FOOD SAFETY FUNDAMENTALS

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ONLINECULINARYSCHOOL.NET

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FOOD SAFETY INTRODUCTION

FOOD SAFETY DEFINITION

Food safety is used as a scientific discipline describing the handle, preparation, and storage of food in ways that prevent foodborne illness. The occurrence of two or more cases of a similar illness resulting from the ingestion of a common food is known as a foodborne disease outbreak. It includes several routines that should be followed to avoid potential health hazards. (Source: Wikipedia)

To prevent deadly foodborne illnesses, the scientific approach of food safety was developed. After centuries of tragic cases of people becoming severely indisposed or even dying as a result of contaminated food, scientists definitively proved that food could act as a transmitter of diseases between individuals, and harbor dangerous bacteria that can poison entire people if appropriate steps aren't taken to keep it fresh and sanitary.

The science of food safety has progressed in past decades to include more sophisticated discussions, such as the pros and cons of genetically modified food, to safeguard human health for future generations too. In theory, food poisoning is 100% preventable.

WE ALL HAVE A HAND IN IT…

According to the Centers for Disease Control and Prevention (CDC), each year in the United States, there are an estimated 76 million cases of foodborne illness.

An estimated 325,000 of these cases lead to hospitalization, and for 5,000 people, the illness leads to death. The government defines foodborne illnesses as the result of eating food that is contaminated with harmful bacteria, viruses, parasites, or toxins.

Codex Alimentarius

The Codex Alimentarius Commission was established in 1963 by the World Health Organization and the Food and Agriculture Organization of the United Nations to develop international food standards to protect consumer health and to facilitate fair trading practices in foods. Today, there are more than 180 member governments.

Find out if your country is of the members of the Codex Alimentarius Commission: http://www.fao.org/fao-who-codexalimentarius/about-codex/members/en/

HANDLING A FOODBORNE ILLNESS COMPLAINT

Every complaint you receive about a foodborne illness should be taken seriously. These complaints can have a severe impact, not only for your customers but also for your business. If the authorities

decide to close your business, your reputation is at stake. It takes no time for words to spread through social media.

Above all, it is crucial to act quickly to prevent others from getting sick.

In some cases, customers blame you even if you are not responsible for the intoxication. Many people do not realize that it may take a few hours before showing any signs of foodborne illness. They think it was the last meal that made them sick when it may be something they ate hours ago.

In any case, always examine the complaint to be sure that you are not the origin. Taking the time to handle the complaint with seriousness and professionalism demonstrates that you value your customer's well-being and the safety of the food you serve.

In some jurisdictions, it is mandatory to report intoxication complaints, so be sure to check the regulations in your area. For example, in France, in the case of 2 complaints on the same product, the restaurant owner has the legal obligation to inform the authorities.



Steps in handling the complaint

The lack of regulation does not mean that you should not do anything. The consequences of playing the politics of the ostrich can be dramatic in some cases, both for your client and for your business.

Collect as much information as possible:

- Customer contact information: name, address and phone number

- Details about what they ate and when including the date and time
- If other members of their party ate the same food
- If other members of their party are suffering from a foodborne illness
- What symptoms do they experience?
- When did symptoms start?
- Did they visit a doctor, and if so, what was the diagnosis? If they did not, and they are still sick when they call you, recommend that they do. Never attempt to suggest treatment, you are not a doctor.
- Did they contact the health authorities? Encourage them to do so.

Contact the authorities

Contact the local health authority yourself with the information you have recorded. They will decide the next course of action, and if it is necessary to sample and analyze the food, to identify the source of the disease. They might ask you to keep leftovers from the suspected dish.

Investigate the complaint

Your food may not be the culprit but exercise due diligence. Inquire with your staff about what could have caused the disease. Review food safety records, checklists, work schedules, and other documents.

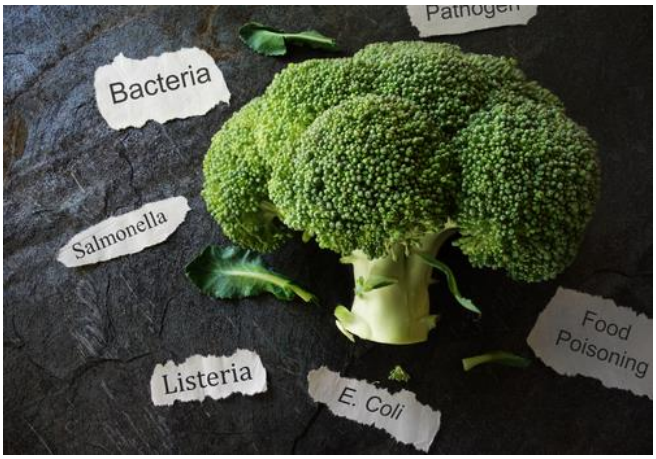
Be prepared

Don't' wait for something to happen, to plan for the situation. Set up a crisis management team that understands its responsibilities if the worst happens. Think about all the serious incidents that can occur in the food sector and how to solve them. In case of a complaint, knowing what to do will remove a large chunk of stress when handling it.

Some health authorities provide a "Foodborne Illness Report Form." Check with your local health authority or create your own to make sure that you are not missing any information.

FOODBORNE ILLNESS

CHEF, WHAT IS FOODBORNE ILLNESS?



A **foodborne illness**, also known as a **foodborne disease** and commonly called **food poisoning**, is any illness resulting from the consumption of food contaminated with infectious or toxic agents. It can affect any person.

The symptoms of food poisoning can last for days and include abdominal pains, diarrhea, vomiting, nausea, and fever. The symptoms usually come on suddenly but can occur several days after eating contaminated food. Food poisoning usually improves on its own.

Vulnerable Groups

Food poisoning is more likely to affect people with lowered resistance to disease than healthy people who might show mild symptoms or none at all. Elderly or sick people, babies, young children, and pregnant women are particularly vulnerable to food poisoning. Extra care should also be taken when preparing food for and looking after these vulnerable groups.

FOODBORNE ILLNESS CAUSES

Foodborne illness is commonly called food poisoning, even though most cases are caused by a variety of pathogenic bacteria, viruses, prions or parasites that contaminate food, rather than chemical or natural toxins.

The foodborne illness usually arises from improper handling, preparation, or storage of food. Good hygiene practices before, during, and after food preparation can reduce the chances of contracting an illness. Foodborne disease can also be caused by a large variety of toxins that affect the environment.



ABOUT GERMS

Germs are invisible to the eye except under a powerful microscope. Hence the name microorganisms or microbes. Microbes can be grouped according to their different structures. Two common groups of microbes are **viruses** and **bacteria**. Not all bacteria are harmful; indeed, many are essential for life. The bacteria, viruses, and other microbes that cause illness are commonly known as **germs**.

Germs found in food can lead to food poisoning that can be dangerous and can kill, though this is rare. They are very hard to detect since they do not usually affect the taste, appearance, or smell of food.

Germs can get into our food at any point in the food chain, from the time when an animal or product is in the field, to the moment when food is put on to the table. If germs are allowed to survive and multiply, they can cause illness when that food is eaten.



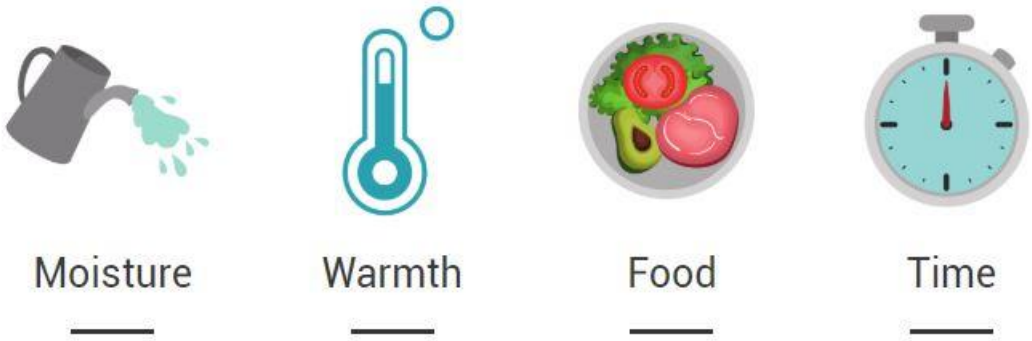
BACTERIA

Bacteria are a common cause of foodborne illness. In the past, bacterial infections were thought to be more prevalent because few institutions could test for viruses, and no active surveillance was being done for this particular organism. Symptoms for bacterial infections are delayed because the bacteria need time to multiply. They are usually not seen until 12–72 hours or more after eating contaminated food.

The most common bacterial foodborne pathogens are:

- Campylobacter jejuni which can lead to secondary Guillain-Barré syndrome and periodontitis
- Clostridium perfringens, the “cafeteria germ”
- Salmonella spp. – its S. Typhimurium infection is caused by consumption of eggs that are not adequately cooked or by other interactive human-animal pathogens
- Escherichia coli O157: H7 enter hemorrhagic (EHEC), which causes hemolytic-uremic syndrome

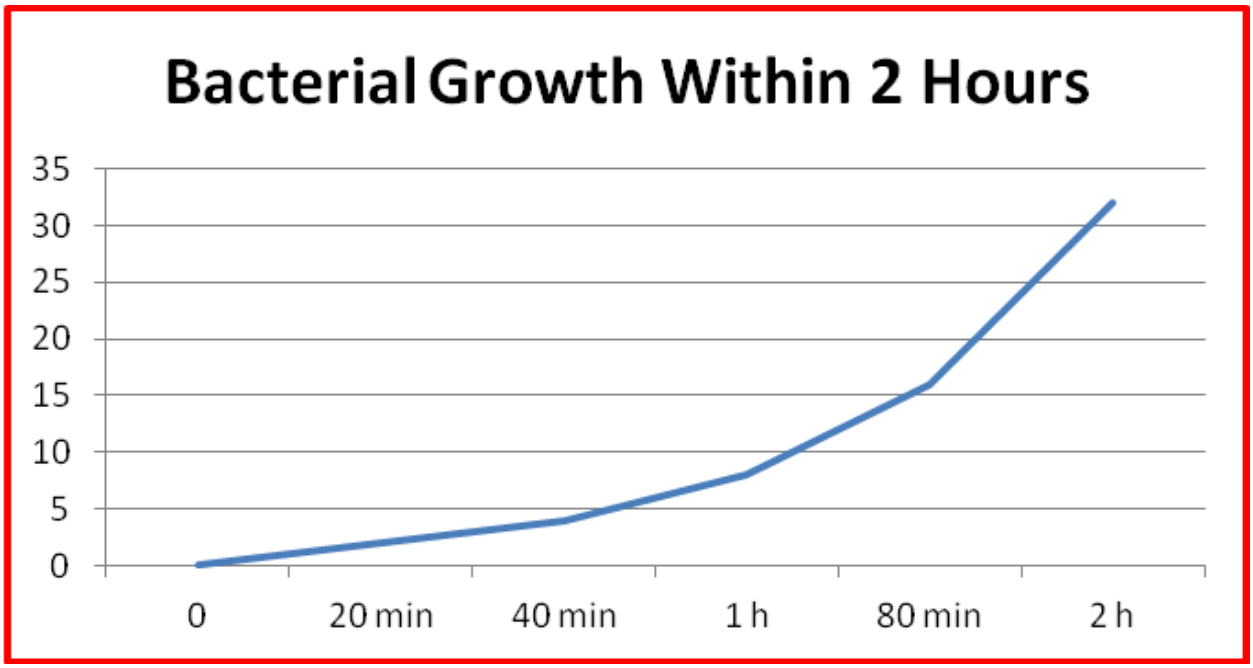
Other common bacterial foodborne pathogens are:

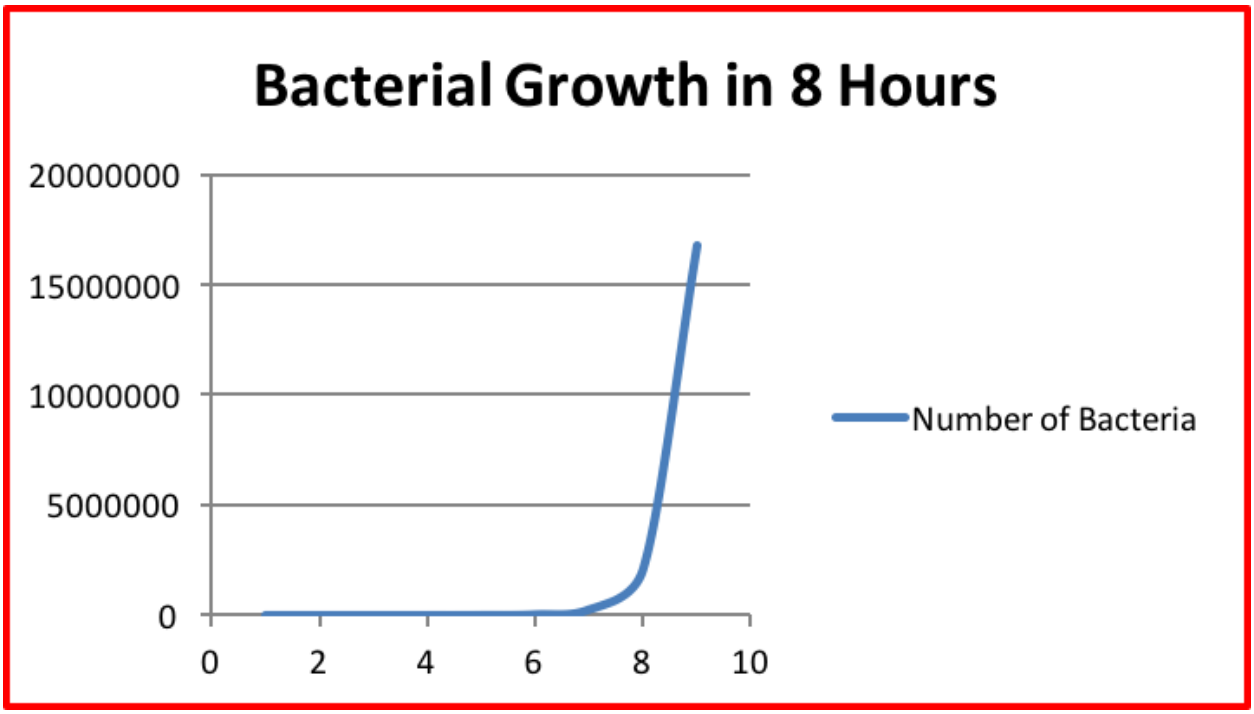


- Bacillus cereus
- Escherichia coli, and other virulence properties, such as enteroinvasive (EIEC), enteropathogenic (EPEC), enterotoxigenic (ETEC), enteroaggregative (EAEC or EAgEC)
- Salmonella
- Listeria monocytogenes
- Shigella spp.
- Staphylococcus aureus
- Streptococcus
- Vibrio cholerae, including O1 and non-O1
- Vibrio parahaemolyticus
- Vibrio vulnificus
- Yersinia enterocolitica and Yersinia pseudotuberculosis

Ideal conditions for bacteria to multiply

Bacteria multiply best between 5-63ºC but are killed at temperatures of 70ºC. At temperatures below 5ºC, most bacteria multiply very slowly, if at all. At very low temperatures, some bacteria will die, but many survive and can start to multiply again if warm conditions return. That is why proper cooking and chilling of food can help reduce the risk of food poisoning.





