



Food **Safety** Basics

A Reference Guide for Foodservice Operators

Julie Garden-Robinson, Ph.D., L.R.D.
Food and Nutrition Specialist

NDSU
Extension Service
North Dakota State University
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More and more people are eating away from home each year, some due to convenience or recreation and others due to necessity. Whether dining in a fast food restaurant, a school foodservice, a hospital cafeteria, or a fine dining restaurant, people expect safe food and a clean environment.

Providing safe food requires careful attention by both management and employees. Since foodservice operations are characterized by high turnover rates, employee training poses a challenge to managers.

The objectives of this manual are to 1) review basic aspects of food sanitation throughout a foodservice operation and 2) provide reference materials on food storage and other aspects of food safety.



The High Price of Foodborne Illness

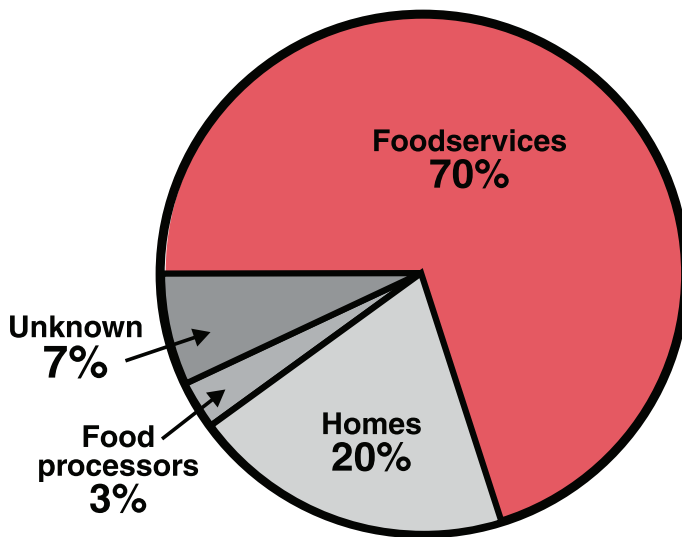
Foodborne illness costs lives and money. Millions of people become sick each year and thousands die after eating contaminated or mishandled foods. Children, the elderly and people with weakened immune systems are especially vulnerable to foodborne illness.

The cost of foodborne illness in 1993 from seven disease-caus-

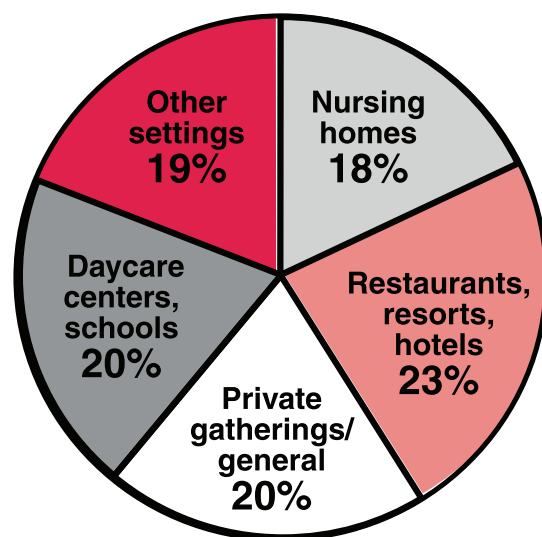
ing organisms (*Campylobacter*, *Salmonella*, *E.coli* 0157:H7, *Clostridium perfringens*, *Staphylococcus aureus*, *Listeria* and *Toxoplasma gondii*) has been estimated at between \$5 and \$9 billion (USDA FSIS, 1996). The National Restaurant Association estimates the average cost of a foodborne illness outbreak at more than \$75,000.

Serving safe food has numerous benefits. By preventing foodborne illness outbreaks, establishments can avoid legal fees, medical claims, wasted food, bad publicity and possibly, closure of the establishment.

Sources of Foodborne Illness Outbreaks



Where the Outbreaks Occurred in Foodservices



The Centers for Disease Control and Prevention (CDC) collects information about foodborne illness outbreaks from state and local health departments. According to recent data, about 70 percent of all foodborne illness outbreaks occur in foodservice operations compared with about 20 percent traced to homes. Of the foodservice outbreaks, the cases are fairly evenly divided among restaurants/resorts/hotels, daycare centers/schools, nursing homes and private gatherings.

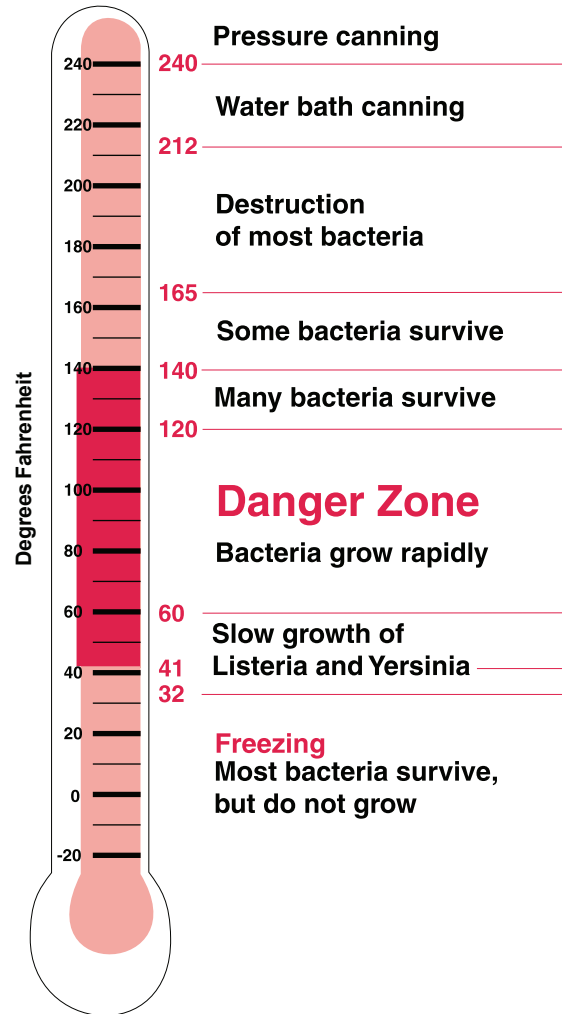
Most of the outbreaks of foodborne illnesses are caused by food handling errors. It only makes sense for managers to implement the most effective food sanitation system possible. Careful food handling and sanitation practices can control the factors that can lead to foodborne illnesses.

