

Home Study Course in Food Protection

The primary objective of any food establishment is to serve attractive, appetizing, nutritious, and **SAFE** food. If any one of these objectives is not met, the reputation of the establishment is likely to suffer and sooner or later the business will decline or fail altogether.

This course was designed by Environmental Public Health with one purpose in mind; to help you, and your staff, meet the fourth objective – **FOOD SAFETY!!** Completion of this course will allow you to have a better understanding of how you can effectively and efficiently operate a food business and at the same time comply with the law.

There are seven sections:

Section 1 - Food Safety Facts

Section 2 - Stories of Food Poisoning

Section 3 - The Top 5

Section 5 - Personal Hygiene

Section 6 - Food Worker Illness

Section 7 - Regulatory Requirements

The course is structured so that you may study the material at your own pace and complete the exam. The exam is optional and is only available upon request by completing the “Exam Request Form” on the following page. Please be advised that there is a \$10 fee for each exam.

The exam has a total of 50 multiple-choice and true or false questions. The passing mark is 80%. Upon successful completion of the exam, you will be awarded a **HOME STUDY COURSE CERTIFICATE**, which is valid for three years

Thank you for your participation and the interest you have shown. We feel that your time will be well spent, and the information you acquire will make your operation safer and more efficient.



Alberta Health Services
Environmental Public Health
HSBC Building
Suite 700, 10055-106 Street
Edmonton, AB T5J 2Y2
phone: (780) 735-1800 fax: (780) 735-1802

EXAM REQUEST FORM

HOME STUDY COURSE IN FOOD PROTECTION

Please complete the following information if you would like an exam package and mail this request form to Alberta Health Services, at the address indicated below.

Name: _____

Mailing Address: _____

City /Town Province Postal Code

Telephone Number: _____

E-mail Address: _____

Number of Exams Requested: _____

Please make sure that you have included a \$10 fee for each exam with this request form. Allow 2 weeks for delivery.

You may also pick up a copy of the exam in person at the address indicated below.

PAYMENT: Return form & payment to:

Alberta Health Services
Environmental Public Health
HSBC Building
Suite 700, 10055-106 Street
Edmonton, AB T5J 2Y2

OR

Fax form & credit card information to
(780) 735-1802 (Credit card information
will not be accepted over the phone)

Please circle method of payment

Visa / Master Card / AMEX / Cash / Money Order

Cheque payable to: Alberta Health Services

Credit Card Information:

Name on Card: _____

Card Number: _____

Expiry Date: _____
(Month) / (Year)

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Receipt # _____ Initials: _____

Section 1

Food Safety Facts

FOOD SAFETY FACTS

In Alberta, more than 3000 cases of foodborne illness, commonly referred to as food poisoning, are reported each year. In Canada, it is estimated that approximately 11 to 13 million cases of foodborne illness occur each year, of which most cases remain unreported. Of the reported cases, most result from improperly handled foods in foodservice establishments. Some of the reported cases result from mishandling foods in the home, and a few result from mishandling foods in food processing establishments or manufacturing plants. The cause for most of the remaining cases is unknown. Foodborne illness can occur in many ways, but there are several ways that it can be prevented.



**It is up to you to follow
safe food handling
practices to reduce the
risks of foodborne
illness!**

What is Foodborne Illness?

Foodborne illness often results from consuming food contaminated with harmful microbes or the toxins (poison) that some of these microbes produce. Less frequently, foodborne illness may result from consuming food containing a naturally occurring toxin, or food that has been accidentally contaminated with a chemical during production, harvesting, or storage.

Microbes commonly referred to as germs, are micro-organisms that cannot be seen individually with the naked eye. They can be seen only with the aid of a good microscope. Microbes are commonly found in human and animal feces. They are also present in our environment including soil, water, dust, ice, air and moisture.

Since microbes are so small, they cannot readily move on their own except in watery fluids. They depend on other methods to move around, such as by hands, pieces of clothing, droplets of moisture from sneezes and coughs, rodents, insects, and dust particles. Food and drink can easily become contaminated with microbes that are transferred from contaminated hands, objects or surfaces.

Symptoms of foodborne illness commonly include:

- diarrhea
- vomiting
- nausea
- stomach cramps

These symptoms may also be accompanied by:

- fever
- malaise
- Headache
- dizziness

You may suffer from only one or a combination of these symptoms. It may only take a few hours or several days for symptoms to develop. The length of time will depend on the type of microbe or toxin that caused the illness.

At one time or another, many of us have experienced a symptom of foodborne illness. Most foodborne illness goes unreported because people just think they have a “24-hour stomach bug”. The symptoms of a foodborne illness may be mild and last only a few hours, but it can also be serious. Symptoms can last much longer, sometimes requiring intensive medical treatment or hospitalization, and can even result in death.

The severity of the reaction often varies depending on the susceptibility of the individual and the microbe or toxin responsible for the illness.

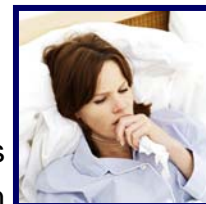
Most types of food poisoning can easily be avoided if safe food handling practices are followed. Safe food handling practices include:

- practicing good personal hygiene, including thorough handwashing,
- avoiding food preparation while ill,
- preventing growth of bacteria with time and temperature control,
- cooking foods to the proper temperature, and
- preventing cross contamination.

Who is Most at Risk?

Some people are more vulnerable to foodborne illness than others. The following groups of people are considered to be high-risk:

- children
- the elderly
- people with compromised immune systems
- pregnant women



These groups of people are more likely to pick up a foodborne illness and develop complications from the illness, resulting in long term health care problems or even death.

What is the Impact of Food Poisoning?

Although most individuals recover, foodborne illnesses can result in chronic health problems and possibly death. Illnesses that can develop from food poisoning include chronic arthritis and hemolytic uremic syndrome (HUS), which can lead to kidney failure. These illnesses can have long-term consequences for the affected individuals, for the society, and the economy as a whole. Health Canada estimates that the costs related to these illnesses and deaths exceed 12 to 14 billion dollars every year.