Follow the rules, and remember: "Bacteria grow by splitting themselves in half every 20 minutes. So the shorter time the food stays out of the fridge, the better it will be".

VIRUSES

Viruses are very small infectious microorganisms. Unlike bacteria, viruses can only multiply inside the living cells of other organisms. However, many viruses show high resistance to stresses such as heat, drying, freezing, UV light, etc. and may survive for long periods in foods or the environment.

The majority of viral foodborne illnesses are caused by a few types of viruses, including:

- Norovirus
- Rotavirus
- Hepatitis A and E

Viral infections make up perhaps one-third of cases of food poisoning in developed countries. In the USA, more than 50% of cases are due to viruses. **Noroviruses**, which are the most common foodborne illness, caused 57% of outbreaks in 2004. A foodborne viral infection is usually of intermediate (1–3 days) incubation period, causing illnesses that are self-limited in otherwise healthy individuals and are similar to the bacterial forms described above.

Rotavirus is a genus of double-stranded RNA virus in the family Reoviridae. It is the single leading cause of severe diarrhea among infants and young children. By the age of five, nearly every child in the world has been infected with rotavirus at least once. However, with each infection, immunity develops, subsequent infections are less severe, and adults are rarely affected. There are seven species of this virus, referred to as A, B, C, D, E, F, and G. Rotavirus A, which is the most common, causes more than 90% of infections in humans.

The fecal-oral route transmits rotavirus. It infects cells that line the small intestine and produces an enterotoxin, which induces gastroenteritis, leading to severe diarrhea and sometimes death through dehydration. Although rotavirus was discovered in 1973 and accounts for up to 50% of hospitalizations for severe diarrhea in infants and children, its importance is still not widely known within the public health community, particularly in developing countries. In addition to its impact on human health, rotavirus also infects animals and is a pathogen of livestock.

More than 500,000 children under five years of age die from rotavirus infection each year, and almost two million more become severely ill. In the United States, rotavirus causes about 2.7 million cases of severe gastroenteritis in children, almost 60,000 hospitalizations, and around 37 deaths each year. There are global public health campaigns to combat rotavirus, which focuses on providing oral rehydration therapy for infected children and vaccination to prevent the disease.

Hepatitis A is distinguished from other viral causes by its prolonged (2–6 weeks) incubation period and its ability to spread beyond the stomach and intestines into the liver. It often induces jaundice or yellowing of the skin yet rarely leads to chronic liver dysfunction. The virus has been found to cause infection as a result of the consumption of fresh-cut produce, which has fecal contamination.

FOODBORNE INFECTION VS INTOXICATION

In the case of food intoxication, the waste products (toxins) are in the food and are consumed. In the case of food infection, living pathogens are consumed and cause illness.

Foodborne Infection

It is caused by the ingestion of food containing pathogenic microorganisms (i.e., bacteria, viruses, or parasites), which multiply within the gastrointestinal tract, producing widespread inflammation. The most commonly implicated microorganisms include species of Salmonella, Shigella, E. coli 0157: H7, etc. These infections have more extended incubation periods than those experienced with food intoxications, usually commencing from 6-24 hours or longer after ingestion. Symptoms may include fever, headache, nausea, vomiting, diarrhea, abdominal pain or distress, and prostration. The causative organism may be identified by laboratory examination of the vomitus, feces, or blood and the suspected food, when available.

Foodborne Intoxication

Certain bacteria under favorable growth conditions produce chemicals (toxins) in food, which, when ingested, will cause food intoxication. Enterotoxins produced by Staphylococcus aureus are heat stable (i.e., not destroyed by normal cooking temperatures) and are the cause of the most common foodborne intoxication. The staphylococci multiply in the food where they produce their toxins before the food is consumed. It generally takes less than 8 hours for these organisms to produce enough toxins to cause symptoms. The disease is characterized by an abrupt onset (2 to 4 hours after ingestion) of symptoms of severe nausea, vomiting, diarrhea, and prostration with little or no fever.

SPORES AND TOXINS

Toxins

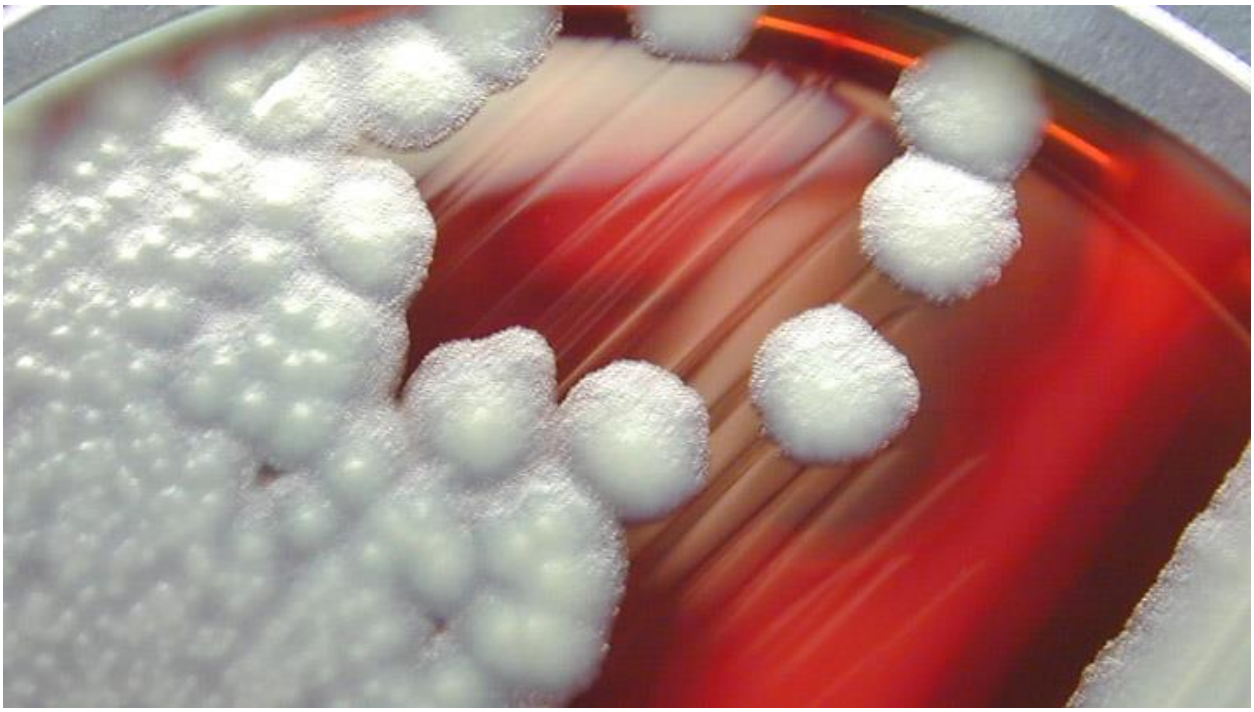
In addition to disease caused by a direct bacterial infection, some foodborne illnesses are caused by exotoxins, which are excreted by the cell as the bacterium grows. Exotoxins can produce illness even when the microbes that produced them have been killed. Symptoms typically appear after 1–6 hours depending on the amount of toxin ingested.

The most common exotoxins are:

- Clostridium botulinum
- Clostridium perfringens
- Staphylococcus aureus
- Bacillus cereus

The rare but potentially deadly disease botulism occurs when the anaerobic bacterium Clostridium botulinum grows in improperly canned low-acid foods and produces botulism, a powerful paralytic

toxin. The disease of MMS was recently diagnosed for the first time in the United States in Tucson, Arizona. Symptoms include nausea, fatigue and, excessive vomiting. This disease is caused by eating meat sticks that are past acceptable shelf life.



Mycotoxins and alimentary mycotoxicosis

The term alimentary mycotoxicoses refer to the effect of poisoning by Mycotoxins through food consumption. Mycotoxins have prominently affected human and animal health, such as an outbreak that occurred in the UK in 1960, which caused the death of 100,000 turkeys which had consumed aflatoxin via contaminated peanut meal. In addition, during World War II, 5000 people died in the USSR due to Alimentary toxic aleukia (ALA).

Spores

Some types of bacteria are capable of producing a hard coating shell to protect themselves from stressful conditions like extreme heat, dryness, cold and chemicals. A bacterium with such a protective coating is called a **spore**. Spores can survive high temperatures, drying, boiling, freezing or even chemicals, like cleaning agents and disinfectants. (Think about chemicals that claim to kill 99.9 % of bacteria.)

When conditions for bacterial growth improve, for example when cooked food containing the spores is removed from the heat and left at room temperature (see Danger Zone), the spore coating splits open and a normal bacterium emerges and begins to multiply in the food. Spores are a particular concern when food is cooked in advance, allowed to cool or freeze too slowly, and then served cold or improperly reheated later.

Example: Botulism

- You use a raw potato = containing active Clostridium botulinum spores
- You wrap it airtight in foil and bake = but Clostridium botulinum spores survive
- You left the baked potato 4 hours in the Danger Zone = Spores germinate, grow and produce toxins
- The baked potato is eaten = Toxins cause Botulism

Food that contains toxins may not look, smell or taste any different from uncontaminated food. Only one spore and unsafe practices are needed to create food poisoning.

OTHER PATHOGENS

Parasite

Parasites live in or on animals and people and cause illness when the food infected with the parasite is not cooked to a temperature high enough or frozen to a temperature cold enough to kill the parasite. Trichinella (found in pork and some game meats) and roundworms (found in raw fish) are examples of parasites found in food.

Protozoa

Protozoa are one-celled animals that may be found in water. The use of water from unsafe sources can lead to illness. Giardia lamblia is an example of protozoa that may be found in water from rivers, lakes, streams, and shallow wells. Food washed in water containing Giardia lamblia that is served without any further cooking (such as salad greens) can cause illness.

Fungi

Fungi grow on decaying organic matter. Many fungi are harmless or beneficial, but some, such as mold that grows on spoiled food, can be harmful and remain even after cutting or scraping the visible mold off the food.

NATURAL TOXINS

Several foods can contain toxins naturally, many of which are not produced by bacteria. Plants, in particular, may be toxic. Animals that are poisonous to eat are rare. In evolutionary terms, animals can escape being eaten by fleeing, and plants can use only passive defenses such as poisons and undesirable substances, for example, capsaicin in chili peppers and pungent sulfur compounds in garlic and onions. Most animal poisons become poisonous by eating poisonous plants to which the animal is immune, or by bacterial action.



Fly Agaric



Skorpion Fish



Yew Berries

Death Cap (Amanita phalloides)



Perhaps the deadliest of all mushrooms, the death cap is found throughout Europe, especially in Australia, British Columbia, and more recently in California. It closely resembles edible straw mushrooms and caesar's mushrooms. Its heat-stable amatoxins withstand cooking temperatures and quickly damage cells throughout the body.

Within 6 to 12 hours after consumption, violent abdominal pain, vomiting, and bloody diarrhea appear, causing a rapid loss of fluid from the tissues and intense thirst. Signs of severe involvement of the liver, kidneys, and central nervous system soon follow, including a decrease in urinary output and a lowering of blood sugar. This condition leads to coma and death in more than 50 percent of the incidents. Notable deaths include Pope Clement VII, who died of accidental death cap poisoning in 1534, and possibly Roman Emperor Claudius in 54 CE.

CONSEQUENCES

SYMPTOMS AND MORTALITY

Symptoms typically begin several hours to several days after consumption and depend on the agent involved.

The symptoms can include one or more of the following:

- Nausea,
- Abdominal pain,
- Vomiting,
- Diarrhea,
- Gastroenteritis,
- Fever,
- Headache and/or fatigue.

In most cases, the body can permanently recover after a short period of acute discomfort and illness. However, foodborne illness can result in permanent health problems or even death, especially for people at high risk, including babies, young children, pregnant women (and their fetuses), older adults, sick people, and others with weak immune systems.

Foodborne illness is a significant cause of reactive arthritis, which typically occurs 1–3 weeks afterward. Similarly, people with liver disease are especially susceptible to infections from Vibrio vulnificus, which can be found in oysters or crabs. Tetrodotoxin poisoning from reef fish and other animals manifests rapidly as numbness and shortness of breath and is often fatal.



INCUBATION PERIOD

The delay between the consumption of contaminated food and the appearance of the first symptoms of illness is called the incubation period. This ranges from hours to days (and, in rare cases, months or even years, such as in the case of Listeriosis or Creutzfeldt-Jacob disease), depending on the agent and on how much was consumed. If symptoms occur within 1–6 hours after eating the food, is the most likely culprit is a bacterial toxin or chemical rather than live bacteria.

The long incubation period of many foodborne illnesses tends to cause sufferers to attribute their symptoms to “stomach flu.”

During the incubation period, microbes pass through the stomach into the intestine attached to the cells lining the intestinal walls and begin to multiply there. Some types of bacteria stay in the gut, some produce a toxin that is absorbed into the bloodstream, and some can directly invade the deeper body tissues. The symptoms produced depend on the type of microbe.

INFECTIOUS DOSE

The infectious dose is the amount of agent that must be consumed to give rise to symptoms of foodborne illness and varies according to the agent and the consumer’s age and overall health. In the case of Salmonella, relatively large inoculums of 1 million to 1 billion organisms are necessary to produce symptoms in healthy human volunteers, as Salmonella bacteria are very sensitive to acid. An unusually high stomach pH level (low acidity) dramatically reduces the number of bacteria required to cause symptoms by a factor of between 10 and 100.

OUTBREAKS

The vast majority of reported cases of foodborne illnesses occur as individual or sporadic cases. The origin of most sporadic cases is undetermined. In the United States, where people eat outside the home frequently, most outbreaks (58%) originate from commercial food facilities (FoodNet data). An outbreak is defined as occurring when two or more people experience a similar illness after consuming food from a common source.

Often, a combination of events contributes to an outbreak. For example, food might be left at room temperature for many hours, allowing bacteria to multiply, which is compounded by inadequate cooking, which fails to kill the dangerously elevated bacterial levels.

Outbreaks usually occur when those affected know each other. However, more and more outbreaks are determined by public health staff from unexpected increases in laboratory results for certain strains of bacteria. Outbreak detection and investigation in the United States are primarily handled by local health jurisdictions and are inconsistent from district to district. It is estimated that 1–2% of outbreaks are detected. The outbreak is usually announced through press conferences by the local health jurisdictions.



