Food Handler Certification study guide

July 2023

Peel Region
working with you

Acknowledgement
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Introduction

A food premises includes a place that prepares and/or sells food

Introduction to food safety

The food service industry is a big part of the Canadian economy. It includes people working in the many different parts of food service, like restaurants and grocery stores, and factories that process, package and ship food to those restaurants and stores.

It's well known that there's a need for special standards in the food industry because:

- There is a potential for the spread of disease and illness through food
- Customers want to know that the food is safe in the places they buy their food

The first goal of any food premise should be to produce the safest and highest quality food possible. Unfortunately, many of the people working in food premises don't fully understand the risks involved in food service or the need to meet food safety requirements, like personal hygiene, avoiding food contamination and keeping foods at safe temperatures.

Test your knowledge

Circle True or False for each of the following statements:

1. **The responsibility for handling food safely belongs to the Public Health Inspector.**
   TRUE FALSE
2. **A Public Health Inspector requires a warrant to enter any place of business to carry out inspections, during normal working hours.**
   TRUE FALSE
3. **Public Health Inspectors enforce the Ontario Food Premises, Reg. 493/17 by conducting routine inspections of all food premises.**
   TRUE FALSE

Benefits for food premises

A well designed food safety program is good for both the food premises and their customers. Repeat business from customers and higher job satisfaction for employees can lead to higher profits and better service.

Some ways that food premises can benefit are:

- More repeat business from customers who will want to keep going to a place where the food is safe
- Employees being happier with their jobs knowing that the food they are working with is safe
- Lower insurance costs because no claims have been made against their insurance from unsafe food
- Not having to spend money on lawsuits, medical claims or fines for having unsafe food
- Happier customers because handling food safely helps to keep it fresher and better tasting
- Cleaning and sanitizing costs can be kept down if food premises are kept safe
- Not wasting money by throwing away food that was not kept safe
- Not losing money by having to close because of unsafe conditions
- Not having the bad publicity and loss of customers that can happen if food premises are closed by the public health unit

Food safety legislation

The food service industry is regulated by legislation at all three levels of government (federal, provincial and municipal). Legislation set out the requirements that food premises need to follow to make sure their food is kept safe. Some of it is specific to the food, like food handling and storage. Other requirements cover things like the condition of the building and the types of equipment that need to be used. All of these things together are very important, and have an impact on how safe your food is. It is the responsibility of everyone working in food premises to make sure they know the rules that apply to them and to follow those rules.

Federal

The Canadian Food Inspection Agency (CFIA) is responsible for the inspection of food at the federal level.

The CFIA enforces policies and standards, set by Health Canada, governing the safety and nutritional quality of all food sold in Canada. The CFIA verifies industry compliance with federal acts and regulations, including the Food and Drugs Act, through activities that include the registration and inspection of abattoirs and food processing plants, and the testing of products.

Provincial - Health Protection and Promotion Act (HPPA)

Each province has its own provincial health acts and regulations. In Ontario, the Health Protection and Promotion Act (HPPA), sets out the mandate to make regulations, programs and protocols which govern food premises. All local public health units are the lead inspection agency for food safety at premises where food is held, prepared and served to the public. It is the responsiblity of the food premises owner/operator and employees to ensure they are meeting the necessary requirements.

The HPPA lays out the powers of the medical officer of health and the public health inspector. **Some of these are:**

Power of Entry - HPPA (S. 41)
The medical officer of health or a public health inspector may enter any place of business, during normal work hours, without a warrant, to carry out the duties under the Act. This would include routine inspections or the investigation of complaints of potential health hazards.

Power of Seizure - HPPA (S. 19)
The medical officer of health or a public health inspector may seize anything suspected of being a health hazard for laboratory testing.

Power of Destruction - HPPA (S. 19)
If a public health inspector determines that food is a health hazard, he/she has the power to destroy or dispose of the food immediately.

Power to Make an Order - HPPA (S. 13)
Orders are issued by public health inspectors or medical officers of health to eliminate a health hazard, or to lessen the effects of a health hazard. They are in writing. They may also give instructions orally. Orders may also require a person or persons to stop doing something specific. In the case of food premises, this includes the power to order the premises to be closed until a health hazard is removed or fixed.

Provincial - PHI

Certified public health inspectors, or PHIs, enforce both the HPPA and the Food Premises Regulation (O. Reg. 493/17) ("regulation") under the HPPA by routine compliance inspections of all food premises. The regulation covers food premises, including cleaning and sanitizing, equipment, food holding temperatures, food handling, employee hygiene in food premises and a requirement for a trained food handler or supervisor on site during all hours of operation. We'll cover all of these later in this course.

During inspections, public health inspectors look for:

- Unsafe food handling practices
- Issues of non-compliance with regulations
- Investigation of foodborne illnesses and foodborne outbreaks
- Investigation of consumer complaints
- Action needed on food recalls, fires, floods and emergencies

If any immediate health hazards are seen during an inspection, the PHI could close the food premises and/or issue offence notices (tickets) under the Provincial Offences Act for not meeting the requirements of the Food Premises Regulation.

Another job of public health inspectors is to conduct a risk assessment during the first inspection of each year, and assign each food premises a risk level of high, moderate or low. This will determine if the establishment is inspected a minimum of three times, twice, or once a year, respectively. Low risk food premises that only offer for sale pre-packaged, non-hazardous food may be inspected a minimum of once every two (2) years.

The risk assessment takes into consideration various factors that may increase the risk of foodborne illness, such as the history of compliance, population being served, number of food preparation steps, presence of certified food handlers, and if a food safety management plan is in place.

During the inspection, the public health inspector may also do a Hazard Analysis Critical Control Point (HACCP) audit. We'll talk more about HACCP in our Food Safety Management section.

Municipal

Each municipality will have their own by-laws governing their municipality. Municipalities create by-laws to deal with issues that are important to them that are not dealt with at the provincial or federal level. By-laws can be different in each municipality as each area has issues that are unique to their own situation.

Municipal by-laws for food premises cover things like:

- Licensing
- Garbage control
- Sewage disposal
- Building standards
- Zoning
- Smoking and vaping
- Public health inspection result disclsosure

There are over 6,500 food premises in Peel Region.

Municipal by-laws are enforced by municipal by-law enforcement officers and/or public health inspectors depending on the specific by-law.

Inspections

When PHIs inspect food premises, they're checking to make sure the HPPA and its regulation is being followed, to keep food safe. Here are some of the things they would be looking for, along with a notation of the section of O. Reg. 493/17 that governs each one. See Appendix for the Ontario Food Premises Regulation 493.

Potentially hazardous foods are maintained at the required temperatures.
Example: Cooked poultry is stored or held for service outside the danger zone, at 4°C or below, or 60°C or higher.

Food is protected from contamination and adulteration.
Example: Food displayed for sale or service is protected from contamination by enclosed containers.

Food contact surfaces can be readily cleaned and sanitized.
Example: Any article or equipment that comes in direct contact with food is of sound and tight construction, kept in good repair, suitable for their intended purpose, and made of material that can be readily cleaned and sanitized.

Ensuring good personal hygiene is being practiced by all employees.
Example: The food handler is clean and wearing clean outer garments while working with food. Food handlers wash their hands after hands are contaminated, before commencing or resuming work, including after using the washroom.

Cleaning and sanitizing of multi-service utensils to prevent harmful bacteria from spreading.
Example: Multi-service utensils must be cleaned and sanitized after each use.

Ensuring that owner/operators are maintaining the food premises.
Example: All floors, walls and ceilings are readily cleanable, kept clean and in good repair.

Ensuring presence of a trained food handler.
Example: During all operating hours, operators must ensure there is at least one food hander or supervisor on site who has completed food handler training.

Posting results of inspections by the public health unit.
Example: Operators ensure the results of any inspection conducted by a public health inspector are posted in accordance with the inspector's request.

The Regional Municipality of Peel (the "Region") has created the Peel Inspections Disclosure website to provide the public with past inspection results of all known inspected premises that operate in Mississauga, Brampton and Caledon.

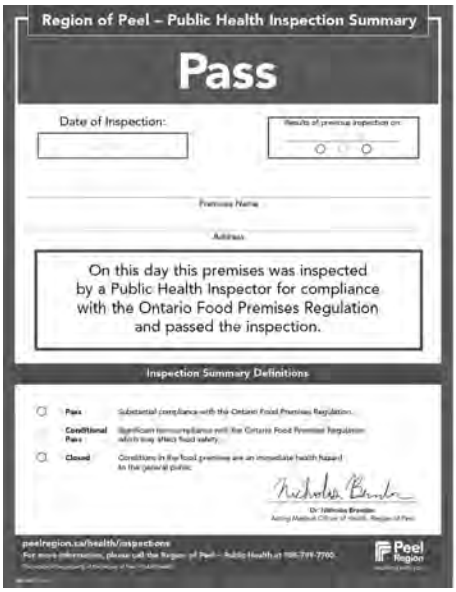
Benefits of Peel Inspection Disclosure

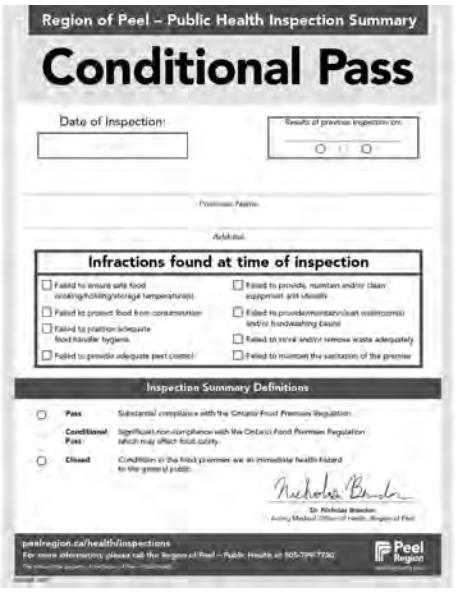
- Increases public awareness of public health programs
- Improves access to inspection information

Inspection reports can be obtained by:

- Visiting **peelregion.ca/health/inspections**
- Calling Peel Region Public Health 905-799-7700, or TTY: 1-888-919-7800

Sample Inspection Summary Reports:





Responsibilities

There are many things to know to keep food safe. The responsibility for safe food belongs to everyone in your food premises, from the owner to the chef to the server to the dishwasher. Every person in your premises has a job to do, and part of that job is keeping your customers and the food you prepare or sell to them safe. As a food handler, it's your responsibility to know what the regulations and standards are and to follow them. You have a responsibility to provide safe food.

Activity

The following are the three levels of government:

A. Federal
B. Provincial
C. Municipal

Beside each example of legislation or agency, indicate which level of government it falls under. Write the appropriate letter: A, B or C.

1. Health Protection and Promotion Act ___
2. Canadian Food Inspection Agency ___
3. Ontario Food Premises Regulation 493 ___
4. Garbage Control Bylaw ___
5. Food and Drugs Act ___
6. Licensing Bylaws ___

Review questions

Circle the letter that represents your answer.

1. What piece of Ontario legislation sets out specific standards for safe food in food premises?

A. Licensing Bylaws
B. Food and Drugs Act
C. Health Protection and Promotion Act
D. Ontario Food Premises Regulation 493

2. The responsibility for safe food belongs to:

A. The customer
B. The government
C. The Public Health Inspector
D. Everyone in the food premises

Summary

- The responsibility for safe food belongs to everyone in a food premises, from the owner to the chef to the server to the dishwasher.
- A well-designed food safety program is good for both the food premises and its customers. Repeat business from customers and higher job satisfaction for employees can lead to higher profits and better service.
- The Regional Municipality of Peel (the "Region") has created the Peel Inspections Disclosure website to provide the public with past inspection results of all known inspected premises that operate in Mississauga, Brampton and Caledon.
- Health Canada establishes policies, regulations and standards related to the safety and nutritional quality of all food sold in Canada. The CFIA is responsible for the inspection of food at the federal level, like meats, milk and dairy, fish and seafood, and poultry and eggs.
- The Food and Drug Act is a federal regulation that sets standards for all foods produced and sold in Canada such as the alteration, colouring, bacterial standards, manufacturing conditions and distribution of food.
- The HPPA is the provincial legislation that mandates the regulations, programs and protocols which govern food premises. It also lays out the powers of the PHI including power of entry, power of seizure, power of destruction and power to make an order.
- PHIs enforce both the HPPA and the *Ontario Food Premises Regulation 493* by routine compliance inspections of all food premises. The regulation covers cleaning and sanitizing, food temperatures, food handling and employee hygiene in food premises.
- Municipalities create bylaws to deal with issues that are important to them but are not dealt with at the provincial or federal level. Bylaws for food premises cover things like licensing, garbage control, sewage disposal, building standards and zoning.

Answer key

Test your knowledge: (pg.5)

1. False
2. False
3. True

Activity: (pg. 10)

1. B
2. A
3. B
4. C
5. A
6. C

Review questions: (pg. 10)

1. D
2. D

In review

This section introduced food safety, and the legislation in place to keep food safe.

The following topics have been covered:

1. Why food safety is so important
2. Situations where food safety legislation is applicable
3. Federal, provincial and municipal legislation governing food safety and the different areas each of these cover
4. The key responsibilities of food premise owners/operators and of food handlers
5. The benefits of following safe food handling practices

Notes

Foodborne illness

Many people have had a foodborne illness without knowing what was making them feel sick.

Introduction

When something you eat or drink makes you sick, it's called 'foodborne illness.' Foodborne illness used to be called 'food poisoning,' but because more foodborne illnesses are caused by infection rather than poison, this has been changed.

When food is contaminated by bacteria, viruses, parasites or chemicals, it can make you sick. Any of these things in food can be called a 'contaminant.'

Every year, a total of about 4 million (1 in 8) Canadians are affected by a foodborne illness (Public Health Agency of Canada, 2016). For most people, a foodborne illness won't be a serious problem. Most will recover in a short time without getting seriously ill. Groups at a higher risk for foodborne illness include: young children, the elderly, pregnant women and people with weakened immune systems. For these groups, foodborne illness can be very dangerous and even fatal.

Test your knowledge

Circle True or False for each of the following statements:

1. **Eggs and shellfish can cause a serious allergic reaction in some people.**
   TRUE FALSE
2. **It is a good idea to chill glasses in the same ice that will be used in making drinks.**
   TRUE FALSE
3. **If chemicals are put into different, smaller containers or spray bottles, it must be labelled with product name and contents.**
   TRUE FALSE

Symptoms

For each reported case of foodborne illness, it's estimated that hundreds of additional cases occurred in the community. When people say they have a '24-hour flu,' it's often really a case of foodborne illness.

Symptoms could include some or all of the following:

- Stomach cramps
- Diarrhea
- Vomiting
- Nausea
- Fever

Symptoms can start soon after eating contaminated food, or they can occur up to a month or more later. **How long it takes for the symptoms to begin will depend on:**

- What caused the illness
- How healthy the person was before this illness
- The amount of contaminant the person ate

Causes of foodborne illness

There are four causes of foodborne illness:

- Chemical Contamination
- Physical Contamination
- Allergens
- Microbiological Contamination

A foodborne illness from food contaminated by bacteria, viruses or parasites is microbiological. Bacterial illnesses are the most common type of foodborne illness in Ontario (Public Health Ontario, 2015).

This section will cover chemical and physical contamination and allergens.

Chemical hazards

Some chemicals are added to food on purpose. These include things like salt, spices and colouring. Other chemicals can get into food by accident through cross-contamination. If cleanser is spilled on a counter and not cleaned off and food is then prepared on that counter, the food would be contaminated with cleanser.

Symptoms usually happen fast, from 20 minutes to a few hours after eating the contaminated food. They usually start suddenly with the most common symptoms being nausea, vomiting, abdominal or stomach pain, and sometimes, diarrhea.

Food poisoning can be caused by:

- Chemicals added to food on purpose, like preservatives or colouring
- Chemicals that aren't supposed to be added to food, like insecticides, rodenticides or cleaning chemicals

Foodborne illness caused by chemicals is called food poisoning.

Metal food poisoning

Dissolved metal in food can cause chemical food poisoning. If an acidic food, like fruit juice, maple syrup or tomatoes, is stored or cooked in metal containers, the acid can cause the metal to dissolve. Lead, copper, tin, zinc, iron and cadmium are all possible sources of metal food poisoning.

Some ways that food can be contaminated with metal are:

- **Copper beverage lines.** Water can be safely run through copper lines because it won't dissolve the copper. Acidic fruit juice or carbonated beverages will cause the copper to dissolve and it will then be in the beverage.
- **Cadmium in shelving.** If unwrapped meats are stored directly on shelves containing cadmium, the metal can dissolve and be absorbed into the meat.
- **Lead in paint.** Painted dishes or glassware may contain lead which can be absorbed into acidic food.
- **Metal containers.** Acidic foods should never be stored in containers made of metal. Use food grade containers.
- You will learn more about proper storage containers in the Receiving and Storage section.

Intentional additives

According to Health Canada, "a food additive is any chemical substance that is added to food during preparation or storage and either becomes a part of the food or affects its characteristics for the purpose of achieving a particular technical effect." In other words, food additives are things added to colour, thicken, firm or preserve food.

If additives are used correctly, they aren't harmful to most people. They make food look better, taste better and last longer. These are called intentional chemical additives as they're added to food on purpose. But if not used properly or too much is used, a chemical additive can cause food poisoning.

Any food additive can make a person sick if he/she is allergic to it. **Three additives well-known for allergic reactions are:**

- Sulphites (used to maintain colour and give longer shelf life)
- Monosodium Glutamate (MSG) (used to boost flavour)
- Tartrazine, also known as FD&C Yellow #5 (a yellow food colouring)

Food allergies and how to help customers with allergies are covered in the Allergens section.

Many food additives are regulated in Canada under the food and drug regulations under the Food and Drugs Act. You can find a list of all allowed food additives on the Health Canada website: **hc-sc.gc.ca** Search "food additive dictionary."

Incidental additives

Poisonous chemicals like insecticides, rodenticides and cleaning chemicals are sometimes used in food premises. If these chemicals get into food, they can cause food poisoning. This would be called an incidental chemical additive.

For safety, chemicals should be stored in their original containers. If chemicals are put into different, smaller containers or spray bottles, each should go in a clean, dry container labeled with the product name and contents. Proper storage and use instructions should be followed very carefully when dealing with poisonous chemicals to make sure that food is kept safe. As an example, some cleansers have to be rinsed off a counter before the counter can be used to prepare food. If the counter is not rinsed off, there will be cleanser on the counter which can get into the food and cause foodborne illness.

Chemicals should not be stored with food or leave chemical products or cleaning cloths used with chemicals on food preparation surfaces.

Examples of chemical foodborne illness

Illness	**Chlorinated hydrocarbon poisoning (insecticide, such as chlordane, DDT, lindane)**	**Monosodium glutamate (MSG)**
Usual source	Insecticides	MSG flavouring agent
Start of symptoms	30 minutes to 6 hours	Few minutes to 1 hour
Symptoms	Nausea, vomiting, numbness, dizziness, muscular weakness, loss of appetite, weight loss, confusion	Burning sensation in back of neck, forearms, chest, feeling of tightness, tingling, flushing, dizziness, headache, nausea.
Food implicated	Any accidentally contaminated food	Processed foods
Factor that contributes to an outbreak	Storing insecticides in the same area as food.	Using excessive amounts of MSG as a flavouring.

*The time from when a person eats the contaminated food to the time when he/she starts to feel sick.

Physical hazards

Physical hazards are things like dirt, hair, broken glass, nails, staples, bits of metal or any other object that accidentally gets into food. These objects could cause anything from a small cut to possible choking.

To keep this from happening you should:

- Put and maintain protective shields or covers on lights over food storage and preparation areas.
- Remove staples, nails and other objects from boxes and crates when food is received so they don't fall into the food.
- Avoid using glasses to scoop ice, because the glass may break in the ice. Use only commercial, food-grade plastic or metal scoops with handles.
- Avoid chilling glasses or any food items in ice that will be used in drinks.
- Avoid storing toothpicks or non-edible garnishes on shelves above food storage or preparation areas.

Allergens

Food allergies, or sensitivities to certain food(s), are a problem for many people. Some foods, like peanuts, shellfish or eggs, are very common allergens. Any food can be a risk for a person who is allergic or sensitive to it. Signs and symptoms of an allergic reaction can occur within minutes of exposure to an allergen. In some cases, the time frame can vary up to several hours after exposure.

It's estimated that over 2.6 million Canadians (7.5 per cent of the population) are affected by food allergy. This means that for every 13 people who come in to your food premises, it's likely that one of them has a food allergy.

Symptoms of an allergic reaction could include:

- Skin reaction: hives, swelling (face, lips, tongue), itching, warmth, redness
- Respiratory (breathing): coughing, wheezing, shortness of breath, chest pain or tightness, throat tightness, hoarse voice, nasal congestion or hay fever-like symptoms (runny, itchy nose and watery eyes, sneezing), trouble swallowing
- Gastrointestinal (stomach): nausea, pain or cramps, vomiting, diarrhea
- Cardiovascular (heart): paler than normal skin colour/blue colour, weak pulse, passing out, dizziness or light-headedness, shock
- Other: anxiety, headache, uterine cramps, metallic taste

Anaphylaxis

Anaphylaxis is a serious allergic reaction that can occur quickly and can be life-threatening. Anaphylaxis can start within minutes of contact with the food to which a person is allergic and must be treated immediately. Because an anaphylactic reaction can be severe, people who may have this type of reaction often carry an epinephrine auto- injector (e.g., EpiPen®), which should be administered at the first sign of a reaction. Epinephrine will help reverse the symptoms of the reaction, such as helping with a person's breathing. The person must be transported to the hospital immediately.

For people with food allergies, the key to remaining safe is avoidance of the foods they are allergic to. Even a very small amount of an allergen, when ingested, can cause an allergic reaction. Because of this, they need to know exactly what's in their food. It's critically important for food service staff to know about food allergies and be aware of how dangerous they can be. Knowing this can save lives.

Individuals may develop one or more of these symptoms very quickly. Breathing difficulties and low blood pressure are the most dangerous symptoms, and if left untreated, can be life- threatening. It is recommended that epinephrine (e.g., EpiPen) be given at the start of a known or suspected anaphylactic reaction.

Risks

People can be allergic to any food, but some food allergies are more common than others. The Canadian Food Inspection Agency (CFIA) has identified the following foods and additives as most frequently associated with causing an allergic reaction:

- Eggs
- Peanuts
- Sesame seeds
- Sulphites
- Wheat and triticale
- Milk
- Fish
- Crustaceans and Molluscs
- Soybeans
- Mustard
- Tree nuts (almonds, Brazil nuts, cashews, hazelnuts, macadamia nuts, pecans, pine nuts, pistachios, walnuts)

For more information on each of these, please see the fact sheets on the CFIA website **Food Allergies and Allergen Labeling**.

If a customer has an allergic reaction, call 911 or your local emergency service.

Communication

Knowing the ingredients included in all food options is critical when a person with an allergy dines out. Restaurants, fast food outlets and bakeries are not required by law to list ingredients like you see on pre-packaged foods.

Some things the retail food service industry can do to help people with allergies are:

- Ask diners before they order if they have a food allergy.
- Ensure staff know how and where to access ingredient information if requested by a customer.
- Make sure the ingredients used in your menu options are documented and are complete, accurate and up to date.
- Make sure your food doesn't get cross-contaminated by other foods.
- Have an accurate and up-to-date recipe binder or electronic file.
- Avoid introducing new common allergens to recipes, when possible.
- Educate serving and kitchen staff on how to manage food allergy requests or questions (e.g. refer to manager or chef on duty).
- If you're not sure what's in a product, say so. Do not give incomplete or inaccurate information.

The following guidelines can help you communicate ingredient information to your customers:

Identify potential problems

Now that you know the list of foods that are considered priority allergens, you can review the recipes used in your food premises to identify the ones that use these ingredients. Where possible, use a product that does not contain a priority allergen. For example, you could use vegetable oil instead of sesame or peanut oil.

If you change the ingredients in any of your recipes, be sure to update your allergy charts, binders or menus immediately.

If you can't find out the full list of ingredients in one of your packaged or prepared items, either don't serve it or let customers know that you don't know all the ingredients. You can suggest another item that you are sure about.

Education and training

Management, kitchen and service staff should all be aware of the seriousness of food allergies and understand how important it is that the ingredient information is complete, accurate and up to date. Food service staff are sometimes not aware of how dangerous food allergies can be.

Staff should be trained about the health effects of allergic reactions and that they can be potentially life-threatening. They should know that food allergies are very serious and it isn't just about a person liking or not liking an ingredient. They should understand the premises' policy on handling questions about ingredients and food preparation processes (e.g., potential for cross-contamination).

Employees should talk directly to their manager or chef when a customer notifies them about their food allergies.

Kitchen staff should follow written recipes exactly when preparing and cooking food. If a recipe needs to be changed, management and all employees involved in preparing and serving the food should be notified, and all changes should be documented in recipe binders or files.

Have a policy

Management in food premises should have a policy about communicating ingredient information to their customers. The policy should be based on making sure customers are kept safe and are given the right information. It also needs to work with the way the food premises are run and be something employees can easily follow.

You don't need to give away your recipes. You can just give the complete and accurate list of ingredients. You can also have the customer tell you what they're allergic to and check it against the recipe.

Employees need to know that these policies should always be followed and check with the manager and/or chef with any questions they are unsure of.

Inform the customer

Your customers should know they can get information about the ingredients you use and how to get it. This can be as simple as a note on the menu such as "Please inform us if you have any food allergies."

However you do it, it should be obvious to customers how to get the information they need and that they get the information without fuss or embarrassment.

Communication method

There are many ways that you could let your customers and staff know what ingredients are in your food:

Provide allergen management information online

Update your company website to include your allergen management policy and procedures. Include information on menu options and ingredients, as well as who to contact directly with any allergy related questions.

Print the ingredient information on your menus

If you have a smaller menu that doesn't change often, this could work for you. If you have a large menu, or you change it often, this could be too costly.

Use food allergy and sensitivity charts

An allergy chart lets customers and staff quickly see which menu items have known priority allergens in them. These charts are designed to identify known allergens rather than all ingredients. You'll see a sample allergy chart on the next page.

Use recipe binders or electronic file

A recipe binder or electronic file would list all the menu items, with all ingredients listed for each, like a recipe cookbook. The list would include the ingredients of any prepared food used in the recipe, like a bottled sauce or a blend of spices. The binder/file should be changed whenever menu items are added, removed or updated. Daily menu items and special items should all be included.

Choose a designated employee

An employee on each shift would be designated to answer customers' questions. This employee would need direct access to the recipes and kitchen staff, and a clear understanding about the importance of ingredient information and potential for cross contamination. Servers would then have all questions answered by this employee.

Check with guests in advance

The organizer of a catered event should ask if any of their guests have special dietary needs or food allergies. Menus can either have allergens removed, or a special meal can be served to any guests in question. When printing banquet and catering contracts, a section called "food allergies or special dietary needs" should be added to address this.