What Makes Food Unsafe?

Hazards can be introduced into foodservice operations in numerous ways: by employees, food, equipment, cleaning supplies and customers. The hazards may be biological (including bacteria and other microorganisms), chemical (including cleaning agents) or physical (including glass chips and metal shavings).

Microbiological hazards (bacteria in particular) are considered the greatest risk to the food industry. Bacteria usually require **F**ood, **A**cidity, **T**emperature, **T**ime, **O**xygen and **M**oisture in order to grow. Controlling any or all of these factors can help prevent bacterial growth. Remember “FAT-TOM” and how it relates to food safety.

Temperature and *time* are the two most controllable factors for preventing foodborne illness. The temperature range between 41°F and 140°F is considered the “danger zone” because these temperatures are very conducive to bacterial growth. Within this range, bacteria grow most rapidly from 60°F to 120°F. When the conditions are right, bacteria double in number every 10 to 30 minutes. For instance, in three hours one bacterium can grow into thousands of bacteria. Cooking food to safe temperature and cooling food quickly, therefore, are critical steps in the prevention of foodborne illness.



Weighing the Risks

Certain foods and foodservice procedures are more hazardous than others. High protein foods such as meats and milk-based products and foods that require a lot of handling during preparation require special attention by foodservice operations. Roast beef, turkey, ham and Chinese foods, for instance, have been linked with more outbreaks of foodborne illnesses than pizza, barbecued meat or egg salad, yet all of these foods are considered potentially hazardous. Other foods such as garlic in oil, rice, melon and sprouts also have been linked with outbreaks of foodborne illness.

Researchers have identified common threads between outbreaks of foodborne illnesses. Outbreaks usually involve one or more of these factors.

1. Improper cooling of foods—the leading cause of foodborne illness outbreaks.
2. Advance preparation of food (with a 12-hour or more lapse before service).
3. Infected employees who practice poor personal hygiene.
4. Failure to reheat cooked foods to temperatures that kill bacteria.
5. Improper hot holding temperatures.
6. Adding raw, contaminated ingredients to food that receives no further cooking.
7. Foods from unsafe sources.
8. Cross contamination of cooked food by raw food, improperly cleaned and sanitized equipment, or employees who mishandle food.
9. Improper use of leftovers.
10. Failure to heat or cook food thoroughly.

Source: CDC.

Food Safety Guidelines throughout a Foodservice Operation

Purchasing

Safe food begins with safe raw materials. Food should be obtained from approved sources:

- Meats should be inspected by the USDA or other agency with animal health jurisdiction. The parts or packaging should carry a federal or state inspection stamp.
- Eggs should have a USDA grade; frozen and dried eggs should be pasteurized.
- Shellfish should be purchased from suppliers that appear on public health service Food and Drug Administration lists of Certified Shellfish Shippers or on lists of state-approved sources. The control tags must be available if live shellfish are used.

Storage

Foods should be protected from time and temperature abuse by purchasing according to the storage space available. Keep food in rooms designated for storage – not in restrooms or hallways. Do not store frozen, refrigerated or dry food directly on the floor or under overhead pipes. Place food on shelves or on mobile equipment at least six inches off the floor. Space foods so air can freely flow around them.

Monitor expiration dates and rotate stock. Use the “FIFO” principle – first in, first out.

Freezer Storage

- Maintain freezers at 0°F or lower. Monitor and record temperatures regularly.

Receiving

All foods should be in excellent condition when they arrive. The quality and temperature of foods should be closely monitored at delivery. Delivery times should be planned for slow periods whenever possible to allow for inspection. Storage areas should be cleared prior to the receiving shipments, so food can be immediately stored, and the storage areas should be clean and well-lit to discourage pests. Sanitary carts and dollies should be readily available to store foods immediately.

- Check frozen foods for signs of thawing and refreezing, such as blood on meat boxes, fluid leakage, frozen liquids at the bottom of the food carton

or large ice crystals in or on the product. Refuse shipments that show signs of being thawed and refrozen.

- Reject canned goods that are dented, bulging or rusty. **Never taste the food in a damaged can.**
- Check packages to make sure they are dry and the seals are intact.
- Refrigerate potentially hazardous foods immediately.

- Defrost units regularly. During defrosting, store frozen foods in another freezer.
- Do not refreeze thawed foods unless they have been thoroughly cooked.

Refrigerator Storage

- Maintain refrigerators at 41°F or lower. Place thermometers in the warmest and coldest areas of refrigerators; measure and record air temperature regularly.
- Do not store raw uncooked meats above prepared foods.

- Keep all goods in clean wrappers and containers. In most cases, wrap products in moisture proof and air-tight materials.
- Do not store foods taken from their original containers in galvanized (zinc-coated) containers such as garbage cans. In addition, food should not be stored in enamelware, which may chip. Tomatoes, fruit punches or sauerkraut should not be stored in metal containers (unless made of stainless steel), due to potential leaching out of metals and other potential toxicants. Foods may be stored in food-grade plastic or glass containers.

Dry Storage

- Keep canned and dry goods dry.
- Label and date all dry goods.
- Measure and record temperature regularly.