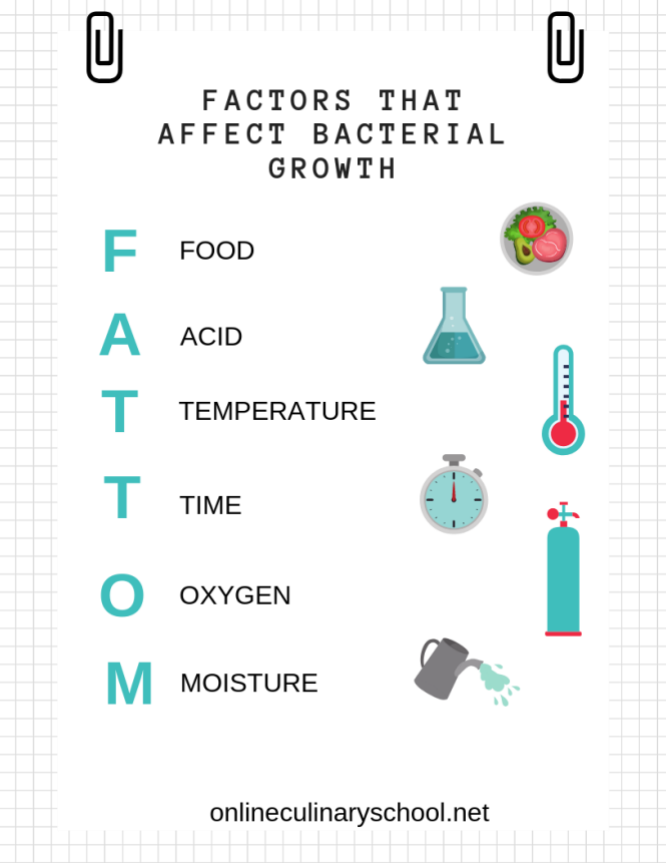
FATTOM

DEFINITION OF FATTOM

FATTOM is a mnemonic device used in the foodservice industry to describe the six favorable conditions required for the growth of foodborne pathogens. The letters stand for:

- **F**ood
- **A**cid
- **T**emperature
- **T**ime
- **O**xygen
- **M**oisture

These are all factors that you can control to limit bacterial growth.

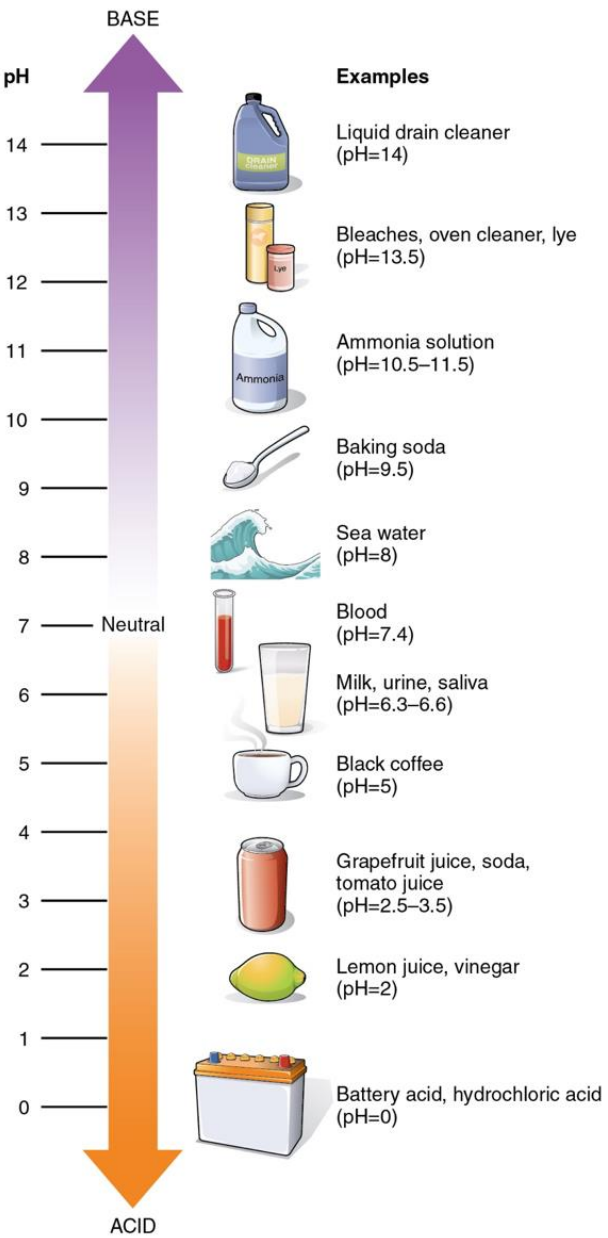


F FOR FOOD

Bacteria is a living organism that requires food to survive. Some food is more prone than others to bacterial growth.

Moist protein-rich foods, such as meat, milk, eggs, and fish, are potentially hazardous, but they are not the only ones. Plant-based cooked meals are also potentially hazardous foods, if not correctly handled.

A FOR ACID



A food product is more or less acidic, and its acidity is measured in the amount of H + ions.

An environment with a pH of 7.0 is exactly neutral. Foods with a pH below 7.0 are acidic; a pH above 7.0 is alkaline. The lower the pH, the higher the acidity; the higher the pH, the lower the acidity.

Why does acidity increase conservation?

To multiply, bacteria's need an environment whose pH is between 5.5 and 6.5, so close to neutrality. The majority of foods are in these values. When a portion of food becomes acidic, the bacteria will stop their development, that's why a product is considered stable for a pH lower than 4,5.

What are the ways to lower the pH?

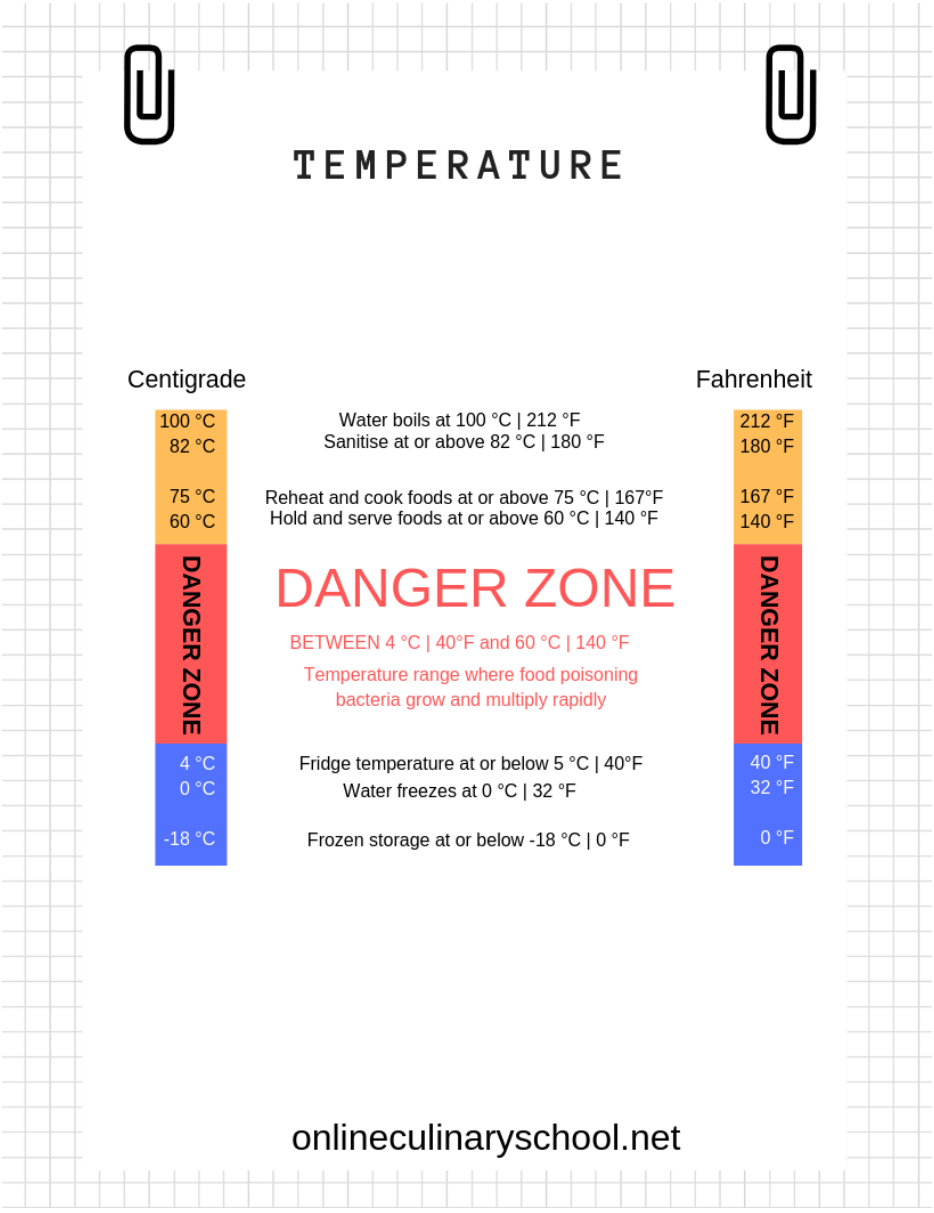
The decrease in pH, and therefore the increase of the acidity of food, is done by additions of vinegar or citrus juice such as lemon. It will, therefore, be preferable to offer lemon pies (pH = 4.2) in the summer menus rather than pastries made with pastry cream or whipped cream (pH between 6 and 6.5), the risk of multiplication of bacteria will be much lower. This parameter is important when outside temperatures are high!

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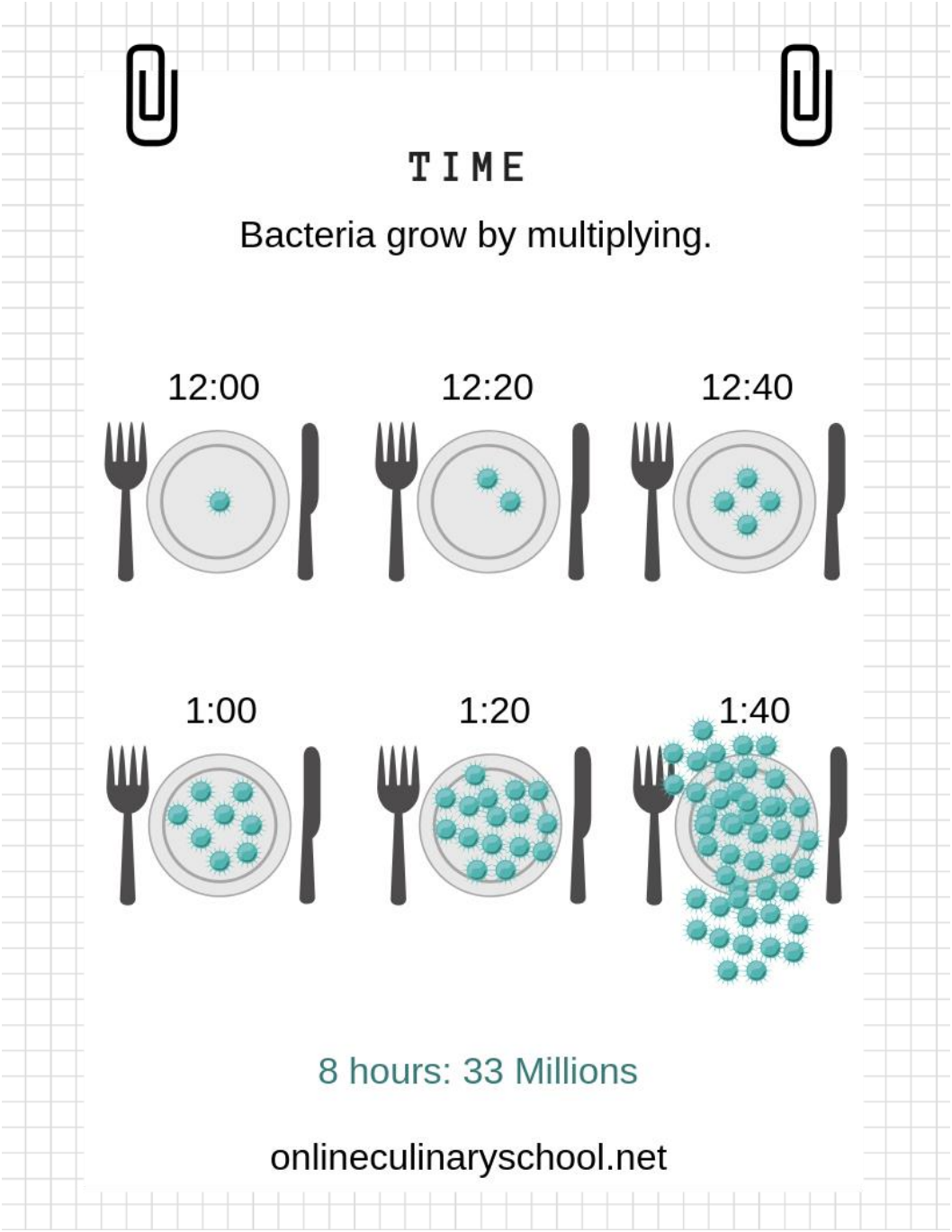
T FOR TEMPERATURE

Foodborne pathogens grow best in temperatures between 40 °F to 140 °F (4 °C to 60 °C), a range referred to as the Temperature Danger Zone. Temperatures below 4 °C and above 60 °C will slow or stop bacteria growth. Temperature control is one of the best ways to reduce the risk of foodborne illness caused by bacteria.



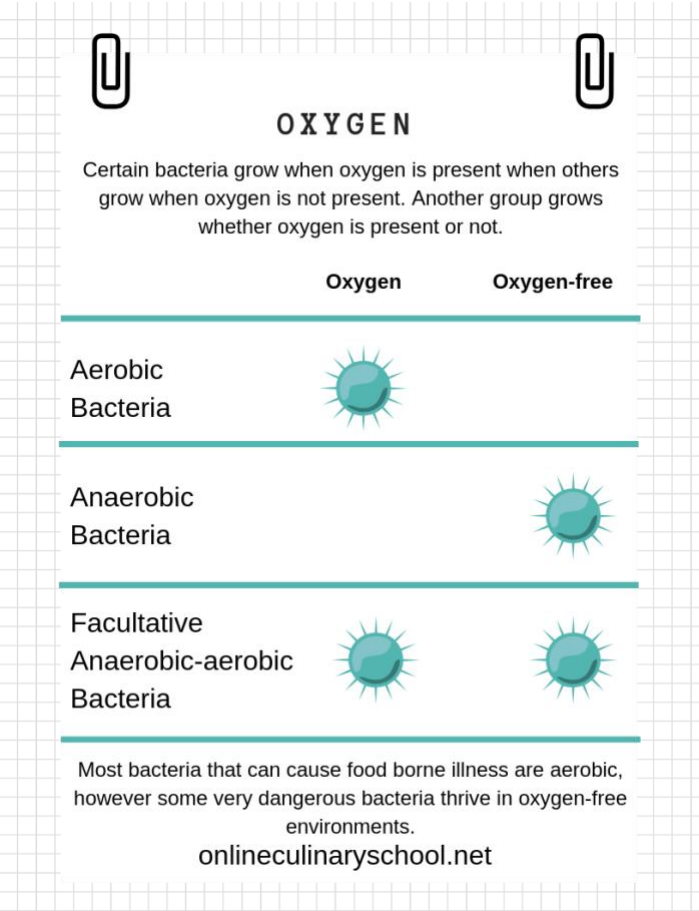
T FOR TIME

Pathogenic microorganisms reproduce by cell division. One becomes two. Restricting the amount of time that foods are left in the danger zone will help reduce the risk.