What Causes Foodborne Illness?

There are several types of microbes that can cause foodborne illness. They tend to fall into these main categories:

- **bacteria,**
- **viruses,**
- **yeasts and moulds,** or
- **parasites**

Toxins and **chemicals** can also cause foodborne illness.

Bacteria

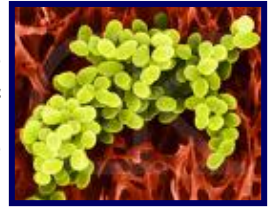


It is easy to prevent foodborne illness by understanding some basic facts about the micro-organisms that cause it. These very small organisms cannot be seen individually with the naked eye. In fact, they are so small that it would take 500 million of them to form a single layer on a postage stamp. Bacteria are not always harmful. Some are naturally present in many foods, particularly raw meats and poultry. Special types of bacteria are useful in food processing, such as for making yoghurt, cheese, and fermented meats such as summer sausage.

Although most bacteria are harmless and many are even beneficial, some are potentially dangerous organisms that are responsible for serious symptoms, illness and even death. Harmful micro-organisms are called **PATHOGENS**. Continuing research indicate that the number of pathogens recognized to cause food poisoning is increasing. These pathogens are commonly found in feces, in the soil, in the digestive tract of animals and on raw meat, poultry and fish.

The nose and throat of healthy individuals may harbour *Staphylococcus* bacterium, which through sneezing may contaminate otherwise uncontaminated or safe food. Food may also become contaminated via the **fecal-oral route**. Pathogens originating from human intestinal tract can be

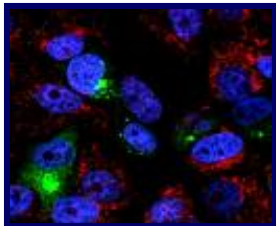
transferred to hands after using the toilet. In turn, the hands contaminate the food being prepared which is then ingested. For this reason, personal hygiene is very important when handling food. Thorough handwashing can remove most of the bacteria that can be transferred from various parts of the body to the hands. In addition, foods should be kept covered to protect them from contamination by flies or other insects and animals.



Most potentially harmful bacteria are not dangerous in foods when present in very small numbers. They typically will not cause food poisoning unless they are allowed to grow and multiply in the food. Because bacteria are living organisms, they need food and warmth in order to grow to numbers that can cause illness. Foods that are moist and rich in protein provide good conditions for bacterial growth. Meats, poultry, eggs, milk and other dairy products, foods with sauces and gravies, and cream-filled pies and cakes are excellent breeding grounds for bacteria. Under ideal temperatures, they can double their number every **20 minutes**. At this rate one bacterium can multiply to more than **2 million in 7 hours**.



Viruses



Viruses are the smallest of the microbes and can only be seen with the aid of an electron microscope. Although they can only grow and multiply in living cells of a host such as in people, animals and plants, they can survive for some time and spread in food, water, clothing, moisture, and dust particles. When found in the feces of infected people, viruses can easily spread via the fecal-oral route. They can cause illnesses such as colds, flu, hepatitis, and herpes. Not all viruses are spread through food; some are bloodborne viruses such as the HIV virus that causes AIDS.

Mould and Yeast

Moulds grow well in warm and moist conditions. Even “low-risk foods” such as bread can support the growth of mould. Like some bacteria, certain moulds can produce harmful toxins, which can spread throughout the food.

Mould found in liquids or semi-solid foods such as jam or maple syrup should be discarded. Scraping away the visible mould may not remove all of the toxins, if toxins are present. Cheese covered with cottony white or green spots should not be eaten unless mould is a characteristic of the cheese e.g. Camembert or blue cheese. If hard cheese such as cheddar has a patch of mould confined to one area, the cheese may be salvaged by cutting away the mould to a depth of 2.5 cm (one inch).



Yeast is another type of micro-organism that can cause food spoilage. They can grow at refrigeration temperature as well as at room temperature. Yeast often grows on fruit, breads, syrups, processed meats, pickles, cottage cheese and yoghurt. Foods, beverages or brines that show signs of yeast formation i.e. slimy or powdery films, cloudy sediment in liquids or gas bubbles, should not be eaten.

Parasites



Parasites are the largest of all the microbes. Like viruses, they need a living host to grow and multiply. These parasites include tapeworms, roundworms and protozoa. Tapeworms and roundworms are multi-celled parasites that can be found living in the flesh of meat animals and fish. Thorough cooking of meat and fish will prevent the spread of these parasites. A protozoa or one-celled organism called *Giardia lamblia* causes an illness commonly referred to as “beaver fever”. It produces a cyst and can be found in feces of humans, beavers, muskrats and dogs. It can spread in food and water through the fecal-oral route. When ingested, it germinates, reproduces and causes illness.

Toxins and Chemicals

Toxins can be produced when certain types of bacteria are allowed to grow in food. Heat or normal cooking temperatures may kill the bacteria, but the toxin produced by the bacteria will NOT be destroyed. The toxin will remain in the food and can cause illness. Some bacteria will produce toxins in the digestive tract, after a person eats the food containing the bacteria. Some toxins are naturally present in animals such as puffer fish. Although considered an Asian delicacy, the puffer fish can cause neurological symptoms when eaten.



Chemicals can contaminate food accidentally during food production, harvesting or storage of food. These chemicals include pesticides, food additives, cleaning compounds and toxic metals. To prevent chemical foodborne illness, all chemicals must be stored separate from food, and all chemical containers must be clearly labelled.

What Foods Are Most Associated With Foodborne Illness?

High-Risk Foods

“High-risk foods” are those in which food poisoning bacteria grow or multiply rapidly unless proper heat (above 60°C) or refrigeration (below 4°C) is maintained. Although some food poisoning bacteria are cold tolerant and can grow at temperatures around 4°C or lower, in most cases food poisoning bacteria grow slowly at 4°C or lower. Refrigerators should therefore, be maintained at 4°C or lower, and foods that could become unsafe should be consumed promptly, preferably within 2 to 3 days.