Allergy chart

This is an example of an allergy chart that could be used to indicate priority allergens in your menu items. The disclaimer at the bottom of the page should be added to let your customers and staff know that this chart only points out common food allergens and not all ingredients in menu items.

Food allergens and sensitivity chart

Item	Menu item #1	Menu item #2	Menu item #3	Menu item #4	Menu item #5	Menu item #6
Eggs	Yes		Yes			
Milk/milk products		Yes			Yes	
Mustard						
Peanuts	Yes		Yes			
Fish	Yes			Yes	Yes	
Crustaceans and molluscs						
Sesame seeds		Yes	Yes			
Soy						
Sulphites				Yes		Yes
Tree nuts		Yes	Yes		Yes	
Wheat and triticale	Yes		Yes			

Note: This list does not include all allergens. Sensitivities and allergies to other foods or ingredients in food may occur among some individuals.

Emergency procedures

All food service premises should have emergency procedures for handling allergic reactions readily available. These should be in an area that all staff know about and have access to – like a staff bulletin board.

At the very least, have a phone number for emergency services (e.g. 9-1-1-) and a list of the names of employees trained in first-aid and CPR posted and easily visible by all staff.

Remember: immediate treatment is needed for an allergic reaction.

Allergen contamination

Kitchen and service staff should also be aware of the risks of introducing allergen contamination. Like cross-contamination, allergen contamination happens when food isn't properly separated. **Cross contamination can occur by:**

- Using equipment that hasn't been thoroughly cleaned and still has other food on it
- Contaminating (adulteration) of food, whether on purpose or by accident
- Using rework materials, like using pastry dough for two different recipes that may have come into contact with an allergen
- Using the wrong packages or wrong labels
- Not identifying all ingredients in food received from a supplier
- Using misleading names for foods or ingredients. For example, "Bombay duck" is actually a type of fish
- Carrying too many plates at one time, causing food on separate plates to touch
- Touching different types of food without hand washing in between

You can prevent contamination that could lead to allergic reactions.

Impacts of foodborne illness

Foodborne illness doesn't just affect the person who gets sick. The average cost of foodborne illness outbreaks to Canadian taxpayers is estimated to be between $12 and 14 billion every year. **Some of these costs are:**

- Medical costs, such as doctor's visits, hospitalization and medications
- Investigation costs, like the health unit doing tests to confirm the type of foodborne illness
- Loss of productivity, including sick people missing work, and food premises having to close during an investigation
- Legal and higher insurance costs, if a food premise is sued by those who got sick

Complaints

If your food premises receives a complaint of a foodborne illness, you should call your public health unit to report any foodborne illness outbreak.

Record the details:

- Who got sick
- What food they ate and when
- What symptoms they had and when
- Write down everything you can about what happened

You should also:

- Talk to your staff
- Ask if any of them have or had the same symptoms
- Ask if any of them were ill when handling food
- Review how the food was prepared
- Save food samples from the meal that was eaten
- Don't give medical advice. Instead, refer to a physician or nurse practitioner.

Review questions

Circle the letter that represents your answer.

1. **Cleaning solution is spilled on a counter and not wiped off; food is then prepared on that counter. This is an example of what type of contamination?**
   A. Allergen
   B. Chemical
   C. Microbiological
   D. Physical

2. **Insecticides, rodenticides or cleaning chemicals accidentally getting into food is an example of a:**
   A. Additive
   B. Adulteration
   C. Allergen
   D. Physical hazard

3. **Bits of metal that accidentally gets into food is an example of what type of contaminant?**
   A. Additive
   B. Allergen
   C. Chemical
   D. Physical

4. **Making sure the ingredients on your menu are accurate can prevent a:**
   A. Allergic reaction
   B. Physical contamination
   C. Chemical contamination
   D. Microbiological contamination

Summary

- Common symptoms of foodborne illness are stomach cramps, diarrhea, vomiting, nausea and fever.
- How long it takes for symptoms to begin depends on what caused the illness, how healthy the person was before this illness and the amount of contaminant the person consumed.
- The four causes of foodborne illness are chemical contamination, physical contamination, allergens and microbiological contamination.
- Foodborne illness caused by chemicals is called food poisoning.
- Chemical food poisoning can occur if metal is dissolved in food. For example, consider an acidic food like tomatoes stored in a metal container. The acid can cause the metal to dissolve.
- Adulteration or contamination of food can be done on purpose or by accident.
- Physical contamination occurs when hazards like dirt, hair, broken glass, nails, staples, bits of metal or any other object accidentally gets into food.
- Food allergies or sensitivities to certain food such as peanuts, shellfish or eggs can cause various symptoms such as digestive problems, respiratory symptoms, skin reactions, anaphylactic shock and even death.
- Additives are things added to colour, thicken, firm or preserve food, such as sulphites and MSG. Any food additive can make a person sick if he/she is allergic to it.
- The retail food service industry can help people with allergies by avoiding ingredients known to cause allergic reactions when possible, having an accurate and up-to-date recipe binder, avoiding cross-contamination with other foods, making sure customers know how they can get information about the ingredients used and having an emergency procedure available for handling allergic reactions.
- Like cross-contamination, allergen contamination happens when food is not properly separated
- If your food premises receives a complaint of a foodborne illness, record the details, talk to staff about illness and how the food was prepared. Save food samples from the meal that was eaten if it is available.

Answer key

Test your knowledge: (pg. 14)

1. True
2. False
3. True

Review questions: (pg. 23)

1. B
2. B
3. D
4. A

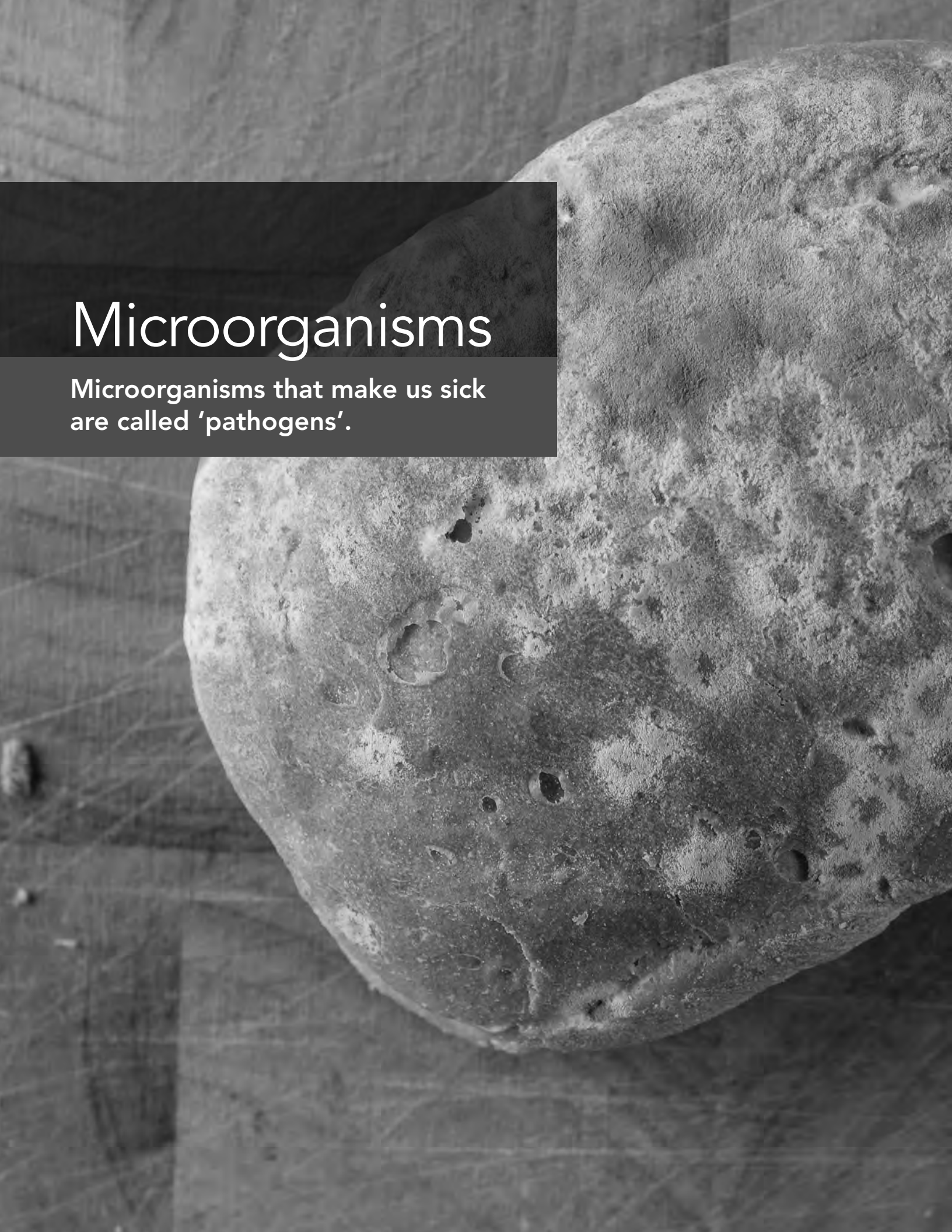
In review

This section introduced the different types of foodborne illness and the impact that foodborne illness has.

The following topics have been covered:

1. Common symptoms of foodborne illness
2. When foodborne illness is food poisoning
3. The three types of chemical food poisoning: metal, intentional additives and incidental additives
4. The dangers of physical hazards in food
5. The impact of foodborne illness on people and businesses

Notes



Microorganisms

Microorganisms that make us sick are called ‘pathogens’.

Introduction

As discussed the last section, foodborne illness can be caused by microbiological hazards, chemical hazards, physical hazards, and allergens. Of these, the most common cause of foodborne illness is microbiological contamination.

To understand how to handle food safely, you need to know a little about microorganisms. Microorganisms are germs that can't be seen without a microscope, but they're found everywhere. These microorganisms can come from food, water, animals, objects and in or on the human body.

Because microorganisms are so small, food that's contaminated with them may look, smell and taste normal, even when it's not safe. So it's very important to know about these microorganisms and how to control them.

Test your knowledge

Circle True or False for each of the following statements:

1. **All micro-organisms are harmful.**
   TRUE FALSE
2. **Bacteria do not grow well in acidic conditions.**
   TRUE FALSE
3. **You can tell that food is contaminated with a microorganism by look, taste or smell.**
   TRUE FALSE

Types of microorganisms

There are six main types of microorganisms: viruses, protozoa, parasites, yeasts, mold and bacteria. Some microorganisms are good for us and can be helpful. **Some examples are:**

- Yeast used to make bread and produce alcohol
- Acidophilus and lacto-bacilli bacteria that help us digest food
- Mold that ripens and flavours cheese (e.g., blue cheese)

Microorganisms that make us sick are called 'pathogens.'

Other microorganisms can make us sick. Bread mold, viruses like influenza and hepatitis, Salmonella bacteria and *E. coli* bacteria are all examples of microorganisms that can be a nuisance, make us sick or even be deadly.

Viruses

Viruses are found in nearly all life forms, including humans, animals, plants and fungi. They are very small, between 20 and 100 times smaller than a bacterium, and often too small to be seen by a standard microscope. Viruses don't grow in food because they can only grow inside a cell that's alive. They use living cells in our body or in living animals or plants to increase in number.

Viruses that cause foodborne illness are also called enteric viruses, which means they enter the body through the intestinal tract. Symptoms usually start suddenly and last one to two days, but a person may keep feeling weak for several more days. They're very contagious and most times can't be treated, which means a person must wait for the virus to go away on its own. Dehydration is a common problem, especially for people in a high risk group. It's also possible for a person who's infected with a virus to have no symptoms, but to pass that virus on to another person who will have symptoms.

The best way to control the spread of viruses is hand washing.

The best way to control the spread of parasites is thorough cooking.

Human hands are the most common way that viruses get into food. This is why hand washing is so important. Another source is contaminated water that can contaminate food washed in it or seafood and shellfish exposed to it. Viruses can also spread through cross-contamination. Three examples of viruses that can be carried in food are Hepatitis A, avian (bird) flu and rotavirus.

Noroviruses are responsible for more than 90 per cent of outbreaks of viral gastroenteritis and approximately 50 per cent of all cases cause outbreaks. Many Norovirus outbreaks have been traced to food that was handled by one infected person. The virus continues to be shed after symptoms have subsided and shedding can still be detected many weeks after infection.

More information on Norovirus and Hepatitis A can be found in the Appendices.

Parasites

Parasites live on or in humans or animals and use them to grow. **People can get parasites from**:

- Contaminated water or any food washed with contaminated water
- Eating undercooked meat from a contaminated animal
- Cross-contamination

Like viruses, parasites don't grow in food.

Symptoms of a parasitic infection depend on the type of parasite. Abdominal or stomach pain, diarrhea, muscle pain, coughing, skin lesions, weight loss and many other symptoms are all possible.

Examples include:

- Trichinosis (pork tapeworm), spread through raw or undercooked pork or wild game
- Anisakiasis (parasitic roundworm), spread through uncooked marine fish and raw fish items such as sushi, sashimi, ceveche or salmon

Protozoa

There are many kinds of protozoa. The ones that cause foodborne illness are a type of parasite that live in the digestive tract of people and animals.

Protozoa can get into food from contaminated water. They can survive longer in water than bacteria can and they're harder to remove from water than bacteria. Protozoa are more likely than most other microorganisms to infect someone who eats or drinks contaminated food or water.

Cross-contamination can spread protozoa to other food. **Examples of foodborne illness caused by protozoa:**

- Giardiasis (also known as beaver fever or backpacker's diarrhea) that can spread through contaminated water or food
- Cryptosporidiosis that can spread through contaminated water

Yeasts

Yeast is used to make breads and alcohol, but yeast can also spoil food. Yeast spoils food by slowly eating it. Contamination shows up as bubbles, an alcoholic smell or taste, pink spots or slime.

Yeast can grow at most food storage temperatures. Yeast usually only spoils food without making people sick. It needs sugar and moisture to survive which it finds in foods like jellies and honey.

Mold

Molds are needed for some things, like making wines and antibiotics. The blue in blue cheese, the flavour and sweetness of some rare white wines, and the power of penicillin to fight disease all come from different kinds of mold. But the molds we find in our kitchens are the slimy, rotten, fuzzy or unpleasant coloured kind that spoils food.

Single mold cells are usually very tiny, but mold colonies (groups of cells that are growing together) may be seen as fuzzy growths on food.

Some molds make toxins called mycotoxins that can cause serious illness or infections. You can't tell by looking whether the mold you see is one of the poison-producing types.

Examples of toxins produced by molds include:

- Aflatoxin often found in nuts, peanuts and peanut butter
- Ochratoxin A often found in grain, coffee and wine

When in doubt

Mold can grow on almost any food at any storage temperature and under any conditions. Freezing prevents the growth of mold but won't kill any mold cells already in the food. The mold that you see on food isn't the only mold that's there. If it creates poisons, they're generally under the surface of the food.

Mold can be thought of like a plant. The part you can see is like the flower. Underneath that are roots inside the food that can make it unsafe. The softer the food, the further into the food the mold is likely to spread.

Does all moldy food have to be thrown out?

Some hard cheeses and hard salami can be saved, if you can cut out the mold at least one inch around and under it. However, it is encouraged that all moldy foods are thrown away.

When in doubt, throw it out!

Bacteria

Bacteria are everywhere in our environment. They can be very helpful to us, but they can also be harmful.

Some examples of good bacteria are:

- Lactobacillus and bifidobacterium which help us to digest food
- Biofilms being used by NASA to clean water aboard the space shuttle

Most foodborne illnesses are caused by non-beneficial, or pathogenic bacteria.

Bacteria illnesses are the most common type of foodborne illness.

Some examples of harmful bacteria are:

Campylobacter

Commonly found in poultry and meat. It can be carried by rodents, wild birds, household pets such as cats and dogs and can also be found in untreated water.

Listeria

Found in soil. People can get infected by eating dairy products, vegetables, and fish and meat products that are contaminated with the bacteria.

E. coli

Lives in the intestines of animals and can be spread to the outer surfaces of meat when it is being butchered. E. coli can also be spread through contaminated water.

Clostridium perfringens

Can be found in high protein or starch-like foods such as cooked beans or gravies and is likely to be a problem in improperly handled leftovers.

Salmonella

Most commonly found in raw poultry, but also found in other meats, unpasteurized milk and raw eggs.

Infection

When food contaminated with living pathogenic bacteria is eaten, it can cause an infection type of foodborne illness. It may take only a small amount of bacteria to cause an infection, depending on the bacteria type.

Bacteria will pass through the stomach and down to the intestines where it'll begin to multiply. Symptoms often take one or more days after eating the contaminated food to appear. With most bacteria, symptoms will appear within three days, but some pathogenic bacteria won't cause symptoms for 10 or more days. Others can take more than two months. Symptoms usually come on slowly and can last for several days. Since this is an infection, one of the symptoms is usually a fever.

The most common examples of this type of food poisoning are Salmonella, Campylobacter, and Shigella. There are many other types as well.

Toxins

Sometimes it's not the bacteria itself that makes a person sick, but what the bacteria produces. All bacteria produce a waste product, some of which are poisonous or toxic to humans. These waste products are called toxins. A foodborne illness caused by a toxin is also called foodborne intoxication.

These toxins have no smell or taste. Some toxins can't be destroyed by normal cooking temperatures. This means cooking a food contaminated with a toxin may not make it safe.

Bacterial toxins can come from bacteria that's growing in food, or from bacteria that's on a person handling the food. Infections, cuts, burns, boils and pimples all have bacteria and, if those bacteria or their waste products get into food, they can cause foodborne illness.

Botulism: Poisoning caused by eating food containing a toxin made by a spore-forming bacterium. Its symptoms are nausea, vomiting, trouble seeing, muscle weakness and tiredness. It can be fatal.

Toxin symptoms

Foodborne intoxication symptoms can start the same day or within a day or two of eating contaminated food. They can last up to two weeks. These illnesses can be very dangerous. Remember, a toxin is a poison. One common type is Clostridium botulinum (*C. botulinum*) that causes botulism.

The symptoms can include:

- Nausea
- Vomiting
- Tiredness
- Dizziness
- Headache
- Double vision
- Dryness in the throat and nose
- Respiratory failure
- Paralysis
- In some cases, death

It's important to remember that with foodborne intoxication, it's not the bacteria that's making the person sick; it's the toxin made by the bacteria.

Spores

Some kinds of bacteria aren't killed by extreme heat, dryness or chemicals. When they're in conditions where they can't grow, they produce spores. The spore is the resting stage of the live bacteria and it can grow into active bacteria when good conditions to grow are available.

C. botulinum, the bacteria that causes botulism, is one type of bacteria known to produce spores. If an infant eats botulinum spores in food, the spores will grow into active bacteria in the intestine and produce toxins. This can also happen in adults with previous medical problems affecting the intestines.

Bacterial spores are NOT destroyed by cooking temperatures or most disinfectants.

Examples of microbiological illness

Illness	Samonellosis (Salmonella)	Staphylococcal intoxication (staphylococcus aureus)	Trichinosis (trichinella spiralis)	Hepatitis A virus	Haemorrhagic colitis (E. coli)
Usual source of microorganism	Raw poultry, pork, and feces of infected humans	Noses, skin and lesions of infected humans and animals, and from udders of cows	Flesh of infested swine and bear	Feces, urine and blood of infected humans	Probably raw beef, pork and poultry
Start of symptoms[1]	6-72 hours, usually 18-36 hours	1-8 hours, usually 2-4 hours	4-23 days, usually 9 days	10-50 days, but usually 25 days	2-6 days
Symptoms	Fever, abdominal pain, diarrhea, nausea, vomiting, dehydration	Severe nausea, vomiting, cramps, usually diarrhea, and prostration	Vomiting, nausea, eye problems, muscular stiffness spasms and laboured breathing	Fever, malaise, nausea, abdominal pain and jaundice	Abdominal cramps, and bloody or watery diarrhea; sometime fatal
Usual foods that get contaminated with this microorganism	Poultry, meat, meat products, unpasteurized milk, egg products, raw eggs, shellfish, pudding, gravies	Foods high in protein, custards, cream filled baked goods, ham, poultry and meat products, and potato and other salads	Undercooked pork and foods in contact with undercooked pork	Shellfish, raw oysters, clams, milk, sliced meat and water	Hamburger, other meat products and raw milk
Factors that contribute to an outbreak	Inadequate refrigeration, holding foods at warm temperatures, inadequate cooking and reheating, preparing food several hours before serving, cross-contamination, inadequate cleaning of equipment, infected worker touching cooked foods, and obtaining foods from contaminated sources	Inadequate refrigeration, infected worker touching cooked foods, preparing foods several hours before serving, working with infection such as cuts or abrasions containing pus and holding foods at warm temperatures	Inadequate refrigeration, holding foods at warm temperatures, preparing foods several hours before serving, and inadequate reheating of leftovers	Infected workers touching foods, poor personal hygiene, inadequate cooking, harvesting shellfish from sewage contaminated waters, and inadequate sewage disposal	Undercooked hamburger and chicken in fast food facilities, cross-contamination

[1] This is the time from when a person eats the contaminated food to the time when he/she starts to feel sick

Carriers

Microorganisms can come from food, water, animals or objects. They can also be found in and on the human body. Microorganisms can be present naturally or they can get into food through a carrier.

Carriers are people or things that are carrying microorganisms which can end up in food that's not handled safely. Because microorganisms are so small, they can't be seen with the naked eye and they can be on people and on objects without you knowing it.

People can transfer germs they have into the food they're preparing. It's possible for a person to have an infection without showing any symptoms or signs. In fact, we're always carrying some germs around. Feeling well doesn't necessarily mean you don't have any microorganisms on or in your body.

People can also pick up microorganisms from one type of food and transfer it to another type of food if they don't handle the food safely. This is called cross-contamination and will be discussed further in a later section.

Remember, viruses, protozoa and parasites can't grow in food, but they can be transferred to food by a carrier. Bacteria can also be transferred to food by a carrier.

Who gets sick?

There are a number of things that can make a person who eats contaminated food more or less likely to get sick. Some of these are:

The person's health before eating the food.

A person who has a weak immune system is more likely than a healthy person to get sick. Persons with weak immune systems include the very young, the very old, pregnant women, and people immunocompromised by a medical condition.

The amount of pathogen in the food.

Campylobacter will generally cause foodborne illness in a healthy person if more than 500 organisms are in the food eaten. For Salmonella, the number is 100,000. For Shigella, a person can get sick from eating as few as 10 organisms. These numbers are called the 'infectious dose.' There has to be enough bacteria to make it through the stomach to the intestines for a person to get sick. Again, if a person's immune system is compromised, it'll take even less.

The type of microorganism.

Some microorganisms are more likely to cause foodborne illness than others. Protozoa and parasites are very likely to cause illness if they're eaten.

Bacteria

What makes bacteria so dangerous?

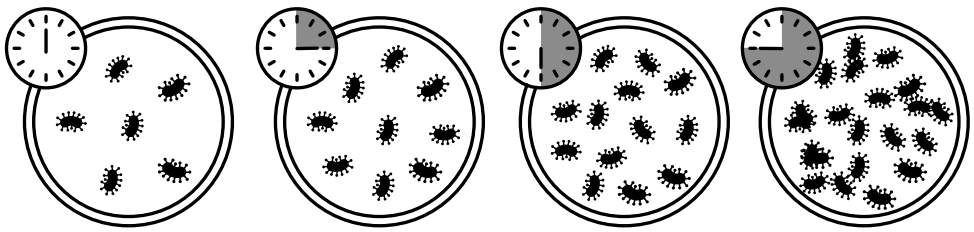
- They can multiply very quickly at room temperature.
- They can live and multiply in food.
- They aren't killed by refrigeration or by freezing.
- Their spores and toxins may still be dangerous after food is cooked.

Bacteria are carried in water, food and as "hitchhikers" by humans, insects, rodents and objects (such as dishes, towels, and clothing). Bacteria can multiply quickly when they're in conditions that suit them, meaning they have the right temperatures, moisture levels and a food source.

The number of bacteria will double every 10-20 minutes if its surroundings are perfect. The number of bacteria can reach dangerous levels very quickly in a short period of time in this case.

Consider the following key factors that support microbial growth:

- Time and Temperature
- The Danger Zone
- Oxygen
- pH
- Moisture
- Protein



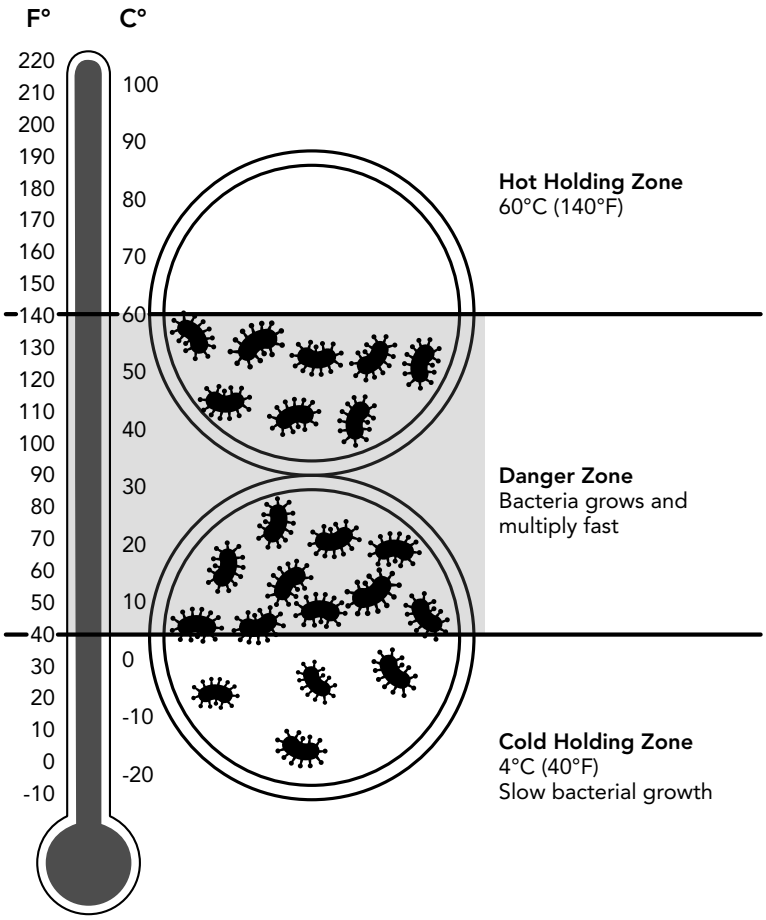
Bacterial growth

Time and temperature

Temperature control is the most effective way to slow the growth of bacteria in food. There's a temperature danger zone for food where bacteria will grow the fastest.

It's important to keep food out of this temperature danger zone as much as possible. The longer food is left in this danger zone, the more bacteria can grow and the more dangerous the food can get. Heating and holding food at or above 60°C (140°F) will prevent further bacterial growth but, as we saw before, won't kill bacterial spores and may not get rid of toxins. Chilling food at or below 4°C (40°F) also doesn't kill bacteria or do anything to spores or toxins, but it does significantly slow bacterial growth.