Safe Food Production and Service

After monitoring receiving and storage for safety, it is essential to avoid cross-contamination and temperature/time abuse during preparation, cooking, serving and cooling. Calibrated thermometers should be used to monitor temperatures. The following guidelines illustrate safe food handling at each stage.

Preparation

- Wash hands before beginning a task and after every interruption that could contaminate hands. The handwashing sink – not the prep sink – should be used.
- **Avoid cross-contamination.** Cross contamination occurs when harmful bacteria are transferred from one food to another by means of a non-food surface, such as utensils, equipment or human hands. Cross contamination can also occur food to food, such as when thawing meat drips on ready-to-eat vegetables. Prevent cross contamination by observing these recommendations:
 - * Use proper handwashing procedures. If plastic gloves are worn, hands should be washed before putting them on. Plastic gloves should be changed whenever changing tasks that could cause contamination. Improperly-used plastic gloves can contaminate foods as easily as bare hands can.
 - * Use clean and sanitized utensils and cutting boards when preparing food. Clean cutting boards thoroughly with hot soapy water, followed by a hot water rinse and a final sanitizing step (1 tablespoon bleach per gallon of water) after using.
 - * Store cooked food and raw food separately.
- Wash all fresh fruits and vegetables with clear running water in a designated produce

- sink or in a ware-washing sink that has been properly cleaned and sanitized. Use a brush as necessary. Detergents are not suggested because they may leave residues.
- Disassemble, clean and sanitize meat slicers (and other equipment) on a timely basis.
- Wash, rinse and sanitize can openers. Wash and rinse tops of cans before opening.
- Prepare batches of food no further in advance than necessary.

Thawing

- Thaw foods in refrigerator units, under cool running water at a temperature of 70°F or lower, or in a microwave oven (depending on the amount of food). If thawing foods in running water, do not allow thawed portions of raw animal foods to be above 41°F for more than four hours.
- Thaw ready-to-eat foods above raw food, so the thaw water does not contaminate the ready-to-eat food.
- Cook microwave-thawed foods immediately.
- Frozen food, such as vegetables and seafood, may be cooked directly to the recommended internal temperature. Allow additional time for cooking. Large food items, such as whole turkeys, should not be cooked from the frozen state.

Cooking

- **Cook foods to safe time-temperature exposures.** Use a clean sanitized thermometer to measure the temperature by placing the thermometer in the thickest part of the food. In sauces and stews, insert the thermometer at least two inches into the food.
- Calibrate thermometers regularly by inserting into a mixture of ice and water and adjusting the reading to 32°F/0°C. Thermometers that have been dropped or exposed to extremes in temperature should be calibrated.

Stuffed meats

165°F for 15 seconds

Poultry

165°F for 15 seconds

Ground beef

155°F for 15 seconds

Roasts

**130°F for 121 minutes or
140°F for 12 minutes or
145°F for 15 seconds**

Pork, ham, sausage or bacon

155°F for 15 seconds

- Do not interrupt cooking times by partially cooking foods.
- Heat microwave-cooked foods 25°F above the recommended temperature to compensate for shorter cooking times. Stir and rotate foods during cooking and allow to stand two minutes after cooking for even distribution of heat.
- Use tasting spoons – not the stirring spoon – to test foods. A clean tasting spoon should be used every time food is tested.

Holding/Displaying Foods Between Preparation and Serving

- Keep hot foods hot and cold foods cold. Maintain hot foods at 140°F or higher and cold foods at 41°F or lower. Measure temperatures periodically near the top surface before stirring; stir with a clean, sanitized utensil, measure and record temperature.
- Do not use holding units, such as steam tables or chafing dishes, to cook or reheat foods.
- Hold cold foods in serving containers on ice; the food should not be in contact with the ice.
- Do not put previously held food on top of freshly prepared food. Use up the previously held food first.
- Do not handle ready-to-eat foods such as lettuce, ham and cheese with bare hands. Use spatulas, tongs, clean plastic gloves or deli tissue to handle food.
- In self-service/buffet situations, provide spoons or tongs so human hands do not touch food. Provide clean plates for every trip through a buffet line.
- Linens and napkins used as liners that contact food must be replaced whenever the container is refilled.
- Handle plates by their edges, glasses by the bases and cups by their handles.
- Handle utensils by their handles.
- Use metal or plastic scoops – not glasses, bowls, cups or plates – to scoop ice.
- Potentially hazardous foods that have been removed from temperature control for more than four hours should be discarded according to North Dakota's adaptation of the Food Code.

Safe Use of Disposables

Single-service items are used in many foodservice settings. They are manufactured to be safe and sanitary and should be handled carefully in foodservice establishments to maintain their cleanliness.

Disposables should be stored in their original storage containers at least six inches above the floor, away from pesticides, detergents and cleaning compounds. Only the amount needed should be removed from the container. To help keep disposables sanitary, follow these tips:

- Handle containers as little as possible. In waited surface, servers should keep fingers

away from any food-contact surfaces of cups, plates or other containers. In self-service situations, stack disposable plates, bowls and cups bottom side up, so customers do not touch the eating surface of another customer's plate.

- Handle unwrapped forks, knives and spoons by the handles. Load utensil dispensers with the handles pointing out.
- Do not touch the drinking surface of cups when removing them from their plastic sleeves. Avoid overloading cup dispensers.
- Never re-use single-service articles even if they appear clean.

Cooling

- Label and date food before cold storage.
- Cool foods from 140 to 70°F within 2 hours and from 70 to 41°F within 4 hours. Do not cool food at room temperature before putting in the cooler.
- Do not mix fresh food with leftover food.
- Divide food into smaller batches and put in shallow 4-inch deep metal pans. Liquid foods should be no more than three inches deep, and thicker foods should be no more than two inches deep. Set the open pans on the top shelf of the cooler and cover the food after it has cooled.
- Use an ice bath to speed cooling. Place container of food in a larger container filled with ice water to reduce cooling time. Stir frequently during chilling to promote cooling and measure temperature periodically.