Food poisoning bacteria show a special liking for meat, fish and poultry and products such as milk, cream and eggs. The following is a list of common “high-risk foods”:

- Meat, poultry, fish and salads containing these
- Cooked vegetables, peas, beans
- Cooked cereals (oatmeal, etc.) and rice
- Custards, pudding, whipped cream
- Milk and milk products
- Shellfish
- Dressings
- Processed meats (bologna, hot dogs, ham, etc.)
- Gravies
- Meat sandwich spreads
- All canned food and combination dinners (after opening)
- Eggs and egg products (except dehydrated eggs) and egg salads
- Soft cheeses



Sometimes “high-risk foods” are left at unsafe temperatures for several hours. For example, meat sandwiches prepared for school lunches are kept at room temperature for hours. These sandwiches can be handled safely by making meat sandwiches the evening before, wrapping them securely and refrigerating promptly. Some sandwich fillings may even be frozen overnight. The following morning the sandwiches are placed in an insulated bag with an ice pack or a frozen juice box. That way, they will remain cold longer than if the sandwiches were prepared in the morning and not adequately insulated.

Alternatively, there are “low-risk foods” that are especially useful for lunches taken to school or work or for picnics that require no refrigeration.

Low-Risk Foods

“Low-risk foods” are those that can be safely kept at room temperature. Food poisoning bacteria will not normally grow in them. Mixing a “low-risk food” with a “high-risk food” however, will produce a potentially unsafe mixture e.g. adding peanut butter to chicken stew. Some fish, meat and other low acid foods packaged in cans or flexible pouches must also be handled like “high-risk foods” once they have been opened. The following is a list of some “low-risk foods”:

- Nuts and peanut butter
- Bread, crackers, cookies and cake
- Jam, honey, syrup and candy
- Butter, margarine and cooking oil
- Dry cereals and powdered milk (until reconstituted)
- Raw, cooked and dried fruit
- Raw vegetables
- Pickles, relishes, mustard and ketchup
- Hard cheeses
- Hard salami and other dried sausages
- All foods in cans and flexible pouches, until opened (unless indicated otherwise on the label)
- Spices



The shelf-life of low-risk foods is limited when stored at room temperatures as some can support the growth of mould. Although low-risk foods do not support bacterial growth, they can still be responsible for the spread of disease if handled improperly. If you have any doubts about the food you serve, don't serve it. After all, **someone's health may be at stake.**

Keeping Foods Safe

There is a "**temperature danger zone**" between 4°C and 60°C. Between these temperatures, which include room temperature, bacteria can multiply rapidly in food. Below 4°C (normal refrigeration temperatures), bacterial growth is slowed down, but bacteria are not killed. “Hot holding” temperatures above 60°C also prevent bacterial growth and toxin formation. Bacteria are usually killed by heat during cooking or reheating to a minimum temperature of 74°C.

We cannot avoid danger zone or “warm” temperatures for short periods of time during purchasing, the journey home from the store, meal preparation and serving. However, it is very important to minimize the time during which food is exposed to the “**temperature danger zone**”. Food kept at temperatures between 4°C and 60°C for more than two hours have the potential to cause foodborne illness and should be discarded. Cold foods should be kept cold below 4°C, and hot foods should be kept hot above 60°C.

Never keep “high-risk foods” in the temperature danger zone for more than 2 hours.

During a power failure, food will usually stay frozen for two days in a non-functioning freezer filled to capacity. If the freezer is less than half full, food will keep frozen for about 24 hours. Open the freezer as little as possible to check on food’s coldness. Food can also be kept frozen for three to four days in the freezer by using dry ice placed on cardboard that has been laid on top of the food.

Generally, food that has started to thaw but contains some ice crystals and has remained cold with no obvious signs of deterioration can be cooked and eaten. It is best to discard “high-risk foods” that are completely thawed and held at room temperature or held at unknown temperature for unknown period of time.

When in doubt, throw it out.



Sanitary practices are also important in the preparation, cooking and storage of foods. Well-scrubbed hands will prevent the spread of bacteria to foods or from one food to another. Kitchen utensils, containers and work surfaces should be properly cleaned. This is especially important when these come in contact with raw meat and poultry. Proper cleaning will prevent **cross contamination**, defined as the transfer of bacteria from one food to another.

To avoid cross contamination:

- Use a separate cutting board for raw meat and poultry and a different cutting board for cooked and ready-to-eat foods.
- Clean can openers in between uses.
- Place meat cooked on the barbecue on a different plate or container used for the raw meat.

Section 2

Stories of Food Poisoning

STORIES OF FOOD POISONING

This section narrates a series of foodborne illness case histories based on real life events. The following accounts illustrate various improper food handling practices that contribute to outbreaks of food poisoning. Remember that these events could happen to you if you don't handle food safely.

Deadly Dessert

After eating a meal at a local restaurant in Edmonton, Alberta, 27 individuals became ill with food poisoning. Their symptoms included diarrhea, abdominal cramps, vomiting, nausea, fever, chills, headache and body aches. Laboratory testing confirmed that 16 of the sick individuals had a common food poisoning bacterium called *Salmonella*. Eleven people went to the hospital emergency and seven were hospitalized. Four of the restaurant employees also suffered from food poisoning during the same period.



All except one individual reported eating mocha mud pie at the restaurant. One of the ingredients used to make this dessert is whole raw shell eggs, which are often contaminated with *Salmonella*. Although there were no leftovers of this mud pie and no eggs available for testing, the eggs were suspected as the likely source of contamination.

In a similar incident but a more serious one, patients at a hospital in Scarborough, Ontario were served tapioca pudding for dessert. Later that night, patients began showing symptoms of food poisoning, which included cramps, chills, vomiting, and diarrhea. A total of 103 patients became ill and two of these patients, both elderly and weak, died.