The danger zone is between 4°C (40°F) and 60°C (140°F).



Oxygen

Some types of bacteria will only grow where there is oxygen and other types will only grow where there is no oxygen. Foodborne illness can be caused by either of these.

Salmonella, bacteria often found in poultry products like chicken, turkey or eggs, needs oxygen to grow.

Clostridium botulinum, bacteria that can be found in improperly packaged cans or jars, only grows where there is no oxygen.

Bacteria that need oxygen to grow are called aerobic bacteria. This is like aerobic exercise, which means exercise that brings a lot of oxygen into your body. Bacteria that grow where there is no oxygen are called anaerobic bacteria.

pH

pH is a measure of how acidic or alkaline a substance is. The pH scale ranges from 0-14, with 7 being neutral. Pure water has a pH of 7. Any number below 7 is acidic, and any number above 7 is alkaline.

Pathogenic bacteria need a pH that's slightly acidic or higher on the pH scale. Most foods that we eat are acidic with a pH between 2 and 7.

pH of some common foods:

Item	pH	Item	pH
Bananas	4.5 - 5.2	**Lemons**	2.2 - 2.4
Bread	5.3 - 5.8	**Milk**	6.3 - 8.5
Carrots	4.9 - 5.2	**Oranges**	3.1 - 4.1
Cherries	3.2 - 4.1	**Oysters**	4.8 - 6.3
Corn	6.0 - 7.5	**Pork**	5.3 - 6.9
Eggs	6.0 - 9.0	**Potatoes**	6.1
Flour	6.0 - 6.3	**Squash**	5.5 - 6.2

Moisture

Bacteria need water to grow. Bacteria will grow faster in moist foods. **Moist foods that are good for bacterial growth are things like:**

- Meat (steak, hamburger and pork)
- Dairy products (milk and cheese)
- Fish
- Eggs
- Vegetables

Low moisture won't kill bacteria, but it will keep bacteria from growing

Dry foods don't have enough moisture in them for bacteria to grow, but bacteria can survive in them without growing. They can become hazardous when water is added; bacteria in them would then have the moisture needed for growth.

Food can be made safer if the amount of water available to bacteria is lowered by freezing, dehydrating (removing the water) or by cooking. Adding solutes like salt, sugar and preservatives can also decrease the available water in food and can reduce the microbial growth rates.

Protein

Bacteria grow best when there is a good supply of food or nutrients. The main nutrient for bacteria is protein.

Foods that are rich in protein are:

- Meat (steak, hamburger and pork)
- Fish
- Poultry (chicken and turkey)
- Eggs
- Dairy products (milk and cheese)

Foods that have a high level of both protein and moisture are very good for bacteria growth.

Potentially hazardous foods

Potentially hazardous foods are those that support bacterial growth because they're rich in protein and have high moisture content. These foods need to have their time and temperature watched very carefully to keep bacteria from growing, producing toxins and producing spores.

Potentially hazardous foods include:

- Moist foods with a pH above 4.5
- Dairy products
- Meat, fish, poultry and eggs
- Some raw vegetables and fruit (e.g., bean sprouts, garlic in oil and cut melon), especially those that won't be cooked

Remember, any food that contains one of these foods would also be potentially hazardous. So a cream-filled doughnut, salad with sliced chicken, pasta dish with meat sauce, and casserole with cheese would all be potentially hazardous.

Some raw and some cooked vegetables and fruit will support the growth of pathogenic microorganisms and are therefore potentially hazardous. Vegetables and fruit may be easily contaminated and have caused a number of outbreaks (e.g., Listeria in microgreens - January 2018; Hepatitis A in frozen strawberries - April 2018).

Review questions

Circle the letter that represents your answer.

1. **Which of the following microorganisms multiply in food?**
   A. Bacteria
   B. Parasites
   C. Protozoans
   D. Viruses

2. **Bacteria will multiply every _____ minutes at room temperature.**
   A. 5 to 10
   B. 15 to 20
   C. 25 to 30
   D. 35 to 40

3. **The most common way viruses contaminate food is through:**
   A. Unwashed hands
   B. Inadequate cooking temperatures
   C. Inadequate hot holding temperatures
   D. Cross-contamination from raw meat juices

4. **Mycotoxins are toxins produced by:**
   A. Bacteria
   B. Mold
   C. Parasites
   D. Yeast

5. **High heat or cooking temperatures kill:**
   A. Bacteria
   B. Mold
   C. Spores
   D. Toxins

6. **The danger zone is:**
   A. A temperature range between 0°C and 74°C (32°F and 165°F)
   B. A temperature range between 4°C and 60°C (40°F and 140°F)
   C. A temperature range between 20°C and 60°C (68°F and 140°F)
   D. A temperature range between 60°C and 82°C (140°F and 180°F)

7. **In a temperature range from 0°C to 4°C (32°F to 40°F) bacteria will:**
   A. Be destroyed
   B. Survive but not multiply
   C. Survive and grow rapidly
   D. Survive and multiply slowly

8. Foods with a pH below three are:

A. Acidic
B. Alkaline
C. Moist
D. Neutral

9. The easiest way to reduce the growth of bacteria in food is to control the:

A. Acidity level
B. Protein level
C. Moisture level
D. Time and temperature

10. Which of the following is a hazardous food that supports the growth of bacteria:

A. Cereal
B. Jam
C. Pickles
D. Pork

11. Bacteria grow in food with a pH of:

A. 3
B. 7
C. 10
D. 16

12. If your food premises receives a complaint of a foodborne illness, you should:

A. Offer the customer a refund
B. Record the details
C. Blame the chef
D. Ignore it

Summary

- Microorganisms are organisms that can only be seen with a microscope
- Pathogens are microorganisms that can cause illness or disease
- There are six types of microorganisms: Mold, yeasts, parasites, protozoa, viruses and bacteria
- Molds and yeasts are known as spoilage organisms. Mold colonies may be seen as fuzzy growths on food. Mold requires moisture to grow and reproduce. Some molds make toxins called mycotoxins that can cause serious illness or infections
- Parasites live on or in humans or animals. They can be seen with the naked eye. When ingested, parasites grow inside you, lay eggs and cause illness. Parasites do not grow in food. It is recommended that fish that is to be consumed raw, be frozen for a number of days
- Protozoa are small parasites that are more likely than most other microorganisms to infect someone who eats or drinks contaminated food or water. Examples are Cryptosporidium and Giardiasis
- Viruses are smaller than bacteria and do not grow in food because they need humans or animals to grow. Human hands are the most common way that viruses get into food
- Foodborne infections occur when someone ingests food contaminated by bacteria. The bacteria will pass through the stomach and down to the intestines where it will begin to multiply. Symptoms that affect the lower body include diarrhea and cramps. Examples of foodborne infections are Salmonella, Campylobacter and Shigella
- Foodborne intoxications occur when bacteria produce a toxin as they grow on food. It is this toxin which makes a person sick. The symptoms can start the same day or within a day or two of eating contaminated food. Cooking food contaminated with a toxin to normal cooking temperatures can't be destroyed. Symptoms usually affect the upper body, including vomiting, nausea and headaches. An example is *C. botulinum*.
- A spore is the resting stage of the live bacteria and can grow into active bacteria when good conditions to grow are available. Spores cannot be destroyed by high heat, chemicals or dryness
- Carriers are people or things that carry microorganisms. People can transfer germs they have into the food they are preparing. It is possible for a person to have an infection without showing any symptoms or signs. Feeling well does not necessarily mean you do not have any microorganisms on or in your body
- Factors for bacterial growth are time/temperature, presence or lack of oxygen, moisture, pH and protein
- The Danger Zone is between 4°C and 60°C (40°F and 140°F). This is the temperature range in which bacteria will grow the fastest
- Potentially hazardous foods are those that support bacterial growth, because they are rich in protein, have high moisture content and have a neutral pH. Potentially hazardous foods include meats, dairy products, some raw vegetables and fruit
- If your food premises receives a complaint of a foodborne illness, record the details, talk to staff about illness and how the food was prepared. Save food samples from the meal that was eaten if it is available

Answer key

Test your knowledge: (pg.26)

1. False
2. True
3. False

Review questions: (pg.36)

1. A
2. B
3. A
4. B
5. A
6. B
7. D
8. A
9. D
10. D
11. B
12. B

In review

1. Not all microorganisms are bad for us
2. The types of pathogenic microorganisms that cause foodborne illness: viruses, parasites, yeasts, mold and bacteria
3. What is similar and what is different about these pathogens
4. The sources of these microorganisms
5. The foodborne illnesses these pathogenic microorganisms cause and the symptoms of illness
6. Why some kinds of food contamination are more likely than others to make people sick
7. Why some people are more likely to get sick than others when they eat contaminated food
8. How carriers can transfer microorganisms to food
9. What bacteria needs in order to grow: time and temperature, oxygen, pH, moisture and protein
10. What makes a food potentially hazardous

Notes

Time and temperature

Keep food in the danger zone for as short a time as possible.

Introduction

It is important that food be in the danger zone range of temperatures (between 4°C/40°F and 60°C/140°F) for as short a time as possible. This is true during all of the different stages of preparing, serving and selling food.

Food goes through many stages before it's made available to your customers. Steps need to be taken at each of these stages to make sure bacterial growth is kept to a minimum. This is done by controlling the temperatures food is kept at, and the amount of time food is kept at those temperatures.

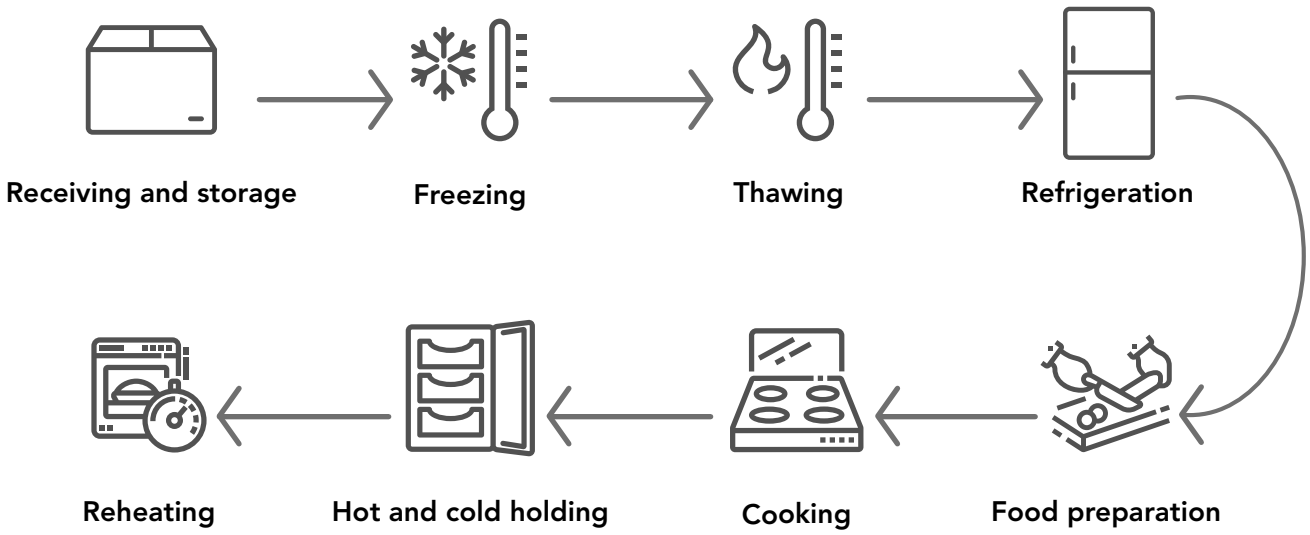
Test your knowledge

Circle True or False for each of the following statements:

1. **Probe thermometers should be recalibrated on a regular basis.**
   TRUE FALSE
2. **All fridges must be equipped with an accurate and easily read thermometer.**
   TRUE FALSE
3. **It is acceptable to thaw raw meat at room temperature as long as it is cooked to the minimum cooking temperature.**
   TRUE FALSE
4. **It is acceptable to thaw raw meat at room temperature as long as it is cooked to the minimum cooking temperature.**
   TRUE FALSE

Food Safety Sequence

The basic sequence of food preparation is:



Not all foods will go through all of these stages and they may not go through them in this order. Fresh vegetables may not get frozen or thawed. Salad ingredients may not get cooked or reheated. All food will go through some or all of these stages. It's very important to monitor and control the temperature of food during all of these stages to make sure bacteria has little chance to grow.

The probe thermometer

To make sure the proper food temperatures are reached and maintained, use a probe thermometer.

- Insert the probe so the sensing area is in the thickest part of the food, or in the centre of the food if there is no part that is thickest.
- Wait at least 15 seconds for the reading to steady and then record the reading.

Probe thermometers must be cleaned and sanitized by using alcohol swabs or a sanitizing solution after each use. This is to make sure you don't cross-contaminate food.

Don't let the probe touch the bottom or sides of the food containers because you won't get an accurate temperature if you do. Never leave the thermometer in food that is being cooked by oven, microwave or stove.

Your probe thermometer must be a food service thermometer. It should have a metal probe; an instant-read type is preferred.

To avoid confusion, be sure to recalibrate your thermometer as soon as possible.

Thermometer recalibration

Recalibrating your thermometer regularly will help to ensure your temperature readings are accurate. Recalibrating means adjusting the thermometer to make sure it's reading the right temperature. **A thermometer should be re-calibrated:**

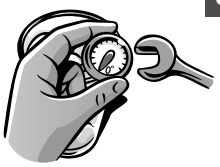
- After an extreme temperature change
- It has been dropped

Even if these haven't happened, your thermometer should be recalibrated on a regular basis. The recommended way to calibrate your probe thermometer is by using the ice point method.

How to recalibrate

1 To use the ice point method, mix a 50/50 slush of crushed ice and water. The temperature of the mix will always be 0°C (32°F), so you can use this to make sure your thermometer is giving an accurate reading.

2 Set the probe of the thermometer in the mixture, making certain it's not touching the sides or the bottom. Wait until the needle stops moving to see what temperature it's reading. If it's not 0°C (32°F), it needs to be adjusted.



3 If your thermometer has a calibration nut, use a small wrench to turn it until the temperature reads 0°C (32°F). Keep the probe in the ice water to make sure the temperature is accurate.

4 Other types of thermometers can be adjusted in much the same way, using its plastic cylinder or pliers.

When you can't recalibrate

Digital thermometers don't usually have a way to be recalibrated, but still need to be checked for accuracy. Use the same method as described above for a dial type thermometer. The exception is that the digital thermometer may have a reset button that has to be pushed to recalibrate the setting. If the thermometer doesn't read 0°C (32°F), try a new battery or have a repair service check the unit.

Follow any instructions for maintenance and care of your thermometer that come with it at purchase, including those for recalibration.

If you test your thermometer and it's off by a few degrees but you're not able to immediately recalibrate it, be sure to adjust any temperature readings manually. For example, if your thermometer reads -3°C (27°F) using the ice point method, you'll need to add 3°C (5°F) to any reading you take because you know that it should be reading 0°C (32°F). This would mean that a refrigerator temperature reading of 4°C (40°F) on your thermometer is really 7°C (45°F).

If your thermometer is off by more than a few degrees, you can't trust it. Recalibrate it, or use a different one.

The sequence

Receiving and storage

It is important for food to be kept at the right temperatures while it's being shipped to you and when you are storing it in your food premises.

Freezing

Frozen foods must be kept at a temperature that allows food to remain frozen solid. Temperatures need to be monitored several times a day to ensure food remains frozen. Once a week, a probe thermometer should be used to make sure that the temperature showing on the freezer's thermometer is right.

Freezers and refrigerators will run better and keep your food safer if you follow these tips:

- Keep the door closed as much as possible.
- Don't overload the space.
- Use open wire shelves that haven't been lined (no cardboard, tin foil or other solid material).
- Make sure door seals are tight and in good repair

If food has been thawed, don't re-freeze it without cooking it first.

Thawing

NEVER thaw foods at room temperature. As the food thaws, although the inside of the food is still frozen, the outside of the food will be at room temperature (the danger zone) for a long time allowing any bacteria that is present to grow and multiply quickly.

Thaw foods safely using one of the following four methods.

In a refrigerator at 4°C (40°F)

This method is slow, so allow a day or more for large items, such as poultry and roasts, to thaw. It takes about 10 hours/kg or 5 hours/lb. Whenever possible, this is the method you should use as it's the safest.

In a sink of cold running water

Use a large clean sink and don't let water splash on other foods or surfaces where food will be, such as counters. Keep the water flowing constantly to keep the outside of the product cold. Remove the food from the sink as soon as it is thawed and sanitize the sink and all utensils used in thawing.

As part of the continuous cooking process

This method works well for small portions of food like seafood, ground beef and similar foods, but not with large items.

In the microwave

Use this method only if the food will be moved immediately to another cooking source, because after thawing with this method, the product is warm. This method isn't effective for large items.

Refrigeration

Refrigerated foods must be kept at a temperature of 4°C (40°F) or lower. Refrigerators need to have their temperatures monitored in the same way as freezers. All refrigerators must have a thermometer that can be easily seen and is accurate. The thermometer should be in the warmest part of the fridge, which is near the door and near the top. Temperatures need to be monitored several times a day to make sure they stay at or below 4°C (40°F). Once a week, a probe thermometer should be used to make sure the temperature showing on the fridge's thermometer is right.

Freezers and refrigerators will run better and keep your food safer if you follow these tips:

- Keep the door closed as much as possible
- Don't overload the space
- Use open wire shelves that have not been lined (no cardboard, tin foil, or other solid material)
- Don't use wood in your refrigerators as it's likely you'll get mold growth
- Make sure door seals are tight and in good repair

Condiment Fridge

Condiment refrigerators are often used to prepare or assemble food items like sandwiches or pizza.

The top of a condiment refrigerator has a preparation counter with food compartments for holding ingredients like cold cuts, cheese, tomatoes, lettuce and pickles. Proper temperatures in the food compartment are very hard to maintain in these units, so it's important to keep the lid closed as much as possible and to closely monitor temperatures. The food compartments should be moved to the main part of the refrigerator for overnight storage.

Food preparation

When you're working with food at room temperature, getting it ready to be cooked or served, you need to take extra care.

Any food preparation that takes place at room temperature is risky because it takes place in the danger zone. Most bacteria grow fastest in the 20° to 50°C (68° to 122°F) range, especially at 37°C (98°F) or body temperature. The longer hazardous foods are in this range, the greater the chance that pathogenic bacteria will grow and/or produce toxins which will cause foodborne illness. Potentially hazardous foods can be prepared, processed and manufactured at room temperature, but for no more than two hours.

This is because that time is too short for bacteria to grow or produce toxins at a level that would likely cause harm.

If you are preparing large amounts of food:

- Use small batches
- Use pre-chilled ingredients
- Pack food on ice

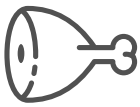
Don't let foods be in the danger zone longer than necessary. If you need to leave your work station for any reason, put food back in the refrigerator until you can start with it again.

Cooking

Food mixtures that contain hazardous foods should be cooked to an internal temperature of at least 74°C (165°F). Verify the temperature with your probe thermometer for at least 15 seconds.

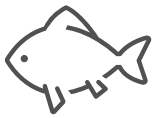
Potentially hazardous food may include:

Dairy products (such as milk and cheese)



Meat

Poultry



Fish

Eggs

Cooking Meats

Some types of meats have different minimum internal cooking temperatures. As mentioned in the section on thawing, most bacteria are on the surface of food. So when a solid piece of meat like a steak is cooked, the outside gets thoroughly heated and the surface bacteria are killed, even if the centre doesn't reach 74°C (165°F).

When meat is ground up, any bacteria on the surface are mixed through the meat. To make sure all bacteria are killed, the meat must be cooked all the way through. The following temperatures ensure adequate cooking of the meats and reduce the chance of bacterial survival.

Cooking food from raw	Temperature requirement
Pork	71°C (160°F)
Poultry (whole)	82°C (180°F) for at least 15 seconds
Poultry (pieces or ground)	74°C (165°F) for at least 15 seconds
Ground meat (other than those containing poultry)	71°C (160°F) for at least 15 seconds
Fish	70°C (158°F) for at least 15 seconds
Food mixtures containing poultry, eggs, meat, fish or other potentially hazardous foods	74°C (165°F) for at least 15 seconds

Hot and cold holding

Holding food means keeping it at the right temperature once it's been prepared and until it's served. Food can be held hot, cold or at room temperature depending on the type of food and how long it's being held.

There are different requirements for each type of holding; we'll look at these next.

Hot holding

When food is kept hot after being cooked, it's called "hot holding." **Some examples of this are:**

- Food held in a buffet
- Hot dogs kept hot in a hot dog cart
- Fast food held in a warming tray until it is served

Food being held hot for service or display must be held at 60°C (140°F) or higher at all times. Use a probe thermometer to monitor temperatures regularly during the holding time and record them. This is after the food has been cooked to the right internal temperature.

Cold holding

All foods being held cold for service or display must be held at 4°C (40°F) or lower at all times. This is the same temperature they would be at in a refrigerator. Use a probe thermometer to monitor temperatures regularly during the holding time and record them.

Don't overfill containers. Use metal containers for all hazardous food since metal conducts cold better than plastic.

Food can be held in the cold zone using a refrigerated unit or on ice. Containers of food should always be moved into a refrigerator if they'll be stored overnight.

Cooling

If cooked food needs to be cooled for storage or service, it must be done carefully because the food will pass through the temperature danger zone. The food should be placed on ice or refrigerated before it drops below 60°C/140°F. The faster the food is cooled, the less time it spends in the danger zone, and the less risk there is of bacterial growth.

The time it should take to cool food is:

- Within two hours, the temperature of the food should drop from 60°C (140°F) to 20°C (68°F).
- Within the next four hours, the temperature of the food should drop from 20°C (68°F) to 4°C (40°F) or less.

As with cooked foods, the temperature of the food must be monitored during cooling using your probe thermometer to make sure it's being cooled fast enough. Cooled food must be stored at 4°C (40°F) or less.

Cooling foods too slowly is one of the leading causes of foodborne illness.

Shallow pans

The best way to cool food is to transfer the hot, cooked food from large containers to shallow pans (2-3 inches/5-7 cm deep or less).

Partly cover pans to protect from contamination, but allow heat to escape. Place the pans in the refrigerator to bring the temperature down quickly. Store them on the top shelves to reduce the risk of cross-contamination while cooling. Stirring food will also reduce cooling time significantly.

Once the foods are thoroughly cooled, cover tightly to protect from contamination and to keep the food from drying out. Label and date the containers so that you'll know how long to keep the food.

Large containers

Cooling cooked food in large containers is much harder and can mean that food will be in the danger zone for a longer time, unless extra care is taken. **You can make food cool faster by:**

- Placing the large container in a sink of ice water (ice water bath)
- Stirring
- Using an ice wand
- Adding ice directly to the food
- Dividing food into small quantities

The temperature of the food must be monitored during cooling, using your probe thermometer, to make sure it's being cooled fast enough.

Cooling after preparation

Food prepared at room temperature should be cooled from 20°C (68°F) to 4°C (40°F) or less within four hours. This applies to food right after it has been cooked. It also applies to food that won't be cooked at all, such as a salad.

Use your probe thermometer to make sure food is being cooled fast enough.

Reheating

When hazardous foods are reheated, they need to be brought to their minimum cooking temperature for at least 15 seconds. The food needs to reach that temperature within two hours. As the food will pass through the danger zone, reheating should be done as quickly as possible so use the highest temperature you can.

- Foods like soups, stews or gravies should be brought to a boil. When possible, reheat in small amounts so you can reheat faster. Remember to always use your probe thermometer to check the reheating temperature.
- Food can't be reheated in a hot-holding unit, like a holding oven, steam table or soup urn, because they're not designed to heat food quickly or to high enough temperatures.
- Be careful when using leftovers as they pass through the danger zone twice. Throw out any leftovers after reheating (i.e., don't use the leftovers of a leftover).

Top 10 improper food handling practices that cause foodborne illness:

1. Improper cooling, 30 per cent
2. Advance preparation, 17 per cent
3. Infected person, 13 per cent
4. Inadequate reheating for hot holding, 11 per cent
5. Improper hot holding, 9 per cent
6. Contaminated raw food or ingredient, 5 per cent
7. Unsafe source, 4 per cent
8. Use of leftovers, 3 per cent
9. Cross-contamination, 3 per cent
10. Inadequate cooking, 2 per cent

Dr. Frank Bryan, Journal of Food Protection, 1988

Activity

The following is a list of different stages of food preparation.

A. Cold holding
B. Cooking – whole chicken
C. Cooking – pork
D. Danger zone
E. Hot holding
F. Reheating – chicken breast

Beside each temperature, indicate the corresponding stage of food preparation by writing the letter (A,B,C, etc.) in the blank space provided.

1. 4°C (40°F) _____
2. 4°C to 60°C (40°F to 140°F) _____
3. 60°C (140°F) _____
4. 71°C (160°F) _____
5. 74°C (165°F) _____
6. 82°C (180°F) _____

Review questions

Circle the letter that represents your answer.

1. Which of the following methods is an acceptable way to reheat food?

A. On a stovetop
B. In a steam table
C. In a chafing dish
D. In a warming drawer

2. Food should be reheated within:

A. Two hours or less
B. Four hours or less
C. Six hours or less
D. Eight hours or less

3. The safest way to thaw/defrost food is:

A. In a microwave
B. In the refrigerator
C. At room temperature
D. In a sink of cold running water

4. Food should be cooled from 60°C (140°F) to 20°C (68°F) within:

A. Two hours
B. Four hours
C. Six hours
D. Eight hours

5. **Food should be cooled from 60°C to 20°C (140°F to 68°F) by which acceptable method?**
   A. In shallow pans
   B. On the counter top
   C. Beside an open window
   D. In a tightly sealed container

6. **The recommended way to calibrate your probe thermometer is by using:**
   A. Cold water at 4°C (40°F)
   B. Ice cubes at minus 4°C (40°F)
   C. Boiling water at 100°C (212°F)
   D. Mix of crushed ice and water at 0°C (32°F)

7. **Probe thermometers must be cleaned and sanitized:**
   A. Every day
   B. Every week
   C. After each use
   D. At least once every hour

8. **To get an accurate temperature reading of a food item make sure your probe thermometer is:**
   A. In the thinnest part of the food
   B. Left in the food while it's cooking
   C. In the center or thickest part of the food
   D. Touching the bottom of the food container

9. **The fridge or freezer thermometer should be placed:**
   A. Near the back, at the top of the fridge
   B. Near the door, at the top of the fridge
   C. Near the door, at the bottom of the fridge
   D. Near the back, at the bottom of the fridge

10. **A customer has ordered a chicken dinner. Which of the following methods should the chef use to determine that the chicken is properly cooked?**
    A. Poking the chicken with his/her finger
    B. Cutting the chicken to ensure that the flesh is no longer pink or red
    C. Using a timer to check that the chicken was cooked for the proper length of time
    D. Using a probe thermometer to check that a minimum internal cooking temperature has been reached

Consider the scenario - Cooling

Read the following scenario and answer the questions below.