Reheating

- Reheat previously-prepared foods to at least 165°F for 15 seconds within 2 hours. Food reheated in a microwave oven should reach 190°F and be allowed to stand 2 minutes to allow for dispersal of heat.
- Reheat leftover foods one time only.
- Do not reheat foods in hot holding equipment such as steam tables.



Personal Hygiene Guidelines for Employees

Foodservice workers must pay close attention to personal hygiene. Policies on personal hygiene should be reviewed with employees and posted as reminders. For instance, workers who have a cold, the flu or another communicable illness, should inform their supervisor and not handle food. The following guidelines should be stressed to any worker dealing with food:

- Keep clean by bathing daily, using deodorant, and washing hair regularly.
- Keep hair under control by wearing a hair restraint.
- Wear clean clothing/uniform and/or apron.
- Avoid wearing jewelry, which can harbor bacteria and cause a physical hazard if parts fall into the food. Jewelry can also pose a personal safety hazard if it gets caught in the equipment.
- Keep fingernails clean, unpolished and trimmed short.
- Wear a bandage and plastic gloves if you have open cuts or sores. In some cases employees should perform other non-food-related tasks until the wound heals.
- Do not chew gum while on duty.
- Do not smoke cigarettes while performing any aspect of food preparation.
- Avoid unguarded coughing or sneezing. Wash hands after coughing or sneezing.

Wash hands thoroughly

- **before** starting work
- **during** food preparation as often as necessary to prevent cross contamination when changing tasks and when changing from handling raw foods to cooked foods.
- **and after—**
 - coughing, sneezing, using a handkerchief or tissue.
 - touching bare human body parts.
 - eating, drinking or smoking.
 - handling raw meats, poultry and fish.
 - handling garbage, sweeping or picking up items from the floor.
 - using cleaners and other chemicals.
 - using the toilet.
 - handling soiled equipment and utensils.
 - switching between raw foods and ready-to-eat foods.

Hand Washing Guidelines

1. Use water as hot as can be comfortably tolerated.
2. Moisten hands and add soap. Lather to the elbow if possible.
3. Scrub thoroughly.
4. Wash all surfaces, including backs of hands, wrists, between fingers and under fingernails.
5. Rub hands together for **at least 20 seconds**.
6. Rinse thoroughly under running water.
7. Dry hands thoroughly with a paper towel or hot air dryer.
8. Don't touch anything that will recontaminate your hands. Use a paper towel to turn off the water faucet and open the rest-room door if necessary.

Wash, Rinse and Sanitize

Surfaces and equipment may look sparkling clean, yet bacteria may be present in large numbers. Cleaning is the physical removal of food and/or soil from surfaces. Clean does not necessarily mean *sanitary*. All food contact surfaces must be sanitized.

Sanitizing takes cleaning a step further by reducing the number of bacteria present. Sanitizing does not make a surface *sterile* or germ-free. Sterility would be impractical and too expensive for foodservice operations.

Sanitizing agents differ in the amount of contact time required and their concentration and temperature requirements. When using combination products, such as detergent-sanitizers, cleaning and sanitizing must be done in two separate steps. First use the detergent-sanitizer to clean, then prepare another solution of the same agent to sanitize. Cleaning cloths can contaminate surfaces. They should be stored in sanitizing solution when not in use.

Sanitizing may be accomplished manually or with equipment such as dishmachines using heat (as steam or hot water) or chemicals. When heat sanitizing, using a higher temperature generally shortens the time required to kill bacteria.

Since equipment varies, procedures should be written that specify cleaning and sanitizing chemicals and methods for all areas of foodservice. A schedule should be in place for cleaning, with records kept of when it was done.

The correct order of steps involved in manual cleaning are:

1. Scrape or remove large particles of food.
2. Wash with an appropriate detergent/ water solution at 110°F.
3. Rinse in clean hot water.
4. Sanitize in hot water (171°F for at least 30 seconds) or use an appropriate chemical sanitizing solution such as chlorine (50 - 100 ppm.), iodine (12.5 - 25 ppm) or quaternary ammonium (100 - 200 ppm) according to manufacturer's directions. Also refer to the requirements of your local regulatory agency.
5. Air-dry.

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Storage and Handling Suggestions

Dry Storage

Staples			
Food		Recommended storage time at 70° F *	Handling hints
Baking Powder		18 months or expiration date on can	Keep dry and covered.
Baking Soda		2 years or expiration date on package	Keep dry and covered.
Bouillon Cubes or Granules		2 years	Keep dry and covered.
Cereals	ready-to-eat (unopened)	6-12 months**	Refold package liner tightly after opening.
	ready-to-eat (opened)	2-3 months	
	cooked (before preparation)	6 months	
Chocolate	premelted	12 months	Keep cool.
	semi-sweet	18 months	Keep cool.
	unsweetened	18 months	Keep cool.
Chocolate Syrup	unopened	2 years**	Cover tightly, refrigerate after opening.
	opened	6 months	
Cocoa Mixes		8 months	Cover tightly.
Coffee	cans (unopened)	2 years**	Refrigerate after opening. Keep tightly closed, use dry measuring spoon.
	cans (opened)	2 weeks	
	instant (unopened)	1-2 years**	
Coffee Lighteners (dry)	unopened	9 months**	Keep lid tightly closed.
	opened	6 months	
Cornmeal		12 months	Keep tightly closed.
Cornstarch		18 months	Keep tightly closed.
Flour	white	6-8 months	Keep in an airtight container.
	whole wheat	6-8 months	Keep in refrigerator. Store in airtight container.
Gelatin, all types		18 months	Keep in original container.
Grits		12 months	Store in airtight container.
Honey		12 months	Cover tightly; if crystallizes, warm jar in pan of hot water.
Jellies, Jams		12 months	Cover tightly. Storage life lengthened if refrigerated after opening.
Molasses	unopened	12 months+**	Keep tightly closed. Refrigerate to extend storage life.
	opened	6 months	
Marshmallow Cream	(unopened)	3-4 months	Cover tightly. Refrigerate after opening to extend storage life. Serve at room temperature.
Marshmallows		2-3 months	Keep in airtight container.
Mayonnaise (unopened)		2-3 months	Refrigerate after opening.