Local health officials confirmed that *Salmonella* had poisoned 91 of the patients. The tapioca pudding was the suspected source of illness. The pudding was made from raw, cracked eggs and those who ate it became ill. Officials found that one of the hospital's food handlers was a *Salmonella* carrier. A **carrier** is someone who "carries" the disease-producing bacteria but show no symptoms. It was suspected that the food handler likely contaminated the egg whites during the preparation of the pudding. Unfortunately there was no pudding available for testing to confirm the official's theory. However, it was discovered that the pudding, amounting to 225 servings, was refrigerated in one large container until dinner. This bulk refrigeration meant that the temperature at the centre of the pudding stayed warm, long enough for bacteria to multiply to high numbers. Had the pudding been divided into several smaller containers, it would have cooled more quickly, and the chances for bacterial growth would have been reduced.

Ill Bill



Bill, an employee of a catering kitchen in a local hotel, woke up one morning with vomiting and diarrhea. Although he was feeling ill and not wanting to disappoint the kitchen staff, Bill came to work anyway. He prepared fruit trays and a fruit salad for a large gathering of 250 people that afternoon.

Within 48 hours, over 100 people who attended the gathering were ill with vomiting and diarrhea. Several felt so sick that they went to the hospital emergency. The local health department was notified, and an outbreak investigation was started. A virus called Norovirus was found in the stool specimens provided by Bill and the people at the gathering who became sick.

The investigation also determined that those who ate the fruit salad were more likely to become ill than those who did not.

The cause of the illness for over 100 people who attended the gathering points to a food worker, who reported for duty while sick with vomiting and diarrhea. Bill likely had Norovirus on his fingertips after going to the toilet, contaminated the food he prepared for the large group, who in turn became sick with the virus.

Norovirus is estimated to be the most common cause of foodborne illness in North America. Infection of Norovirus is often observed in long-term care facilities, but also occurs in other institutions, restaurants and private dwellings. The infection can occur if a person ingests contaminated food or water containing the virus, comes in close contact with an infected person, or comes in contact with a surface contaminated with the virus (e.g. hands, soiled laundry, kitchen utensils). Symptoms usually appear about 24 - 48 hours after ingestion of the virus, and the illness can last between 24 - 48 hours.

It is imperative that food workers who are ill with vomiting or diarrhea do not report to work until the vomiting and/or the diarrhea have stopped.

Individuals who are ill with symptoms should not prepare food for others or provide care to those in child-care centres or long-term care facilities until at least 48 hours after the illness stops. Frequent handwashing can also prevent the spread of the virus especially after using the toilet, after providing care to an ill person, after handling soiled laundry and before handling food.

A Raw Deal

It was an exciting day for a mental health association day group as they undertook a field trip to a Hutterite colony. The group had a tour of the farm and some individuals had contact with calves. Lunch was provided by the Hutterite colony. Several days later, some of the mentally disabled clients and staff members of the association were reportedly ill with diarrhea. The stool specimen of one case was confirmed positive for the bacterium, *Campylobacter*. Individuals who were ill reported that they consumed milk served at the farm. The milk was unpasteurized. During the investigation by the local health authority, milk was still available from the colony's kitchen cooler. Laboratory analysis confirmed that the leftover milk sample contained *Campylobacter*.

Raw or unpasteurized milk has been implicated in many food poisoning outbreaks. Illness quite often occurs following the consumption of raw milk contaminated with *Campylobacter*. Milk straight from a cow can carry dangerous bacteria such as *Campylobacter*, *Listeria* and *Salmonella*. Drinking raw milk can cause diseases such as tuberculosis and brucellosis. Pasteurization, which heats the milk, is an effective way of destroying harmful bacteria as well as extends the keeping quality or shelf life of the product.



Toxin in Home Canned Food

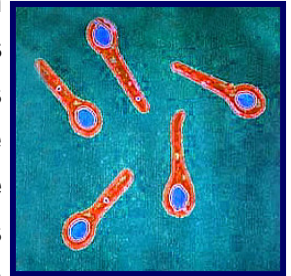
A day after a 31-year-old man ate unheated home-canned green chilli, he developed blurred vision, dry mouth and weakness in his limbs. On day two, he developed respiratory weakness and required mechanical ventilation. He also had fixed dilated pupils, facial weakness, tongue and neck muscle paralysis and severe weakness in all limbs. He was diagnosed with botulism. Type A botulism toxin was identified in the patient's stool and from the jar of green chilli. Fortunately, the patient made slow, steady recovery over the next three months.

In another part of the country, a 47-year-old man was admitted to hospital while suffering from dizziness, blurred vision, slurred speech, difficulty swallowing and nausea. He was hospitalized for 49 days and required mechanical ventilation for 42 days. Botulism antitoxin was administered intravenously. Investigation revealed that before the onset of symptoms, the patient had eaten home-canned green beans and a stew containing roast beef and potatoes. Although analysis of the leftover green beans was negative for botulism toxin, type A toxin was detected in the stew. The stew had been cooked, covered with a heavy lid and left on the stove for 3 days before being eaten without reheating.



Clostridium botulinum is a bacterium that prefers to grow under conditions where there is no oxygen such as inside a canned food. If the bacterium is allowed to grow, it produces a toxin that attacks the central nervous system, which may cause paralysis or death.

C. botulinum, which may be on any raw product, only becomes dangerous when it grows and produces a toxin before the food is eaten. In fact, unless the food is adequately heat-processed or acidified, we probably eat some cells and spores of *C. botulinum* in food every day, but not in high enough numbers to allow the production of toxin in the food. When allowed to grow in food, in addition to the toxin, the bacterium usually produces gas and foul-smelling odours, which makes the food distasteful to most people. Unfortunately, some types of this organism produce toxin without these tell-tale signs.



Most risks of botulism in this country are caused by home-canned foods, which have been inadequately processed at too low a temperature. Common culprits are vegetables or meat (low-acid foods), which are improperly heat-processed in boiling water instead of being safely processed in a pressure cooker. Never use or taste test any food that comes from a bulging can, is mouldy, has a gas build-up or a bad odour.