A large pot of chili is prepared and cooked for the lunch service. The chili is removed from the stove and served as ordered. After the service, the chili is placed on the counter to cool for five hours. At the end of the shift, the chili is placed in the walk-in-cooler until the next day.

Question: List the steps that should have been taken at each of the food preparation stages to minimize bacterial growth.

Answer:

Consider the scenario - Food preparation in the danger zone

Read the following scenario and answer the questions below.

You are asked to prepare 100 chicken salad sandwiches for the lunch service. **Here are the steps taken:**

8 a.m.	Take the chicken breast out of the oven after checking that the internal cooking temperature reaches 74°C (165°F) with a probe thermometer. Let the chicken breast cool on the counter for half an hour.
8:30 a.m.	Dice the cooled chicken breast and wash celery stalks. Add mayonnaise.
9 a.m.	Leave the prepared chicken salad on the counter for two hours.
11 a.m.	Begin assembling all of the sandwiches.
12 p.m.	Leave the 100 prepared chicken salad sandwiches on the counter until service.
12:30 p.m.	The 100 chicken salad sandwiches are served to customers.

Question: What could have been done differently to safely prepare the chicken salad sandwiches?

Answer:

Summary

- Use a probe thermometer to ensure proper internal food temperatures are reached and maintained. Insert the probe in the thickest part of the food or in the centre of the food if there is no part that is thickest. Wait for at least 15 seconds. Do not let the probe touch the bottom or sides of the food containers as you will not get an accurate internal temperature. Probe thermometers must be cleaned and sanitized by using alcohol swabs saturated with 70 per cent isopropyl alcohol or a sanitizing solution after each use
- Recalibrating your thermometer regularly will help to ensure your temperature readings are accurate
- To use the ice-point method, mix a 50/50 slush of crushed ice and water. The temperature of the mix will always be 0°C (32°F). Set the probe of the thermometer in the mixture and wait until the needle stops moving. If the thermometer does not read 0°C (32°F), it needs to be adjusted
- Thaw foods safely using one of the following methods: In a refrigerator at 4°C (40°F), in a sink of cold running water, or in the microwave. The safest method of thawing food is in the refrigerator
- Large amounts of food can be prepared safely at room temperature by using small batches of food, using pre-chilled ingredients and packing food on ice
- The faster the food is cooled, the less time it spends in the danger zone, and the less a risk there is of bacterial growth.
- Foods can be cooled quickly using one of the following methods: Shallow pans, reduce portion size, ice water bath and stirring frequently
- Potentially hazardous foods should be reheated to minimum cooking temperatures for at least 15 seconds. Cold holding temperature is 4°C (40°F) or less. Proper hot holding temperature is 60°C (140°F). Frozen food is to be kept frozen.

Answer key

Test your knowledge: (pg. 41)

1. True
2. True
3. False
4. False

Activity questions: (pg. 48)

1. A
2. D
3. E
4. C
5. F
6. B

Review questions: (pg. 48)

1. A
2. A
3. D
4. A
5. A
6. D
7. C
8. C
9. B
10. D

Consider the scenario - Cooling (pg. 50)

- Take the internal temperature of the chili with a probe thermometer to ensure the minimum cooking temperature has been reached
- Hot hold the chili using the stovetop method. Check the internal temperature to ensure a minimum hot holding temperature of 60°C (140°F) is maintained. Hot hold the chili for no more than two hours
- To ensure the chili moves through the danger zone as quickly as possible, cool the chili using the following methods:

A. Cool from 60°C (140°F) to 20°C (68°F) within two hours or less by:

- Portioning the chili into smaller containers and place in an ice bath
- Portion chili into shallow containers

B. Cool chili from 20°C (68°F) to 4°C (40°F) within four hours or less by:

- Stirring, placing the portioned chili in the refrigerator, loosely covered

Consider the scenario - Food preparation in the danger zone (pg. 50)

- The cooked chicken was left in the danger zone for more than four hours
- The prepared chicken salad was not cooled to 4°C (40°F) or lower before serving
- To prepare the chicken salad sandwiches, the following steps should have been taken:

A. The day before serving, cook the chicken breasts, cool and place in the refrigerator
B. On the day of serving, take the chicken breasts out of the refrigerator and dice. Add the rest of the salad ingredients
C. Divide the chicken salad into smaller containers and cover. Place the containers of chicken salad into the refrigerator to cool
D. Take one small container of chicken salad out of the refrigerator at a time. Assemble small batches of sandwiches, cover and store in a refrigerator immediately to cool
E. Continue to assemble small batches of sandwiches, using one small container of chicken salad at a time, covering and refrigerating immediately to cool
F. If a break is needed or there is stop in preparation, move the container of chicken salad and prepared sandwiches into the cooler before walking away
G. Serve cooled chicken salad sandwiches

In review

The following topics have been covered in this section:

1. How and when to recalibrate your probe thermometer
2. The correct temperatures to store frozen and refrigerated foods
3. Safe methods for thawing frozen foods
4. How to properly monitor freezer and refrigerator temperatures
5. Which stages put food in the danger zone: preparation, cooking, cooling and reheating
6. How to cool food safely by minimizing time in the danger zone
7. The different safe temperatures for cooking meats and other hazardous foods
8. How to safely hold food at hot, cold and room temperatures

Notes

Receiving and storage

Make sure food is coming from a safe source and is stored properly.

Introduction

Food safety is important during all of the different stages of preparation and production. To make sure the food you're serving to customers is safe, you need to make sure it comes from a safe source and is stored properly.

Test your knowledge

Circle True or False for each of the following statements:

1. **Food received at your premises can be accepted if it is not from an inspected source as long as it is in good condition.**
   TRUE FALSE
2. **All delivery trucks are required to have a thermometer in their refrigeration units.**
   TRUE FALSE
3. **Grade C eggs can be used in a food premises.**
   TRUE FALSE

Shipping and receiving

Whenever food is received at your premises, it should be inspected. You want all of the food you're receiving to come from an approved source and be in good condition.

Check delivery trucks. They should be clean and shouldn't have signs of contamination.

All food products should be checked before they're accepted to make sure they're not spoiled or damaged. **Look for:**

Thawing and refreezing are major dangers for frozen foods.

- Proper shipping temperatures
- Dents or rust on cans
- Bulging, leaking or stains on packaging
- Signs that products may be spoiled or infested by pests (e.g., gnawed holes or insect wings)
- Proper labeling and labeling should be intact - not changed, broken or removed from the food to which it's supposed to be attached.
- Check the manufacturer's 'best before' date. If the date has passed, don't accept the food.

Temperatures

Foods that need to be refrigerated or frozen need to be shipped in vehicles that can keep them at the right temperatures. Refrigerated foods must be shipped at 4°C (40°F) or lower and frozen foods must be frozen solid with no signs of thawing.

Products that must be kept at refrigerator or freezer temperatures should be double checked for their actual temperatures. Check the temperature of the thermometer in the delivery truck first (all delivery trucks are required to have thermometers in their refrigeration units). Use your probe thermometer to check internal temperatures. If you can't insert the thermometer directly into the product, open a case and insert the entire sensing area of the thermometer between two packages, being careful not to poke a hole in them. Reject any products that are too warm.

Frozen products should be checked carefully to make sure they haven't thawed and been refrozen. Look for large ice crystals, solid areas of ice, discoloured or dried-out food. Reject any food product that may have been thawed and refrozen. If a product you receive is thawing, it should not be refrozen. Put it in the refrigerator, date it and continue the thawing process – or reject it.

Look for government stamps on beef products or tags on chicken and seafood products.

Water

Any water used in food premises must be from a potable water supply, which means the water must be drinkable.

Meat, Poultry and Seafood

Only government inspected meat, poultry and fish/shellfish are allowed in food premises. Wrappers and/or boxes of these foods usually show government approval and where the food was packaged.

You should reject meat and poultry products if they're discoloured, have a strange smell, or if the food is slimy, sticky or dry. These products must be delivered frozen or refrigerated.

Fish and shellfish should be delivered either frozen solid or live at 4°C (40°F). Inspect the fish itself. **Reject fish products if:**

- There is a strong 'fishy' or ammonia smell.
- The eyes are sunken or cloudy.
- The flesh is soft and gives (i.e., if you poke the flesh with your finger and the fingerprint stays).
- The shipping temperature is above 4°C (40°F).

If clam, mussel or oyster shells are partly open and don't close when tapped, it means they're dead. Reject them. If lobster and shrimp are soft and have a strong smell, reject them.

Samples of Ontario and Canadian Food Inspection Stamps

Source: Canadian Food Inspection Agency. Reproduced or adapted with the permission of the Canadian Food Inspection Agency.

Eggs

Hen eggs prepared or sold in a food premises (such as restaurants) must be from a registered egg station and must be graded. Consumers may purchase ungraded eggs directly from a producer, for their own consumption, and not for resale.

Always check inside egg cartons. Look for cracks, feathers and/or feces. If you see any of these, the eggs are Grade C and may carry a risk of Salmonella contamination. Cracked eggs and Grade C eggs can't be used in food premises. Liquid eggs must be pasteurized and packaging can't be broken or damaged.

Eggs and egg products should be delivered at 1 to 4°C (40°F); and rejected if they're at a higher temperature. If eggs are coming directly from an egg grading station, they can be shipped at 13°C (55°F). Refrigerate acceptable eggs as soon as you receive them. Store them in their original containers.

Non hen eggs, such as duck and quail, should be clean and uncracked when received at the food premises. Any transportation or storage of these eggs should be done at 4°C or lower.

Dairy products

Buy only pasteurized milk. All dairy products like ice cream, cheese, sour cream and yogurt must be made using only pasteurized milk. This doesn't apply to cheese made from unpasteurized milk in a licensed plant, and cheese made from animals other than cows or goats, provided the cheese has been prepared in a way that destroys and prevents bacterial growth and any other contamination that would make it unsafe to eat. It is recommended to freeze ice cream and to store most other dairy products between 2°-4°C (36°-40°F). Dairy products shouldn't have a sour or moldy taste or a strange colour or texture. Make sure you check the 'best before' date. These products should be delivered at 4°C (40°F) or lower. Reject them if the temperature is higher.

Map foods

Modified Atmosphere Packaging (MAP) reduces or replaces oxygen with other gases to help keep bacteria from growing. Food packaged in MAP can be kept longer without using preservatives.

Some of the foods available in MAP are:

Refrigerated meals | **Fresh pasta** | **Prepared salads** | **Soups** | **Sauces** | **Cooked meats and poultry**

Check packages for any holes or tears, bubbles, slime or discoloured contents. If you see any of these, reject them. MAP makes food much less likely to spoil as long as the packaging is done right and isn't mishandled.

Check for the expiration or 'best before' date on the package, and make sure the foods are received at the temperature marked on the package by the manufacturer or supplier.

Canned foods

Food premises can't use or accept any home-canned foods. The risk for botulism is too high. Commercially prepared foods are made safe by heating to very high temperatures to meet quality control standards which are tested and verified on a regular basis.

Don't accept any metal cans with swollen sides or ends, flaws in the seams, rust, dents, leaks or bad smelling contents. Reject any can without a label. After a metal can is opened, it must not be re-used to store or cook foods.

Never taste a can's contents to test them. You can get botulism from even one small taste.

Fresh produce

Check fresh fruits and vegetables for wilting, mold or any signs of infestation by bugs or other pests. You should reject any products that aren't in good condition.

Remember your cross-contamination rules. Make sure that refrigerated produce is stored below ready-to-eat foods and above any raw meats, poultry or seafood.

Dry goods

Dry goods are foods like:

Cereal

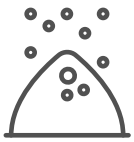
Grains

Nuts

Rice

Crackers

Pretzels



Sugar

Flour

They should be received in dry, unbroken packages. Dampness or mold may be signs of spoiled food or bacterial growth. Check packages for holes or tears which could be evidence of infestation. Make sure these products are well within the 'best before' or expiration dates.

You should store all grain and bulk foods in closed metal or plastic containers to prevent contamination and keep pests out.

How to receive

Once you've inspected food and decided to accept it, there are a few more things you should do to keep the food safe.

Remove potential physical contaminants.
Remove staples, nails or other fasteners from packages so they don't later end up as physical contaminants in food served to customers.

Check your invoices.
Check what you're getting against invoices to make sure you're receiving everything you ordered, and only what you ordered.

Remember your temperature control.
Get refrigerated and frozen items into cold storage as quickly as possible. Don't leave them on the dock or in receiving.

Prevent contamination.
All foods should be moved to their storage areas as soon as possible to keep them from getting contaminated.

Maintain records and receipts:
It is a requirement to keep all receipts up to a year after purchase.

Inspected sources:
Ensure food that is subject to inspection by the government of Canada or Ontario (i.e., meat, dairy, hen eggs) is obtained from an inspected source.

Rejecting a shipment

Employees responsible for receiving goods should know what to do whenever a shipment doesn't meet the standard of your food safety system. If you are responsible for this, make sure you know your company's policy on what to do. If you reject all or part of a shipment, record the rejection in a delivery log. The log may include, the date, food involved, the package identification (if there is one), the standards not met, and the type of adjustment made

Storage

Different kinds of foods have different storage needs. Some foods can be safely stored at room temperature; others need to be refrigerated or frozen to be kept safe. In the appendix you will find a guide that breaks down the storage times or shelf life for foods stored in the refrigerator, freezer and at room temperature.

All foods should be stored on shelves, and never be stored on the floor. This ensures you can effectively clean the floor, and that food is protected from potential contamination and pests. A general rule is 15 centimeters (6 inches) off the floor. If there isn't enough space, adjustments should be made. Consider more frequent, smaller deliveries, or decreases in menu choices.

Never store food in:

- Washrooms
- Staff dressing rooms
- Corridors
- Furnace rooms

Mops, pails, brooms and other such items should be kept separate from food storage areas.

Storage guidelines

There are some general rules that apply to all kinds of food storage.

Always store food in an area that's used only for food storage.

- Your storage areas need to be kept clean.
- All food products should be kept at least 15 cm (six inches) off the floor. This makes cleaning and pest control easier.
- Chemicals and food must never be stored together. Keep chemicals in the original containers – labeled with the proper mixing instructions, warnings and first-aid information – and store them away from food.
- All foods should be stored in food grade containers that are of good quality and easy to clean. Commercial food grade containers are made to be durable and will last longer than cheaper containers that can't take the daily wear and tear. Cardboard as an original container for certain foods (e.g., mushrooms) is allowed, but can't be reused to store any other foods because it can't be cleaned and sanitized properly.
- Food should not be crowded. There needs to be enough space for air flow and circulation both in cold storage (refrigerators and freezers) and room temperature storage areas. There should also be enough space to keep foods separate to prevent cross-contamination.
- Keeping moisture low will help food last longer and prevent mold.

Stock rotation

It's important to make sure you keep your stored food products, or stock, in a way that will keep them safe and fresh.

- All foods stored in the freezer, refrigeration unit or dry storage should be arranged using the first in, first out (FIFO) rule. Sort foods by their expiration or 'best before' dates. Products without these dates should be dated when they're received. New products should be put behind older products to make sure that older products are used first – the first product you received (in) is the first product you use (out).
- Follow the recommended storage times for refrigerated, frozen and dry good foods. Use the Food Handlers' Storage Guide in the appendix to help you. Make sure all foods are dated.
- Don't order more than you can use. If you overstock, you'll end up wasting food.
- If you're not going to throw them away immediately, keep foods that are past their 'best before' or expiration date away from other foods.

Best before dates

Best before dates must appear on pre-packaged foods that will keep fresh for 90 days or less. It applies only for unopened products. Once opened the product should be consumed rapidly. Foods susceptible to spoilage, such as milk and cheese, should not be consumed if the best before date is passed. It is important to know that a best before date is only meant to indicate how long a food will retain its normal wholesomeness, flavour and nutritional value when stored under normal conditions.

Expiration dates

Expiry dates must be used on infant formula, formulated liquid diets, meal replacements, pharmaceutical drugs and natural products. After the expiry date, the food may not have the same microbiological and physical stability and nutrient content declared on the label. Food should not be eaten if the expiration date has passed. They should be discarded.

Review questions

Circle the letter that represents your answer.

1. **What should you do if your supplier offers to sell his home-canned tomatoes?**
   A. Do not accept it or any other offer of homemade products
   B. Accept it and store it immediately in the dry goods area
   C. Accept it. The jars appear to be in good condition
   D. Accept it and store it in a cold holding unit

2. **Invoices, receipts and records for meats should be stored on-site for a minimum of:**
   A. 30 days
   B. 60 days
   C. 90 days
   D. One year

3. **Which of the following food products can be received and accepted upon delivery?**
   A. Unpasteurized milk
   B. Unpasteurized soft cheeses
   C. Grade A eggs at a temperature of 14°C (58°F)
   D. A poultry product with a label indicating it is from a federally inspected plant

4. **Which of the following egg products can be accepted upon delivery?**
   A. Cracked Grade B eggs at 4°C (40°F)
   B. Unpasteurized liquid eggs at 4°C (40°F)
   C. Grade A eggs at a temperature of 4°C (40°F)
   D. Grade C eggs at a temperature of 4°C (40°F)

5. **What is the general rule to how high food should be stored off the ground?**
   A. 5 cm/two inches
   B. 10 cm/four inches
   C. 15 cm/six inches
   D. 15 mm/one inch

6. **When a shipment of food arrives, the employee should:**
   A. Inspect only the potentially hazardous food
   B. Put everything away first and inspect it later
   C. Inspect all foods right away before storing them
   D. Stack or place the new food items in front of old product

7. **The first in, first out (FIFO) rule means:**
   A. Rotating stock to be sure the oldest products are used first
   B. Food that is placed in the oven first should be the first food to come out
   C. Storing foods, being sure that frozen foods are put away first when they are received
   D. Making sure ready-to-eat foods are stored above raw foods, on the first shelf in the fridge

Summary

- Ensure all of the food you are receiving is from an inspected source and in good condition. Do not accept any homemade food, including canned or jarred foods, baked goods or any other type of food
- Ensure records, receipts and invoices for meats are provided and available for at least one year from the date of delivery. PHIs may require reviewing these documents at the time of inspection
- Refrigerated or frozen foods need to be shipped in vehicles that can keep them at the right temperatures. Refrigerated food must be shipped at an internal temperature of 4°C (40°F) or lower and frozen food in a frozen state
- Cracked and Grade C eggs cannot be used in food premises. Liquid eggs must be pasteurized
- All dairy products like ice cream, cheese, sour cream and yogurt must be pasteurized or made using only pasteurized milk
- Commercially prepared canned foods are made safe by heating to very high temperatures to meet quality control standards which are tested and verified on a regular basis. Reject canned products if there are signs of swelling, leakage, rusting, dents, missing or unreadable labels
- Dry goods must be received in dry and unbroken packages. Dampness or mold may be signs of spoiled food or bacterial growth. Check packages for holes or tears which could be evidence of infestation. Store all grain and bulk foods in closed food-grade containers to prevent contamination and keep pests out
- Any water used in food premises must be from a potable water supply. Food premises on a private well (under the Small Drinking Water System O. Reg 319/08) must routinely sample their water and have it tested. The area PHI will also take water samples during routine inspections. If a food premises is notified of an adverse result, action must be taken immediately
- Storage areas need to be kept clean and at low moisture levels to help food last longer and prevent mold. Always store food in an area that is used only for food storage. Chemicals and food must never be stored together
- All food should be kept off the floor and should be stored in containers that are of good quality and easy to clean
- All food should be stored using the first in, first out (FIFO) rule. Sort foods by their best before or expiration dates. New products should be put behind older products to make sure that older products are used first – the first product you received (in) is the first product you use (out)

Answer key

Test your knowledge: (pg. 55)

1. False
2. True
3. False

Review questions: (pg. 61)

1. A
2. D
3. D
4. C
5. C
6. C
7. A

In review

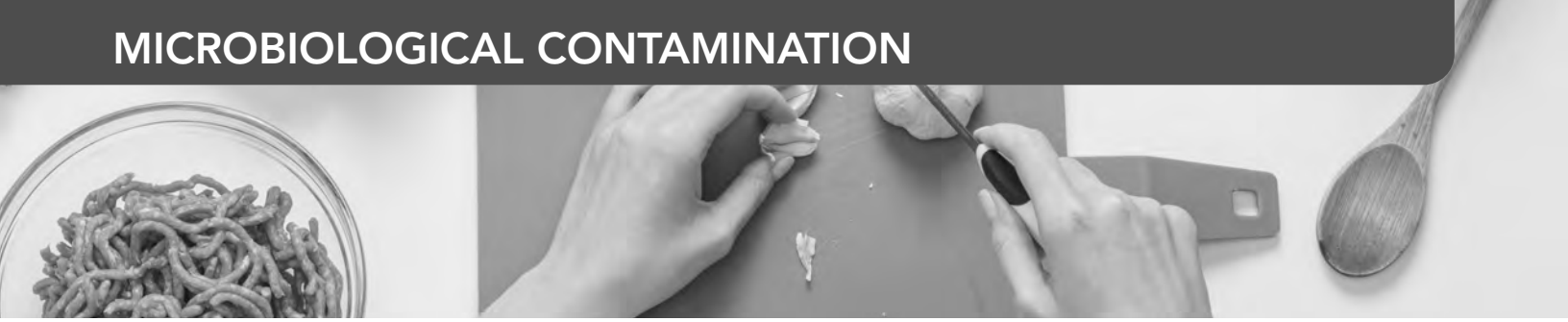
The following topics have been covered in this section:

1. The different shipping and storage requirements for different types of foods
2. Checking the temperature and condition of foods you receive to make sure they've been shipped using food safety standards
3. What to do when you need to reject a shipment
4. Using the 'first in, first out' rule to ensure food is used in the right order

Notes

Microbiological contamination

If you think there's a chance that food has been contaminated, throw it away or let your supervisor know.



Introduction

Microbiological contamination is the spread of harmful microorganisms to food that doesn't naturally contain those microorganisms.

As discussed in the Microorganisms section, some foods naturally have microorganisms in them, like *Salmonella* in raw poultry. If *Salmonella* is transferred from raw poultry to another food, this is called cross-contamination. There are also other sources of microbiological contamination. Viruses, like Hepatitis A, can be transferred to food from an infected person who is handling the food.

Other sources of microbiological contamination include poor cleaning, poor personal hygiene or dishes that haven't been cleaned and sanitized properly. There are simple things you can do as a food handler to make sure food doesn't get contaminated.

Test your knowledge

Circle True or False for each of the following statements:

1. **It is acceptable to dip your clean finger in food to taste it.**
   TRUE FALSE
2. **It is acceptable to store dry goods in a corridor if there is a lack of space as long as it is kept clean and sanitary.**
   TRUE FALSE
3. **It is acceptable to re-use single-use-utensils such as spoons if they appear not to have been used.**
   TRUE FALSE

Cross-contamination

Cross-contamination happens in three ways:

1. **Food to Food.** Raw food or juices come in contact with ready-to-eat food.
2. **Equipment to Food.** The same equipment is used with raw and ready-to-eat food without cleaning and sanitizing in between.
3. **People to Food.** Hands that have touched raw food then touch ready-to-eat food without being washed in between.

Refrigerate

When food is stored in a refrigerator, it's important to place the food in a way that avoids cross-contamination.

Keep raw meat, poultry and seafood on the bottom shelves. Cooked and ready-to-eat foods should go on the upper shelves. Raw fruits and vegetables and foods that will be re-heated belong in the centre. If there's a lot of refrigeration space, store each food group in a separate area of the refrigerator.

Make sure that all stored foods are covered to avoid cross-contamination from drippings or juices from other foods, and to keep out other contaminants like dust or objects.

What could go wrong?

What could go wrong if...

Lettuce is stored next to raw chicken?

- The lettuce won't be cooked before being served, and could be cross-contaminated with *Salmonella* or other bacteria from the chicken.

Raw chicken is stored above loosely covered ready-to-eat foods?

- The juices from the chicken could drip into the foods below and cross-contaminate them.

Soup placed at the bottom of the fridge is uncovered?

- Physical or microbiological contamination from the food stored above it could happen easily.

You should always use new utensils and new food pans when replacing food on display.

Food display

Old food should never be mixed with new food. The old food may spoil faster than the new food, contaminating the new food. Additionally, microbiological contamination is another reason not to mix old food with new food. Keeping them separate keeps any contaminants that could have gotten into the old food from getting into the new food.

Each time a pan of food is replaced, the pan and all utensils used with it should be sent for dish washing. Clean and sanitized utensils should go out in their place. "Sneeze guards," which are the protective shields that sit between a person's face and the food on display, should always be used. The handles of utensils used to serve out the food should never come in contact with the food.

Serving food

Microbiological contamination can also happen when food is being served to customers. To keep from contaminating food as it's being served, you should follow these tips:

- Use single-use disposable plastic bags, wax paper or disposable gloves to give out food
- Cover cutlery (forks, knives and spoons) and keep glasses upside down if they're out but not in use
- Use trays to serve
- Don't touch the surfaces of dishes or utensils that come into contact with mouths or food – like insides of glasses, straws or eating ends of cutlery
- Don't put your thumb on top of a plate to hold it. Hold plates underneath with your thumb on the rim

Even if food looks like it hasn't been touched, you don't know for sure that it hasn't been. It could be contaminated and must be discarded.

Discarding

Any food that has been served but not eaten must be thrown out, with the exception of low-risk food that was previously served in packaging or a container that protects the food from contamination. This may be re-served if the packaging or container has not been compromised and the food has not been contaminated.

Single service items such as disposable plates, plastic cutlery or chopsticks must be discarded. Even if they look like they haven't been used, you can't know that for sure, so you must throw them out.

Single service items aren't made to be used more than once. They can't be properly cleaned or sanitized; therefore, they can't be re-used.

Equipment

If a piece of equipment used in your kitchen comes in contact with raw food, it will pick up the microorganisms that are on the food. If it then touches ready-to-eat food, that food will be cross-contaminated.

To keep this from happening, all equipment must be washed, rinsed and sanitized often, especially between being used with different foods.

It's very important to keep raw food away from cooked or ready-to-eat food. Raw foods - including meat, other animal products like eggs, and raw fruits and vegetables - may contain harmful microorganisms. The best way of avoiding cross-contamination between raw food and ready-to-eat food is to have separate equipment, utensils, cutting boards and preparation areas for each.

Colour coded utensils and cutting boards can help. Use one colour for raw foods, and a different colour for ready-to-eat food. If you can't, then it's very important to immediately wash, rinse and sanitize any surface that food (especially raw food) touches each time it's used.

How could this happen?

To show you how easy it can be for food to get cross-contaminated, consider this example.

A food handler slices raw chicken on a cutting board. The raw chicken is contaminated with Salmonella bacteria, which is commonly found on raw poultry, but is destroyed by cooking. The raw chicken contaminates the board, the knife and the food handler's hands.