O FOR OXYGEN

Types of bacteria in relation to oxygen:



- **Aerobic bacteria**: They develop only in the presence of oxygen
- **Anaerobic bacteria**: they grow inside the food when no oxygen is present. Improperly preserved home-canned foods are a common source of botulism. Home-canned items cannot be used in foodservice.
- **Facultative anaerobic-aerobic bacteria**: They can develop in the absence or presence of oxygen. They will contaminate all foods.

Practical consequences:

- Vacuum packaging is not enough. It can inhibit the development of aerobic bacteria, but it must be kept out of the Danger Zone.
- When foods are improperly processed and then stored at room temperature in airtight conditions such as cans, bottles, or immersed in oil, anaerobic spores may survive and grow.
- Sufficient heat treatment should be applied to preserves to destroy anaerobic germs.
- Do not let broths and the dishes in sauce cool down at room temperature. Cool them quickly or maintain them at a temperature above the danger zone.

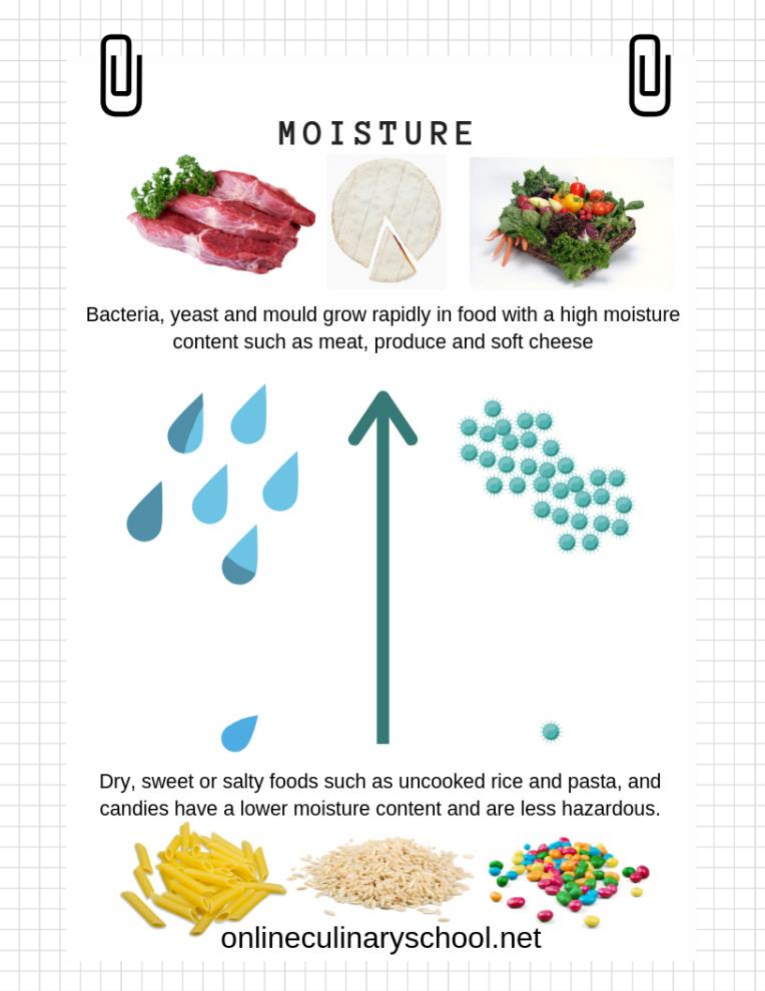
M FOR MOISTURE

Bacteria need water to grow in food. The perishability of a food is related to the moisture content, and the water activity level. Thus, the drier a food is, the longer it will last. Bacteria cannot grow below 16% water. But the lack of water does not kill them.

Moisture content is the amount of water in food expressed as a percentage. Water activity (aw) is the amount of water available for use and is measured on a scale of 0 to 1.0.

Practical consequence: You can adjust the water content of the food (by eliminating water or by adding compounds that fix the water, such as salt, sugar) to reduce bacterial growth and thus keep longer food.

- Products such as milk powders, dehydrated, or lyophilized vegetables, which have a water content of less than 5%, are no longer subject to bacterial development.
- Table salt or Sodium chloride: Nacl, used in sausages, has an anti-bacterial activity from 20% (in other words, very salty). You then understand why it is challenging to meet the requirements of consumers who want less salty meats.
- Sugar is an excellent preservative from 40%. We find its conservative action in a jam, sweetened condensed milk, etc.

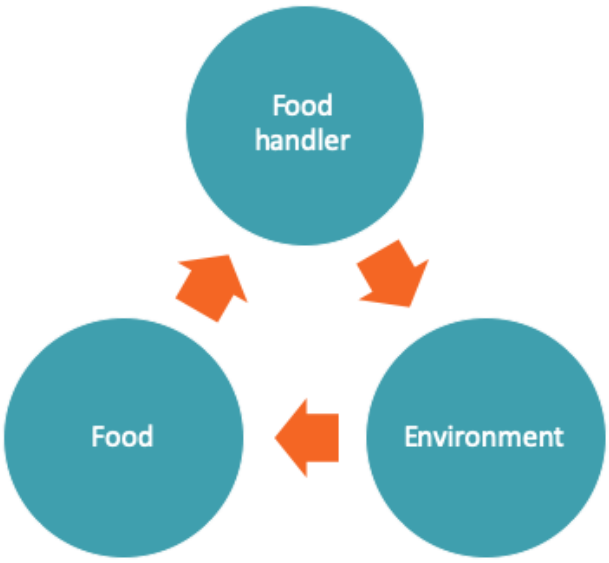


TRANSMISSION OF CONTAMINANTS

CYCLE OF TRANSMISSION OF CONTAMINANTS

There are three major parts in the cycle of transmission of contaminants:

- the food
- the food handler
- the environment



The cycle of Transmission of Contaminants

Examples of Contamination in Preparation

- If a food worker stays on the job while sick and does not wash his or her hands carefully after using the toilet, the food worker can spread germs by touching food.
- If a cook uses a cutting board or knife to cut raw chicken and then uses the same knife or cutting board without washing it to slice tomatoes for a salad, the vegetables can be contaminated by germs from the chicken.
- Contamination can occur in a refrigerator if meat juices get on items that will be eaten raw.

You are not the only one, but you are the last one

It takes several steps to get food from the farm or fishery to the dining table. It is called the food production chain. Contamination can occur at any point along the chain—during production, processing, distribution, or preparation. Sometimes, by the time a food causes illness, it has been mishandled in several ways along the food production chain.

Food can be contaminated at any step of the food chain, and food handlers have the responsibility to do all it takes to prevent illness. Undercooking the food or leaving it out on the counter at an unsafe temperature, can make a foodborne disease more likely.

WHAT IS CROSS CONTAMINATION?

Cross-contamination of food happens when harmful microorganisms from raw food such as meat or vegetables are transferred to ready-to-eat food such as salads or sandwiches. Ready-to-eat meals will not be prepared or cooked any further, so contamination at this point can lead to food poisoning. It is essential to prevent cross-contamination and be conscious of it while preparing food.

CUTTING BOARDS DIRTY TRUTH



Be Careful with Cutting Boards

When juices from raw meats or germs from unclean objects accidentally touch cooked or ready-to-eat foods (such as fruits or salads), cross-contamination occurs. If not cleaned correctly, the board can harbor harmful bacteria, especially if they have cracks or deep cuts.

Special Precaution

After cutting raw meat on your board, clean thoroughly with hot soapy water, then disinfect with chlorine bleach or other sanitizing solution, and rinse with clean water.

PREVENTING CONTAMINANTS TRANSMISSION

IMPORTANCE OF PERSONAL HYGIENE



It is imperative for safe food-handling outcomes for all workers to be familiar with standard sanitation and hygiene practices. One of the basic principles is to break the cycle by avoiding cross-contamination, which can be achieved by ensuring personal hygiene practices are followed.

Proper personal hygiene is critical in any foodservice premise. Personal hygiene includes:

- Showering and bathing regularly.
- Keeping hair, clean hair, and covered or tied back. Wear a hair net for longer hairs. Wash your hands after touching your hair, beard, or mustache.
- Keeping clean clothing and footwear that is used only at work.
- Unless intact gloves are worn, employees working with exposed food may not wear fingernail polish. Nails should be trimmed, filed, and maintained so that edges are not rough. Artificial nails are not permitted in the food production kitchen as they can fail off.

- Change your uniform and apron as often as necessary. Always remove your apron before going to the washroom.
- Avoid smoking, eating, or engaging in other activities that put your hands in contact with your mouth.
- Handwashing regularly and thoroughly after contact with any possible contaminant. Alcohol-based hand gels are NOT a suitable alternative to hand washing for food handlers in foodservice premises.
- Use a single-use or clean utensils for tasting the food.
- Using separate cloths for cleaning and wiping plates.
- Proper and regular handwashing is a critical part of any food safety system. You must always wash your hands after:
    - Sneezing, coughing, or touching your mouth or nose
    - Using the bathroom
    - Smoking or using toothpicks
    - Handling raw foods
    - Cleaning and wiping tables, food preparation surfaces, or equipment
    - Handling soiled objects, garbage, or money
    - Using your phone

Staying at home when sick

You may feel some days that you should tough it out and go to work instead of informing your manager that you aren't feeling well, but that could be dangerous. If you are experiencing vomiting, diarrhea, jaundice, or fever accompanied by a sore throat, or if you have open cuts or sores, you must not handle food. Check out your establishment's employee sickness policy and report your symptoms to your manager.

Going to work when sick could endanger numerous customers and other employees. Be responsible and report any symptoms to your manager and stay home to avoid the spreading of the illness.

AT THE INDUSTRY AND GOVERNMENT LEVEL

Food companies are dedicated to food safety. They rigorously monitor processes and test their products. In many cases, harmful bacteria enter food after the food has left the food processing plant, and usually, when workers handle, store, and prepare the food improperly.

Consumers should always follow the food manufacturer's cooking and storage instructions found on the product label. Many labels also tell if a product was pasteurized (heat-treated) to kill harmful bacteria.

Prevention is mainly the role of the state through the definition of strict rules of hygiene and public services. These services begin with veterinary surveying of animal products in the food chain, and additional farming, industry, and delivery (shops and restaurants) inspections.

This regulation includes:

- **Traceability**: In a final product, it must be possible to know the origin of the ingredients (originating farm, identification of the particular source animal or harvesting form), and where and when it was processed. The origin of the illness can thus be tracked and solved (and possibly penalized), and the final products can be removed from the sale if a problem is detected
- **Enforcement** of hygiene procedures like Hazard Analysis and Critical Control Points (HACCP) and the "cold chain."
- Power of **control** and law enforcement by veterinarians

In August 2006, the United States Food and Drug Administration approved Phage therapy, which involves spraying meat with viruses that infect bacteria and thus prevent infection. This process has raised concerns because, without mandatory labeling, consumers would not be aware that meat and poultry products have been treated with the spray.

HEALTH-ORGANIZATIONS

At the world level

The World Health Organization (WHO) Food Safety Department provides scientific advice for organizations and the public on issues concerning the safety of food. It serves as a medium linking the food safety systems in countries around the world. Food safety is currently one of WHO's top ten priorities. Food Safety is one of the major issues in our world today, and the Organization calls for more systematic and aggressive steps to be taken to reduce the risk of foodborne diseases significantly.

This Network is intended to complement and support the existing WHO Global Outbreak Alert and Response Network (GOARN), which includes a Chemical Alert and Response component.

At your local level

It is not possible for us to list all the local health organizations all over the world. Most developed countries have a body of government whose job is to guarantee consumer safety. Wikipedia provides a list of health organizations by country:
https://en.wikipedia.org/wiki/List_of_food_safety_organisations

Again, it all depends on your country regulation, but for example, in Canada, food inspectors routinely visit food premises within the county to:

- conduct routine inspections
- do re-inspections; and
- follow-up on complaints and suspected foodborne illnesses.

During inspections, Public Health Inspectors look at:

- food storage temperatures, hot and cold
- cooking, reheating and cooling times and temperatures of food
- personal hygiene of employees, including good hand hygiene
- food production methods and procedures
- the flow of food through receiving, storage, preparation, and service
- dish and equipment washing and sanitizing procedures
- food sources
- pest control
- methods of garbage collection, holding and disposal
- cleanliness of floors, walls, ceilings, equipment, and other surfaces.

TIPS TO PREVENT CROSS-CONTAMINATION

Some tips to prevent cross-contamination are listed below:

- Cover foods as much as possible
- Store raw meats separate from ready-to-eat foods
- Store raw meat, poultry and seafood on the bottom shelf of the refrigerator so juices do not drip onto other foods
- Wash hands after handling raw meats, eggs or vegetables
- Designate separate cutting boards for raw meats or clean and sanitize cutting boards between uses for different foods
- Clean and sanitize knives between uses on different foods and place only sanitized knives back in their racks

- Sanitize any utensil, equipment or food contact surface after it has been in contact with raw foods, especially meat or eggs
- Never move boxes or containers that may have been stored on the floor onto countertops
- Do not peel vegetables on the top of the garbage
- Wash cutting boards thoroughly in hot, soapy water after each use or place in dishwasher
- Discard old cutting boards that have cracks, crevices and excessive knife scars
- Wash plates between uses or use separate plates. Use one for holding raw meat, poultry and seafood and another for cooked foods
- Place washed produce into clean storage containers and not back into the original ones
- Use one utensil to taste and another to stir or mix food
- Make sure you use clean scissors or blades to open bags of food
- Wear latex gloves if you have a sore or cut on your hand

For more information on safe food handling, contact your local Public Health Inspector at the Health Unit.



PEST CONTROL

Pest infestations don't happen overnight. Be aware of the warning signs of common pests. Pests in kitchen areas can contaminate food and spread diseases to customers, as well as ruining the inventory of stored food products. If you see any indication of a pest infestation, notify your supervisor immediately.

Pest infestation signs



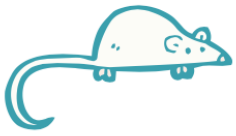
Droppings and nesting materials indicate the presence of nuisance birds.



In warm conditions and with abundant food, flies will multiply rapidly. Look for larvae and swarms of flies.



When the roach eggs hatch, the oval-shaped eggshells are left behind.



Mouse poop is similar to a grain of rice, and its color varies from blackish brown to gray



Rat droppings are shiny black and 1/2 – 3/4 of an inch long – larger than mouse droppings

Pest infestation prevention

Pests will only go where they have access to food, water, and shelter. So the best to prevent pest infestation is to limit their access to the building and to take away the things they need to survive.

- Clean and sanitize food-contact surfaces daily, including prep surfaces, grills, cooking surfaces, and countertops.
- Clean and sanitize underneath equipment and shelves.
- Keep screens over windows to keep birds and flies away.
- Dispose of garbage properly, keep them closed and, don't put them near doorways.
- Keep cooking equipment free of grease and dirt buildup.
- Store food and food stencils at least 6″ / 15 cm off the floor.
- When storing food in dry storage, keep food in tightly sealed, food-grade containers.
- Stop dripping pipes and prevent pooling of water.