Banquet Blues

When 500 people attended a Christmas dinner and dance in Edmonton, Alberta, they never imagined that half of them would be sick with food poisoning. Within 12 hours, they experienced diarrhea, abdominal cramps, nausea and vomiting. Stool specimens from 20 individuals isolated the bacterium, *Clostridium perfringens*. Investigation by public health officials revealed that the illness was strongly associated with the ingestion of turkey slices in gravy. During the event, hot holding temperatures were not monitored or recorded with a thermometer. The steam tables were borrowed from another food facility and when these hot holding units were plugged into the wall, it would trip the circuit. This indicated that the hot temperatures were not constantly maintained at the minimum required temperature of 60°C.

Hot holding units are essential when preparing large batches of food that must be kept hot prior to serving. The temperature of food in these units should be monitored closely and frequently to ensure that they remain hot, above 60°C. These units should also never be used for reheating prepared foods.



In North Battleford, Saskatchewan, a local church organization prepared the food for a large banquet. After almost 50 guests became ill with diarrhea, nausea, and cramps, laboratory testing confirmed that the turkey was the cause of the food poisoning. Further investigation revealed that some of the frozen turkey were thawed and left unrefrigerated overnight. They were also cooked at too low a temperature in a short time. To further complicate matters, the turkeys were unrefrigerated for another 24 hours before being served.

Turkey and other poultry products should be thoroughly cooked before being served. The oven temperature should be between 150°C -160°C. Cooking at temperatures below 150°C may not kill all the food poisoning bacteria. The final temperature of the meat should be 85°C. This temperature can be measured with a meat thermometer inserted into the thickest part of the thigh muscle. Leftover turkey and other types of poultry should be cut into smaller portions or sliced, placed in shallow containers and refrigerated within two hours after cooking.



For maximum safety, instead of stuffing the turkey, cook stuffing separately. Warm stuffing provides an ideal place for bacterial growth. It is especially unsafe to stuff a turkey the night before cooking, even if it is refrigerated. The stuffing may not cool fast enough, allowing bacteria to multiply. When placed inside the turkey, stuffing may not be thoroughly heated by the time the turkey is done, and bacteria may survive. Stuffing must reach an internal temperature of at least 74°C for heat to destroy bacteria.

If you decide to stuff the turkey, stuff immediately before cooking and cook stuffing to an internal temperature of at least 74°C. Remove stuffing from the turkey immediately after cooking. There is always a higher risk associated with leftovers. If stuffing is not removed from the turkey before refrigerating the leftovers, it may stay warm long enough for bacteria to multiply.

Danger with Ground Beef

Because of confirmed cases of *E. coli* O157:H7 food poisoning, the ground beef distributed by a large meat packing plant was recalled. About that time, a father bought ground beef at a local



grocery store. After cooking and eating the ground beef, the father and his two-year-old daughter had symptoms of diarrhea and later tested positive for *E. coli* O157:H7. A sample of leftover ground beef obtained from this household also contained the bacterium *E. coli* O157:H7. The grandmother, who was looking after the toddler with diarrhea, later tested positive for *E. coli* O157:H7, even though she did not eat any ground beef.

Thorough cooking will easily destroy the bacteria often found in raw ground beef. The illness can also be prevented by avoiding cross contamination. Do not use the same plate or utensil for uncooked and cooked meat. Wash hands properly after touching raw meat. Follow good hygiene practices particularly when caring for young children in diapers. Wash hands after diaper changing and before preparing or eating food.

The Donair Scare

In 2004, a donair restaurant failed to thoroughly cook a gyro (a cone of seasoned, restructured, ground raw meat) before serving donairs to customers. As a result, 84 of the customers became ill with *E. coli* O157:H7 infection. Eight of the customers were admitted to hospital between 2 to 18 days. The kidneys of two of the customer shut down. They developed a complication of *E. coli* O157:H7 infection called HUS (hemolytic uremic syndrome) and were placed on dialysis.

A donair is a sandwich primarily made up of cooked, sliced gyro meat wrapped in pita bread. The gyro meat is sliced off the cone as it continuously cooks on a vertical broiler. Because the sliced meat does not always cook to a safe temperature of at least 74°C, it requires a **secondary cook step** before serving. This secondary step is achieved by using an oven, a grill, a broiler, or a microwave oven. This ensures that the sliced portion of meat is further heated to a temperature of at least 74°C. A food establishment operator is required to have a suitable thermometer to confirm that this temperature is achieved. Had the meat sliced from the gyro undergone a secondary cook step, this outbreak could have been prevented.

uncooked and cooked meat. Wash hands properly after touching raw meat. Follow good hygiene practices particularly when caring for young children in diapers. Wash hands after diaper changing and before preparing or eating food.



Section 3

The Top 5 (Reasons Why Foodborne Illness Occurs)

THE TOP 5

(REASONS WHY FOODBORNE ILLNESS OCCURS)

(Based on statistics from the Edmonton Zone)

1. Ill Food Handlers

- A food handler with a foodborne infection handles or prepares food and contaminates the food.
- A food handler, after going to the toilet, has pathogens on his or her fingertips and in turn contaminates the food being prepared.
- Food employees with symptoms of nausea, vomiting and/or diarrhea continue to work in a kitchen.
- Sick employees return to work too soon after being ill. They work while still suffering from symptoms or return to work less than 48 hours after the symptoms disappears.

2. Temperature Abuse

- Foods are left in the temperature danger zone (between 4°C and 60°C) allowing bacteria to grow rapidly.
- Hot foods are not hot enough and cold foods are not cold enough.
- Perishable foods are in the temperature danger zone for longer than 2 hours.

3. Inadequate Cooking

- Perishable foods are not thoroughly cooked.
- Recommended internal cooking temperatures (see Safe Food Cooking Tips in the following section) are not followed.
- A thermometer is not used to ensure food is thoroughly cooked.
- Leftover foods are not adequately heated to an internal temperature of at least 74°C.