The food handler wipes the contaminated knife and board with a cloth, and sets them aside. Now the board, knife, cloth and food handler's hands are all contaminated with microorganisms from the raw chicken.

Sitting out at room temperature, Salmonella bacteria multiply very quickly. The microorganisms can't be seen, so other food handlers in the kitchen won't know that all of these objects are contaminated.

Another food handler picks up the knife and cutting board, and uses them to chop lettuce for a salad. The lettuce is now contaminated with Salmonella bacteria.

To prevent this, the knife, cutting board and cloth need to be cleaned and sanitized before they come into contact with any food or food contact surfaces. The food handler's hands need to be washed before handling any other food or food contact equipment.

Equipment care

To help prevent equipment cross-contamination you should:

- Keep sanitizing solution on hand in a bucket or labeled spray bottle, mixed to the proper strengths.
- Keep wiping cloths in sanitizing solution to keep bacteria from growing on the cloth.
- Replace cutting surfaces if they have cracks, crevices or open seams. Damaged surfaces can't be cleaned well enough to get rid of harmful microorganisms.
- Remember that meat slicers come into contact with food and must be taken apart and thoroughly cleaned and sanitized after use. If slicers are used several times every day, clean the equipment throughout the day to remove bacteria from cutting surfaces. Take the slicer apart and thoroughly clean it at the end of the day.
- Change utensils (i.e., knives, ladles, tongs, etc.) often throughout the day. If a utensil is dropped, don't wipe it on your apron or cloth and reuse it. It's dirty and must be sent to the dish washing area and replaced with a clean one.
- Can opener blades enter the can and touch the food. They must be cleaned regularly.

Tasting food

Food handlers often need to taste food as they prepare it.

Do:

- Use a disposable spoon and throw it out right after you have tasted the food.
- Use a clean regular spoon and place it with the dirty dishes right after you have tasted the food.
- Ladle food into a cup, tasting bowl or another spoon. Use a second spoon to taste the food – that way, the first utensil goes in the food, the second goes in your mouth, and the two never touch.

Don't:

- Dip your fingers into the food then into your mouth.
- Put a spoon that has been in your mouth back into the food.

When you're tasting food, you need to make sure the microorganisms in your mouth and on your fingers don't end up in the food.

Activity

Refrigerator shelves:

A. Top shelf
B. Middle shelf
C. Bottom shelf

Beside each food item, indicate which refrigerator shelf it should be stored to prevent cross-contamination. Write the appropriate letter A, B or C.

List of foods:

1. Milk _____
2. Raw beef _____
3. Raw vegetables _____
4. Prepared salad _____
5. Leftover lasagna _____
6. Raw chicken wings _____

Review questions

Circle the letter that represents your answer.

1. Which of the following procedures should employees follow when serving food?

A. Store glasses right side up
B. Re-use single-service-utensils if they appear to not have been used
C. Refrain from touching the insides of glasses or the eating ends of cutlery
D. Serve food to the customers quicker by carrying as many plates as possible

2. Which of the following procedures should be used to taste food?

A. Re-use a regular spoon, rinsing it under water after each use
B. Dip a washed finger into the food and then re-wash your hands
C. Ladle food into a cup and use a second spoon to taste the food
D. Re-use a disposable spoon, rinsing it under water after each use

3. Which of the following is the correct way to store raw, unwashed vegetables in a refrigerator?

A. Under raw meats
B. Above a cheese platter
C. Under a prepared salad
D. Above cooked vegetables

4. Where should wiping cloths be stored?

A. In the handwash sink
B. Hung from your apron
C. In a bucket of sanitizing solution
D. On the counter to be close at hand

5. Which of the following is an example of cross-contamination?

A. A cheese platter placed next to a bowl of prepared salad in a walk-in-cooler
B. A wiping cloth in a labelled bucket of sanitizer under a food prep counter
C. A knife used to slice raw chicken breasts and then to chop vegetables
D. A knife used to slice cucumbers and then to slice tomatoes

Summary

Food-to-food

- Place raw meat, poultry and seafood on the bottom shelf of the refrigerator. Place cooked and ready-to-eat foods on the upper shelf. Place raw fruits and vegetables and foods that will be reheated on the middle shelf. If there is a lot of refrigeration space, store each food group in a separate area of the refrigerator

Equipment-to-food

- To prevent equipment cross-contamination, keep sanitizing solution in a labeled spray bottle or a bucket mixed to the proper strength. Keep wiping cloths in a sanitizing solution to keep bacteria from growing on the cloth
- Replace cutting boards with cracks, crevices or open seams that cannot be cleaned and sanitized properly
- Change utensils such as knives, ladles and tongs often throughout the day
- Clean and sanitize meat slicers regularly throughout the day

People-to-food

- Take care when serving food to customers. Prevent cross-contamination by using trays, holding plates with thumb on the rim and fingers under the plate and resist touching the eating ends of cutlery
- When tasting food, use a disposable spoon and discard it after each use. Use a clean, regular spoon and each use, or ladle food into a cup and use a second spoon to taste the food

Answer key

Test your knowledge: (pg. 65)

1. False
2. False
3. False

Activity: (pg. 69)

1. A
2. C
3. B
4. A
5. B
6. C

Review questions: (pg. 69)

1. C
2. C
3. C
4. C
5. C

In review

The following topics have been covered in this section:

1. How to keep microorganisms from being transferred into food that is being prepared, served, stored or displayed
2. The importance of keeping kitchen equipment and utensils clean
3. How to prevent cross-contamination by keeping foods separate as they're prepared and stored

Notes

Personal hygiene

Avoid wearing hand jewelry. Rings, bracelets and wrist watches can trap dirt, making thorough hand washing harder.

Introduction

People are one of the major sources of microorganisms that cause foodborne illness. There are microorganisms on and in the body (e.g., on hands, face, hair) and on clothes. These microorganisms are there all of the time, not just when a person is feeling ill.

They could make another person very sick if they're transferred through food. This could happen even if the microorganisms don't make the person carrying them feel sick. A person may carry a pathogen and not show any symptoms. That is why it is important that people who handle and prepare food follow good personal hygiene practices. This will make it less likely for you to transfer microorganisms from yourself to the food you're handling. It is something over which you have control. You must take it seriously. Even a small amount of a microorganism could be deadly to some people.

Test your knowledge

Circle True or False for each of the following statements:

1. **You do not have to wash your hands after you sneeze as long as you contain it with a tissue.**
   TRUE FALSE
2. **Human hair can be a problem both as physical contamination and microbial contamination.**
   TRUE FALSE
3. **When wearing gloves, hands do not have to be washed after use.**
   TRUE FALSE
4. **A person who has diarrhea can handle food as long as they practice proper handwashing.**
   TRUE FALSE

Uniforms, clothing and aprons

The Food Premises Regulation requires all employees in food premises to wear clean outer clothing when they'll be handling food. Light coloured clothing is recommended because it's very easy to see when the clothing gets dirty.

Remember, dirty clothing may carry pathogens. When a food handler's clothing or apron looks dirty, get it changed for a clean one immediately.

Hair

Human hair can be a problem both as physical contamination and microbial contamination. Headgear, such as hats or hairnets, will help to keep hair out of food and off of food contact surfaces. Headgear also helps to keep people from touching their hair and contaminating their hands. When it gets warm in the kitchen, people may brush their hair from their forehead and back of neck without even realizing they're doing it. Wearing headgear would make you more aware of touching your head and hair.

Hair also carries microorganisms, some of which may be pathogens, so hair must be kept out of food to prevent foodborne illness. It's also important to keep your hands from touching your hair when preparing food or handling food contact surfaces or utensils (such as dishes, forks, spoons and knives).

Hair restraint

Food handlers are required by the Food Premises Regulation to take reasonable precautions to ensure food is not contaminated by hair. This could include wearing headgear that confines their hair. Food service workers who don't prepare food, like persons who wait on tables, may not have to wear headgear. If a server waits on tables and also does some food preparation (e.g., prepares salad or desserts, or ladles soup), then headgear is required.

It's important to wear headgear properly. It should cover all the hair, keeping hair off the forehead and the back of the neck.

Hands and nails

Hands can pick up germs very easily. Hands need to be cleaned well to keep dirt and germs from being transferred to food. Pay extra attention to your fingernails. Dirt can get stuck under fingernails and may need more than just regular hand washing to clean.

- Use a personal nylon nail brush to clean under nails.
- Keep nails well-trimmed to help them stay clean.
- Avoid nail polish as it could chip and fall into food.
- Protect and care for hangnails to prevent infection.

Hand washing

Hand washing, when done correctly, is the single most effective way to prevent the spread of communicable diseases. That includes foodborne illness. Food handlers must wash their hands when needed and wash them well whenever they do.

- Always wash your hands before you start work.
- Wash before handling any food, or cleaning dishes and utensils.
- Any time your hands get dirty or contaminated with germs or with other types of food, you must wash them.

Using the washroom

It's very important to wash your hands properly after using the toilet or urinal. Very high levels of microorganisms and pathogens can be spread through fecal matter or urine, even when you don't feel sick. Toilet paper doesn't keep germs from getting on your hands. Microorganisms are so small they can pass through the toilet paper.

Hepatitis A outbreaks have been caused this way:
"Other people are the only source of the hepatitis virus. The virus is found in feces in high numbers a week or two before symptoms become obvious. Therefore, it is possible to unknowingly spread the virus to other people through lapses in proper personal hygiene (hand washing). Outbreaks have been associated with... food contaminated by infected food handlers, including sandwiches and salads which are not cooked or are handled after cooking" (Alberta Health and Wellness: Common Foodborne Illnesses, 2009).

Nose or mouth contact

Touching your nose or mouth will contaminate your fingers and hands. If you touch your nose or mouth, wash your hands at the hand sink immediately.

To make sure you don't transfer microorganisms to your fingers and hands, you should avoid:

- Biting your fingernails
- Smoking
- Licking your fingers to pick things up, like paper
- Smoothing your hair, beard or moustache
- Touching your nose

Cough or sneeze

Coughs and sneezes send microorganisms, such as Staphylococcus aureus, into the air where they can be breathed in by other people. They also land on nearby surfaces where they can contaminate anything that comes in contact with those surfaces. You should contain any sneezes or coughs with tissue paper and to wash your hands at the hand sink immediately afterwards. Remember, microorganisms are so small they can pass through the tissue and onto your hands. If you don't have a tissue handy, cough or sneeze into your upper sleeve instead of your hands. Don't use a cloth handkerchief. Each time you touch it, the germs already on it get back onto your hands. Any food contaminated by a sneeze or cough must be thrown away. Any food contact surface contaminated by a sneeze or cough should be cleaned and sanitized.

If you do any of these things, you must wash your hands properly before handling food or anything that touches food, like counters or utensils.

Other times

Some other common ways that your hands could get contaminated are:

- Handling raw foods
- Clearing tables
- Handling dirty dishes
- Handling garbage
- Cleaning and mopping
- Handling bottoms of boxes
- Handling money

How to wash

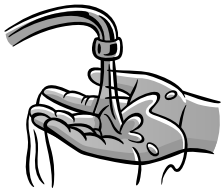
To properly wash your hands so that surface microorganisms are removed, you need to use lots of soap and warm water. Use a sink that's only used for hand washing.

1 **Wet Hands**. Remove jewelry and watches. Wet hands with warm water first.

2 **Soap.** Be sure to use enough liquid soap.

3 **Lather well.** Lather for 15-20 seconds. Clean wrists, palms, back of hands and between fingers.

4 **Rinse.** Rinse with warm water. Be sure not to touch the side of the sink.



5 **Dry.** Dry hands completely with paper towel or with an air dryer.

6 **Keep clean.** Use a paper towel to turn off the water to protect hands from getting dirty again.

No-touch techniques

Food handlers should avoid directly touching food whenever possible. Utensils like tongs, spoons and scoops act as barriers between your hands and the food. Napkins or sheets of waxed paper can be used to pick up foods like muffins, donuts, cookies, bread, and ice cream cones without directly touching the food with your hands.

Disposable plastic gloves can be used instead of bare hands, but gloves will pick up microorganisms the same way hands do. Make sure you wash your hands before and after using gloves, and always use a new pair of disposable plastic gloves when you change tasks or after any potential contamination. Throw away the used ones.

"No-touch" techniques are especially important when handling any food that isn't going to be heated or cooked after you touch it. If you touch a ready-to-eat food with dirty hands, then whatever is on your hands will get on the food and then in someone's mouth. Remember, no one wants your fingers in their mouth!

Remember, glove use doesn't eliminate the need for hand washing. Be sure to wash hands before and after gloving.

The work at hand

Some other tips to keep the food you're handling safe are:

- Never stack plates to carry several of them at one time, as your hands may touch the food.
- Never blow into bags to open them.
- Never hold place settings or food without washing your hands after clearing tables or bussing dirty dishes.
- Never touch the inside of glasses or the eating surfaces of tableware.

During a single shift, you should avoid combining jobs that are likely to cause contamination:

- Don't work with both raw and cooked foods.
- Don't wash dirty dishes and stack clean ones.
- Don't clear dirty dishes and reset tables with clean dishes.

If you have to do these things together, you need to wash your hands between each task.

When you need gloves

If you have a cut or infection on your hand, a bandage should be worn to cover it and a glove should be worn over the bandaged hand until the cut or infection heals. A bandage alone is not enough. Bandages get wet and dirty and can then carry pathogens. This is the only time a food handler should wear gloves, unless it's required as part of your employer's policy. Remember to change your gloves after each task.

When you're sick

If you're sick, your body is producing more germs and microorganisms than it does when you're healthy. If you have any of the following symptoms you must not prepare or serve food:

- Diarrhea
- Vomiting
- Fever
- Sore throat
- Persistent coughing or sneezing

If you have any of these symptoms or if you have a communicable disease, you must let your manager or supervisor know.

Returning to work

If you have diarrhea, the levels of pathogens being shed by your body are so high that even good hand washing may not reduce them to safe levels. After 24 hours without symptoms, pathogens are still being shed by your body, but the numbers are much lower.

Even if you're feeling well, you should still be careful and practice proper hand washing. You could be sick and not know it. With some illnesses, your body can shed microorganisms up to two weeks before you start to feel sick.

You shouldn't return to work until 24 hours after the symptoms have stopped.

Review questions

Circle the letter that represents your answer.

1. **Can a food handler perform regular food preparation duties with a cut on their finger?**
   A. Yes, if they use antiseptic between jobs
   B. Yes, if the cut is bandaged and they wear a glove over the bandage
   C. Yes, if they have a doctor's note to show that the cut is not contagious
   D. No, they should be exempt from food preparation until the cut is healed

2. **An ill food handler can return to work:**
   A. As soon as he/she feels better
   B. After he/she is symptom free for at least 24 hours
   C. After he/she is symptom free for at least 12 hours
   D. As long as he/she wears gloves when preparing food

3. **What is an acceptable way to deal with a cough or sneeze?**
   A. Into your upper sleeve
   B. Into the air but away from food
   C. Into a disposable tissue and discard it
   D. Into a re-usable cloth handkerchief and wash your hands

Summary

- All employees in food premises must wear clean outer clothing when handling food.
- Human hair can be a problem both as physical contamination and microbial contamination. Headgear, such as hats or hairnets, will help to keep hair out of food and off of food contact surfaces.
- Hand washing should occur any time hands get dirty or contaminated.
- The six steps to proper hand washing: Wet hands, apply soap, lather well, rinse, dry and turn off taps with a towel.
- Contain any sneezes or coughs into your upper sleeve or elbow instead of your hands.
- Food handlers should avoid directly touching food whenever possible. Utensils like tongs, spoons and scoops act as barriers between your hands and the food.
- Use new gloves when you change tasks or after any contamination. Throw away the used ones.
- The only time a food handler is required to wear gloves is when the food handler has a cut or infection on their hand. A bandage must be used and a glove must be worn over the bandaged hand until the cut or infection heals.
- A food handler should not prepare or handle food if they are experiencing any of the following symptoms: Diarrhea, vomiting, fever, sore throat and persistent coughing or sneezing. A food handler must inform a manager or supervisor. A food handler should not return to work until 24 hours after the symptoms have stopped.

Answer key

Test your knowledge: (pg. 72)

1. False
2. True
3. False
4. False

Review questions: (pg. 77)

1. B
2. B
3. A

In review

The following topics have been covered in this section:

1. Why it's so important to keep your hands clean
2. Some of the ways your hands can get contaminated
3. How to properly wash your hands before handling food
4. Ways to handle food without directly touching it

Notes

Cleaning and sanitizing

It's important to mix chemicals properly. Not using enough chemical will mean microorganisms are not being killed; using too much can lead to chemical contamination.

Introduction

Keeping your food premises clean isn't only about it looking good. It's about cleaning and sanitizing to control microorganisms and keep your food and your customers safe.

Destroying all microorganisms is nearly impossible, but by cleaning and sanitizing it's possible to reduce them to safe levels. To do this, both steps are needed and both must be done properly.

A well maintained food premises will depend on:

- Using proper cleaning and sanitizing agents and using them the right way
- Educating staff on how to clean and sanitize
- Having dedicated management and employees
- Being organized

Test your knowledge

Circle True or False for each of the following statements:

1. **If a cutting board has significant cracks or scratches, it must be replaced.**
   TRUE FALSE
2. **Once properly washed and sanitized, dishes should be dried with a dish-towel.**
   TRUE FALSE
3. **Multi-use service utensils such as plates and cups may be manually washed in a two compartment sink.**
   TRUE FALSE
4. **When not in use, a handwash sink can be used to wash small amounts of utensils.**
   TRUE FALSE
5. **Cleaning schedules are a good practice to use.**
   TRUE FALSE

How to clean

When you clean, use the right chemicals and friction to remove dirt or soil. Examples of this could be washing a floor with floor cleaner or washing dishes with dish soap.

The steps to cleaning are:

- Remove any obvious pieces of food, dirt or other debris.
- Use cleaning chemicals and friction to remove the rest.
- Rinse with hot tap water to remove cleaning chemicals.

When it comes to food contact surfaces like counters, dishes, cutting boards or utensils, cleaning alone isn't enough. A surface can look clean but still have unsafe levels of microorganisms. Once a food contact item is clean, the next step is to sanitize it.

How to sanitize

When you sanitize, you reduce the number of microorganisms to safe levels. Examples of sanitizing is soaking cleaned utensils in diluted bleach or using the very high water temperatures in the sanitizing cycle on a dishwasher.

The steps to sanitizing:

- Always clean before sanitizing.
- Use very hot water, at least 77°C (170°F), or chemicals to remove microbiological contaminants.
- Make sure the items you're sanitizing are in contact with the chemical solution or hot water for at least 45 seconds.
- Use test reagents, test strips or a thermometer to make sure your sanitizer or sanitizing solution is working.

Follow the manufacturer's directions when using chemicals to sanitize.

Types of chemical sanitizers

When selecting a sanitizer, make sure you also get a test reagent or test strips to measure the solution's strength. Special test strips are available from your chemical or restaurant supplier. Where hot water is used to sanitize, an accurate thermometer must be used to check the water temperature.

Chlorine-based products **Strength - 100 parts per million (ppm)**

There are many chlorine-based chemicals. The most common one is household bleach. Ensure the strength used is 100 mg per litre. To make 100ppm chlorine sanitizer, mix 2 ml of (5 per cent strength) bleach per litre of water.

Quaternary ammonium-based products **Strength - 200ppm**

Measure according to the manufacturer's label to make a 200 mg per litre concentration. You may need to rinse any food contact surface after sanitizing with ammonium. Follow the manufacturer's label instructions. These quarternary ammonium-based cleaning compounds are also referred to as "Quats" or "quat sanitizers".

Iodine-based products **Strength - 25ppm**

Mix according to the manufacturer's label instructions to make a 25 mg per litre concentration.

Other sanitizers

Other sanitizers may be used, but under the conditions that:

- They are approved by Health Canada, Canadian Food Inspection Agency, or the local medical officer of health for the intended purpose;
- They are used in accordance with manufacturers' directions; and
- They come with a test reagent to ensure the appropriate concentration when using.

Make sure that these approvals and manufacturers' directions are available for public health inspectors to ensure correct use.

Chemical sanitizers

Whichever one you choose to use, it's important to remember the three things that affect how well they work:

Contact

The solution must be in contact with the items you're sanitizing for at least 45 seconds for it to kill microorganisms.

Selectivity

Some products are more effective than others in killing certain types of microorganisms. Quats, in particular, may not kill all types of microorganisms.

Concentration

Solutions need to be mixed to the right strength. If the solution is too weak, it may not sanitize. If it's too strong, it may leave a taste or smell, damage metals, or be a health hazard. It's best to use a system that automatically dispenses sanitizer.

Making sure it's sanitized

Make sure you use a test reagent or test strips to measure your sanitizing solution's strength. If you sanitize with hot water, you need to check the water temperature with an accurate thermometer.

All food contact surfaces should be cleaned and sanitized between uses. **This includes:**

- Sanitizing dishes after cleaning them
- Sanitizing tables between customers
- Sanitizing food preparation areas between preparing different types of food

Dishwashing

There are three dishwashing methods that can be used in a food premises, depending on the type of dishes you have to clean and the equipment you use. **These are:**

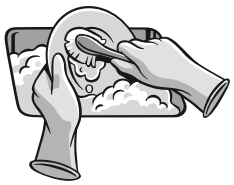
1. Manual dishwashing using three sinks
2. Manual dishwashing using two sinks
3. Mechanical dishwashing

Three compartment sink

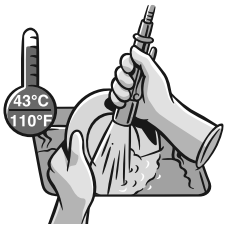
If you're washing multi-service articles (e.g., reusable dishes, knives, forks, spoons, glasses) you need three sinks – one to wash, the second to rinse, and the third to sanitize. If you have items with baked-on grease or heavy food residue, pre-soak and scrape before you wash.

1 **Scrape or pre-rinse.** Remove any leftover food on the dishes by scraping or rinsing it off

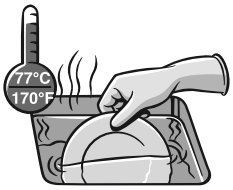
2 **Wash (sink 1).** In the first compartment, wash and scrub the dishes, utensils and pots, making sure all food and grease are removed. Remember, cleaning takes chemicals and friction. Use warm water and detergent.



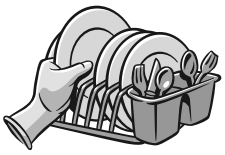
3 **Rinse (sink 2).** In the second compartment, rinse the dishes, utensils and pots to remove the soap and any remaining food particles. This is important because any detergent left on the dishes will weaken the sanitizer. Use clean water, at least 43°C (110°F). Change the water if it doesn't look clean.



4 **Sanitize (sink 3).** Sanitize in the third compartment by submerging dishes, utensils and pots in hot water, at least 77°C (170°F), or a chemical solution in water that's at least 24°C (75°F). Let them soak for at least 45 seconds to give the sanitizer time to kill microorganisms. It's important to make sure that the sanitizer is strong enough to do the job, so test the sanitizer right after mixing it in the sink.



5 **Air dry.** After sanitizing, let items air dry on a non-porous sloped draining board. Never towel dry, as you could cause contamination from a worker's hand or a damp dish towel.



Two compartment sink

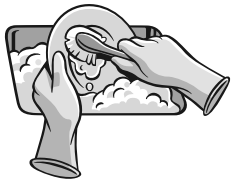
You can wash and rinse in one sink, and sanitize in the second. **This method can be used:**

- If you use single-service disposable dishes
- For cleaning and sanitizing any items other than multi-service articles, such as pots and pans too large for a mechanical dishwasher

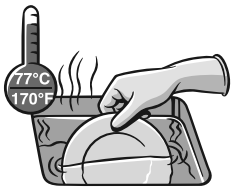
If you have items with baked-on grease or heavy food residue, scrape and pre-soak before you wash.

1 **Scrape or pre-rinse.** Remove any leftover food on the dishes by scraping or rinsing it off.

2 **Wash (sink 1).** In the first compartment, wash and scrub the dishes, utensils and pots, making sure all food and grease are removed. Remember, cleaning takes chemicals and friction. Use warm water and detergent. After washing, rinse under the tap with clean running water. Make sure the soapy water and all soap suds are rinsed off.



3 **Sanitize (sink 2).** Sanitize in the second compartment by submerging dishes, utensils and pots in hot water that is at least 77°C (170°F) or a chemical solution in water that is at least 24°C (75°F). Let them soak for at least 45 seconds to give the sanitizer time to kill microorganisms. It's important to make sure that the sanitizer is strong enough to do the job, so test the sanitizer right after mixing it in the sink.



4 **Air dry.** After sanitizing, let items air dry on a non-porous sloped draining board. Never towel dry, as you could cause contamination from a worker's hand or a damp dish towel.

All machines must have gauges that show wash and rinse temperatures.

Mechanical

All dishwashers must meet minimum standards as outlined in Food Premises Regulation. They must be regularly cleaned and maintained.

The two basic kinds of dishwashers are those that sanitize using hot water and those that sanitize using a chemical solution. Either one can be used as long as it's checked regularly to make sure it's sanitizing properly.

High temperature machine

High temperature machines use hot water in the rinse cycle to sanitize. The water temperature in this cycle must reach 82°C (180°F) or higher and last for at least 10 seconds. Use a water temperature booster if needed.

Low temperature machine

Low temperature machines use chemical sanitizers in the rinse cycle to sanitize. Test strips for measuring the sanitizer in the rinse cycle must be available to make sure the machine is sanitizing properly. Don't overcrowd the dishes as it will be harder for them to get clean. Bowls, cups and glasses should be put in open side down. Cutlery should be mixed to keep them from "nesting".

NSF

NSF approved dishwashers may also be used in a food premises. They may have different time/temperature settings for washing and sanitizing. Operators must ensure that it is working as per manufacturer directions.

After washing

Once dishes, utensils and pots have been cleaned, they should be stored on surfaces that are cleaned and sanitized. Keep them away from dust, garbage or splashes and at least 15 cm (six inches) off the floor. You should not put them away until they are dry and cool. Remember, don't towel dry them as they could get contaminated from the towel.

Always wash your hands before handling clean dishes.

Damaged dishes (cracked, chipped or warped) should not be used because they're a physical hazard. They should be thrown away.

General cleaning

To be effective, cleaning should be organized. Expecting staff to clean "when they have a free moment" doesn't work and tasks get forgotten. A food service manager should show dedication to keeping things clean. This shows the importance of cleaning to their staff. All staff members need to take pride in their job. No one person alone can keep the food premises clean. A cleaning schedule is very useful.

It should include:

- Each job that needs to be done
- Who will do the job
- The chemicals and/or tools to be used to do the job
- How often the job must be done (hourly, daily, weekly)
- A follow-up check to make sure the job was done

The schedule should be discussed with staff before it's put in place and regularly afterwards to make sure it's working.