Milk	condensed or evaporated (unopened)	12 months	Invert cans every two months.
	non-fat dry unopened	6 months**	Put in airtight container.
	opened	3 months	
Pasta (spaghetti, macaroni, etc.)		2 years	Once opened, store in airtight container.
Rice	white	2 years+	Keep tightly closed.
	flavored or herb	6 months	
Salad Dressings	bottled (unopened)	10-12 months**	Refrigerate after opening. Refrigerate prepared dressing.
	bottled (opened)	3 months	
	made from mix	2 weeks	
Salad Oils	unopened	6 months**	Refrigerate after opening
	opened	1-3 months	
Shortenings, solid		8 months	Refrigeration not needed.
Sugar	brown	4 months	Put in airtight container.
	confectioners	18 months	Put in airtight container.
	granulated	2 years+	Cover tightly.
	sweeteners	2 years+	Cover tightly.
Syrups		12 months	Keep tightly closed. Refrigerate to extend storage life.
Tea	bags	18 months	Put in airtight container.
	instant	3 years	Cover tightly.
	loose	2 years	Put in airtight container.
Vinegar	unopened	2 years+	Keep tightly closed. Slightly cloudy appearance doesn't affect quality.
	opened	12 months	Distilled vinegar keeps longer than cider vinegar.

* These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.

** Total time "unopened" product can be stored at home. If recommendation is for "opened" product, subtract this time from the total storage or "unopened" time.

Mixes and Packaged Foods

Food		Recommended storage time at 70° F *	Handling hints
Biscuit, Brownie, Muffin Mix			
		9 months	Keep cool and dry.
Cakes	purchased	1-2 days	If butter-cream, whipped cream or custard frostings, fillings, refrigerate.
Cake mixes			
	angel food	9 months 12 months	Keep cool and dry.
Casseroles, complete or add own meat			
		9-12 months	Keep cool and dry.
Cookies	homemade	2-3 weeks	Put in airtight container.
	packaged	2 months	Keep box tightly closed.
Crackers		3 months	Keep box tightly closed.



Frostings	canned mix	3 months 8 months	Store leftovers in refrigerator.
Hot Roll Mix		18 months	If opened, put in airtight container.
Pancake Mix		6-9 months	Put in airtight container.
Pie Crust Mix		8 months	Keep cool and dry.
Pies and Pastries		2-3 days	Refrigerate whipped cream, custard and chiffon fillings.
Potatoes, Instant		6-12 months	Keep in airtight package.
Pudding Mixes		12 months	Keep cool and dry.
Rice Mixes		6 months	Keep cool and dry.
Sauce and Gravy Mixes		6-12 months	Keep cool and dry.
Soup Mixes		12 months	Keep cool and dry.
Toaster Pastries		2-3 months	Keep in airtight packet.

* *These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.*

Canned and Dried Foods

Food	Recommended storage time at 70° F *	Handling hints
Canned Foods, all (unopened)	12 months	Keep cool.
Canned Fruit Juices	9 months	Keep cool.
Canned Food (opened)		All opened canned foods— refrigerate and cover tightly; transfer foods in cans to plastic or stainless steel storage container if kept more than one day.
	fish and seafood	2 days
	fruit	1 week
	meats	2 days
	pickles, olives	1-2 months
	poultry	2 days
	sauce, tomato	5 days
	vegetables	3 days
Fruits, Dried	6 months	Keep cool, in airtight container; if possible, refrigerate.
Vegetables, Dried	1 year	Keep cool, in airtight container; if possible, refrigerate

* *These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.*

Spices, Herbs, Condiments and Extracts

Food	Recommended storage time at 70° F *	Handling hints
Catsup, Chili Sauce	unopened opened	12 months** 1 month
		Refrigerate for longer storage.

Mustard, Prepared Yellow	unopened	2 years**	May be refrigerated. Stir before using.
	opened	6-8 months	
Spices and Herbs	whole spices	1-2 years	Store in airtight containers in dry places away from sunlight and heat. At times listed, check aroma; if faded, replace. Whole cloves, nutmeg and cinnamon sticks maintain quality beyond two year period.
	ground spices	6 months	
	herbs	6 months	
	herb/spice blend	6 months	
Vanilla	unopened	2 years**	Keep tightly closed; volatile oils escape.
	opened	12 months	
Other Extracts (opened)		12 months	Keep tightly closed; volatile oils escape.
Vegetables, Dehydrated Flakes		6 months	

* These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.

** Total time "unopened" product can be stored at home. If recommendation is for "opened" product, subtract this time from the total storage or "unopened" time.