4. Cross Contamination

- Cutting boards and utensils are not always washed, rinsed and sanitized between uses.
- The cutting board used for raw meat and poultry is the same cutting board used for cooked or ready-to-eat foods.
- Uncooked perishable foods are stored close to ready-to-eat foods.
- Hands are not washed properly after handling raw meats and poultry.
- Raw meats are stored on the top shelf of the refrigerator, above ready-to-eat foods instead of on the lower shelf.

5. Improper Cooling of Cooked Food

- Foods are left to cool slowly.
- After cooking, food does not cool quickly because it is not divided into smaller portions.
- Hot foods are cooled using large stock pots or deep containers instead of shallow, covered, metal containers.
- Ice inserts or wands or simply stirring soups, gravies, and sauces while cooling are not considered as options for rapid cooling.

Section 4

Safe Food Tips

SAFE FOOD TIPS

By following these safe food tips you will help reduce the spread of foodborne illness.

SAFE FOOD PREPARATION TIPS

1. Prevent cross contamination. Potentially harmful bacteria can be transferred from raw foods, particularly raw meats and poultry, to cooked and ready-to-eat foods, via hands, utensils, containers and work surfaces in the kitchen. This transfer of bacteria is known as **cross contamination**. To prevent cross contamination, observe the following precautions:
 - Wash hands thoroughly using soap and hot water before handling food.
 - Keep hands, utensils and work area clean.
 - Use a clean utensil each time food is tasted.
 - Thoroughly clean all utensils and surfaces such as knives, cutting boards, countertops and sinks that have been in contact with raw meats, fish and poultry with hot soapy water. Using a dilute solution of household bleach ($\frac{1}{2}$ ounce or 1 tablespoon of bleach per gallon of water) will kill food poisoning bacteria remaining on surfaces.
 - Use a separate cutting board for raw meats and poultry and another cutting board for cooked or ready-to-eat foods.
2. Keep food preparation areas free of flies, insects and rodents, which may carry bacteria.
3. Do not handle food when ill. Avoid handling food if you have an infected cut, boil or burn if at all possible. Keep small cuts on hands clean and covered. Cover your mouth during a cough and sneeze and wash hands immediately after.
4. Do not use bulging, leaking or badly dented cans. Avoid tasting the contents of a can that spurts when opened, appears bubbly or has an abnormal smell.

SAFE FOOD COOKING TIPS

Use a meat thermometer to ensure that meat and poultry have been thoroughly cooked before being served. Cook the following to these internal temperatures:

- Poultry 85°C
- Stuffing 74°C
- Beef 74°C
- Pork 71°C
- Ground Mea 71°C
- Fish 65°C



1. Cook all poultry at an oven temperature of 150°C or higher to destroy food poisoning organisms.
2. Stuff poultry, meat or fish just before cooking. A safer method is to cook the stuffing separately.
3. Cook poultry and ground meats well. Use a thermometer to ensure meat is cooked.
4. Cook eggs thoroughly. Avoid recipes that call for raw eggs. Use pasteurized eggs instead.
5. Avoid eating raw fish, seafood and shellfish unless these have been properly frozen to kill the parasites. Otherwise, cook fish thoroughly until it flakes to the fork, and ensure that all fish products come from an approved source.

SAFE FOOD SERVING TIPS

1. Avoid food poisoning from “high-risk foods” by keeping hot foods hot (above 60°C) and cold foods cold (below 4°C). This keeps food out of the **danger zone** where bacteria and other microorganisms can grow rapidly.
2. Organize preparation times so that all foods to be served at a meal are cooked at the same time. Avoid holding foods at room temperature for long periods of time.
3. Throw away any food if you have any doubt about its safety. **Unsafe food does not always have a change in appearance, odour, or taste, but it can make you sick.**
4. Serve food fresh. Do not consume food that is more than 2 or 3 days old.
5. Never mix old food with new batches of food.
6. Reheat foods to a minimum internal temperature of 74°C. Reheat only as much food as needed for service.
7. Do not reheat food more than once. Discard any unused portion of the reheated food.
8. If providing food samples to the public, cook the food according to manufacturer’s cooking instructions and pre-cut into sample portions.
9. Prevent the public from directly handling food samples by providing them with toothpicks or single-use containers.
10. Replace samples if they have been displayed for over an hour. Discard leftover samples and those that may have been contaminated.

SAFE FOOD COOLING TIPS

1. Rapidly cool bulk quantities of hot food by dividing it into smaller portions, and store food in the cooler using shallow, covered metal containers. Rapid cooling reduces the amount of time “high-risk food” is held in the danger zone and reduces the risk of bacterial growth.
2. Ice baths can be used for rapid cooling. Place the pot of hot food in an ice water bath and stir food frequently. Use a thermometer to check the internal temperature of the food as it cools.
3. For large pieces of meat such as a roast or a turkey, divide in smaller portions or de-bone for rapid cooling.

SAFE FOOD THAWING TIPS

1. Thaw meat or poultry in the refrigerator, under cold running water, or defrost in the microwave oven; do not thaw at room temperature.
2. If thawing under cold running water, refrigerate food if food is not going to be used immediately. However, when using a microwave oven to defrost food, cook food immediately after defrosting.
3. Keep the food in its original plastic wrap when thawing in the refrigerator or in cold water, making sure that there are no leaks or tears in the plastic.
4. Ensure that raw foods do not contaminate cooked foods e.g. by letting meat juices drip on other foods. Avoid drip contamination by placing food in a container to catch the drips and storing raw meats on the bottom shelf of the refrigerator.
5. Avoid thawing commercially frozen stuffed poultry before cooking. Follow package directions for storage and cooking.
6. It is not necessary to wash poultry after it is thawed as this may cause the spread of harmful bacteria around the kitchen.
7. Wash hands thoroughly after handling raw meat, poultry and fish.
8. Thoroughly clean all surfaces that have been in contact with raw meats and poultry with hot, soapy water. Sanitize surfaces using a dilute solution of household bleach (½ ounce of bleach per gallon of water) or other approved sanitizer.