Food contact surfaces

Work surfaces that come in direct contact with food, such as counters, cutting boards, tables and grills, must be durable and easy to clean.

Having many cutting boards small enough to fit into a dishwasher or sink is better than having a few large ones. Small boards can be quickly changed when dirty without slowing down food preparation. It's a good idea to code cutting boards for specific uses to avoid cross-contamination. One good way to do this is to use different coloured boards or boards with coloured handles for different food types: red for raw meat, green for vegetables, orange for bread, etc.

Plastic is a good cutting board material because it's durable and easy to clean and sanitize. Hardwood can be used as long as it's free of gaps and cracks that would trap bits of food and make thorough cleaning and sanitizing impossible. Extra care must be taken to sanitize wood cutting boards as they can't go in a dishwasher. Wooden food contact surfaces must not be varnished or sealed as these finishes will wear and the chemicals will get in the food.

If a cutting board has significant cracks or gouges that can't be properly cleaned or sanitized, it should be replaced.

Clearing tables

Tables should be cleaned and sanitized between customers. Use sanitizer and a clean damp cloth or a disposable paper towel to make sure any contaminants on the table are removed. Cloths used for cleaning tables should be clean and shouldn't be used for any other purpose.

If there are any table linens (tablecloths, cloth napkins, placemats) they should be changed between settings. Any table linens used must be clean and in good repair. They must be laundered between uses.

Equipment

Your equipment needs to be cleaned often enough to keep it from getting a buildup of food residue or any other contaminants like dust or debris.

Equipment that's used without breaks at room temperature or used with hazardous foods needs to be cleaned and sanitized at least once every four hours and between being used with raw and ready-to-eat foods. Some examples would be a meat slicer or grinder, cheese slicer or food processor. It's a good idea to have more than one piece of equipment when possible, so that one can be used while the other is being cleaned.

Facility

Food safety depends in part on how your premises is laid out, and its maintenance. **Make sure your building:**

- Is kept clean
- Has proper lighting
- Is in good repair
- Has proper ventilation
- Is pest free

Microorganisms can be transferred from floors or walls to food contact surfaces by other objects.

- Floors must be tight, smooth and non-absorbent.
- Walls and ceilings must be easy to clean.
- Floors, walls and ceilings must be kept clean. Repair any damaged areas as they can't be properly cleaned and sanitized.
- Water damaged or broken ceiling tiles need to be replaced.

Washrooms

The number of washrooms you need in your food premises for customers and staff and the number of handicap washrooms are determined by your local building code and building department. The number of fixtures (sinks, toilets, etc.) needed is also listed in the building code. No operator can alter the floor space, number of toilets or washbasins in a sanitary facility without receiving approval in writing from a public health inspector.

Washroom fixtures must be cleaned and sanitized at least once a day and as often as needed to keep them sanitary.

It's a good idea to post hand washing posters in your washrooms for both staff and customers.

Handwash sink

As discussed in the Personal Hygiene section, you should wash your hands using the six-step method whenever they get contaminated.

Food premises need to have at least one sink that is used only for hand washing. This sink needs to be in an area that is convenient for employees. In food premises a hand washing sink is required in each area where food is prepared or processed or where utensils are washed.

At a minimum, each hand washing sink needs to have:

- Hot and cold water
- Soap or detergent in a dispenser
- Clean, single use towels or a cloth roller towel AND a supply of paper towels

The handwash sink can't be used for any food preparation, washing dishes, emptying out water from pots or cleaning buckets. Using the sink for anything other than hand washing increases the risk of contaminating a food handler's hands.

Handwash sinks can only be used for hand washing.

Garbage control

Garbage containers inside your food premises should be easy for your staff and customers to use. There should be enough available to keep them from getting overfilled, and the containers should be emptied often to prevent overfilling and maintain your premises in a sanitary condition. Any time garbage containers are full, they need to be emptied.

Lids or other kinds of covering, like a garbage container inside a compartment with a swinging door, will help to prevent odours, pests and airborne contamination. Garbage containers should be cleaned and sanitized after each use, so they need to be made of durable materials.

When garbage is taken to containers outside your premises, those containers need to be made in a way to keep pests out and any odours or health hazards, like contaminated food, in. Any spills or leaks should be cleaned up right away.

Live animals

Live animals are not permitted in food premises. **There are exceptions to this rule:**

- Service animals described in subsection 80.45 (4) of Ontario Regulation 191/11 (Integrated Accessibility Standards) made under the Accessibility for Ontarians with Disabilities Act, 2005 where food is served, sold or offered for sale.
- Live aquatic species that are in sanitary tanks such as fish or lobsters
- Live birds or animals if they are offered for sale on food premises other than food service premises with permission from the local medical officer of health.

Also note the unique rule about live birds or animals that are sold as food. Having live chickens in a food service premise (e.g. a restaurant) is not allowed, but selling live chickens at a market may be allowed.

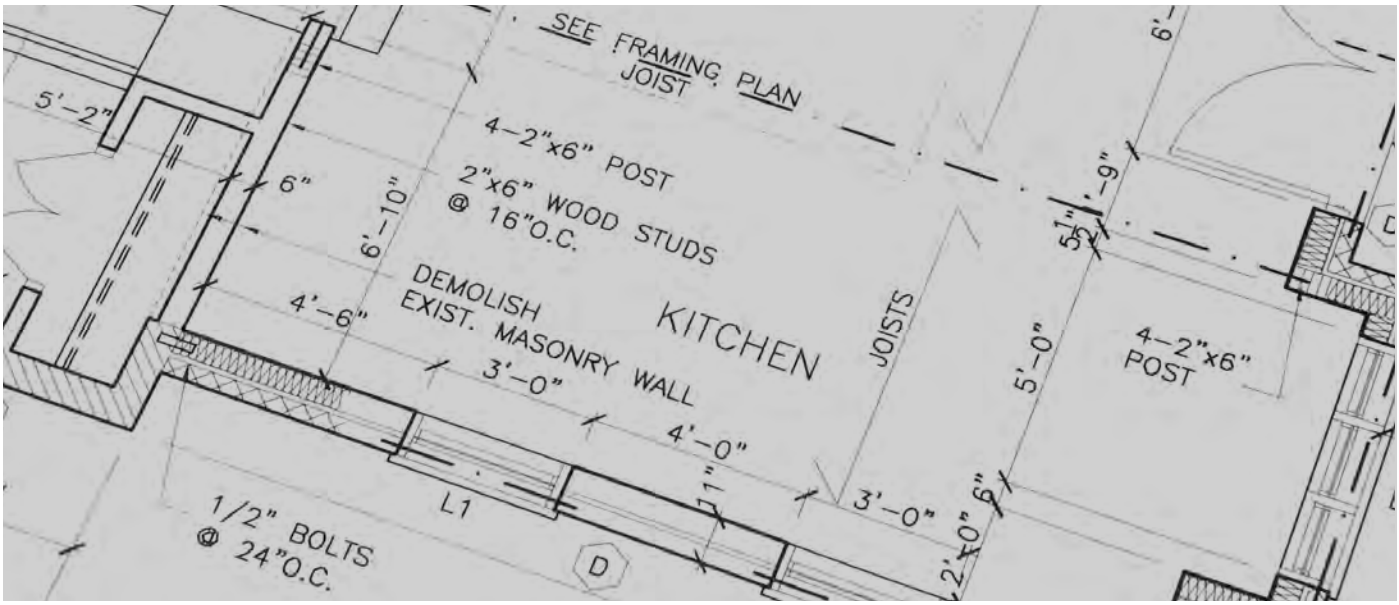
Kitchen layout and plans

Premises that are easy to clean and have a good flow for people and food products are less likely to have problems with cross-contamination, temperature abuse or personal hygiene. If the hand washing sink is easy to get to, it's more likely to get used often. If the fridge is close to the food preparation area, it's more likely that food will stay in the fridge until it's needed.

Before building or renovating any part of a food premises, plans or blueprints of the layout should go to the public health unit for review. Having the plans reviewed before work starts can save money by keeping you from having to change things after they're built.

The layout of the kitchen should be designed to:

- Allow people and food to easily move from place to place to avoid crowding and cross-contamination.
- Make sure there is plenty of storage space for cold storage and dry storage, staff clothing, garbage and cleaning supplies.
- Have separate food preparation areas for raw foods and ready- to-eat foods, if possible, to reduce risks of cross-contamination.
- Make access to hand washing sinks easy and convenient.
- Have separate designated sinks for hand washing and dishwashing.
- Separate the dishwashing area from food preparation areas.



Activity

The steps to manual dishwashing are listed below. Number the steps in their proper order, 1-5.

Wash _____
Rinse _____
Air dry _____
Sanitize _____
Scrape or pre-rinse _____

Review questions

Circle the letter that represents your answer.

1. _____ reduces the number of microorganisms to safe levels.

A. Cleaning
B. Disinfecting
C. Sanitizing
D. Soaking

2. At what strength should chlorine-based sanitizing solution be when sanitizing multi-use utensils?

A. 25 ppm
B. 100 ppm
C. 200 ppm
D. 400 ppm

3. At what strength should quaternary ammonium-based sanitizing solution be when sanitizing multi-use utensils?

A. 25 ppm
B. 100 ppm
C. 200 ppm
D. 400 ppm

4. At what strength should iodine-based sanitizing solution be during the sanitizing cycle of a bar glass dishwasher?

A. 25 ppm
B. 100 ppm
C. 200 ppm
D. 250 ppm

5. A two compartment sink method can be used for washing:

A. Pots and pans
B. Reusable plates
C. Reusable glasses
D. Reusable cutlery

6. The proper procedure for washing dishes in a three compartment sink is:

A. Scrape/pre-rinse, wash, rinse, sanitize, air dry
B. Scrape/pre-rinse, wash, sanitize, rinse, air dry
C. Scrape/pre-rinse, wash, sanitize, rinse
D. Wash, rinse, sanitize

7. High temperature mechanical dishwashers must reach a sanitizing rinse temperature of:

A. 74°C (165°F)
B. 77°C (170°F)
C. 82°C (180°F)
D. 100°C (212°F)

8. Which of the following statements is TRUE regarding cleaning and sanitizing?

A. Garbage containers do not need to be cleaned and sanitized
B. Test strips make sure your sanitizing solution is working
C. Cleaning alone reduces the number of microorganisms to safe levels
D. When cleaning in-place, the chlorine sanitizer must be at a 200 ppm concentration

9. A designated handwash sink can be used for:

A. Handwashing only
B. Handwashing and rinsing small utensils
C. Handwashing and storing sanitizer solution
D. Handwashing and washing vegetables and fruits

Summary

- The three types of chemical sanitizers and their proper concentrations are: Chlorine-based products at 100 ppm, quaternary ammoniumbased products at 200 ppm and iodine-based products at 25 ppm
- Use a test reagent or test strips to measure the sanitizing solution's strength. When sanitizing with hot water, the water temperature must be checked with an accurate thermometer
- The five steps for manual dishwashing are: Scrape/pre-rinse, wash, rinse, sanitize and air dry
- When washing multi-service articles (such as reusable dishes, knives, forks, spoons and glasses) three sinks are needed – one to wash, the second to rinse and the third to sanitize
- The two compartment dishwashing method can be used if single-service disposable dishes are used or for pots and pans too large for a mechanical dishwasher
- There are two kinds of mechanical dishwashers. High temperature dishwashers are those that sanitize using hot water at 82°C (180°F) for at least 10 seconds. Low temperature dishwashers are those that sanitize using a chemical solution
- Food contact surfaces and/or equipment need to be cleaned and sanitized often enough to prevent a buildup of food residue or any other contaminants like dust or debris. Food contact surfaces should be in good repair, made of durable material and easy to clean and sanitize
- Food premises need to have at least one sink that is used exclusively for hand washing. This sink needs to be in an area that is convenient for employees. In large food premises, there must be one hand washing sink in each area where food is prepared or processed or where utensils are washed
- At a minimum, each hand washing sink must have hot and cold water, soap in a dispenser, clean, single use towels or a cloth roller towel and a supply of paper towels
- Non-food contact surfaces such as floors, walls and ceilings, must be tight, smooth, non-absorbent and easy to clean. The facility must have proper ventilation and lighting
- Garbage containers inside a food premises should be easy for staff and customers to use. Garbage containers should be emptied often and cleaned and sanitized after each use. Garbage containers need to be made of durable materials
- Service animals, such as seeing eye dogs or aquatic species kept in sanitary tanks are allowed in a food premise
- Before building or renovating any part of a food premises, plans or blueprints of the layout should go to the local health unit for review.
- The layout of the kitchen should be designed to allow people and food to easily move from place to place to avoid crowding and cross-contamination

Answer key

Test your knowledge: (pg. 81)

1. True
2. False
3. False
4. False
5. True

Activity: (pg. 90)

Wash 2
Rinse 3
Air dry 5
Sanitize 4
Scrape and/or pre-rinse 1

Activity: (pg. 90)

1. C
2. B
3. C
4. A
5. A
6. A
7. C
8. B
9. A

In review

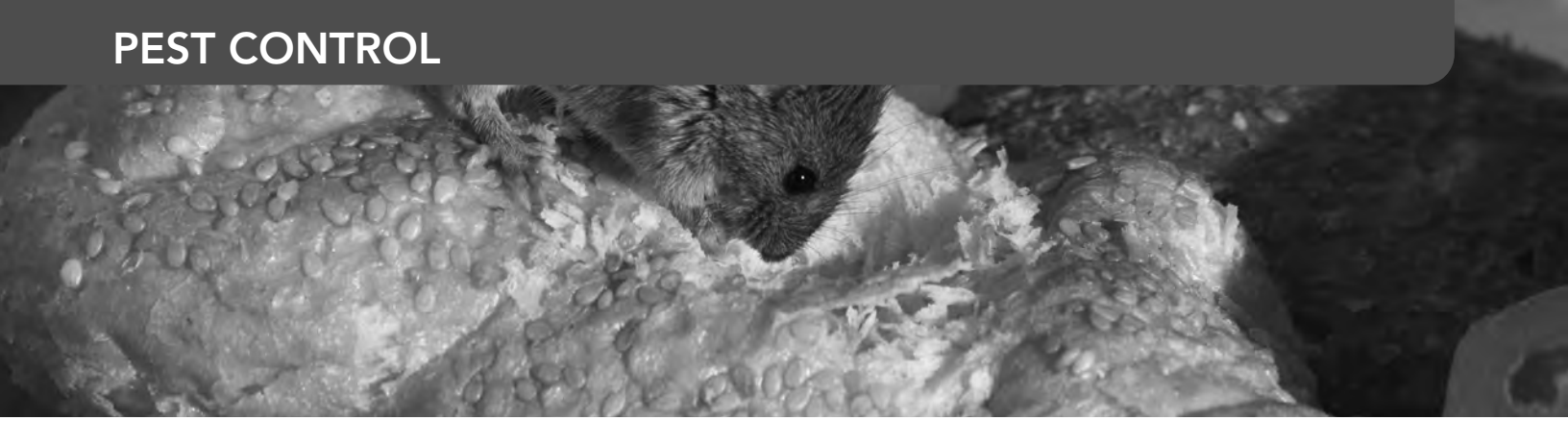
The following topics have been covered:

1. Why it's important to clean and sanitize food contact surfaces and other areas of your premises
2. How to clean and how often to clean the different areas and equipment
3. The two compartment, three compartment, and mechanical dishwashing methods
4. How the layout of a food premises can facilitate cleaning and sanitizing

Notes

Pest control

Their greatest threat is that they spread diseases by contaminating food.



Introduction

Insects and rodents are more than just a nuisance in a food premises. Pests can contaminate your food supplies. They can damage your building by causing electrical or fire hazards and creating holes in the building structure.

Knowing a little about the kinds of pests food premises deal with will help you control them.

Test your knowledge

Circle True or False for each of the following statements:

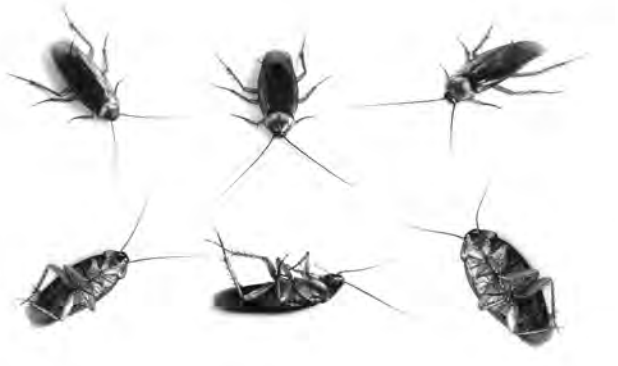
1. **Keeping pests from infesting your premises is much easier and less expensive than getting rid of pests that are already there.**
   TRUE FALSE
2. **Chemicals can be sprayed during food preparation as long as a licensed pest control company is hired to do it.**
   TRUE FALSE
3. **Flies are only a nuisance; they do not pose a health hazard.**
   TRUE FALSE
4. **It is required to maintain records of all pest control measures taken.**
   TRUE FALSE

Cockroaches

Once you have cockroaches, you'll find it very hard to get rid of them. If you see cockroaches in a lit up area, it usually means you have a serious cockroach infestation. Live roaches can survive on very little food and water. They can live for up to two years during which the female roach can lay over 500 eggs. Roach eggs are protected by an egg case.

Cockroaches can live and breed almost anywhere that is dark, warm, moist, and hard to clean. **Some spots they like are:**

- Behind refrigerators, freezers and stoves
- In sink drains and floor drains
- In spaces around hot water pipes
- In the motors of electrical equipment
- Under shelf liner and wallpaper
- In delivery boxes and bags



Cockroaches give off a strong oily odour and their feces looks like large grains of pepper. They will eat almost anything organic and they like to lay their eggs inside the corrugated sections of cardboard.

If you see cockroaches in a lit up area, it usually means you have a serious cockroach infestation. Cockroaches normally look for food and water in the dark.

Common types of cockroaches

There are many different types of cockroaches. **Here are the ones most commonly found in Ontario:**

Type	Description
German	• Pale brown or tan and 10-15 mm (about 1⁄2 inch) long • Found in indoor areas – in motors, cracks, crevices, soft drink machines and near water • Like potatoes, onions and sweet beverages • Reproduce more rapidly than other roaches
Oriental	• Shiny, black and about 25-32 mm (about 1 to 1-1⁄4 inches) long • Found in basements, water pipes and indoor incinerators
American	• Reddish brown and about 34-53 mm (about 1-1⁄4 to 2 inches) long • Drawn to wallpaper, water, and starch in food • Found in drainage and sewer areas, rest rooms, heating pipes and damp oven areas
Brown-banded	• Look like the German cockroach • Found in kitchens, dry storage, and under dining area tables and chairs
Asian	• Look like the German cockroach, but they can fly • Drawn to light and tend to hide in tropical plants

Flies

Flies are so common in our day-to-day lives that sometimes they're not really seen as a problem. In food premises, they're a big problem.

Flies are attracted by smells. They breed in garbage and feces. A female housefly can lay between 375 to 750 eggs over its life span and eggs laid will hatch in as little as seven days. A small fly problem can turn into a big one very quickly.

The #1 reason for closure of food premises is pest infestation.

Flies easily spread filth because their bodies are covered in hair and their feet have suction cups. Any contaminants they touch get stuck to them. Flies don't have teeth so they can't chew food. If they want to eat something that is solid, they vomit on it. The acid from their stomach dissolves the solid, and then they suck it back up. If the fly is scared away, the vomit stays behind and so do the germs. Flies usually defecate while feeding as well.

Flies:

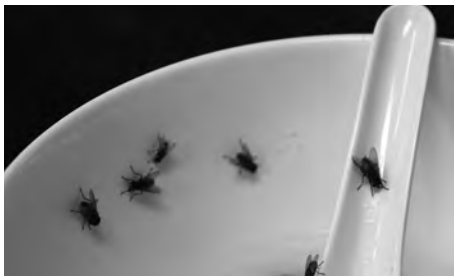
- Can enter a building through an opening the size of a pin head
- Are drawn to smells of rot, garbage, and human feces and animal waste.
- This is where they lay their eggs and find food.
- Are drawn to places out of the wind and to the edges of objects, such as garbage can rims
- Need moist, warm, rotting material out of sunlight for their eggs to hatch into maggots

Other insects

Beetles, moths and ants can survive on very small amounts of food. Flour moths, beetles and insects like them are often found in dry storage areas. **Look for:**

- Insect bodies
- Wings or webs
- Food that's clumped together
- Holes in folds and packaging

Ants often nest in walls and floors, especially near stoves and hot water pipes. They're drawn to warmth and to greasy and sweet foods.



Rodents

Rodents, like rats and mice, eat and ruin food and damage property. Both rats and mice can damage buildings. They can make walls weak by chewing holes, and even cause fires by chewing through electrical wires.

These pests are a serious health hazard. They can spread disease through their waste and by touching food or food contact surfaces. Rodents have a simple digestive system and weak bladder control. They urinate and defecate as they move around your premises. Their waste can fall, be blown or carried into food. Like other pests, rats and mice will breed often and quickly.

Rats are smart enough to avoid poorly set traps and other control measures. Rat bites can be very dangerous to humans and dead rats must be carefully handled to avoid spreading disease.

Like cockroaches, rodents are active in the dark and at night. If you see them in daylight or well lit areas, it's a sign of heavy infestation.

A good working relationship between the operator and the pest control company is important to keep a pest free environment.

Prevention and control

The best way to control a pest infestation is to prevent it from happening in the first place.

If, despite your best efforts, your prevention methods haven't kept pests out, you need to know how to get rid of them. Some of these methods can be dangerous to you, your staff and your customers if proper care isn't taken.

Preventing pests from infesting your premises is much easier and less expensive than getting rid of pests that are already there.

Pest management system

Food premises operators should rely on certified pest control services and emphasize integrated pest management practices that minimize the reliance on chemical controls in order to minimize the risk of contamination of food products by pesticides.

An integrated pest management (IPM) program is a system designed to keep pests from getting into your food premises, and get rid of any pests that are already there.

Three common sense rules for developing an IPM program are:

- Deny pests food, water and shelter by following good sanitation and housekeeping practices.
- Keep pests out of the food premises by pest-proofing the building.
- Work with a licensed pest control company.

Pest control company

Pest control companies can be used for emergencies where pests have already infested your food premises. They should also be used for prevention.

Hire a licensed pest control company that is well suited for your premise. Work with your pest control company to arrange the best possible contract, inspection system, treatment procedures and follow-up. Know which chemical(s) and procedure(s) will be used in specific areas.

Pest control methods, especially the use of chemicals, can be very dangerous for your employees and customers if they're not used properly.

Food premises must be protected against the entry of pests and kept free of conditions that lead to the harboring or breeding of pests. Operators must retain receipts and records for all pest management up to a year for the public health inspector's viewing.

Control methods

Before using chemicals

- Cover all food and dishes in areas where chemicals will be sprayed before spraying starts.

After using chemicals

- You should always thoroughly clean and sanitize all food contact surfaces and equipment before using them for food preparation.
- NEVER spray while food preparation is going on.
- Some chemicals and treatments can't be used when employees are in the area or on the premises. Again, you should hire a professional to do this.
- Other methods that a pest control operator can use are traps, glue boards and poison baits. They can also destroy nests and breeding places.
- Follow up is important to make sure the methods are successfully eliminating the infestation. If not, other methods should be tried.

Pest proofing

Do

- Seal gaps, cracks and openings in floors, walls and equipment.
- Repair any leaky plumbing.
- Keep the outside of the building in good repair.
- Use screens to cover windows, doors and vents.
- Install heavy plastic strips or air curtains on any receiving doors that need to be open often.

Don't

- Don't have a water source for pests. Drain sinks and repair leaky pipes.
- Don't leave doors open when you're not using them. Use a door sweep if there's a gap between the door and floor (mice can squeeze through a quarter inch opening and rats can squeeze through a half inch opening).

Sanitation and housekeeping

Pest control doesn't take the place of good sanitation. The cleaner your premise is, the easier it will be for you to control pests.

Do

- Store all food and supplies at least 15 cm (six inches) off the floor so you can watch for signs of pests.
- Keep grains and open bulk food products in sealed metal or heavy plastic containers.
- Keep break rooms, washrooms and locker rooms clean and dry.

Don't

- Don't accept any shipment that shows signs of pests, like gnawing or feces.
- Don't keep cardboard packaging around. It can carry cockroach eggs.
- Don't let spilled food attract pests. Clean up any spills right away.
- Don't leave garbage where it will attract pests. Store it properly.

Keeping pests from infesting your premises is much easier and less expensive than getting rid of pests already there.

Review questions

Circle the letter that represents your answer.

1. **Which of the following pests like to live and breed in sink or floor drains and spaces around hot water pipes?**
   A. Ants
   B. Cockroaches
   C. Flies
   D. Rodents

2. **Seeing a cockroach in daylight usually means that you have:**
   A. A very large infestation
   B. No places for the cockroaches to hide
   C. A breed of cockroaches that like daylight
   D. Not enough food sources for the cockroaches to survive

3. **When should a food premises first contact a pest control company?**
   A. When they see signs of infestation
   B. If cockroaches or rats are seen during daylight hours
   C. Before any signs of pests are seen, for pest prevention
   D. If they have tried spraying for insects themselves, but it has not worked

4. **What is the greatest concern regarding pests in a food premises?**
   A. Pests may spread foodborne illnesses
   B. Pests may cause damage to the building
   C. Pests may cause damage to foods in dry good areas
   D. Customers may not return because they are bothered by pests

5. **What is one of the rules for developing an Integrated Pest Management (IPM) program?**
   A. Do not work with a licensed pest control company
   B. Pest-proofing the building is not necessary
   C. Follow good sanitation and housekeeping practices
   D. An IPM program is not needed if there are no pests inside the food premises

Summary

- Insects and rodents are not only a nuisance in a food premises, but can also spread diseases by contaminating food and cause electrical fires and structural damage to the building structure
- Seeing a cockroach or rodent in daylight usually means that there is a large or serious infestation
- The best way to control a pest infestation is to prevent it from happening in the first place. Keeping pests from infesting a premises is much easier and less expensive than getting rid of pests that already exist
- An integrated pest control management (IPM) system is designed to keep pests from getting into a food premises, and to get rid of any pests that are already there
- The rules of an IPM system include: Deny pests food, water and shelter by following good sanitation and housekeeping practices, keep pests out of the food premises by pest-proofing the building and work with a licensed pest control company
- A pest control company should combine sanitation, non-chemical controls, building maintenance and chemical treatment. They should also arrange the best possible process, inspection system, treatment procedures and followup
- Pest control methods, especially the use of chemicals, can be very dangerous for employees and customers if they are not used properly
- To pest-proof the building of a food premises; seal gaps, cracks and openings to floors, walls and equipment; repair any leaky plumbing; use screens to cover windows, doors and vents, or install heavy plastic strips or air curtains on any receiving doors that need to be opened often

Answer key

Test your Knowledge: (pg. 95)

1. True
2. False
3. False
4. True

Review questions: (pg. 100)

1. B
2. A
3. C
4. A
5. C

In review

The following topics have been covered in this section:

1. The different kinds of pests to look out for in food premises
2. What you can do to keep pests from being attracted to your food premises
3. Why it's more effective and less expensive to prevent a pest infestation, rather than get rid of them once they're in

Notes

Food safety management

Introduction

HACCP stands for Hazard Analysis Critical Control Point. It's a self-inspection system designed to control physical, chemical, biological and allergen contamination at all points in food processing.