Others

Food		Recommended storage time at 70° F *	Handling hints
Cheese, Parmesan-grated	unopened	10 months**	Refrigerate after opening, Keep tightly closed.
	opened	2 months	
Coconut, Shredded-canned or packaged	unopened	12 months**	Refrigerate after opening.
	opened	6 months	
Meat Substitutes-textured protein products (imitation bacon bits)		4 months	Keep tightly closed; for longer storage, refrigerate.
Nuts	in shell	4 months**	Refrigerate after opening. Freeze for longer storage. Unsalted and blanched nuts keep longer than salted.
	nutmeats packaged vacuum can	1 year**	
	other packaging	3 months**	
	nutmeats (opened)	2 weeks	
Peanut Butter	unopened	6-9 months**	Refrigeration not needed. Keeps longer if refrigerated. Serve at room temperature.
	opened	2-3 months	
Peas, Beans-dried		12 months	Store in airtight container in cool place.
Popcorn		2 years	Store in airtight container.
Vegetables, Fresh	onions	2 weeks	Keep dry and away from sun
	white potatoes	2-4 weeks	For longer storage, keep about 50°F.
	sweet potatoes	1-2 weeks	Don't refrigerate sweet potatoes.
Whipped Topping (dry)		12 months	Keep cool and dry
Yeast (dry)		expiration date on package	

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** Total time "unopened" product can be stored. If recommendation is for "opened" product, subtract this time from the total storage or "unopened" time.

Refrigerated Storage

Dairy Products

Food	Recommended storage time at 41° F or lower *	Handling hints	
Butter	1-2 weeks	Wrap or cover tightly.	
Buttermilk	3-5 days	Cover tightly. Flavor not affected if buttermilk separates. Remix before serving.	
Cheese	cottage, ricotta	5 days	Keep all cheese tightly packaged in moisture resistant wrap. For longer storage see freezer storage chart.
	cream, Neufchatel	2 weeks	
	Cheddar, Edam, Gouda, Swiss, brick, etc. (large pieces)		
	unopened	3-6 months	
	opened	3-4 weeks	
	sliced	2 weeks	
	Parmesan, Romano: grated (opened)	2 months	
	processed (opened)	3-4 weeks	Refrigerate slices of process cheese and cheese food. Refrigerate loaves and jars after opened. Most squeeze packages and aerosol cans don't need refrigeration (check label).
Cream: light, heavy, half-and-half	3 days	Cover tightly. Do not return unused cream to original container.	
Dips, sour-cream, etc.			
	commercial	2 weeks	Keep tightly covered.
	homemade	2 days	Keep tightly covered.
Eggs	in-shell	2-3 weeks	Store covered. Keep small end down to center yolks.
	whites	3 days	Store in covered container.
	yolks	3 days	Cover yolks with water; store in covered container.
Margarine		4-6 months	Wrap or cover tightly.
Milk	evaporated (opened)	4-5 days	Keep covered.
	homogenized, reconstituted dry nonfat, skimmed	5 days	Keep containers tightly closed. Don't return unused milk to original container.
	sweetened, condensed (opened)	4-5 days	Keep covered.
Sour Cream		2 weeks	Keep covered.
Whipped Topping	in aerosol can	3 months	
	prepared from mix	3 days	Keep covered.
	bought frozen (once thawed)	2 weeks	Keep covered
Yogurt		7-10 days	Keep covered.

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Fresh Fruits

Food	Recommended storage time at 41° F or lower *	Handling hints
Bananas		Refrigerate only when fully ripe.
Apples	1-3 weeks	**
Berries, Cherries	1-2 days	**
Citrus Fruit	3 weeks	**
Juices: bottled, reconstituted frozen, canned	6 days	Keep fruit juice tightly covered. Transfer canned juice to glass or plastic container if not used up in one day.
Melons	1 week	Wrap uncut cantaloupe and honeydew to prevent odor spreading to other foods.
Other fruits	3-5 days	Wrap cut surfaces of citrus fruit and cantaloupe to prevent Vitamin C loss.

* *These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.*

** *Discard bruised or decayed fruit. Do not wash before storing; moisture encourages spoilage. Store in crisper or moisture resistant bag or wrap.*

Fresh Vegetables

Food	Recommended storage time at 41° F or lower *	Handling hints
Asparagus, Corn in Husks	1-2 days	Keep moist.
Beans, green or wax	1-2 days	Keep in crisper or moisture resistant wrap or bag.
Beets, Carrots, Radishes	1-2 weeks	Remove leafy tops; keep in crisper.
Cabbage, Celery	1-2 weeks	Keep in crisper or moisture resistant wrap or bag.
Lettuce, head (washed, thoroughly drained)	3-5 days	Store away from other vegetables and fruits to prevent russet spotting.
Mushrooms	1-2 days	Do not wash before storing.
Onions, Potatoes, Sweet Potatoes		Refrigeration not needed. (See Dry Storage Chart).
Shredded Cabbage, Leaf and Bibb Lettuce, Salad Greens	1-2 days	Keep in moisture resistant wrap or bag.
Tomatoes, ripe	1-2 days	Ripen tomatoes at room temperature away from direct sunlight; then refrigerate.
Unshelled Peas, Limas, Spinach	3-5 days	Keep in crisper or moisture resistant wrap or bags.

* *These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.*

Meat, Fish and Poultry - Fresh, Uncooked

Food	Recommended storage time at 41° F or lower *	Handling hints
Beef, Lamb, Pork and Veal		
chops	2-3 days	
ground meat	1-2 days	
roasts	2-4 days	
steaks	2-3 days	
stew meat	1-2 days	
variety meats (liver, heart, etc.)	1 day	
Chicken, Duck or Turkey: ready-to-cook	2 days	
Clams, Crab, Lobster: in shell	2 days	Cook only live shellfish.
Fish and Shellfish: fresh cleaned fish, including steaks and fillets	1 day	
Seafood: including shucked Clams, Oysters, Scallops, Shrimp	1 day	Store in coldest part of cooler.

* These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.

Cured and Smoked Meats

Food	Recommended storage time at 41° F or lower *	Handling hints	
Bacon	7 days	**	
Bologna	4-6 days	**	
Corned Beef	5-7 days	**	
Dried Beef	10-12 days	**	
Dry and semi-dry Sausages (Salami, etc.)	4-5 days	**	
Frankfurters	4-5 days	**	
Hams	whole	1 week	**
	canned (unopened)	6 months	
Luncheon Meats	5-7 days	**	
Sausage, fresh or smoked	2-3 days	**	

* These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.