SAFE FOOD STORAGE TIPS

1. Follow directions on food package labels. “Keep refrigerated” means refrigerate food promptly and not only after opening the container.
2. Refrigerate or freeze leftover cooked foods immediately after serving. “High-risk foods” left out at room temperature for more than two hours can be hazardous.
3. Store perishable foods in the refrigerator (below 4°C) or in the freezer (below -18°C). Place thermometers in the refrigerator and freezer to monitor the temperatures periodically.
4. Ensure that raw foods do not contaminate cooked food. For example, do not let meat juices drip on other foods in the refrigerator. Store raw foods on the bottom shelves.
5. Remove any stuffing from leftover poultry, meat and fish before cooling, and refrigerate stuffing in a separate container.
6. Use refrigerated leftovers as soon as possible, preferably within 2 to 3 days. Frozen foods may be kept frozen for months without causing any food poisoning hazards.
7. Always date and label food stored for use later so you know how old it is. Date canned goods at the time of purchase. Always use old products first before the new ones. This is called the **“FIFO” rule** which means **“first in, first out”**.
8. Store pesticides and other chemicals separate and away from food.

THE TIME AND TEMPERATURE RULE

Remember the time and temperature rule by keeping foods out of the “**temperature danger zone.**” This is between 4°C and 60°C, where bacteria can multiply rapidly in foods. Remember these rules when handling food:

1. Keep **hot foods hot** (above 60°C) and **cold foods cold** (below 4°C). Perishable foods, especially those that are moist and rich in protein and have been kept at temperatures between 4°C and 60°C for more than two hours may cause food poisoning and should be thrown away.
2. Transport foods home from the grocery store as quickly as possible.
3. Use chilled ingredients to keep the temperature of foods cold during preparation.
4. Cook or serve foods immediately after preparation or refrigerate until ready to do so.
5. Follow package instructions carefully when handling frozen foods. If thawing is necessary, this should be done in the refrigerator, not at room temperature.
6. Cool hot liquid foods in the refrigerator using shallow containers; foods will not “sour” under these conditions.
7. Cool hot solid foods such as large roasts and turkey quickly. Cut them into smaller portions or slice the meat before storing them in shallow containers in the refrigerator.
8. Always separate dressing and gravies from meat, poultry and fish dishes before cooling and storage.
9. Make sure that picnic foods are kept cool until ready to eat. An insulated cooler with ice packs will keep picnic foods cool on the way to the park or beach.
10. Take special care when handling foods in large quantities such as food prepared for church suppers or other community affairs.

SAFE DISHWASHING METHODS

Utensils and surfaces with which food comes in contact must be maintained in a sanitary condition. They must be properly washed and sanitized to remove contamination.



Manual Dishwashing

When washing dishes by hand, follow the three step dishwashing method.

1. Wash dishes in warm soapy water at a temperature not lower than 45°C. Change wash water frequently.
2. Rinse dishes with clean warm water at a temperature not lower than 45°C. Change rinse water frequently.
3. Sanitize, either by immersing dishes in hot water (77°C) for 2 minutes, or in an approved chemical sanitizer at a temperature not lower than 45°C for 2 minutes. Approved chemical sanitizers include:
 - 100 ppm (parts per million) chlorine ($\frac{1}{2}$ ounce or 1 tablespoon of bleach per gallon of water),
 - no more than 25 ppm iodine, or
 - 200 ppm quaternary ammonium compound (follow instruction on the chemical label for proper dilution).

Test papers are required to check the chemical concentrations mentioned above.

Mechanical Dishwashing

When using a commercial dishwasher to wash dishes, follow the manufacturer's recommendations.

1. Ensure the dishwasher is maintained in good repair and proper working order. It is important that the dishwashing machine is scheduled for regular maintenance service.
2. Ensure an adequate supply of hot water is available to meet the demand of the machine.
3. Ensure wash water is kept reasonably clean at all times.
4. The final rinse cycle in a commercial dishwasher should either use hot water at 82°C or an approved chemical sanitizer. Approved chemical sanitizers include:
 - 100 ppm chlorine,
 - 12.5 ppm iodine, or
 - 200 ppm quaternary ammonium compound.

Test papers are also required to check the chemical concentrations during mechanical dishwashing.

For both manual and mechanical dishwashing, dishes should be left to air dry on a drain board. The drain board should be made of non-corroding and non-absorbent material.

Always examine the dishware for cleanliness and damage. Re-wash any unclean dishware, and throw out any damaged ones.

Section 5

Personal Hygiene

PERSONAL HYGIENE

Personal hygiene plays an important part in preventing the spread of infection through food. Dangerous micro-organisms or germs can be spread through food or drink. These germs may be found on our hands, our faces, our hair and intestinal tract. If you do not take care of your personal hygiene, your hands and clothes can pass on germs to food, dishes and utensils.

Wash Your Hands

Think of your hands and fingernails as always dirty. Just because they look clean does not mean they are clean. If you do not wash your hands properly or keep your fingernails trimmed short, your hands can easily spread germs in food and cause food poisoning. Always wash your hands at the handwashing sink using warm water and soap and dry hands with disposable paper towels.

The use of gloves **does not** replace handwashing. Gloves can also spread germs onto food if not used properly. Wash and dry hands before putting on the gloves and change the gloves between tasks.

Wash Your Hands Properly

It takes at least 20 seconds to wash your hands properly.

- Wet hands with warm water.
- Add soap and lather well.
- Rub hands together.
- Use a nylon nail brush and scrub under the fingernails, between the fingers and backs of the hands.
- Rinse thoroughly using warm water.
- Use paper towel to turn off the taps.
- Dry hands with a paper towel or hot air dryer.