The HACCP system of monitoring food was originally developed for NASA. Food prepared for astronauts in space had to be as risk free as possible. The program was so successful it was introduced to food production companies and is now used around the world.

The goal of the HACCP system is to eliminate or reduce the incidence of foodborne illness and prevent food adulteration.

This section will review the principles of HACCP. For more information on implementing a HACCP system, visit the Canadian Food Inspection Agency (CFIA) website.

Test your knowledge

Circle True or False for each of the following statements:

1. **A food safety management system takes the place of cleaning and sanitizing.**
   TRUE FALSE
2. **A food safety management system guarantees safe food.**
   TRUE FALSE

Before you start

Before you begin with any food safety management system, you need to make sure you're following basic food safety practices. We've gone over all of these in previous sections.

- Make sure your food premise is clean and sanitary. This includes cleaning, sanitizing, pest control and proper maintenance of your equipment.
- Your food premises must be safe. This includes both receiving and storage as well as transportation methods.
- You must use safe food handling and packaging methods.
- Every member of your staff who is handling food must practice good personal hygiene.

HACCP principles

The seven principles of HACCP are:

1. Conduct a hazard analysis.
2. Determine the Critical Control Points (CCPs).
3. Establish critical limit(s).
4. Establish a system to monitor control of the CCPs.
5. Establish the corrective action to be taken when monitoring indicates that a particular CCP isn't under control.
6. Establish procedures for verification to confirm that the HACCP system is working effectively.
7. Establish documentation concerning all procedures and records appropriate to these principles and their application.

Adapted from Canadian Food Inspection Agency, QMP Reference Standard and Compliance Guidelines, Ch. 3, Subject 4, Section 5.

Step 1 - Hazard analysis

The first step in HACCP is a hazard analysis. **This involves:**

- Identifying any potential hazards in your food processing or preparation
- Determining how critical each hazard is
- Determining how likely each hazard could happen

These hazards need to be identified at every stage of food processing and preparation. **As you've learned, these stages are:**

- Receiving and storage
- Freezing
- Thawing
- Refrigeration
- Food Preparation
- Cooking
- Hot and cold holding
- Cooling
- Reheating

Hazard examples

Throughout these sections, different types of food safety hazards have been discussed. Some of these are:

- Microorganisms that can grow during preparation, storage and/or holding
- Microorganisms or toxins that can survive heating
- Chemicals that can contaminate food or food contact surfaces
- Physical objects that accidentally enter food

Some examples of potential hazards are:

- Adding a known allergen to a recipe.
  Potential hazard: Allergen.
- Moving foods received from original packaging to storage containers.
  Potential hazard: Physical contamination.
- Reheating food from cold to hot temperatures.
  Potential hazard: Microbiological contamination.
- Cleaning food contact surfaces with chemicals.
  Potential hazard: Chemical contamination.

Each of these is a potential hazard, and should be examined to determine whether it's a critical hazard based on how high the food safety risk is and how likely it would lead to foodborne illness.

Processing risks

Some of the ways food is prepared or processed can increase the risk of a potential hazard. **Some examples are:**

- Large volumes of food being prepared at one time, which increases time in the temperature danger zone
- Processes involving multiple step preparation, especially if they occur over more than one day or involve more than one food handler
- Processes with significant temperature changes that enter the danger zone or pass through the danger zone from hot to cold or cold to hot

Step 2 - Critical Control Points

A Critical Control Point (CCP) is any point during food preparation or production where food safety could be at risk. Once hazards are identified and analyzed, CCPs must be established. For each critical hazard identified in step one, a way to lessen, prevent or eliminate the risk needs to be documented.

A standard Hazard Analysis/Critical Control Point worksheet should be used for record keeping. Refer to the appendix for a printable worksheet.

Critical Control Point examples

You learned to control the CCPs related to temperature and time in the Time and Temperature section.

As a reminder, some of these are:

- Making sure hazardous foods are cooked to the minimum temperature needed to kill bacteria
- Storing foods at temperatures that keep bacteria from growing
- Limiting the amount of time food spends in the danger zone

In the Foodborne Illness section you learned how to put allergen controls in place by:

- Making sure food ingredients are clearly communicated to the customer
- Using safe food handling methods to make sure allergens aren't added to foods they aren't supposed to be in
- Replacing known allergens with foods less likely to cause a reaction

Step 3 - Critical limits

For each Critical Control Point (CCP) identified, a critical limit should be set. You've learned about critical limits in other sections.

Some examples are in the following table.

Critical Control Point	Critical limit example
Raw chicken parts may contain Salmonella bacteria.	As per best practice and current evidence, chicken parts should be cooked to a minimum internal temperature of 74°C (165°F) to kill the Salmonella bacteria.
Bacterial growth is most likely to occur between 4°C (40°F) and 60°C (140°F).	It is recommended to cool cooked foods from 60°C (140°F) to 20°C (68°F) within two hours, and from 20°C (68°F) to 4°C (40°F) or less within the next four hours.
Handling raw foods contaminates a food handler's hands.	Hands should be washed between handling raw foods and ready-to-eat foods.

Step 4 - Monitoring

At each Critical Control Point (CCP), the system needs to be monitored to make sure the critical limits are in effect.

Some examples of monitoring include checking:

- Temperatures during cooking
- Refrigerator and freezer temperatures
- Cooling times to make sure temperatures of foods drop quickly enough
- For government inspection stamps or labels on received food
- For signs of infestation or contamination
- For correct shipping temperatures for received food

Monitoring procedures need to be documented. They should be measurable and recordable, and it needs to be clear who's responsible for doing them and how often.

Step 5 - corrective action

Corrective actions explain what to do if monitoring shows the critical limits aren't being met. **The steps for a corrective action need to cover:**

- Correcting the problem
- Identifying product(s) affected by the problem
- Dealing with the affected products
- Preventing the problem from happening again

When corrective action needs to be taken, records should be kept showing what was done, when and why.

Corrective action examples

Corrective actions may be different in different food premises. **These are some examples that could be in place.**

Critical limit	Corrective action example (if control measure is not met)
Whole chicken must be cooked to a minimum internal temperature of 82°C (180°F) to kill Salmonella bacteria.	Continue to cook chicken until minimum internal temperature 82°C (180°F) is reached.
Cool cooked foods from 60°C (140°F) to 20°C (68°F) within two hours, and from 20°C (68°F) to 4°C (40°F) or less within the next four hours.	If food has not been cooled to 20°C (68°F) within two hours, food should be discarded.
Handling raw foods and ready-to-eat foods.	Any food handled with contaminated hands should be discarded.
Hold baked chicken at 60°C (140°F) or higher until served.	If held over two hours, one should discard the chicken. If held less than two hours and temperature falls below 60°C (140°F), reheat to 74°C (165°F) or higher for at least 15 seconds – one time only.

Corrective actions must meet food safety standards.

Verification is usually done by someone who isn't involved with monitoring.

Step 6 - Verification

Verification is a double check to make sure the HACCP system is working. Verification is done in addition to monitoring. Unless there's a problem, verification would be done less often than monitoring.

As with the other HACCP principles, procedures for verification should be written down. **They should include:**

- Who will do the verification
- How to do it
- When to do it
- What needs to be verified

Step 7 - Documentation

There are two types of records needed for HACCP: documentation and records. HACCP documentation refers to the policies, procedures and other documents that are written as the HACCP system is created.

Records are created when the HACCP procedures are followed. Records include recorded temperatures, logs of corrective actions and any other information kept.

Records should be simple and easy for employees to use:

- Keep blank forms and a clipboard near work areas to check several items at the same time.
- Have notebooks or extra pages available to write down what actions have been taken.
- Post or store documentation near work areas so employees can refer to them quickly.
- Attach logs to the equipment they're used for, like posting temperature logs on the front of a refrigerator.

For more information on implementing a HACCP system and the types of records kept, see the HACCP section of the Canadian Food Inspection Agency (CFIA) website.

Employees are more likely to use records correctly if they are easy to use. Hard to use or inconvenient record keeping areas can tempt staff to put in numbers without actually measuring.

HACCP activity - Beef stew recipe flowchart with food safety plan

Beef and fresh vegetables

↓

Receiving

Storing

Store in refrigerator at 4°C (40°F) or less

Beef stock, seasoning, canned tomatoes and oils

↓

Receiving

Storing

Store in dry storage area

Preparing

Preheat stove. Dice beef and fresh vegetables. Add oil, beef vegetables and seasoning to pot. Add beef stock, canned tomatoes and rest of seasoning to pot

Cooking

CCP – Cook beef stew to required minimum internal temperature
Critical limit – Heat to 74°C (165°F) or hotter and hold for at least 15 seconds
Monitoring – Check stew temperature with a sanitized thermometer before serving/holding
Corrective action – Continue heating until 74°C (165°F) or hotter for 15 seconds

Hot holding

CCP –
Critical limit –
Monitoring –
Corrective action –

Cooling

CCP –
Critical limit –
Monitoring –
Corrective action –

Reheating

CCP –
Critical limit –
Monitoring –
Corrective action –

Standard operating procedures

Review questions

Circle the letter that represents your answer.

1. **Which of the following is an example of a critical limit?**
   A. Cooking chicken breast to a minimum internal temperature of 74°C (165°F)
   B. Microbiological contamination of a raw chicken
   C. Hot holding cooked chicken on a buffet table
   D. Cold holding a prepared chicken salad

2. **Discarding food that is handled with contaminated hands is an example of a:**
   A. Critical control point
   B. Corrective action
   C. Hazard analysis
   D. Critical limit

3. **Cooking whole chicken to a minimum internal temperature is an example of a:**
   A. Critical control point
   B. Corrective action
   C. Hazard analysis
   D. Critical limit

4. **"Bacterial growth is most likely to occur between 4°C and 60°C (40°F and 140°F)" is an example of:**
   A. Critical control point
   B. Corrective action
   C. Hazard analysis
   D. Critical limit

5. **Checking temperatures during cooking is an example of what HACCP step?**
   A. Monitoring CCPs
   B. Hazard analysis
   C. Documentation
   D. Verification

6. **HACCP stands for:**
   A. Hazard Analysis Critical Control Point
   B. Health Activities Critical Control Program
   C. Hazard Analysis Comprehensive Control Point
   D. Hazard Analysis Comprehensive Control and Prevention

Summary

- HACCP stands for Hazard Analysis Critical Control Point. It is a self-inspection system designed to control physical, chemical, biological and allergen contamination at all points in food processing.
- **Step 1:** Hazard Analysis: Involves identifying any potential hazards in food processing or preparation, determining how critical each hazard is and determining how likely each hazard could happen.
- **Step 2:** Determine Critical Control Points (CCPs): A CCP is the point in the stage of food preparation that will control, reduce or eliminate the identified hazard, from step one, to an acceptable level. For example, making sure hazardous foods are cooked to the minimum internal temperature needed to kill bacteria.
- **Step 3:** Establish Critical Limit(s): A critical limit is a measurable limit or condition that will control, reduce or eliminate the potential hazard at the CCP. For example, a chicken leg must be cooked to a minimum internal temperature of 74°C (165°F) to kill Salmonella.
- **Step 4:** Monitor CCPs: At each CCP, the system needs to be monitored to make sure the critical limits are in effect. For example, minimum internal cooking temperatures can be monitored by using a probe thermometer. The monitoring procedures need to be documented.
- They should be measurable and recordable, and it needs to be clear who is responsible for doing them and how often.
- **Step 5:** Corrective Action: It explains what to do if monitoring shows the critical limits are not being met. The steps for a corrective action need to cover: correcting the problem, identifying products affected by the problem, dealing with the affected products and preventing the problem from happening again. Records should be kept showing what was done, when and why. For example, if the internal temperature of a chicken leg is checked and is below 74°C (165°F), the chicken must be cooked until the minimum internal temperature.
- **Step 6:** Verification: Double check to ensure the HACCP system is working. Procedures for verification should include who will do the verification, when to do it and what needs to be verified. This is usually done by a manager or supervisor.
- **Step 7:** Documentation: HACCP documentation refers to the policies, procedures and other documents that are written as the system is created. Records are created when the HACCP procedures are followed. Records include recorded temperatures and logs of corrective actions.
- Food preparation is not recommended during a power outage. A power outage can cause food to spoil and make it unsafe to eat due to a lack of refrigeration and proper sanitation methods. If you experience a long-term power outage, contact Peel Region Public Health at 905-799-7700. A long-term power outage can result in a possible health hazard and in the closure of your food premises by a PHI is reached.

Answer key

Test your Knowledge: (pg. 104)

1. False
2. False

Review questions: (pg. 110)

1. A
2. B
3. A
4. C
5. A
6. A

HACCP activity - Beef stew recipe flowchart with food safety plan: (pg. 109)

Cooking

CCP – Cook beef stew to required minimum internal temperature
Critical limit – Heat to 74°C (165°F) or hotter and hold for at least 15 seconds
Monitoring – Check stew temperature with a sanitized thermometer before serving/holding
Corrective action – Continue heating until 74°C (165°F) or hotter for 15 seconds

Hot holding

CCP – Maintain beef stew at minimum hot holding temperature
Critical limit – Hot hold at 60°C (140°F) or higher
Monitoring – Check stew temperature in hot holding unit every two hours
Corrective action – Reheat to 74°C (165°F) if stew is less than 60°C (140°F) for two hours or less. If more than two hours, discard

Cooling

CCP – Cool beef stew to proper cold holding temperature within required time
Critical limit – Cool beef stew from 60°C to 20°C (140°F to 68°F) within two hours and from 20°C to 4°C (68°F to 40°F) in four hours
Monitoring – Check internal temperature with sanitized probe thermometer
Corrective action – Discard food if time/temperature standards are not met

Reheating

CCP – Reheat beef stew to proper internal minimum temperature
Critical limit – Reheat to 74°C (165°F) for 15 seconds within two hours
Monitoring – Check internal temperature with sanitized thermometer
Corrective action – Discard food if time/temperature standards are not met

Standard operating procedures

Receiving – Potentially hazardous foods must be received at 4°C (40°F) or lower and food should not have any signs of contamination
Cold holding – Refrigeration units must maintain food at 4°C (40°F) or lower
Preparation – All utensils and food contact surfaces must be cleaned and sanitized before and after use
Personal hygiene – Food handlers must practice proper handwashing, wear hairnets and clean uniforms

In review

In this section, the following topics have been covered:

1. The seven principles of HACCP
2. How to identify Critical Control Points (CCPs) and how to set limits for them
3. What you need to monitor and verify your HACCP system
4. The documentation and records you'll need to create and keep

Notes

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Food Premises Regulation (O. Reg. 493/17)
For the latest version of the Ontario Food Premises Regulation Health Protection and Promotion Act R.R.O. 1990, Regulation 493/17, visit the following link: **https://www.ontario.ca/laws/regulation/170493**

Appendices

Appendices

Appendix A: Food safety links

For more information about food safety, visit these websites:

Canadian Food Additive Dictionary
hc-sc.gc.ca/fn-an/securit/addit/diction/index-eng.php

Canada Food and Drug Regulations
laws-lois.justice.gc.ca/eng/regulations/C.R.C.%2C_c._870/index.html

Canadian Food Inspection Agency
inspection.gc.ca

Food Science Network
uoguelph.ca/foodscience/

Health Canada
hc-sc.gc.ca

Ministry of Agriculture, Food and Rural Affairs
omafra.gov.on.ca

Ministry of Health
ontario.ca/page/ministry-health

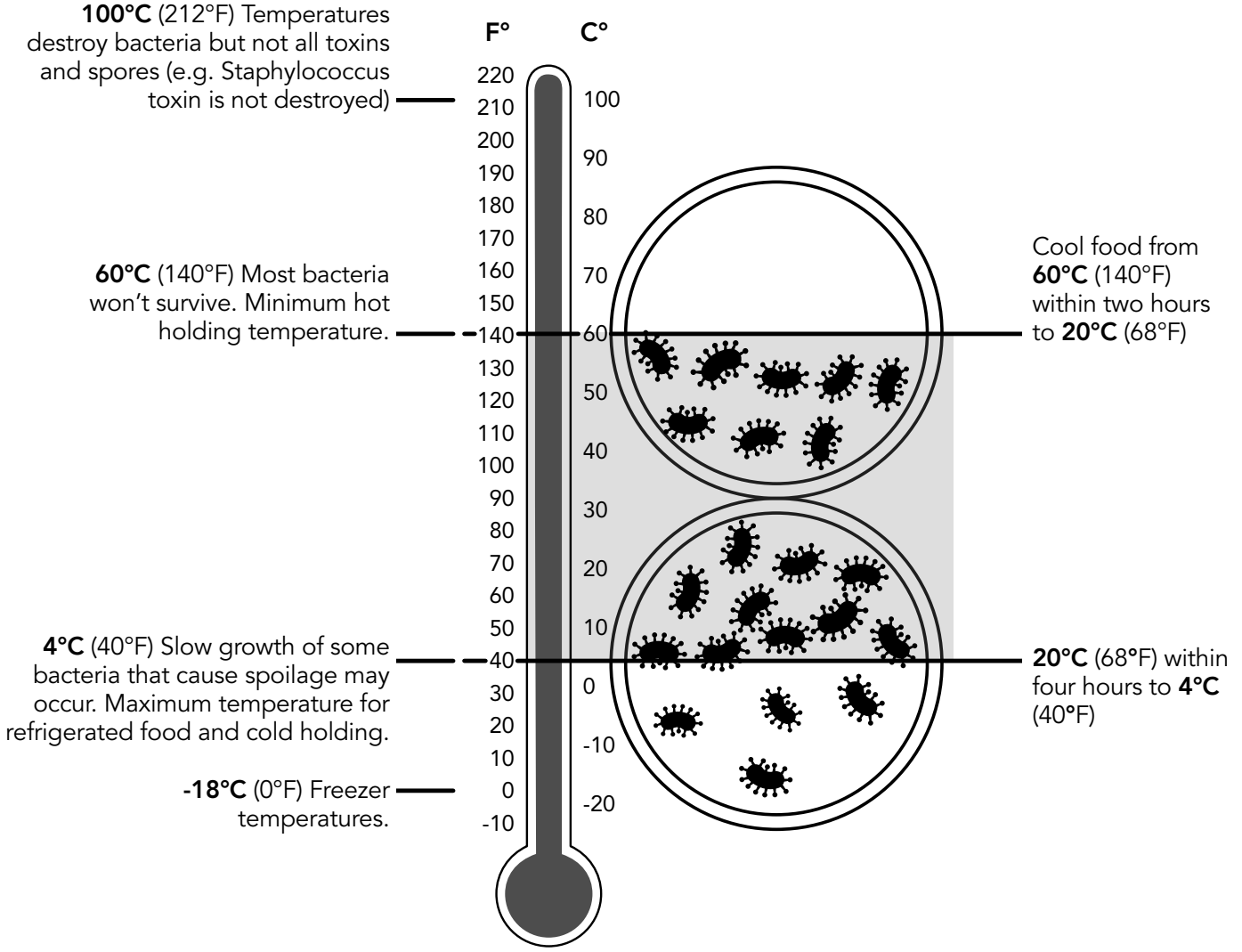
Ministry of Long-Term Care
ontario.ca/page/ministry-long-term-care

Public Health Agency of Canada
phac-aspc.gc.ca

World Health Organization
who.int/en

Appendix B: **Critical temperatures**

The leading cause of foodborne illness is time and temperature abuse. Temperature abuse of food occurs when food is left at temperatures that are above 4°C (40°F) or below 60°C (140°F). This temperature range is commonly called The Danger Zone. Below are the temperatures you should know.



Appendix C: **Hepatitis A**

What is Hepatitis A?

Hepatitis A is a liver infection caused by the Hepatitis A virus. The disease is fairly common, with several hundred cases reported each year in Canada. Anyone can get Hepatitis A, but it occurs most frequently in school age children and young adults. Other groups at increased risk of getting Hepatitis A include staff and clients of day care centres with diapered children, travellers to countries where the disease is widespread, injection drug users, and men who have sex with men. People with Hepatitis A normally recover on their own. Relapses can occur for up to a year in 15 per cent of cases. Once an individual fully recovers from Hepatitis A, he or she is immune for life and will not continue to carry the virus.

What are the symptoms of Hepatitis A?

The symptoms of Hepatitis A may include fever, a feeling of being unwell, loss of appetite, nausea, abdominal discomfort and sometimes diarrhea. Urine may become darker in colour and jaundice (a yellowing of the skin and whites of the eyes) may appear. The symptoms may appear from two to seven weeks after exposure, but usually occur about four weeks after exposure. The disease is rarely fatal, and most people recover without any complications after several weeks. Infants and young children tend to have very mild or no symptoms, and are much less likely to develop jaundice than are older children and adults. People who have pre-existing liver problems (especially those who have hepatitis C) can become extremely ill if they contract Hepatitis A. No chronic infection is known to occur.

How does Hepatitis A spread?

People with Hepatitis A pass the virus in their stool (feces). It is common for the Hepatitis A virus to spread to the household and sexual contacts of an acute case. The virus can spread by:

- Touching an infected person's stool (for example, changing an infected baby's diaper), and then eating or drinking with your hands. Most children with Hepatitis A have unrecognized infections and are often the source of infection to others
- Eating food made by someone who touched infected stool. Hepatitis A outbreaks have been traced to food contaminated by infected food handlers
- Eating food harvested from contaminated waters (such as raw or undercooked molluscs) or contaminated produce such as lettuce and strawberries
- Drinking water or drinks with ice cubes that are contaminated by infected stool (a problem in developing countries)
- Having oral-anal sex with an infected person

The contagious period begins about two weeks before the symptoms appear, and continues for about one week after onset of jaundice.

How can Hepatitis A be prevented?

Hepatitis A can be prevented through the following measures:

Handwashing: Wash hands after using the washroom, after changing diapers and before preparing or eating food.

Careful food preparation: Wash fruits and vegetables thoroughly in safe water before eating. Infected people should not handle foods during the contagious period.

Vaccination: Vaccines are available to protect against Hepatitis A and are recommended for the following individuals:

- People who are in regular close contact with someone who has Hepatitis A
- People with chronic liver disease (including those who have hepatitis C)
- People who have blood clotting-factor disorders
- Sexually active men who have sex with men
- People who work or reside in institutions for the developmentally disabled
- Injection drug users
- Travellers to countries where Hepatitis A is common

Note: Vaccines are for people one year of age and older.

What if I have been in close contact with someone who has Hepatitis A?

Household members, daycare contacts or others who have learned that they are in close contact with an infected person should promptly call a doctor or their local health department to ask if they should be vaccinated. In typical workplace and classroom situations, contacts do not need to receive the vaccine.

If an exposure to Hepatitis A has taken place, one dose of Hepatitis A vaccine is very effective at preventing infection if given within two weeks after the last exposure to a person with Hepatitis A. The vaccine may continue to provide some protection if given more than two weeks after the last exposure, but the degree of protection is unknown. For long-term protection against Hepatitis A, a second dose of vaccine is recommended in six to 12 months.

In very rare circumstances, immune globulin (IG) is provided for infants less than one year of age, immunocompromised people who may not respond fully to the vaccine, and those for whom vaccine is contraindicated. Infants do not usually develop symptoms, so immune globulin should be reserved for infants who are immunocompromised, in consultation with a paediatric infectious diseases consultant. It is important to note that live vaccines should not be given for at least three months after receiving immune globulin because if given earlier, their effectiveness will be reduced.

What is the treatment for Hepatitis A?

There are no special medicines or antibiotics that can be used to cure Hepatitis A once the symptoms appear. Generally, bed rest is all that is needed.

For further information, please call: Peel Region Public Health 905-799-7700 • 1-888-919-7800 (toll-free) or visit **peelregion.ca**

Appendix D: **Norovirus**

What is Norovirus?

Norovirus is a highly contagious virus that causes gastroenteritis (inflammation of the stomach and intestines). Even small amounts of the virus can spread infection. This can lead to diarrhea, vomiting and stomach cramps.

Norovirus is the most common cause of gastroenteritis outbreaks worldwide. Many such outbreaks have been traced to food that was handled by an infected person. Outbreaks have also been linked to banquets, swimming pools, schools and restaurants.

The illness can occur year round, but is more common in the fall and winter.

What are the symptoms of Norovirus?

- Sudden onset of watery diarrhea
- Vomiting
- Nausea
- Cramps
- Headache
- Fever
- Muscle aches
- Fatigue

These symptoms may occur as soon as 12 hours after exposure to the virus, but may take up to 24 to 48 hours. The illness commonly lasts 24 to 48 hours and is usually not severe.

How does Norovirus spread?

Noroviruses are very contagious. The main source of the virus is stool and vomit from infected people.
People can become infected with the virus in several ways:

- Direct contact such as shaking hands with a person who is infected
- Touching surfaces and objects contaminated with the virus like a door knob, then touching your mouth
- Eating and drinking food that are contaminated with the virus

Those infected with Norovirus are most contagious when they are sick and for three days after they recover. Afterwards they can continue to spread the virus for up to three weeks after symptoms (usually diarrhea) stops.

Outbreaks have been linked to:

- Food handlers who are infected with the virus
- Shellfish harvested from contaminated waters
- Water contaminated with sewage

How is Norovirus treated?

There is no specific treatment for Norovirus. Persons who are severely dehydrated may need rehydration therapy.

How can Norovirus be prevented?

The best prevention is washing your hands with soap and water thoroughly and often, especially after using the washroom, handling diapers and before preparing or eating food.

Safe food handling and preparation practices also reduce the risk of the spread of Norovirus. After handling food in the kitchen, especially raw food, thoroughly clean and sanitize all surfaces used for food preparation.

Other measures include:

- People who are ill with diarrhea and vomiting should not go to work or attend school until they are symptom-free
- Carefully disposing of stool and stool contaminated material (e.g., soiled diapers)
- Cleaning and sanitizing washrooms and all hand contact surfaces daily or as needed
- Avoid drinking untreated water
- Carefully washing fruits and vegetables with clean water
- Cooking shellfish thoroughly before eating

Source

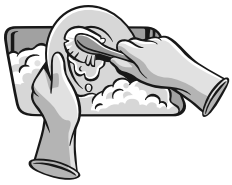
Norovirus Fact Sheet, Public Health Agency of Canada 2013; CDC Updated Norovirus Guidelines 2011.

For further information, please call: Peel Region Public Health 905-799-7700 • 1-888-919-7800 (toll-free) or visit **peelregion.ca**

Appendix E: **Dishwashing in a three compartment sink**

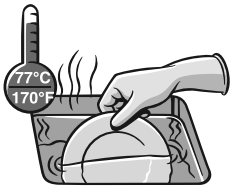
1 **Scrape or Pre-Rinse.** Scrape, sort, and pre-rinse before washing.