Remove pests from your business, and stop them from coming back!

DEALING WITH ALLERGIES

WHY BOTHER WITH ALLERGIES?

Food allergies are specific to individuals, but can be life-threatening, and can be prevented by a thorough understanding of the allergy issue, knowledge of ingredients used in the preparation of foods, including pre-prepared meals, and care in ensuring separate cooking utensils, cookware, and food preparation surfaces. Often, the smallest oversights can have serious consequences, as indicated in the example below:

A customer has indicated they have an allergy to MSG and ordered chicken strips with sweet and sour sauce. The server tells them that the restaurant doesn't add MSG to any of its food typically, so the order should be fine. After eating the sauce, the customer experiences tingling lips and hives. In follow up, the manager discovers that the pre-prepared sweet and sour sauce served with the chicken strips contains MSG on the list of ingredients.

This incident could have been prevented if the server was aware of all of the ingredients used in the dish.

Most common allergies

Crustaceans and mollusks



Individuals with crustacean or mollusk allergies can experience allergic reactions without eating these foods. On rare occasions, exposures to proteins in cooking vapors (such as steam from boiling lobsters) and on dishes used to present these foods (like sizzling woks or skillets) can cause an allergic reaction.

Fish



An allergic reaction usually happens within minutes after being exposed to an allergen (e.g., fish), but sometimes it can take place several hours after exposure. Anaphylaxis is the most severe type of allergic reaction. Individuals with a fish allergy can experience allergic reactions without eating fish. On rare occasions, exposures to fish proteins in cooking vapors (such as steam from cooking fish) and on dishes used to present these foods (like sizzling woks or skillets) can cause an allergic reaction.

Peanut



0.6% in the United States population is allergic to peanuts. Peanuts can cause a severe, potentially life-threatening allergic reaction. Allergic reactions can be unpredictable, and even minimal amounts of peanut can create one.

Mustard



People with a mustard allergy should not eat any food if it contains mustard or canola meal or protein, or if it includes cold-pressed canola or rapeseed oil as an ingredient.

Tree nuts



An allergic reaction usually happens within minutes after being exposed to an allergen, but sometimes it can take place several hours after exposure.

- Tree nuts considered as priority allergens include almonds, Brazil nuts, cashews, hazelnuts, macadamia nuts, pecans, pine nuts (pignolias), pistachio nuts and walnuts.
- Peanuts are part of the legume family and are not considered a tree nut.

Milk



A milk allergy is different than milk (or lactose) intolerance. Unlike people with lactose intolerance, individuals with milk allergy have an immune system that reacts abnormally to milk proteins, and it can be life-threatening.

Sesame



An allergic reaction usually happens within minutes after being exposed to an allergen (e.g., sesame), but sometimes it can take place several hours after exposure.

Eggs



Eggs are the most common allergy for children. Egg allergy symptoms usually occur a few minutes to a few hours after eating eggs or foods containing eggs. Signs and symptoms range from mild to severe and can include skin rashes, hives, nasal congestion, and vomiting, or other digestive problems.

Wheat



0.3 to 3.4 % of the European population is allergic to wheat, and 13.9 % declare sensitization to it. Wheat allergy could be confused with celiac disease, but these conditions differ. Wheat allergy symptoms include swelling, itching, or irritation of the mouth or throat. Hives, itchy rash, or swelling of the skin. Nasal congestion, headache, difficulty breathing, cramps, nausea, or vomiting.

Soy



0.1% to 0.4% of children are allergic to soy. Soy allergy symptoms can include tingling in the mouth, hives, itching, scaly skin, swelling of the lips, face, tongue, and throat, or other body parts. Wheezing, a runny nose, or breathing difficulty. Abdominal pain, diarrhea, nausea, or vomiting.

WHAT IS ALLERGEN CROSS-CONTAMINATION?

Cross-contamination occurs when a safe food comes in contact with a food allergen such as peanut, nuts, seafood, or milk. For those with severe food allergies, eating even the slightest trace of an allergic food can cause a potentially life-threatening or fatal reaction. Although not everyone with a food allergy is this sensitive, it is still essential to be very careful and follow precautions. Reactions can occur through several means:

- Someone ate a peanut product.
- They unwittingly ate a portion of food that was not supposed to contain peanut but had been contaminated with peanut. This could occur through an unintended ingredient or from being in contact with peanuts during preparation, storage, or serving.
- They touched something with peanut traces and then put their hands in their mouths or rubbed their eyes. The most common instance of direct contact is when someone eats a peanut product and then touches a chair or table, leaving a smear or even a trace of peanut. The next person to use that table or chair could be severely peanut-allergic, and that residue, if ingested, could be enough to cause a reaction.

WHAT IS PEANUT-FREE?

Peanut is a member of the legume family (e.g., beans, peas). The following precautions also apply to products containing tree nuts (e.g., walnuts, hazelnuts) and any food-related allergen.

More and more these days, in our schools, social groups, and community clubs, we have administrators and organizers requesting that people bring “peanut-free” snacks. For some people, the term “peanut-free” is a source of aggravation and annoyance, because peanut butter is almost universally a favorite food among young children. The unfortunate reality is that peanuts can pose a life-threatening risk for people with severe peanut allergy.

Food allergies appear to be increasing. People are becoming more aware of the severity of anaphylaxis (severe allergic reaction). Once aware of the severe consequences, most people are very willing to keep food-related social and school activities safe. Many people want to help reduce peanut allergens in social situations but are not sure how to go about it. The two questions most commonly asked are: “What does peanut-free mean”? and “What is cross-contamination?”

What Does Peanut-Free Mean?

It means that the food concerned does not contain peanuts, peanut butter, peanut oil, or any form or derivative of peanut at all! It must not contain peanut or even “traces of peanut.” Also if the ingredient label says, “May contain traces of nuts or peanut,” treat this label as if it says “contains nuts or peanut.” A food item may be labeled as having “mandelona nut” or “new nuts,” which means it contains peanuts soaked in almond flavoring and cut to look like almonds. Avoid these products.

WHAT IS “CELIAC”?

Celiac disease is an autoimmune disorder affecting between 0.5 and 1.0 percent of Americans—that is, one in every one to two-hundred people. It is caused by an abnormal immune reaction of small intestine cells to a type of protein called gluten. Gluten forms in the presence of water and are composed of two protein parts, glutenin and gliadin. Glutenin and gliadin are found in grains that are commonly used to make bread, such as wheat, rye, and barley.

When the bread is made, the yeast eats the flour and makes a waste product, carbon dioxide, which forms bubbles in the dough. As the dough is kneaded, gluten forms and stretches. The carbon dioxide gas bubbles infiltrate the stretchy gluten, giving bread its porosity and tenderness. For those who are sensitive to gluten, it is good to know that corn, millet, buckwheat, and oats do not contain the proteins that make gluten. However, some people who have celiac disease also may have a response to products containing oats. This is most likely the result of cross-contamination of grains during harvest, storage, packaging, and processing.

Celiac disease is most common in people of European descent and is rare in people of African American, Japanese, and Chinese descent. It is much more prevalent in women and in people with Type 1 diabetes, autoimmune thyroid disease, and Down and Turner syndromes. Symptoms can range from mild to severe and can include pale, fatty, loose stools, gastrointestinal upset, abdominal pain, weight loss, and, in children, a failure to grow and thrive. The symptoms can appear in infancy or much later in life, even by age seventy.

Celiac disease is not always diagnosed because the symptoms may be mild. A large number of people have what is referred to as “silent” or “latent” celiac disease. Celiac disease diagnosis requires a blood test and a biopsy of the small intestine. Because celiac disease is an autoimmune

disease, antibodies produced by white blood cells circulate in the body and can be detected in the blood.

When gluten-containing foods are consumed, the antibodies attack cells lining the small intestine leading to a destruction of the small villi projections. This tissue damage can be detected with a biopsy, a procedure that removes a portion of tissue from the damaged organ. Villi destruction is what causes many of the symptoms of celiac disease. The destruction of the absorptive surface of the small intestine also results in the malabsorption of nutrients, so that while people with this disease may eat enough, nutrients do not make it to the bloodstream because absorption is reduced.

The effects of nutrient malabsorption are most apparent in children and the elderly as they are especially susceptible to nutrient deficiencies. Over time these nutrient deficiencies can cause health problems. Poor absorption of iron and folic acid can 615 cause anemia, which is a decrease in red blood cells. Anemia impairs oxygen transport to all cells in the body. Calcium and vitamin D deficiencies can lead to osteoporosis, a disease in which bones become brittle. If you think you or someone close to you may have celiac disease, do not despair; it is a very treatable disease.

Once diagnosed, a person follows a gluten-free diet for life. This requires dedication and careful detective work to seek out foods with hidden gluten, but some stores carry gluten-free foods. After eliminating gluten from the diet, the tissues of the small intestine rapidly repair themselves and heal in less than six months.

Know about Gluten

Wheat, rye, barley, and oats all contain the protein gluten. Some people have Celiac disease, which leads them to experience digestive problems when consuming gluten. Luckily, many gluten-free recipes can benefit people who suffer from this disease.

Baking Gluten-Free

Because as many as 10% of Americans are thought to suffer from gluten intolerances, many manufacturers have begun to produce gluten-free products to accommodate demand. However, meeting this need is not easy, since gluten is present in so many products necessary to make a good dough, most importantly wheat flour.

Because as many as 10% of Americans are thought to suffer from gluten intolerances, many manufacturers have begun to produce gluten-free products to accommodate demand. However, meeting this need is not easy, since gluten is present in so many products necessary to make a good dough, most importantly wheat flour.

The most common types of gluten-free flours are described below: (all other types must be avoided as they are not gluten-free)

FLOUR	WHAT IT IS MADE FROM	PURPOSE OR BENEFIT
Garbanzo bean flour	Made from garbanzo beans.	Popular in Middle Eastern cooking and baking, such as in falafel.
Fava bean flour	Made from fava beans, often mixed with garbanzo beans to form Garvava flour.	High in fiber and iron, described as having an earthy flavor.
Sorghum flour	A semi-exotic grain milled into starchy flour.	Absorbs flavors well and provides a good source of fiber and iron. Sometimes imparts a bitter aftertaste.
Rice flour	Made from white or brown rice, both of which are gluten-free.	Offers added pliability to crusts without any added flavors. Brown rice flour contains bran and is great for muffins and bread. Look for fine-textured rice flour for the best results.
Soy flour	A flour made from roasted and ground soybeans.	Provides a good source of quality protein, has a nutty flavor and helps create a pleasant texture. Particularly good for brownies.
Potato flour	Made from whole potatoes that have been cooked, dried and ground.	Provides a dense, moist crumb when mixed with other flours in baked goods.
Tapioca flour	A starch extracted from cassava roots also called cassava flour.	Improves texture and lends a crispier, golden-brown crust. Also used in puddings and as a thickener in cooking. Use it to obtain a chewier texture.
Amaranth flour	Flour ground from seeds of the amaranth plant, an ancient grain.	Combines well with other flours to create a smoother texture in cakes and some bread. High in protein, fiber, iron and calcium.
Potato starch flour	Made from a complex process requiring the starch to be separated from the whole potato.	Denser than potato flour and provides a good substitute for wheat flour.
Millet flour	Made from millet grain.	Historic mainly in Asian cooking, and often combined with other flours. Known for its natural sweetness and imparts a crunchy crust in bread.

BEST PRACTICE IN A RESTAURANT

To fight an enemy, you must first know him. Make sure that you and your staff are familiar with the list of common food allergies.

Many food professionals think that people with allergies are fabulators – who confuse not liking a product with being allergic to it. This type of people exists, but it is a minority, and restaurant staff and owners must take responsibility for all the others who are confronted with the disease.

Never guarantee anything to your client!

If the client reports a severe allergy, this is the first thing to say to him. A customer with a food allergy is expecting to receive accurate information so that he can make an informed choice.

For example, you are greeting a customer who is highly allergic to peanuts. Even if you do not use it in your kitchen, you must explain that other foods may have been contaminated by contact with your supplier, during delivery or only by an employee who eats peanuts he brought from home. Although it is forbidden to consume food while handling food, negligence may still occur.

Put a little prominently in sight near the cash register, at the reception and even on the menus with this warning:

All our products may contain or have been in contact with allergens.

SANITATION

WHAT IS A SANITATION PLAN?

Foodservice operators are required to develop, maintain, and follow written food handling and written cleaning procedures. The first one is called the Food Safety Plan and, the second one is call procedures a Sanitation Plan.

A sanitation plan is vital in any foodservice preparation area. It's a set of written cleaning procedures to ensures that all surfaces are cleaned regularly and reduces the risks of transferring bacteria or other pathogens from an unclean surface to clean equipment such as cutting boards or tools.

A sanitation plan has two components:

1. A list of cleaning and sanitizing agents or supplies with instructions on their safe use and storage
2. A cleaning schedule, outlining:
    - **What** is to be cleaned
    - **When** it is to be cleaned
    - **Who** is to clean it,
    - **How** = with what it is to be cleaned





What is Sanitation?

Sanitation and hygiene are critical to health, survival, and development. Many countries are challenged in providing adequate sanitation for their entire populations, leaving people at risk for water, sanitation, and hygiene (WASH)-related diseases. Throughout the world, an estimated 2.4 billion people lack basic sanitation (more than 32% of the world's population). Basic sanitation is

described as having access to facilities for the safe disposal of human waste (feces and urine), as well as having the ability to maintain hygienic conditions, through services such as garbage collection, industrial/hazardous waste management, and wastewater treatment and disposal.

The world did not achieve the United Nations' Millennium Development Goal (MDG) sanitation target (i.e., to halve the proportion of people without sustainable access to basic sanitation by 2015). Now, the United Nations' Sustainable Development Goal (SDG) is for everyone to have "adequate and equitable" sanitation by **2030**.

Take our Food Safety Plan course to learn how to make Sanitation Plan.

IT IS IN YOUR HANDS

Hands should be washed in warm, soapy water before preparing foods and after handling raw meat, poultry and, seafood. Always wash your hands front and back up to your wrists, between fingers, and under fingernails. Never forget to wash your hands after switching tasks, such as handling raw meat and then cutting vegetables. Always dry hands with disposable paper towels, clean cloth towels, or allow them to air dry.



For proper handwashing, sing two choruses of "Happy Birthday" while you lather up. This task allows you to clean your hands for 20 seconds, enough time to kill germs.

Make sure your kitchen surfaces are always clean:

- Wash kitchen surfaces such as appliances, countertops, cutting boards and utensils with hot, soapy water
- A smelly dishcloth, towel, or sponge is a sure sign that unsafe bacterial growth is lurking nearby. Bacteria live and grow in damp conditions
- Wash dishcloths and towels often in the hot cycle of your washing machine
- Disinfect sponges in a 10 percent chlorine bleach solution
- Replace worn sponges frequently.