** Store in cooler unless label indicates refrigeration is not needed. Keep wrapped. Store in coldest part of cooler. Times are for opened packages. Refer to processor's freshness date on package for storage times for unopened packages.

Other Foods

Food		Recommended storage time at 41° F or lower *	Handling hints
Canned Goods	fruits, opened	1 week	If not used in one day, transfer to glass or plastic container to avoid metallic taste. Cover and refrigerate.
	vegetables, opened	2-3 days	
	Puddings, Custards (opened)	1-2 days	Keep covered.
Leftover Gravy and Broth		2 days	Keep covered.
Refrigerated Biscuits, Rolls, Pastries, Cookie Dough		Expiration date on label.	

* These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.

Freezer Storage

Meat

Food		Recommended storage time at 0° F *	Handling hints
Bacon			**
Corned Beef			**
Frankfurters			***
Ground Beef, Lamb, Veal		2-3 months	
Ground Pork		1-2 months	
Ham and Picnic Cured			**
Luncheon Meat			***
Roasts	beef	6-12 months	
	lamb, veal	6-9 months	
	pork	3-6 months	
Sausage, dry, smoked			Freezing alters flavor.
Sausage, fresh, unsalted		1-2 months	
Steaks and Chops	beef	6-9 months	
	lamb, veal	3-4 months	
	pork	2-3 months	
Venison, Game Birds		8-12 months	

* These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.

** Freezing cured meats not recommended. Saltiness encourages rancidity. If frozen, use within a month.

*** Freezing not recommended. Emulsion may be broken and product will "weep."

Fish

Food	Recommended storage time at 0° F *	Handling hints
Bluefish, Perch, Mackerel, Salmon	2-3 months	**
Cod, Flounder, Haddock, Sole	6 months	**
Breaded Fish	3 months	**
Clams	3 months	**
Cooked Fish or Seafood	3 months	**
King Crab	10 months	**
Lobster Tails	3 months	**
Oysters	4 months	**
Scallops	3 months	**
Shrimp, uncooked	12 months	**

* These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.

** Keep frozen foods in original wrapping; thaw; follow cooking directions on label.

Poultry

Food	Recommended storage time at 0° F *	Handling hints
Chicken Livers	3 months	
Chicken, whole or cut-up	10 months	
Cooked Poultry	3 months	
Duck, Turkey	6 months	

* These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.

Fruits

Food	Recommended storage time at 0° F *	Handling hints
Berries, Cherries, Peaches, Pears, Pineapple, etc.	12 months	*
Fruit Juice Concentrates	12 months	*

* These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.

Vegetables

Food	Recommended storage time at 0° F *	Handling hints
Purchased frozen cartons, plastic bags or boil-in-bags	8 months	**

* These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.

**Cabbage, celery, salad greens and tomatoes do not freeze successfully.

Commercial Frozen Foods - Baked Goods

Food	Recommended storage time at 0° F *	Handling hints
Bread, unbaked	1 month	**
Cake, baked, frosted	8-12 months	
Cake, baked, unfrosted		
angel food	2 months	
chiffon, sponge	2 months	
cheese cake	2-3 months	
chocolate	4 months	
fruit cake	12 months	
yellow or pound	6 months	
Cookies, baked	8-12 months	**
Fruit Pie, unbaked	8 months	**
Pie, baked	1-2 months	**
Quick Bread, baked	2-3 months	**
Rolls, partially baked	2-3 months	**
Yeast Breads and Rolls, baked	3-6 months	**

* These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.

**Freezing does not freshen baked goods. It can only maintain the quality (freshness) the food had before freezing.

Commercial Frozen Foods - Main Dishes

Food	Recommended storage time at 0° F *	Handling hints
Meat, Fish, Poultry Pies and Casseroles	3 months	

* These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.

Dairy Foods

Food	Recommended storage time at 0° F *	Handling hints	
Butter	6-9 months	Store in moisture vapor-proof container or wrap.	
Margarine	12 months		
Whipped Butter and Margarine		Do not freeze. Emulsion will break and product will separate.	
Buttermilk, sour cream and yogurt		Do not freeze.	
Cheese	Camembert	3 months	Thaw in refrigerator.
	cottage, farmer's cheese (dry curd only)	3 months	Thaw in refrigerator. Do not freeze creamed cottage cheese- it gets mushy.
	Neufchâtel		Do not freeze.
	hard cheese		
	Cheddar	6 weeks	Cut and wrap cheese in small pieces; when frozen, may show mottled color due to surface moisture. Thaw in refrigerator.
	Edam, Gouda Swiss, brick, etc.	6-8 weeks	
	processed cheese food products (loaf, slices)	4 months	
	Roquefort, blue	3 months	Becomes crumbly after thawing; still good for salad and melting.
Cream	light, heavy, half-and-half	2 months	Heavy cream may not whip after thawing; use for cooking. Thaw in refrigerator.
	whipped	1 month	Make whipped cream dollops; freeze firm. Place in plastic bag or carton; seal; store in freezer. To thaw, place on top of dessert.
Eggs	in-shell		Do not freeze.
	whites	12 months	Store in covered container; freeze in amounts for specific recipes.
	yolks	12 months	For sweet dishes, mix each cup of yolks with one tablespoon corn syrup or sugar. For other cooking, substitute 1/2 teaspoon salt for sugar.
Ice Cream, Ice Milk, Sherbet	2 months		
Milk	1 month	Allow room for expansion in freezer container; thaw in refrigerator. Freezing affects flavor and appearance; use in cooking and baking.	

