Mechanical Sanitization

Mechanical dishwashers use either heat or chemicals to properly sanitize items. Operate the dishwasher in accordance with the instructions on the machine's data plate. Use a thermometer to verify correct temperatures on machines that use heat to sanitize and use chemical test strips for chemical sanitizers.

A SAFE & CLEAN **FACILITY**

Toxic cleaning compounds, sanitizing agents and pesticide chemicals must be labeled and stored in a manner that protects against contamination of food, food-contact surfaces or food-packaging materials. Never store chemicals above food. Use only chemicals that are approved for food service areas.

The use of insecticides or rodenticides is permitted only under precautions and restrictions that will protect against the contamination of food, food-contact surfaces and food-packaging materials.

Insects and rodents carry diseases and can contaminate food and food contact surfaces.

Pest control: Effective measures shall be taken to exclude pests from the processing areas and to protect against the contamination of food on the premises by pests.

- Protect outer openings, keep outer doors closed, repair screens, and maintain tight fitting doors and openings.
- Eliminate conditions where pests can hide.

CORRECTIVE ACTIONS

Risk Factor	Corrective Action
Approved source: food from unapproved source or unsound condition	Discard or reject or return the food
Handwashing: food employee observed not washing hands at appropriate time	Employee should be instructed when and where to wash hands
Cold-holding: Time/temperature control for safety food held above 45°F for more than 6 hours	Discard the food
Cold-holding: Time/temperature control for safety food held above 41°F for more than 6 hours	Use the food immediately or cool rapidly
Cooking: Time/temperature control for safety food undercooked	Continue cooking to proper temperature
Hot-holding: Time/temperature control for safety food held below 135°F for more than 4 hours	Discard the food
Hot-holding: Time/temperature control for safety food held below 135°F for less than 4 hours	Rapidly reheat to 165°F in less than two hours or discard
Two stage cooling process: Time/temperature control for safety food cooled from 135°F to 70°F in more than 2 hours but less than 6 hours	Reheat to 165°F and start alternative cooling method again
Two stage cooling process: Time/temperature control for safety food cooled from 70°F to 41°F in more than 4 hours	Discard the food
Reheating: Time/temperature control for safety food is improperly reheated	Discard the food

HELPFUL **RESOURCES**

Call the Nebraska Department of Agriculture's Food Program (402-471-3422):

- Prior to opening a food establishment.
- To review plans prior to construction or remodeling.
- When there is a change of ownership.
- If you have questions concerning licensing or inspections.
- When there are natural disasters involving food.
- If there are power outages of two hours or more.

Helpful Websites

- **Nebraska Department of Agriculture, Food Safety and Consumer Protection**
  www.nda.nebraska.gov/fscp
- **Food and Drug Administration**
  www.fda.gov
- **United States Department of Agriculture**
  www.usda.gov
- **Center for Disease Control**
  www.cdc.gov
- **Nebraska Restaurant Association**
  www.nebraska-dining.org
- **National Restaurant Association**
  www.restaurant.org/Home