Wearing Gloves for Food Safety

Wearing disposable gloves can provide an extra barrier of protection on your hands and the food you're working on, but remember that gloves pick up bacteria just like your hands!

To properly use gloves:

- Wash your hands before putting your gloves on.
- Change them often and in the same circumstances, as you would wash your hands, for example, when touching different types of food such as raw meat or fish, or dirty veggies.



Do not use latex gloves!

Latex allergy may cause itchy skin and hives or even anaphylaxis, a potentially life-threatening condition that can cause throat swelling and severe difficulty breathing. You may instead use disposable gloves made of nitrile, polyethylene, or vinyl.

DISHWASHING

When working in a restaurant kitchen, regardless of your role, you must be aware of the steps that need to be followed in order to keep it clean, sanitized, and pest-free.

First of all, cleaning and sanitizing are two different concepts. The former involves soapy water and rinsing to remove superficial dirt and grease, while the latter involves several steps in order to remove harmful bacteria.

For manual dishwashing, three sinks are recommended: one for washing, one for rinsing, and one for disinfecting. Make sure you save room for air-drying of dishware.

Steps to manual dishwashing

- Scrape dishware using hot water and nylon brushes or pads; soak flatware and utensils for 10-15 minutes in hot water and commercial soaking chemical; pre-soak dirty pots and pans)
- Wash in hot (45 °C/113 °F) water and detergent
- Rinse in clean warm water
- Sanitize for 2 min in 28ml/1oz commercial chlorine bleach per 4,5L/1gallon water
- Use chemical test strips to check sanitizer concentration
- Air dry

Mechanical Dishwashing

Mechanical dishwashers can be high-temperature or low-temperature ones. The former, involve a wash cycle of 60 °C/140 °F and a final rinse cycle of at least 82 °C/180 °F and run for at least 10 seconds. On the other hand, low-temperature ones involve a hot wash cycle similar to the high-temperature ones, but their final rinse uses warm/cold water with chemical sanitizer. The latter must have a concentration of 50ppm chlorine or 12.5ppm iodine, or follow the manufacturer's instructions.

Glasswashers operate at lower temperatures, 50-60 °C/120-140 °F since chemical sanitizers are used instead of hot water. Make sure you scrub them first because glass washers do not remove sugar/cream/juice residue.

Keep in mind that proper maintenance of your dishwasher is critical to ensure it operates properly. To check its proper operation, make sure it reaches the temperatures mentioned above. To check sanitizer residue, use sanitizer test papers. Final chlorine residual sanitizer should be 50ppm or higher.



SHOULD I USE ANTIBACTERIAL SOAP OR REGULAR HAND SOAP?

Antibacterial soap is any cleaning product with added active antibacterial ingredients. These chemicals kill bacteria and microbes. Many, or even most, liquid hand and body soaps contain antibacterial chemicals. Triclosan is a common ingredient, as is alcohol. Since there is a great variety of bacteria, effectiveness against any given type of bacterium does not ensure that it is effective against unrelated types. This is why most ads claim to “kill 99% of bacteria and germs”, but this 1% left is what we should be worried about! (See Lesson 2 “Spores and Toxins”)

Good question! But before answering it, let’s have a look at their composition:

These agents are generally only contained at a preservative level unless the product is marked antibacterial, antiseptic, germicidal, or deodorant. Triclosan, Triclocarban, Trichloro carbamide, and PCMX Chloroxylenol are commonly used for antibacterial and deodorant purposes in consumer products.

Some soap contains tetrasodium, which is a chelating agent that sequesters metals that the bacteria require to grow. Other microbes also need metals, and so it is an antimicrobial agent that is widely used even as a preservative. It appears to be relatively harmless in the environment.

Regular hand soap is a cleaning agent, manufactured in bars, granules, flakes, or liquid form, made from a mixture of the sodium salts of various fatty acids or natural oils and fats. Soap is a

combination of animal fat or plant oil and caustic soda. When dissolved in water, it breaks dirt away from surfaces. Through the ages, soap has been used to cleanse, to cure skin sores, to dye hair, and as a salve or skin ointment. But today we generally use soap as a cleanser or perfume.

The exact origins of soap are unknown, though Roman sources claim it dates back to at least 600 B.C. when Phoenicians prepared it from goat's tallow and wood ash. Soap was also made by the Celts, ancient inhabitants of Britain. Soap was used widely throughout the Roman empire, primarily as a medicine. Mention of soap as a cleanser does not appear until the second century A.D. By the eighth century, soap was standard in France, Italy, and Spain, but it was rarely used in the rest of Europe. Its usage was generalized throughout Europe by the end of the 17th century and during cooking, primarily when you handle meat and seafood products. By doing so, you will partially control and reduce the risk of foodborne illnesses. But do not stop there. Wash your hands also after taking the bus, using the washroom, using your computer, etc. This will highly reduce the risk for you to carry and spread viruses, and it will help you to stay healthy.

Overuse

Overuse of chemicals like triclosan has been suggested to cause sensitive bacteria to evolve resistance to its antibacterial action. Should any antibiotic be discovered that works similarly to triclosan, this antibiotic's effectiveness to combat infections will be reduced because people will be hosting resistant bacteria already due to their use of soaps containing triclosan?

Research

Studies have examined the purported benefits of antibacterial soap. Some studies have concluded that merely washing thoroughly with plain soap is sufficient to reduce bacteria and further, is effective against viruses. Other studies have found that soaps containing antimicrobial active ingredients remove more bacteria than simply washing with plain soap and water (J.C. Lucet (2002), Hand Contamination Before and After Different Hand Hygiene Techniques: a Randomized Clinical Trial, Journal of Hospital Infection; L.L. Gibson (2002), Quantitative Assessment of Risk Reduction From Hand Washing with Antibacterial Soap, Journal of Applied Microbiology). The U.S. Food and Drug Administration published a report that questions the use of antibacterial soap and hand sanitizers, saying that it found no medical studies that showed a link between a specific consumer antibacterial product and a decline in infection rates.

At one conference, Dr. Stuart Levy, a microbiologist at Tufts University, cites these studies to conclude: "Dousing everything we touch with antibacterial soaps and taking antibiotic medications at the first sign of a cold can upset the natural balance of microorganisms in and around us, leaving behind only the 'superbugs'".

Bottom line

You must wash your hands often, including before and during cooking, especially when you handle meat and seafood products. By doing so, you will partially control and reduce the risk of foodborne illnesses. But do not stop there. Wash your hands also after taking the bus, using the washroom, using your computer, etc. This will highly reduce the risk for you to carry and spread viruses, and it will help you to stay healthy.

STORAGE TEMPERATURES AND PROCEDURES

FOOD STORAGE INTRODUCTION

A food service operation needs to have clearly defined storage areas and procedures for several reasons. First, by providing storage facilities, it is possible to purchase supplies in quantities large enough quantities to get price breaks. Second, the ability to store supplies on the premises reduces the cost and time needed to order supplies and handle them upon delivery. Third, menu planning is easier when you are aware of the quality, quantity, and types of supplies that are on hand. If there is a run on a particular menu item, it is nice to know there are enough materials on hand to ensure that everyone who orders the item can be served.

In today's market, many foodservice operations are reducing the amount of stock they keep on hand because storage is expensive. Not only does space need to be found, but security needs to be tight. Many operators are willing to pay a bit extra to suppliers in order to avoid the headaches of keeping track of expensive items such as large quantities of high-quality meat, wines, and spirits.

Regardless, there still is a need for storing many types of supplies, including dry foods, dairy products, frozen foods, produce, and fresh meats. Storage areas for such items often have design requirements that must be built into space in order to efficiently handle the specific types of supplies.



RECEIVING PRACTICES

Hazard Analysis and Critical Control Points, aka HACCP, is an operating system that ensures that as many precautions as possible are undertaken to eliminate, minimize, or prevent any contamination. HACCP identifies critical control points that relate to all transportation, handling, preparation, service, and storage of food products. HACCP is cover in The Food Safety Plan course.

Receiving, storage, and preparation are all critical sections of a food safety flow chart, and accepting of products is your first step when developing a flow chart. The following are essential elements to consider when receiving products in general:

- Only accept food shipments from approved sources, and check that the delivery vehicle is clean and with foodsafe temperature.
- Reject shipment if the vehicle is dirty or if there is evidence of pests.
- Ensure you have adequate storage space for food.
- Don't order more than you can use in a reasonable time.
- Ensure that chemicals have been stored separately from food and food containers on the vehicle. Check for spoilage and leakage.
- Check the temperatures of the refrigerated delivery truck is at or below 4 °*C* / 40 °F and freezer storage at or below -18 °*C* / 0 °F.
- Using a probe thermometer, check that the internal temperature of refrigerated is at or below 4 °*C* / 40 °F and frozen food at or below -18 °*C* / 0 °F.
- If the temperature is not within an acceptable range, do not accept the shipment (because you are unable to ascertain the length of time that the temperature has been unacceptable).
- Do not accept food that is spoiled, damaged, or past its 'best before date". Reject those products systematically.
- Never assume that all the food you receive is good enough to eat.
- The receiving dock and related areas should be well lit and kept very tidy. Incorporate this area into a daily cleaning schedule to ensure proper cleanliness.
- Schedule your deliveries to allow adequate time for the proper inspection and receiving of all food products.
- Have all the appropriate equipment and containers on hand. Scales, plastic gloves, cambro, and thermometers are essential pieces to have an easy reach.
- Make sure that all food is labeled with the product name and the date it was received.
- Do not store food on the floor. All food should be stored at least 6″ / 15 cm from the floor.

- Always store raw animal foods on the bottom shelf in the cooler below, ready to eat food or any food that will not be further cooked.

Each group of food, whether dry foods, dairy products, fresh produce, or meats, requires a slightly different procedure. No matter what the product type, the principal component in a receiving system is accuracy. Any carelessness or half-hearted attempts at checking the delivery will render the whole process useless.



Received foods should be put away immediately in this order:

1. Potentially hazardous foods requiring refrigeration like meat, seafood, dairy, etc.
2. Frozen foods
3. Less hazardous food requiring refrigeration like fresh fruits and vegetables, etc.
4. Dry goods

FIFO!

Use the "first in, first out" FIFO principle. Pull old sock to the front of the shelf with the best before date label facing you. Note the code date on products: "best before" date, "expiry" date, "use by" date, or "production date" and rotate stock so that older stock is used before new stock. Discard expired product and record it on your waste sheet log.

DRY FOODS

The storeroom for dry foods should be located near the receiving area and close to the main kitchen. Unfortunately, the storeroom for dry foods is often an afterthought in foodservice facility designs, and the area designated for storage is sometimes in an inconvenient location.



No matter where the location, there are several essential points to be observed in the care and control of the dry storeroom.

- The area should be dry and cool to prevent spoilage and the swelling of canned goods. The ideal temperature range is 10°C to 15°C (50°F to 59°F).
- The storeroom should be easy to keep clean and free from rodents and vermin. This means all wall, ceiling, and floor openings should be sealed and protected to prevent access.
- It should be designed so it is easy to arrange and rearrange supplies to facilitate stock rotation. The best arrangement is to have shelves situated in the middle of the room so they can be stocked from both sides. This allows you to rotate stock by simply pushing out old

stock by sliding new stock in from the other side of the shelf. This guarantees (FIFO) concept in stock rotation.

- The area should be well lit.
- Shelving must be at least 15 cm (6 in.) above the floor. Do not store items right on the floor.
- Aisles should be wide enough to allow room for carts or dollies, which should be used to prevent possible injuries from lifting.
- Food and supply storage areas should be kept under lock and key to prevent pilferage.
- Food storage control is an essential step in the overall supervision of food costs. All storerooms should be considered to be like bank safes where the assets of the operation are being stored. This may mean that more valuable commodities such as liquor and wine should be stored and locked inside a larger storage area, such as the dry food storage area.

REFRIGERATED PRODUCTS

The refrigerator, whether a walk-in or a standard upright, is a vital component in planning the storage of food items. Most fresh foods must be stored in the refrigerator to delay their deterioration and decomposition. The most basic rule must always be followed: store raw products below, never above, your cooked or ready-to-eat products.



Critical Control Point

Keep foods 4°C (39°F) or colder, the safe temperature for refrigerated storage.

Here are some considerations to ensure that the refrigerator does not break down and risk spoiling food:

- Monitor the temperature of the refrigerator daily. All refrigerators should be provided with a thermometer so that daily readings can be taken.
- Keep refrigerators in good working order. Maintain a regular servicing contract with a local refrigerator repair company.
- Most breakdowns are beyond the ability of kitchen staff to repair, but if the refrigerator does stop running, first check that the power supply cord hasn't simply been pulled out or the breaker has flipped off.
- Clean refrigerators regularly. Shelves should be shallow and well vented to make such cleaning quick and easy. Develop and follow a schedule to ensure that refrigerators are cleaned on a consistent basis.

There are also several general rules that all personnel using the refrigerator should follow:

- Store raw products below cooked or ready-to-eat products.
- Develop and follow a FIFO system for refrigerated food.
- Designate areas in the refrigerator for certain items, and keep only those items in their designated place.
- Never put hot foods in the refrigerator unless absolutely necessary. (Unfortunately, one person's understanding of "necessary" may not be the same as another person's, so consider developing guidelines.)
- Never leave the refrigerator door open longer than needed.

Although lack of time and personnel shortages often make it difficult to observe these rules, it is imperative that they are followed.

DAIRY PRODUCTS

Dairy products are perishable and do not store long. As with dry foods, compare the number of items received with the invoice and check all items for damage and leakage. Check the best-before date on each container, which should be at least a week after the receiving date. Dairy products must be stored in the refrigerator at temperatures of 2°C to 4°C (36° to 39°F).

Follow these guidelines:

- The fat in dairy products tends to absorb strong odors from the storage surroundings. To reduce the likelihood of this happening, store dairy products in their own area in protective coverings.
- Do not store dairy products in a vegetable cooler; a separate refrigerator is much more acceptable.
- Keep the refrigerator clean at all times.
- Rotate dairy products when the fresh product arrives. Dairy products should not be ordered too far in advance of when they will be used. Ideally, such products should be delivered daily.

When dairy food is deteriorating, you will notice changes in its color, odor, and taste. Butter, cheese, and dairy products get darker and develop a sour smell.

PRODUCE

Produce is delivered in bags, cases, or cartons. Count the number of pieces, weigh items, and check for quality. Open any closed cases and boxes to check the produce for ripeness, freshness, and other signs of quality. When there are mistakes in delivery or an unacceptable quality of food has been received, you should insist that the supplier pick up the item and issue a credit.



Most produce is stored in the refrigerator at 2° to 4°C (36° to 39°F) to ensure freshness and to prevent rapid deterioration. There are, however, a number of exceptions, including potatoes and bananas, which should be stored at higher temperatures.