2 **Wash (Sink 1).** Wash with warm water and detergent solution capable of removing grease.



3 **Rinse (Sink 2).** Rinse with clean water that is at least 43°C (110°F).

4 **Sanitize (Sink 3).** Sanitize with clean warm water. Soak for at least 45 seconds in one of the following: 24°C (75°F) water with 100ppm chlorine. 24°C (75°F) water with 200ppm quaternary ammonium. 77°C (170°F) water only

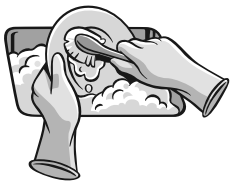


5 **Air Dry.** Do not towel dry.

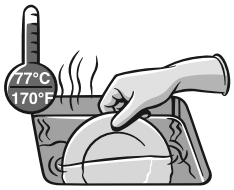
Appendix F: **Dishwashing in a two compartment sink**

1 **Scrape or Pre-Rinse.** Remove any leftover food on the dishes by scraping or rinsing it off.

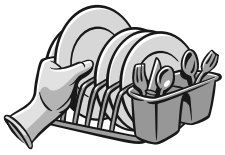
2 **Wash (Sink 1).** In the first compartment, wash and scrub the dishes, utensils and pots, making sure all food and grease are removed. Remember, cleaning takes chemicals and friction. Use warm water and detergent. After washing, rinse under the tap with clean running water. Make sure the soapy water and all soap suds are rinsed off.



3 **Sanitize (Sink 2).** Sanitize in the second compartment by submerging dishes, utensils and pots in hot water that is at least 77°C (170°F) or a chemical solution in water that is at least 24°C (75°F). Let them soak for at least 45 seconds to give the sanitizer time to kill microorganisms. It's important to make sure that the sanitizer is strong enough to do the job, so test the sanitizer right after mixing it in the sink.



4 **Air Dry.** After sanitizing, let items air dry on a non-porous sloped draining board. Never towel dry, as you could cause contamination from a worker's hand or a damp dish towel.



Appendix G: Temperatures for cooking and reheating hazardous foods

An accurate food thermometer is required to measure the internal temperature of hazardous foods. Internal temperature must reach the minimum temperature listed for at least 15 seconds.

The reheating process for hazardous foods should not take more than two hours.

Whole Poultry

Cook: internal temperature of **82°C**, 180°F
Reheat: internal temperature of **74°C**, 165°F

Chicken pieces, ground poultry and all parts of ground meat that contain poultry

Cook: internal temperature of **74°C**, 165°F
Reheat: internal temperature of **74°C**, 165°F

Food mixtures containing poultry, eggs, meat, fish or other hazardous foods

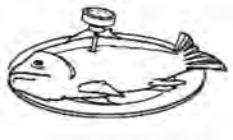
Cook: internal temperature of **74°C**, 165°F in all parts of the mixture
Reheat: internal temperature of **74°C**, 165°F in all parts of the mixture

Pork and pork products

Cook: internal temperature of **71°C**, 160°F
Reheat: internal temperature of **71°C**, 160°F

Ground meat, other than ground meat containing poultry (e.g., ground beef or pork)

Cook: internal temperature of **71°C**, 160°F
Reheat: internal temperature of **71°C**, 160°F



Fish

Cook: internal temperature of **70°C**, 158°F
Reheat: internal temperature of **70°C**, 158°F

Other hazardous foods such as roast beef, lamb or goat

Cook: internal temperature of **60°C**, 140°F
Reheat: internal temperature of **60°C,** 140°F

For more information visit peelregion.ca or call Peel Public Health **905-799-7700**, Caledon residents call 905-584-2216, and ask to speak with a Public Health Inspector.

Appendix H: Food handler's storage guide

General guidelines for the shelf life of common foods. Read the label and check 'best before' dates if applicable. Most foods are safe to eat if stored longer, but flavour and nutritional value will deteriorate. Discard if there is evidence of spoilage.

Cupboard

(room temperature) Unless otherwise specified, times apply to unopened packages.

Cereal grains (once opened, store in airtight containers, away from light and heat)

Bread crumbs (dry) ..... 3 months
Cereals (ready-to-eat) ..... 8 months
Cornmeal ..... 6-8 months
Crackers ..... 6 months
Pasta ..... several years
Rice ..... several years
Rolled oats ..... 6-10 months
White flour ..... 1 year
Whole wheat flour ..... 3 months

Canned foods (once opened, store covered in airtight container in refrigerator)

Evaporated milk ..... 9-12 months
Other canned foods ..... 1 year

Dry foods (once opened, store in airtight containers, away from light and heat)

Baking powder, baking soda ..... 1 year
Beans, peas, lentils ..... 1 year
Chocolate (baking) ..... 7 months
Cocoa ..... 10-12 months
Coffee (ground) ..... 1 months
Coffee (instant) ..... 1 year
Coffee whitener ..... 6 months
Fruit (dried) ..... 1 year
Gelatin ..... 1 year
Jelly powder ..... 2 years
Mixes (cake, pancake, and biscuit) ..... 1 year
Mixes (pie filling and pudding) ..... 18 months
Mixes (main dish accompaniments)..... 9-12 months
Potatoes (flakes) ..... 1 year
Skim milk powder
- unopened ..... 1 year
- opened ..... 1 months
Sugar (all types) ..... several years
Tea bags ..... 1 year

Miscellaneous foods

Honey ..... 18 months
Jam, jellies (once opened, covered in fridge) .... 1 year
Mayonnaise, salad dressings
- unopened ..... 6 months
- opened (covered in fridge) ..... 1-2 months
Molasses ..... 2 years
Nuts ..... 1 months
Peanut butter
- unopened ..... 6 months
- opened ..... 2 months
Pectin - liquid ..... 1 year
- opened (covered in fridge) ..... 1 months
- powdered ..... 2 years
Sandwich spread
(once opened, covered in fridge) ..... 8 months
Syrups - corn, maple, table ..... 1 year
Vegetable oils (once opened, covered in fridge) 1 year
Vinegar ..... several years
Yeast (dry) ..... 1 year

Vegetables

Potatoes, rutabaga, squash ..... 1 week
Tomatoes ..... 1 week
Cool room (7-10°C, 45-50°F)
Onions (dry, yellow skin) ..... 6 weeks
Potatoes (mature) ..... 6 months
Rutabaga (waxed) ..... several months
Squash (winter) ..... several months

Refrigerator

(4°C, 40°F) Unless otherwise specified, cover all foods.

Dairy products and eggs (check 'best before' dates)

Butter
- unopened ..... 8 weeks
- opened ..... 3 weeks

Cheese
- cottage (opened) ..... 3 days
- firm ..... several months
- processed (unopened) ..... several months
- processed (opened) ..... 3-4 weeks

Eggs ..... 3 weeks

Margarine
- unopened ..... 8 months
- opened ..... 1 months

Milk, cream, yogurt (opened) ..... 3 days

Fish and shellfish

Clams, crab, lobster and mussels (live) ..... 12-24 hours

Fish (cleaned)
- raw ..... 3-4 days
- cooked ..... 1-2 days

Oysters (live) ..... 24 hours

Scallops, shrimp (raw) ..... 1-2 days

Shellfish (cooked) ..... 1-2 days

Fresh fruit (ripe)

Apples ..... 2 months
- purchased February to July ..... 2 weeks

Apricots (store uncovered) ..... 1 week

Blueberries (store uncovered) ..... 1 week

Cherries ..... 3 days

Cranberries (store uncovered) ..... 1 week

Grapes ..... 5 days

Peaches (store uncovered) ..... 1 week

Pears (store uncovered ..... 1 week

Plums ..... 5 days

Raspberries (store uncovered) ..... 2 days

Rhubarb ..... 1 week

Strawberries (store uncovered) ..... 2 days

Fresh vegetables

Beans (green, wax) ..... 5 days

Beets ..... 3-4 weeks

Broccoli ..... 3 days

Brussels sprouts ..... 1 week

Cabbage ..... 2 weeks

Carrots ..... several weeks

Cauliflower ..... 10 days

Celery ..... 2 weeks

Corn ..... use same day

Cucumbers ..... 1 week

Lettuce ..... 1 week

Mushrooms ..... 5 days

Onions (green) ..... 1 week

Parsnips ..... several weeks

Peas ..... use same day

Peppers (green, red, etc.) ..... 1 week

Potatoes (new) ..... 1 week

Spinach ..... 2 days

Sprouts ..... 2 days

Squash (summer) ..... 1 week

Meat and poultry

Uncooked

Chops, steaks ..... 2-3 days

Cured or smoked meat ..... 6-7 days

Ground meat ..... 1-2 days

Poultry ..... 2-3 days

Roasts ..... 3-4 days

Variety meats, giblets ..... 1-2 days

Cooked

All meats and poultry ..... 3-4 days

Casseroles, meat pies meat sauces ..... 2-3 days

Soups ..... 2-3 days

Miscellaneous foods

Coffee (ground) ..... 2 months

Nuts ..... 4 months

Shortening ..... 12 months

Whole wheat flour ..... 3 months

Freezer

(-18°C, 0°F) Use freezer wrapping or airtight containers. Freeze fresh food at its peak condition.

Dairy products and fats

Butter
- salted ..... 1 year
- unsalted ..... 3 months

Cheese - firm, processed ..... 3 months
Cream - table, whipping
(separates when thawed) ..... 1 months
Ice cream ..... 1 months
Margarine ..... 6 months
Milk ..... 6 weeks

Fish and shellfish

Fish (fat species: lake trout, mackerel, salmon) 2months
Fish (lean species: cod, haddock, pike, smelt) 6 months
Shellfish 2-4 months

Fruits and vegetables 1 year

Meat, poultry and eggs

Uncooked

Beef (roasts, steaks) ..... 10-12 months
Chicken, turkey
- cut up ..... 6 months
- whole ..... 1 year

Cured or smoked meat ..... 1-2 months
Duck, goose ..... 3 months
Eggs (whites, yolks) ..... 4 months
Ground meat ..... 2-3 months
Lamb (chops, roasts) ..... 8-12 months
Pork (chops, roasts) ..... 8-12 months
Sausages, wieners ..... 2-3 months
Variety meats, giblets ..... 3-4 months
Veal (chops, roasts) ..... 8-12 months

Cooked

All meat ..... 2-3 months
All poultry ..... 1-3 months
Casseroles, meat pies ..... 3 months

Miscellaneous foods

Bean, lentil, pea, casseroles ..... 3-6 months
Breads (baked or unbaked, yeast) ..... 1 months
Cakes, cookies (baked) ..... 4 months
Herbs ..... 1 year
Pastries, quick bread (baked) ..... 1 months
Pastry crust (unbaked) ..... 2 months
Pie (fruit, unbaked) ..... 6 months
Sandwiches ..... 6 weeks
Soups (stocks, cream) ..... 4 months

Appendix I: **Handwashing poster**

This poster can be downloaded from the Region of Peel website:
peelregion.ca/business/owners-operators/_media/handwashing-poster.pdf

Appendix J: **Food safety summary poster**

This poster can be downloaded from the Region of Peel website:
peelregion.ca/business/owners-operators/_media/food-premises-cleaning-schedule.pdf

Food premises cleaning schedule

How to prepare your cleaning schedule

- You can use this guideline to help you develop your own cleaning schedule that meets the specific needs and requirements of your business.
- To ensure the schedule is effective it will need to be monitored by management.
- All food spills must be removed, and areas cleaned and sanitized in a timely fashion. Never let food spills build up anywhere within the premises.
- To help with cleaning, divide your premises into smaller areas and instruct your staff to clean and sanitize all items in that area. For example, equipment, shelves, walls, etc.

Weekly

Kitchen and food preparation areas
- ☐ Char-broilers
- ☐ Deep fryers
- ☐ Food storage bins, containers, shelves
- ☐ Heat lamp units
- ☐ Ice cube machine (interior and exterior)
- ☐ Plate, glassware storage
- ☐ Pop machine, dispensing equipment
- ☐ Salamander, broilers
- ☐ Utensil storage – bins, containers, drawers
- ☐ Walls

Dishwashing area
- ☐ Above ground grease trap (exterior)
- ☐ Dish, plate, utensil, cutlery – containers and shelves

Coolers and freezers
- ☐ Reach in cooler compressor,
- ☐ Storage shelves
- ☐ Walls, ceiling

Dry goods storage area
- ☐ Food storage shelves, bins, containers

Public, staff washrooms
- ☐ Staff lockers

Other
- ☐ Chemical, utility room

Monthly

Kitchen and food preparation areas
- ☐ Ceiling, ceiling fans, covers and tiles
- ☐ Hood vent covers
- ☐ Pipes and cables – electric, gas, water

Coolers and freezers
- ☐ Compressor unit: fan, filter

Dry goods storage area
- ☐ Walls, ceiling, light covers

After each use

Kitchen and food preparation areas
- ☐ Bakery equipment
- ☐ Blenders, grinders, kettle cookers
- ☐ Counter tops
- ☐ Cutting boards
- ☐ Deli slicer
- ☐ Food prep tables – top
- ☐ Ice cream blender and blades

After each shift or day

Kitchen and food preparation areas
- ☐ Bun warmer
- ☐ Convection ovens
- ☐ Crock pots
- ☐ Flat bed grill and grease traps
- ☐ Floors – main food handling, prep areas, and under main line equipment
- ☐ Food prep tables – top surface
- ☐ Garbage bins
- ☐ Hand wash basins
- ☐ Ice cream dipping wells and scoops
- ☐ Ice cube scoop and scoop container
- ☐ Microwaves interiors and exteriors
- ☐ Rotisserie – interior, exterior and underneath
- ☐ Splash guards
- ☐ Steam ovens, pressure cookers
- ☐ Steam tables and reservoirs
- ☐ Stoves and ovens

Dishwashing area
- ☐ Dishwasher (exterior)
- ☐ Dishwasher filter
- ☐ Floor
- ☐ Garbage containers
- ☐ Pre-wash sink
- ☐ Slop sink, mop head, bucket
- ☐ Splash guard

Coolers and freezers
- ☐ Display coolers
- ☐ Floor
- ☐ Reach in coolers

Dry goods storage area
- ☐ Floor

Public, staff washrooms
- ☐ Floor
- ☐ Garbage bins
- ☐ Handwash basin
- ☐ Infant diaper change tables
- ☐ Toilets
- ☐

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For more information visit peelregion.ca or call Peel Public Health 905-799-7700, Caledon residents call 905-584-2216, and ask to speak with a Public Health Inspector.

Region of Peel
working with you

Appendix K: Glossary

Additive (food)
A substance added in small amounts to something else to improve, strengthen or otherwise alter it.

Adulteration
To make something impure or inferior by adding something else to it. An example is adding less expensive apple juice to other fruit juices to reduce costs. Adulteration can also happen when an ingredient is accidentally or unknowingly added to food.

Aerobic bacteria
Bacteria that need oxygen to live and grow.

Allergen
A substance, such as a pollen or a food, that causes an allergy.

Allergy
An abnormally high sensitivity to certain substances, such as pollens, foods or microorganisms. Common symptoms of allergy may include sneezing, itching and skin rashes.

Anaerobic bacteria
Bacteria that can only live and grow where there is no oxygen.

Anaphylaxis
A sudden, severe allergic reaction that includes a sharp drop in blood pressure, rash or hives and breathing difficulties. The reaction may be fatal if emergency treatment, including epinephrine injections, is not given immediately.

Anisakiasis
Also called parasitic roundworm, a parasite spread through uncooked marine fish and raw fish items such as sushi, sashimi, ceviche or salmon.

Bacteria
Plural for bacterium. Any of a group of single-celled microorganisms that live in soil, water, the bodies of plants and animals, or matter obtained from living things. They are important because of their chemical effects and disease-causing abilities.

Botulism
Poisoning caused by eating food containing a toxin made by a spore-forming anaerobic bacterium. Its symptoms are nausea, vomiting, trouble seeing, muscle weakness and tiredness. It can be fatal.

By-Laws
Laws created by municipal or regional governments to deal with important issues that fall under their control and aren't dealt with at the provincial or federal level.

Campylobacter
A foodborne pathogenic bacterium, commonly found in poultry and meat. It can be carried by rodents, wild birds and household pets like cats and dogs. It can also be found in untreated water.

Canadian Food Inspection Agency (CFIA)
CFIA is made up of food inspectors from Health Canada, Agriculture and Agri-Food, and the Department of Fisheries and Oceans. It is responsible for the inspection of food at the federal level.

Carrier
Carriers are people or things that carry microorganisms. When food is not handled safely, microorganisms can get into food through carriers.

Chlorine
A nonmetallic element, found alone as a greenish yellow, irritating gas. It is used as a bleach, disinfectant or sanitizer. It is often used in liquid form to sanitize food contact surfaces. It is also used in the sanitizing sink in two and three sink dishwashing systems.

Clean
To remove oil, grease, dirt and debris using soap, water and friction.

Clostridium perfringens
Foodborne pathogenic bacteria that can be found in high protein or starch-like foods such as cooked beans or gravies. It is especially likely to be a problem in improperly handled leftovers.

Communicable
Capable of being transferred or carried from one person or thing to another. Also called contagious.

Compliance inspection
A thorough and complete inspection of a food premises to determine the overall level of food safety compliance with Food Premises Regulation (O. Reg. 493/17) at the time of the inspection. Compliance inspections are conducted by a public health inspector.

Contaminant
Something in food – like bacteria, viruses, parasites, chemicals or allergens – that can cause a foodborne illness.

Contamination (of food)
Adding microorganisms or other things to food that can cause foodborne illness. See also cross-contamination.

Critical Control Points (CCP)
In a Hazard Analysis Critical Control Point System, the point in a recipe where a hazard exists and a control measure is used to eliminate, prevent or minimize that hazard.

Cross-contamination
Transferring microorganisms or disease agents from raw food to safe or ready- to-eat food, making the ready-to-eat food unsafe. Cross-contamination can happen when raw food or its juices come in contact with cooked or ready-to-eat food. Cross-contamination can also happen when contaminated hands touch food. Another way food can be cross-contaminated is through using the same equipment or utensils to handle raw and cooked food. Please see the Microbiological Contamination section (page 70) for more information.

Critical infraction
An infraction that poses a high and immediate food safety risk.

Cryptosporidiosis
A foodborne illness caused by the protozoan parasite Cryptosporidium. Cryptosporidium can spread through contaminated water.

Danger zone
The temperature range from 4°C to 60°C in which bacteria grow and multiply extremely well.

Dehydration
An abnormal loss of water from the body, especially from illness or physical exertion.

Diarrhea
Abnormally frequent and watery bowel movements.

Disinfection solution
A mixture of a disinfection chemical and water that will be used to disinfect or sanitize food contact surfaces, equipment and multiservice articles. Also called a sanitizing solution.

E. coli
Foodborne pathogenic bacteria that live in the intestines of animals. E. coli can be spread to the outer surfaces of meat when meat is being butchered. E. coli can also be spread through contaminated water.

Eczema
A skin condition marked by redness, itching and scaly or crusty lesions.

Enterotoxin
A toxin that is produced by micro- organisms and causes gastrointestinal symptoms (as in some forms of foodborne illness or cholera).

Epinephrine
A hormone of the adrenal gland. It causes narrowing of blood vessels and raising of blood pressure. Also called adrenaline. Used to treat anaphylaxis.

Food and Drugs Act
The main regulating legislation at the federal level. It looks at things such as the alteration, colouring, bacterial standards, manufacturing conditions and distribution of food to ensure the safety of human health.

Food grade
Made of corrosion-resistant, non-toxic materials that will not break down during normal use. A food grade product can be readily cleaned, sanitized and kept in good repair. If a product is not manufactured or designated to have repeated contact with food, it is not to be used. Some examples of non-food grade materials are plastic garbage containers and plastic storage bins that are not designed for storing food.

Food premises
Premises where food or milk is manufactured, processed, prepared, stored, handled, displayed, distributed, transported, sold or offered for sale but doesn't include a room actually used as a dwelling in a private residence (HPPA).

Friction
The rubbing of one object or surface against another.

Giardiasis
A foodborne illness caused by the protozoan parasite Giardia lamblia. It's also known as beaver fever or backpacker's diarrhea. It can spread through contaminated water or food.

Hand washing
The physical action of removing dirt and microorganisms from the hands using soap and water by scrubbing for at least 15 seconds then rinsing and drying with paper towels. The six-step method is to be used in food premises.

Hazard Analysis Critical Control Point (HACCP)
A system used throughout the food industry to enhance food safety. The system looks at hazardous food, identifies the greatest risk factors and makes the necessary changes to reduce or eliminate the risk. HACCP also monitors overall food handling.

Hazardous food
Food in which pathogenic microorganisms can grow or produce toxins.

Health hazard
Any condition of food premises, or substance, thing, plant or animal other than man, or a solid, liquid, gas or combination of any of them that has or is likely to have an adverse effect on the health of any person.

Hives
A skin condition of intensely itching welts. Hives can be caused by an allergic reaction to internal or external agents, an infection or a nervous condition.

Host
A living animal or plant on or in which a microorganism lives.

Ice wand
A plastic stirring instrument that is filled with a freezable liquid. Stirring hot food with the frozen wand causes food to cool more quickly. It is also called a cooling wand.

Immune System
The bodily system that protects the body from foreign substances, cells and tissues by producing the immune response. A person's immune system includes the thymus, spleen, lymph nodes, lymphocytes and antibodies.

Immuno-compromised
Unable to develop a normal immune response, usually because of disease, malnutrition or immunosuppressive therapy.

Infection
A condition caused by the presence, growth and increase in numbers of germs in the body.

Intoxication
An adverse reaction by the body to a foreign (toxic) substance, whether the substance was produced within or outside the body.

Iodine
A chemical used as a disinfectant or sanitizer. Very expensive and can stain multi-service articles.

Legislation
A law or a body of laws enacted. Food safety legislation means all of the laws and by-laws that are in place to govern safe handling of food.

Listeria
Foodborne pathogenic bacteria found in soil. People can get infected by eating dairy products, vegetables, fish and meat products that are contaminated with the bacteria.

Microorganisms
Living single cell organisms too small to be seen with the naked eye.

Monosodium glutamate
A chemical used to flavor food, especially in China and Japan. It occurs naturally in tomatoes, parmesan cheese and seaweed.

Mold
An often fuzzy surface growth of fungus especially on damp or decaying matter.

Multi-service articles
Utensils (forks, knives, spoons) and dishes (plates, bowls, cups) meant to be used more than once. Multi-service articles must be cleaned and sanitized after each use.

Mycotoxin
A toxic substance produced by a fungus, especially a mold.

Outbreak
As related to foodborne illness: The occurrence of two or more cases of a similar illness resulting from the same food.

Parasites
Organisms that cause illness by living and feeding off a host organism. Parasites don't necessarily cause disease.

Pasteurized
To expose (a food such as milk, cheese, yogurt, beer or wine) to a high temperature for a period of time long enough to destroy certain microorganisms without radically altering the taste or quality of the food. Pasteurization is done to destroy microorganisms that can produce disease or cause spoilage or undesirable fermentation of food.

Pathogen
Harmful microorganisms that can cause disease in humans. Pathogenic Bacteria Colourless and odourless bacteria that cause disease in humans.

pH
A number used to express acidity or alkalinity on a scale whose values run from 0 to 14. Seven represents a neutral pH. Numbers less than seven show increasing acidity, and numbers greater than seven show increasing alkalinity. High or low pH won't kill pathogenic bacteria but won't allow them to grow.

Potable
Fit or suitable for drinking. Preparation (of Food) The final stage(s) of readying a food to be eaten, whether commercially or in the home. Preparation is usually done in a kitchen.

Processing (of food)
The treatment of food, usually on a commercial scale, to increase its usefulness, stability or acceptability.

Production (of food)
The growing, usually under human supervision, of the basic animal or vegetable material of a food.

Protein
Any of numerous substances that consist of chains of amino acids and contain the elements carbon, hydrogen, nitrogen, oxygen and often sulfur. Proteins include many compounds like enzymes and hormones that are essential for life. Proteins are supplied by various foods like meat, milk, eggs, nuts and beans. Proteins are used as a food source by living organisms.

Protozoa
Any of a large group of single-celled and usually microscopic organisms, such as amoebas, ciliates, flagellates and sporozoans. Some protozoa are parasites and may be pathogenic.

Provincial Legislation
Acts and regulations passed by the provincial government. The legislation must be followed throughout the province.

Quaternary ammonium
A chemical used as a disinfectant or sanitizer. Commonly used in the sanitizing rinse cycle of mechanical dishwashers.

Reagents
Substances used in a chemical reaction to detect, measure, examine or produce other substances. When a sanitizer is mixed with a reagent, the colour the solution turns is used to tell whether the solution is the right strength.

Retail (of food)
The selling of food to the end-user or consumer.

Rework materials
Leftover ingredients or food products kept for subsequent use or reprocessing. Examples include re-forming meat patties from others that were broken or too small, or reusing cooked sausage as pizza topping.

Salmonella
Foodborne pathogenic bacteria most commonly found in raw poultry. Salmonella can also be found in other meats, unpasteurized milk and raw eggs.

Sanitize
To kill 999 out of 1,000 pathogenic microorganisms.

Service (of food)
The final preparation and sale or giving of food to be eaten on the premises (in a restaurant or cafeteria) or elsewhere (take-out). Service can also include outdoor group feeding at picnics.

Shigella
Foodborne rod-shaped bacteria that cause dysenteries in animals and especially humans.

Source (of a contaminant)
Where a microorganism originates or comes from (often human or animal intestines).

Solute
A substance dissolved in another substance. The solute is usually the component there is less of. If salt is dissolved in water, salt would be a solute.

Spores
A resistant body formed by certain bacteria when exposed to environments where the bacteria can't grow.

Sterilize
To kill all microorganisms.

Sulphites
Regulated food additives that are used as preservatives to maintain food colour and prolong shelf life, prevent the growth of microorganisms, and maintain the potency of certain medications. Sulphites are used to bleach food starches (e.g., potato) and are also used in the production of some food packaging materials (e.g., cellophane).

Tartrazine
A water soluble synthetic yellow dye used as food colouring. Also called FD&C Yellow 5.

Trichinosis
Also known as pork tapeworm. A parasite spread through raw or undercooked pork or wild game.

Viruses
Microorganisms that multiply inside living cells and cause illness.

Wash in place
A system to clean, rinse and sanitize large equipment that can't be cleaned in a dishwasher or sink. The equipment must be washed with soap and water and rinsed with clean water. The sanitizing rinse can consist of hot water or steam sprayed on the treated surface to a minimum temperature of 82°C (178°F) or a chemical solution sprayed on the treated surface at double the strength used for manual dishwashing.

Yeast
Single celled fungi that may occur on the surface of sweet foods, especially liquids. Also a commercial leavening agent containing yeast cells; used to raise the dough in making bread and to ferment beer or whiskey.

Peel Public Health
1-888-919-7800 • peelhealth@peelregion.ca
peelregion.ca

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