Wash Your Hands OFTEN

- Before you start work and before preparing food
- After using the bathroom
- Before touching food that will not be cooked
- After working with raw meat, fish or poultry
- After smothering a sneeze or a cough
- After smoking
- After using cleaning or toxic chemicals
- When your hands become soiled e.g. after handling dirty dishes or garbage

Personal Hygiene Checklist

- Keep clean.
- Wear clean, clothes and head gear that controls the hair.
- Do not handle food when you are ill or have an infection, unless proper precautions have been taken to protect the food.
- Wash hands often using proper procedures.
- Keep fingernails short and clean.
- Do not wear nail polish or fake fingernails.
- Avoid wearing jewellery. Jewellery can hide germs and food particles that can cause people to become sick.
- Store your clothes and personal items in a locker or change room, not in food storage areas.
- Do not smoke where food is prepared or stored.



Section 6

Food Worker Illness

FOOD WORKER ILLNESS

When people are ill with vomiting and diarrhea, they can shed millions of the germs. The germs often end up on the fingertips of those who are ill. If food handlers come to work while they are ill, the food they touch will likely become contaminated with the same germs. Customers who in turn eat this food can become sick. **If you are sick, do not go to work.** The fecal-oral route is a common way of transferring pathogens to food. This occurs when a food handler does not wash their hands properly after using the toilet and then handles food or objects which then enter another person's mouth.

REMEMBER;

- Do not work if you are ill with vomiting and/or diarrhea.
- A person in charge shall not schedule an employee to work if they are aware that the employee is ill with vomiting and/or diarrhea.
- Obtain medical advice from your physician before returning to work while ill with vomiting and/or diarrhea.
- Do not prepare food for others until at least 48 hours after the symptoms of the illness stops.
- Do not work with food if you have an infected cut, boil or burn on your hand.
- Report any cut, abrasion or infection to the Food Service Supervisor.
- Do not work if you have yellowing of the skin or urine is dark brown in colour as this may be an indication of jaundice.
- Do not work if you have a fever and/or a sore throat.
- Do not work with food if you are sneezing, coughing or have a runny nose.

Common Foodborne Illness Symptoms

- Diarrhea
- Vomiting
- Abdominal Cramps
- Nausea
- Fever
- Jaundice (yellowing of the skin or eyes)



Section 7

Regulatory Requirements

REGULATORY REQUIREMENTS

Protecting our Food

Many people in Alberta continually work to protect the food we eat. They ensure that foods are produced under carefully controlled conditions. Government agencies inspect the food at various stages, from the farm to the retail store or restaurant. Environmental Health Officers (Public Health Inspectors) ensure that the establishments where our food is stored, processed, sold or served meet strict sanitation and food handling standards to protect the health and safety of the public.

Despite these safeguards, many Albertans suffer from food poisoning caused by the improper storage and handling of foods. To prevent unnecessary illness, compliance with the Food Regulation and Public Health Act is expected at all times.

Food Regulation

The Public Health Act and the Food Regulation are available online at the Alberta Queen's Printer website at www.qp.gov.ab.ca or by telephone at (780) 427-4952.

The Food Regulation requires that anyone who operates a food establishment must hold a valid **food handling permit** approved by the Regional Health Authority.

- It is valid for no more than one year.
- It is not transferable.
- It must be displayed in an area visible to the public.
- It may restrict the type of food that is served or the manner in which it is prepared.

There are a few exceptions to the requirement for a food handling permit. Special events, temporary food establishments and community organization functions do not require a food handling permit. They do require approval from the health authority and must follow regulatory requirements to ensure food is handled in a safe manner.

The Food Regulation also sets out requirements for, but is not limited to:

General construction

- a food establishment must submit plans to the Regional Health Authority for approval prior to construction or alterations of the food establishment
- the facility must be of sound construction and in good repair
- designed so that all equipment, utensils and surfaces can be effectively cleaned and sanitized
- designed to ensure the safe and sanitary handling of food
- living quarters must be separate from food preparation areas
- handwashing stations must be easily accessed by all food handlers and supplied with both hot and cold potable water, and soap and paper towels in appropriate dispensers
- approved ventilation systems are required for the removal of grease and odours

Equipment, utensil, and food surfaces

- must be smooth, non-absorbent and easily cleanable
- proper temperatures of all refrigeration and hot holding equipment must be maintained
- accurate thermometers must be present on all coolers/freezers

Storage of articles and materials

- food and non-food related items are to be stored separately
- chemicals and cleaners must be labelled and stored separately from food

Pest control measures

- the facility must be kept free of pests and conditions which lead to the reproduction of pests
- written records of pest control measures used must be maintained

Obtaining food from approved sources

- all food entering the facility must be inspected by the government

Contamination and unfitness for human consumption

- all food must be protected from contamination and handled in a sanitary manner
- any food that has become unfit for human consumption can not be served, sold, processed or displayed

Processing food

- food handling must be done in a manner that makes food safe to eat

Storing, displaying and transporting food

- all high-risk food must be stored and transported at 4°C or lower or 60°C or higher
- frozen foods must remain frozen while stored, displayed, packaged or transported
- eggs must be stored at 7°C or lower

Sanitation procedures

- written sanitation procedures are required that includes a cleaning schedule and a list of all cleaning and sanitizing chemicals

Food handler's hygiene and health

- food handlers must wear clean clothing, footwear, exhibit cleanliness, keep hair under control, wash hands often and refrain from smoking in food areas

Food safety training

- at least one supervisor or manager from a food establishment must hold a certificate in Food Sanitation & Hygiene Training
- if there are 6 or more staff on duty, a person holding a certificate must be present on site

If a food establishment does not remain in compliance with the Food Regulation, an Environmental Health Officer may close the facility and/or suspend or cancel the food handling permit. An Environmental Health Officer may also order the seizure or destruction of food if the food is deemed unfit for human consumption.

For information on starting a food business please contact your local Environmental Health Officer or Public Health Inspector.



Remember!

***Poor food handling
practices can
cause illness.
So think food safety –
that's good food
for thought!***

For more information, please contact your nearest Environmental Public Health office.

*Edmonton Main Office
Calgary Main Office
Lethbridge Main Office*

*(780) 735-1800
(403) 943-2295
(403) 388-6689*

*Grande Prairie Main Office
Red Deer Main Office*

*(780) 513-7507
(403) 356-6366*

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