* *These storage times assume that safe food handling practices have been followed during all steps of food production and that food is stored properly in equipment that is working effectively and efficiently.*

Source: Adapted from Kansas State University Rapid Response Center's Food Storage Charts.
http://www.oznet.ksu.edu/ext_f&N/

Food Safety Checklist for Foodservice Operations¹

Item Comments	OBS		Comments	Item	OBS
Receiving					
A metal stemmed, numerically scaled thermometer, accurate to $\pm 2^{\circ}\text{F}$ is used to take temperatures of potentially hazardous food (PHF) products.			Potentially hazardous foods which are not at acceptable temperatures are rejected.		
Temperatures of frozen and refrigerated PHF products are taken immediately upon delivery.			Fresh shellfish is identified by a shell stock tag. This information is recorded and kept on file for 90 days.		
PHF products are removed from the temperature danger zone (41°F to 140°F) as quickly as possible.			Cans with swelled tops or bottoms, leakage, flawed seals, rust or dents are not accepted.		
Storage					
FIFO (First In-First Out) procedures are used for storage. Items are labeled for date received.			Freezer temperatures are 0°F or below and temperatures are checked daily.		
Dry storage temperatures are between 50°F and 70°F .			All food stored in the refrigerator or freezer is covered, dated and labeled.		
Refrigerator storage temperatures are between 32°F and 41°F and temperatures are checked daily.			Pesticides and chemicals are stored in original labeled container in a locked cabinet, away from food handling and storage areas.		
Ready-to-eat foods are stored above raw foods, never below.			Detergents, sanitizers, polishes and other cleaning agents never come into contact with food and are stored in original labeled containers.		
Employee Preparation					
Employees wash hands before beginning to work, during work as needed and after touching anything that might be a source of contamination (telephone, raw meat, smoking, eating, drinking, sneezing, coughing, using the toilet, handling trash or garbage, touching head, hair or face.)			Employees' hands do not touch ready-to-eat food.		
Employees do not sneeze or cough near foods. Employees do not have sores or signs of transmittable illness. Employees who are ill are sent home.			Plastic gloves are worn over cuts and abrasions.		

Continued next page

¹ Incorporates HACCP principles and 1995 Food Code temperature guidelines. Adapted from Cooperative Extension Service, Kansas State University, Manhattan, Kansas. Elizabeth Barrett, Assistant Professor, HRIMD; Karen P. Penner, Extension State Leader, F&N.

Preparation (Thawing) and Preparation *

Frozen products are thawed in refrigerators at temperatures 41°F or lower.		The lowest shelf in the refrigerator is used for thawing PHF to prevent cross contamination.
If needed for immediate cooking, frozen PHF products are thawed under potable running water at 70°F or lower, or in the microwave.		If PHF products which have been defrosted are maintained above 41°F for more than 2 hours, the foods are discarded.
Raw products are separated from cooked and/or ready-to-eat products during preparation.		
PHF products are kept at temperatures below 41°F. If not, food is discarded after 2 hours. Temperatures of PHF products are checked in the product's center or thickest part.		Pork products and ground beef cooked by heat sources other than the microwave are cooked to an internal temperature of 155°F for at least 15 seconds.
Batch cooking (preparing food as needed) is used to reduce holding times of foods.		Beef roasts (rare) are cooked to an internal temperature of 140°F for 12 minutes.
Poultry and stuffed meats are cooked to an internal temperature of 165°F for at least 15 seconds.		When cooking PHF products in the microwave, final internal temperature is 25°F higher than when cooked in a conventional oven.

Serving and Reusing Prepared Foods *

If hot PHF products are held below 140° for more than 2 hours, they are discarded. If held for less than 2 hours, they are reheated to 165°F.		After preparation, cold PHF products are held at 41°F. Temperatures are checked every 2 hours. If PHF are held above 41°F for more than 2 hours, products are discarded.
Hot PHF products are cooled to 70°F within 2 hours and to 41°F within 4 hours. If cooled too slowly, products are discarded.		Transported foods are held at $\geq 140^\circ\text{F}$ or $\leq 41^\circ\text{F}$. If not, foods are discarded.
Reused PHF products are heated to 165°F (in the thickest part) within 2 hours. If not, foods are discarded.		

Cleaning and Sanitizing

Kitchenware is washed, rinsed and sanitized after each use.		For fixed equipment, removable parts are removed after each use, then washed, rinsed and sanitized by immersion.
The third sink of a three compartment sink is used to sanitize by immersing items in either: 1. hot water (171°F) for 30 seconds or 2. properly mixed chemical sanitizing solution for one minute.		For fixed equipment, unremovable food contact surfaces are washed, rinsed and sanitized.
For a heat sanitizing dishmachine, the wash (120°-140°F), the rinse (140°-160°F) and the sanitizing (180°F) water temperatures are checked and maintained.		

**Note: According to North Dakota's adaptation of the Food Code, potentially hazardous foods that have been removed from temperature control for more than four hours should be discarded.*



Ten Rules for Handling Food Safely

1. All employees must follow strict personal hygiene policies.
2. Potentially hazardous foods should be identified on the menu, and safe handling procedures should be established for each.
3. Food must be obtained from approved suppliers
4. Time/temperature abuse must be avoided when handling prepared foods.
5. Potentially hazardous raw foods must be kept separate from ready-to-eat foods.
6. Cross-contamination must be avoided: Establish handwashing guidelines. Wash, rinse and sanitize all food contact surfaces.
7. Foods must be cooked to recommended internal temperatures.
8. Hot foods should be held hot (140°F or greater) and cold foods held cold (41°F or lower).
9. Foods must be cooled from 140°F to 70°F in 2 hours or less and from 70°F to 41°F in 4 hours or less.
10. Leftovers must be heated to 165°F for at least 15 seconds within 2 hours. Leftovers only should be reheated once.

References: Serving Safe Food Certification Coursebook. 1995. The Educational Foundation of the National Restaurant Association and Food Code. 1995.

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For more information on this and other topics, see: www.ag.ndsu.edu

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