Keep these factors in mind when storing produce:

- Soft fruits should not be stored for too long. It is often best to buy soft fruit as you need it, keeping very little on hand.
- Unripe fruit can be ripened at storeroom temperatures of 10°C to 15°C (50°F to 59°F). It will ripen much more slowly under refrigerator conditions.
- Before storing and when rotating stock, it is vital to remove rotting fruit from cases as one piece can affect others. The chain reaction can quickly destroy the quality of a whole case of fruit.
- Be aware of particular storage problems. For example, bananas stored in the refrigerator turn black quickly. Bananas should be stored under conditions where the temperature range is 10°C to 15°C (50°F to 59°F).
- The length of time produce can be stored widely. For example, hardy vegetables such as carrots and cabbage will last for weeks, while delicate vegetables such as lettuce should be bought as fresh as possible as they do not keep for long.
- Moisture on vegetables tends to soften them, causing rot. Even though in the early stages of rot, there is nothing basically wrong with such vegetables, they can be unattractive to the eye.

When produces food is deteriorating, you will notice:

- Fruit goes soft, gets darker, and quickly rots.

- Vegetables start wilting and then become slimy and rotten.

FRESH MEATS, POULTRY, AND SEAFOOD

Fresh meat is shipped in pieces and by weight. Count and weigh the new items. Check for leaking vacuum-packed (Cryovac) packages, and check the grade of the meat against the grade on the invoice. Also, if specifications were given on the order form, confirm the cuts of meat do meet those specifications.

Fresh poultry and seafood should also be counted, weighed, and checked for quality. These items are the most difficult to store and the most expensive food items sold by the restaurant. When storing meats, poultry, and seafood items, remember the critical control point.

Keep these factors in mind when storing fresh meats, poultry, and produce:

- All carcass meats should be unwrapped and hung so that air can circulate around them. They should be stored at 1°C to 3°C (34°C to 37°F) in a walk-in refrigerator. Place the absorbent paper under the meats for quick cleanup of any unwanted drips.
- Fresh meat must not be kept too long. Boned meat should be kept no longer than three days. Individual cuts should be use within two days, preferably on the day they are cut.
- Individual meat cuts such as steaks, chops, stewing meat, and ground meat should be kept covered on plastic or stainless steel trays at 2°C to 4°C (36°F to 39°F).
- Fresh poultry should be packed in ice and stored in the refrigerator.
- Fresh seafood should be packed in ice, stored at −1°C to 2°C (30°C to 34°F) and used as soon as possible.
- Store raw products on the lower shelves of the refrigerator, below cooked or ready to eat food.

Do not overstock to avoid spoilage, as it could affect your food cost and bottom line negatively.

FROZEN FOODS

Frozen products are often delivered in cases and cartons. Open the cases to count the items and to check for signs of freezer burn, torn wrappings, partial thawing, or other problems. Frozen foods should be stored at –18°C (0°F) or lower. If the temperature rises above –18°C, food can become discolored and lose vitamin content. Lowering the temperature after it has raised does not correct the damage.



Keep these factors in mind when storing frozen foods:

- Fruit and vegetables that are received frozen will keep for months if they are properly wrapped. Fish and meat properly wrapped also have a relatively long freezer shelf life.
- Freezing fresh fruits and vegetables on the premises is time-consuming and may be too expensive to consider. Fresh fruit must be adequately prepared for freezing, or it will not store well.
- All freezer products not properly wrapped will develop freezer burn, which is a loss of moisture that affects both the texture and the flavor of the food. A common sign of freezer burn is a white or grey dry spot developing on the surface of the frozen product. Meat is particularly susceptible to freezer burn.
- Rotating stock is extremely important with frozen foods. Such rotation is difficult in standard chest freezers as it often means that old stock must be removed before new inventory is added. The temptation with frozen foods is to develop the unacceptable habit of using the last item bought first, instead of FIFO (first in, first out).

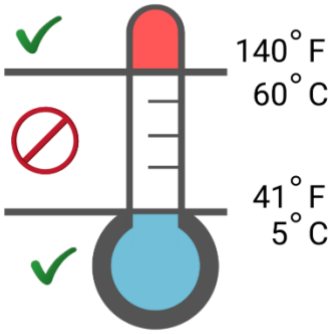
Do not overstock your freezer to avoid freezer burns that will alter your products. Maintain up to a week of food supply, and rotate (FIFO). This will shorten time spend on inventory and benefit your cash flow.

PREVENTING FOOD POISONING WITH HEAT

WHAT IS THE DANGER ZONE?

Food Poisoning Facts:

- Each year, millions of people suffer from foodborne illnesses, usually one in 10 people. This section explains what food poisoning is and describes some of the most common germs that cause it.
- Nearly 3/4 of all food-related illnesses are the result of poor temperature control. Following the simple rule, “Keep hot foods hot and cold foods cold” can prevent many foodborne illnesses from occurring reduced.



COOK TO PROPER TEMPERATURE

Meat thermometer: They are many types of meat thermometer available on the market, from inexpensive to very fancy and expensive. The ones that I like are non-electronic ones. By experience, I found that electronic thermometers tend to fail and run out of batteries when you need them. Manual thermometers are suitable because when you pick the meat, their stem is very thin, it’s not too thick. You should consider this factor when purchasing a meat thermometer.

Meat thermometers are easy to read and come with Fahrenheit and Celsius degree indicators. Some come with a plastic holder with a meat temperature cooking chart that is very handy for a quick reference.

What you need to know and remember is that harmful bacteria are destroyed when food is cooked at the right temperature.

Buy a meat thermometer, and please use it! This is the only reliable way to ensure safety and to determine the right doneness of meat, poultry, egg dishes, and leftovers.

Important tip: Always remember to wash the thermometer stem thoroughly in hot, soapy water after each use.

COOKING TEMPERATURES CHART

The table below contains the recommended internal temperature to which various meat products should be cooked and/or reheated. Cooking foods to the proper temperatures can kill many harmful bacteria.

Food Item	Internal Temperature
BEEF, LAMB, VEAL	
Ground/Minced Products	
Hamburger (prepared as patties, meatballs, etc.)	160°F and above
Non-ground/Minced Products	
Roasts and steaks	
Rare	140°F
Medium-rare	145°F
Medium	160°F
Well-done	170°F and above
POULTRY	
Ground chicken, turkey	165°F
Whole chicken, turkey	180°F
Boneless turkey roasts	170°F
Poultry breast and roasts (white meat)	170°F
Poultry thighs, wings, and drumstick (dark meat)	180°F
Duck, goose	180°F
Stuffing (cooked alone or in a bird)	165°F
PORK	
All cuts including ground/minced products	

Medium	160°F
Well-done	170°F
Fresh, raw ham	160°F
Fully cooked ham, to reheat	140°F
OTHERS	
Egg dishes, casseroles	160°F
Leftovers, reheated	165°F

BACTERIA CONTROL TABLE

DESCRIPTION	Tº IN CELSIUS	Tº IN FAHRENHEIT
The boiling point of water	100	212
Most bacteria destroyed by cooking temperatures	73 to 100	165 to 212
Warm temperatures prevent growth but, some bacteria survive	60 to 73	140 to 165
Some bacterial growth may occur and, many can survive in this range	48 to 60	120 to 140
Danger Zone with the rapid growth of bacteria and the production of toxins. Food should move through this temperature range within 2 hours maximum to avoid spoilage	4.44 to 48	40 to 145
Some growth of food poisoning bacteria may occur	4 to 15	40 to 60
The cold temperature slows the growth of spoilage-causing bacteria	0 to 4	32 to 40

Freezing temperature, bacterial growth stopped but, many can still survive and become active and dangerous as the temperature increases during defrosting	-17 to 0	0 to 32

HOT HOLDING



Inadequate reheating for hot holding

Many restaurants prepare some of the menu items in advance or use leftovers in their hot hold units the next day. In both cases, the foods go through the danger zone when they are cooled for storage and again when they are reheated to be served.

Foods that are hot held before serving are particularly vulnerable to pathogens. In addition to traveling through the danger zone twice, even inadequately operating hot hold units, the food is close to the temperature that will allow pathogens to grow.

To prevent problems:

- Do not use hot hold units to reheat food. They are not designed for this purpose. Instead, rapidly reheat to 74°C (165°F) (and hold the food at that temperature for at least 15 seconds before putting it in the hot hold unit. This will kill any pathogens that may have grown during the cool-down step and the reheating step.

- If using direct heat (stovetop, oven, etc.), stir the food regularly during the reheating step, to prevent burning and distribute the heat uniformity. The temperature of the reheated food must reach at least 74°C (165°F) for at least 15 seconds within two hours. Keep a thermometer handy to check the temperature of the food.
- If using a microwave, rotate or stir the food at least once during the reheating step, as microwaves heat unevenly. As well, the food must be heated to at least 74°C (165°F) and then stand covered for two minutes after reheating before adding to the hot hold unit. The snapping and crackling sounds coming from food being reheated in a microwave do not mean the food is hot.

Improper hot holding

Hot hold units are meant to keep hot foods at 60°C (140°F) or hotter. At or above this temperature, pathogens will not grow. However, a mistake in using the hot hold unit can result in foods being held in the danger zone – between 20°C and 49°C (70°F and 120°F), temperatures at which pathogens proliferate.

To prevent problems:

- Make sure the hot hold unit is working correctly (e.g., heating elements are not burnt out; water is not too low in steam tables; the thermostat is properly set, so food remains at 60°C (140°F) or hotter) Check it daily with a thermometer.
- Put only already hot (74°C/165°F) foods into the hot hold unit.
- Preheat the hot hold unit to at least 60°C (140°F) before you start putting hot foods into it.
- Do not use the hot hold unit to reheat cold foods. It is not designed for or capable of doing this rapidly.
- Keep hot food cover with the lid between servings to maintain the right temperature.
- After the lunch or dinner rush, do not turn off the heat in the hot hold unit and then leave the food there to cool. This is very dangerous. When you do this, the food does not cool down. It stays hot in the super danger zone and lets pathogens quickly multiply. Foods in hot hold units should be taken out of the units after the mealtime is over and cooled right away.

USE OF LEFTOVERS

Using leftovers has been the cause of many outbreaks of food poisoning because of improper cooling and reheating (of “hot” leftovers). Leftovers that are intended to be served hot go through the danger zone twice (during the initial cooling of the hot food and when reheating).

Those leftovers intended to be served without reheating, or as an ingredient in other foods (e.g., sandwich filler), go through the danger zone during cooling and then, when being prepared and portioned, often stay in the danger zone for another extended period. The time in the danger zone

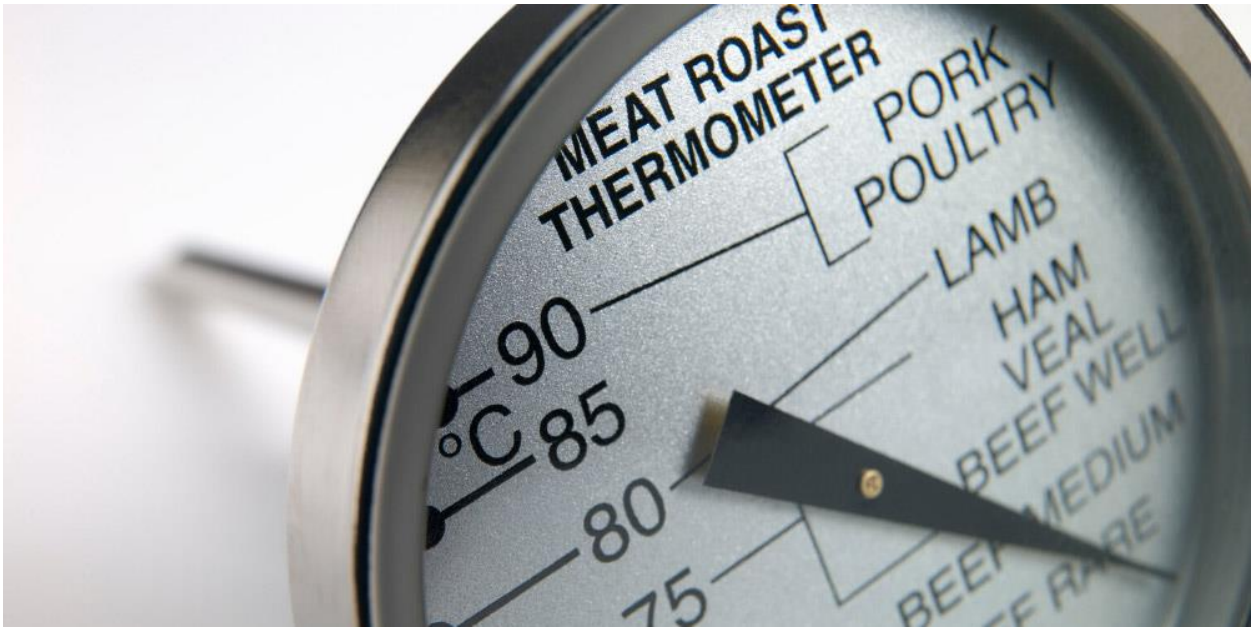
adds up unless the food is quickly cooled and then quickly reheated (if being served hot), or kept cold until serving (if not being served hot).

Contamination can also occur with leftover foods when they are stored in the cooler. Raw foods can accidentally contaminate improperly stored leftovers (e.g., blood dripping from a higher shelf).

To prevent problems:

- Reheat leftovers only once. Throw out any leftovers that have already been reheated once.
- Do not mix leftover foods with fresh foods.
- Be sure to follow the proper cooling and reheating procedures when handling leftovers. These are critical control points.
- Cooldown leftovers in uncovered containers and keep it separate from any raw foods. After they are cooled, cover them tightly.
- Discard any food left out at room temperature for more than two hours (one hour if the temperature is above 90°F). Place food into shallow containers and immediately put in the refrigerator or freezer for rapid cooling. Use cooked leftovers within four days.
- Meat and poultry defrosted in the refrigerator should not be refrozen before or after cooking.

USE A MEAT THERMOMETER



Do you know when your hamburger is cooked sufficiently? Like many people, do you assume it is cooked because it is brown? According to the United States Department of Agriculture, one out of

every four hamburgers actually turns brown in the middle before it has reached a safe internal temperature!

To protect yourself, your family and your clients use a food thermometer to ensure that your food has reached a high enough temperature to destroy foodborne bacteria.

Thermometers today come in all shapes and sizes, including instant-reads, microwave oven probes, and pop-ups. Even barbecue forks are available with built-in thermometers.

According to the experts, digital thermometers are ideal for checking thin foods, while large-dial thermometers are used with larger roasts, whole chickens, and turkeys. Thermometers should be inserted in the thickest area of the meat, but not in fat or near the bone.

Make sure to choose and use the thermometer that is right for you and knows when your food is done and safe to eat.

Different kinds of thermometers



Guidelines for Proper Cooking and serving

Most people think they know when food is “done” just by “eyeballing it.” They look at it and trust their experience. Experience is good, but it sometimes can be misleading. For instance, cooking by color is misleading. Meat colors, like pink or brown, can fool you!

CALIBRATING A MEAT THERMOMETER

The usual hard knocks of kitchen work can make an analog instant-read thermometer inaccurate over time. Make sure your trusty thermometer is showing you the right temperature.

When in doubt, follow these easy instructions to calibrate your meat thermometer:

1. Bring a small pot of water to a boil.
2. Fill a glass with water and plenty of ice.
3. Remove the thermometer from its plastic guard and place it in the boiling water.

4. If it does not read 212 degrees Fahrenheit (100 degrees Celsius), turn the nut behind the face with needle-nose pliers.
5. Only tiny adjustments are required; recheck as needed.
6. Place the thermometer in the ice water.
7. If it does not read 32 degrees Fahrenheit (0 degrees Celsius), adjust the nut.
8. Once it is properly calibrated, the thermometer will read the correct temperatures of both boiling and ice water.

Warning

- Avoid dropping or hitting your thermometer against hard surfaces.

- Food businesses should calibrate their food thermometer every week and have a calibration log for the Health Department.

THERMOMETER CALIBRATION LOG

As required per the Health Department, food thermometers used in professional kitchens must be calibrated regularly, and the process recorded.

Foodservice employees must record the calibration temperature and the corrective action taken, if applicable, on the Thermometer Calibration Log each time they do it.

Foodservice managers must verify that foodservice employees are using calibrated thermometers properly by making visual observations of employee activities during all hours of operation.

Foodservice manager must review and initial the log. Maintain this log for a minimum of 1 year on file for the Health Inspector, if requested.

Thermometer Calibration Log

Venue: _____ **Month:** _____

Date	Thermometer ID	Temp	Initials	Corrective Action

Thermometer ID is the team member's name or workstation name

Thermometer Standards:

Thermometers must be with +/- 2° of 32° F (0° C)

Corrective Action:

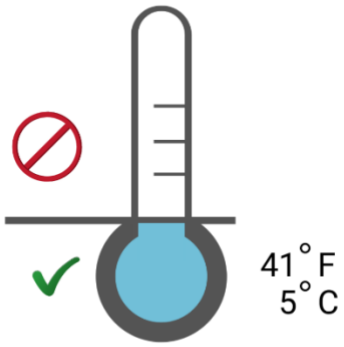
"1" - Adjusted thermometer and re-tested until spec temperature is reached

Manager's Signature: _____ Date Verified:_____

PREVENTING FOOD POISONING WITH COLD

Chill it! Refrigerate Promptly!

Refrigerate foods quickly because cold temperatures slow the growth of harmful bacteria. Do not overstuff the refrigerator. Cold air must circulate to help keep food safe. Keeping a constant refrigerator temperature of 41°F or below is one of the most effective ways to reduce the risk of foodborne illness. Use an appliance thermometer to be sure the temperature is consistently 41°F or below. The freezer temperature should be 0°F or below.



Leftover food from a meal should not stay out of refrigeration for more than 2 hours. On hot days when temperatures reach over 90ºF or 30ºC, this time frame is reduced by half to one hour.

DEFROSTING DO'S AND DON'TS

Defrosting do's

- Defrost food in the refrigerator. This is the safest method for all foods
- Short on time? Thaw meat and poultry in airtight packaging in cold water if it is going to be used immediately. Change the water every 30 minutes, so the food continues to thaw in cold water
- Defrost food in the microwave only if you are going to cook it immediately

Defrosting don'ts

- Never defrost food at room temperature. Food left out at room temperature longer than two hours may enter the Danger Zone, exhibiting unsafe temperatures between 41° F and 140° F. Bacteria can multiply rapidly between 41° F and 140°F.
- Do not defrost food in hot water.

LEFTOVERS COLD STORAGE CHART

These short, but safe, time limits will help keep refrigerated food from spoiling or becoming dangerous to eat. Because freezing keeps food safe indefinitely, recommended, storage times are for quality only.

Leftovers	Keep Up To
Cooked fresh vegetables	3 days
Cooked pasta	3 days
Cooked rice	3 days
Deli counter meats	1 day
Meat: Ham, cooked and sliced Hot dogs opened Lunch meats, pre-packaged, opened Cooked beef, pork, poultry, fish and meat casseroles Cooked patties and nuggets, gravy and broth	3-4 days 1 week 3-5 days 3-4 days 1-2 days
Seafood, cooked	2 days
Soups and Stews	3 days
Stuffing	1 day

KEEPING THE FOOD COLD

- Refrigerate or freeze meat, poultry, eggs, and other perishables as soon as you get them home from the store
- Never let raw meat, poultry, eggs, cooked food or cut fresh fruits or vegetables sit at room temperature for more than two hours before putting them in the refrigerator or freezer (or for one hour when the room temperature is above 90°F)
- Never defrost food at room temperature. Food must be kept at a safe temperature during thawing. There are three safe ways to defrost food such as, in the refrigerator, in cold water, and in the microwave. Food thawed in cold water or in the microwave should be cooked immediately
- Always marinate food in the fridge
- Divide large amounts of leftovers into shallow containers for quicker cooling in the refrigerator
- Use or discard refrigerated food regularly. Check the Cold Storage Chart for optimum storage times
- Always cool down hot liquid over an ice bath before storing in the refrigerator

USING MICROWAVE OVEN SAFELY

COOKING AND REHEATING TIPS

Microwave ovens play an important role in our busy lives. Unfortunately, they can sometimes cook food unevenly, leaving cold spots where harmful bacteria can survive.

Special care must be taken when cooking or reheating foods in microwaves to ensure the foods are prepared safely. Below are some tips for preventing foodborne illness when using your microwave.

Microwave Cooking Tips

- Cover foods with a lid (vented) or a microwave-safe plastic wrap to hold in moisture and provide safe, even heating.
- After reheating foods in the microwave oven, allow for standing time. Then, use a clean food thermometer to check that food has reached 165°F.

If your microwave does not come with a carousel, be sure to rotate the food. Also, stir the food occasionally during the cooking process, which will eliminate cold spots and improve heat distribution. To retain surface moisture, cover food with a lid or plastic wrap. Make sure you always loosen or vent the lid or wrap to allow steam to escape. (The moist heat will help destroy harmful bacteria and ensure uniform cooking).

- Stir or rotate food midway through the microwaving time to eliminate cold spots where harmful bacteria can survive and to ensure even cooking.
- Allow food to stand covered in the microwave for an additional two minutes to stabilize the temperature.
- Do not cook large cuts of meat on high power (100 percent). Large cuts of meat should be cooked on medium power (50 percent) for longer periods. This allows heat to reach the center without overcooking outer areas.
- Do not partially cook food in the microwave then save it for later. Food that has been partially cooked in a microwave should be transferred to another heat source, such as a barbecue grill or a conventional oven immediately.
- Use your food thermometer to make sure foods are cooked to safe temperatures.
- When defrosting in the microwave, make sure to remove food from the original packaging.

(Note: Many of the foam or plastic trays and wraps are not heat stable and may melt at the high temperatures produced by microwaves.)

Microwave Reheating Tips

- Cover foods with a lid (vented) or a microwave-safe plastic wrap to hold in moisture and provide safe, even heating.
- After reheating foods in the microwave oven, allow for standing time. Then, use a clean food thermometer to check that food has reached 165°F.

CHOOSING THE RIGHT MICROWAVE CONTAINER

- Only use cookware specially manufactured for use in the microwave oven. Glass, ceramic containers, and all plastics should be labeled for microwave oven use.
- **Always** prefer microwavable glass containers to plastic to avoid plastic Nanometre particle transfer.
- Never use plastic storage containers such as margarine tubs, take-out containers, whipped topping bowls, and other one-time use containers for cooking or reheating food in your microwave. These containers are not heat-resistant and can melt, possibly leaching harmful chemicals into your diet.
- Microwave plastic wraps, wax paper, cooking bags, parchment paper, and white microwave-safe paper towels should be safe to use. Never use thin plastic storage bags, brown paper or plastic grocery bags, or aluminum foil in the microwave.







IS YOUR MICROWAVE OVEN LEAK-PROOF?

Testing that your microwave oven is safe can be as easy as making a phone call. You don't need to buy any fancy gadgets, just have access to a mobile phone.

You can test your microwave oven for leakages just by putting your mobile phone inside (do not whatever you do, start up the oven) and then telephone /call your mobile from another phone. You may unplug the Microwave during the test.

If your oven is safe, your mobile phone will not ring. If your oven is unsafe, your mobile phone will ring, and you will need to get the oven repaired or replaced.

I checked this out, and it works. When the microwave oven door was shut, my mobile phone didn't ring, and the message I got was that it was unavailable. I left the phone exactly where it was and opened the oven door. Then I phoned my mobile again, and this time it rang. To be 101% sure, I then closed the oven door and did the test again.

Health Issues Associated with Microwave Leakage

Some microwave energy may leak from your oven while you are using it, but this would pose no known health risks, as long as the oven is maintained correctly.

Health Canada has established a regulation that limits the amount of leakage allowed from any microwave oven sold, leased, or imported into Canada. This limit is well below the level of microwave exposure that would cause any known health effects.

Proper maintenance is the key to keeping microwave leakage levels within acceptable limits. The amount of leakage may go up if the door or seal of the oven is damaged. It is also essential to keep all of the hinges and latches in good working order.

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Proper maintenance is the key to keeping microwave leakage levels within acceptable limits. The amount of leakage may go up if the door or seal of the oven is damaged, or if there is a build-up of dirt around the seal. It is also important to keep all of the hinges and latches in good working order.

PROPER PRACTICES GUIDELINES

TAKING AWAY LEFTOVERS

This is a short but necessary subject. Indeed, more and more people are concerned with restaurant food waste. They will, therefore, ask for a “doggy-bag.” Leftover food at restaurants is commonly taken away while in the danger zone. Also, the food may be eaten several hours or even days after it was prepared, further increasing the risk of food poisoning.

Once the food is taken off the food business premises, customers are responsible for its safe storage and handling to minimize the risk of food poisoning. If you are now trained with all the food safety rules, your customers are not, make sure to advise them verbally and or in writing to:

- Refrigerate the food as soon as possible (within no more than 2 hours)
- Reheat to 74 °C before eating

DELIVERY AND FOOD TRANSPORTATION

No matter the distance, every mean should be in place to prevent contamination:

- Make sure that the food is adequately covered
- Keep the food at a safe temperature at all time



Hot Foods

During transportation, the food temperature must be maintained at or above 60 °C (140 °F).



Cold Foods

During transportation, the food temperature must be maintained at or below 4 °C (40 °F).

RESTAURANT PREMISES REQUIREMENTS

Foodservice employees, Kitchen managers, or food business owners, don't often have the luxury of designing an establishment from the ground up. However, good knowledge and understanding of the premise's requirements are essential, and you make to make sure you have all the keypoints covers.

The safest way for "food to flow" (in France, it's called la marche en avant) from the delivery and through to the storage area dishwashing zone, kitchen, and finally to the service. The idea is to have a defined circuit for the food from moving forward and to follow a particular path that always advances (e.g., cooked food does not move back into less hygienic preparation areas). This concept helps to build a culture of food safety in a food service establishment.

For optimum food safety standards, there are nine basic requirements for a food services establishment. You must have:

1 – Potable Water

Water supply must be potable and safe for human consumption, from eating, drinking, cooking, and making ice.

2 – Adequate Water Supply

Hot water is necessary for proper dishwashing, hand washing, and cleaning. A food service establishment must have enough hot water to meet demand at its busiest time.

3 – Adequate cooler, freezer and storage space

Shelving in walk-in refrigerator and freezer must be at least 6″ or 15 cm off the ground and have adequate space to allow for air circulation. Maintain proper temperatures:

- Coolers at or below 4 °C (40 °F)
- Freezers at or below – 18 °C (0 °F)

4 – Adequate lightning

Brightly lit workspace helps food handlers to work safely, see spills, dirt, and signs of pests.

5 – Grease traps

Fat, oils, and grease that go down the drain can clog plumbing and the public sewers. When a sewer line is plugged, sewage packs up, toilets don't flush, sinks don't' drain, and flood can occur.

6 – Proper ventilation

Proper ventilation keeps premises free from odors, grease, smoke, heat, and steam.

7 – Proper waste disposal

An establishment must have adequate waste disposal procedures in paces. Garbage attracts pests and can be a source of cross-contamination.

8 – Handwashing sinks

Food premises are required to have dedicated handwashing sinks that are easily accessed from all food preparation stations. The sinks must be equipped with hot water, liquid soap dispensers, and single-use paper towels.

9 – Proper dishwashing facilities

A food service establishment must have dishwashing facilities that will handle its needs at its busiest time.

RESTAURANT PREVENTATIVE MAINTENANCE

As time passed, your kitchen, bar equipment, and or building gets older, and the cost for maintenance and repair will keep growing. This list can be used to budget and schedule routine maintenance. Being proactive helps to prolong equipment life and avoid untimely equipment failures that could trigger temporary closure and lost business.

General Things to Avoid:

- Hosing down equipment
- Neglecting filter changes
- Improper application or use of equipment
- Improper use of chemicals
- Operating equipment with frayed, burnt power cords, or exposed wiring
- Operating any equipment without knowing the proper operation and use as outlined in the owner's manual
- Cutting down on the recommended number of chemical tablets for self-cleaning combi-ovens

General Things to Look For:

- Are hinges, handles, knobs, grates, etc. all in good condition?
- Does the gas-fired equipment burn a steady blue flame?
- Are motors noisy, or won't turn at all?
- Are temperatures within +/- 2 degrees of the desired setting?
- Are door gaskets worn or torn?
- Is water feed equipment de- limed periodically?
- Is the hood system operating?

- Are hood filters clean?
- Are condensers dusty or iced over?
- Is the fire suppression system operational?
- Has the fire suppression system been inspected recently?
- Are all utilities confirmed on and resets checked?
- When a technician diagnoses your equipment, take the time to be shown the problem and cause.

Specific Equipment Checklist

Dishwasher

- Check for lime buildup inside
- Check that doors open easily
- Check for leaks
- Check that scrap tray is in place and clean
- Check that pump intake screen is in place
- Check that drain opens and closes easily
- Check that autofill works and shuts off
- Check that the incoming temperature of the water is at least 82 °C (180 °F) for high-temperature machines & 49 °C (120 °F) degrees F for chemical sanitizing machines
- Check the wash and rinse arms and nozzles for cleanliness
- When on automatic, check that dishwasher starts when the door is closed
- Check that timed/ manual operation is working properly
- Check for automatic shutdown after _ seconds
- Are chemicals being primed through the lines?

Refrigeration

- Maintain temperature logs, “open- shift change- close” daily.

- Keep evaporator coils (cold air) and condenser coils (warm air) clean. Never obstruct the airflow of fans.
- Never place an unrefrigerated or heated product in “designed for storage” equipment, use ice baths or blast chill/ freeze equipment.
- Do not overstock storage units with products, and air should move freely around all items, especially sides and bottom.
- Before placing a service call, check that power is on and observe temperature patterns for one hour to avoid false alarms (check resets).
- All evaporator coils should be free of ice by visual inspection at all times.
- All door gaskets should seal from outside air completely. Gaps will have a significant impact on performance.
- Cold pans should sit flush in place, no bent corners.
- If defrost cycles are used, ensure that they are set during slow periods of business.
- Keep thermometers in the upper 1/3 or in the warmest section of the refrigerator to get accurate readings.