# Program Introduction

While the food served in the United States today is generally very safe, improper handling can make it unsafe and result in people getting sick and dying. Food safety is enhanced when managers and others are properly trained in safe food handling and preparation and when they pass their knowledge on to others. Since the viruses, bacteria, and parasites that are the main causes of food borne illness change over time, it is important for food service personnel to keep up with new risks and regulations. This booklet has been prepared to help both those being initially certified in food safety as well as those being re-certified prepare to take the National Restaurant Association's ServSafe® examination. The information presented in this booklet is a compilation of ServSafe® materials (6th and 7th Editions) and has been updated to conform with the 2017 Food and Drug Administration Food Code. It is intended to supplement a classroom program. *This booklet is not intended to be a complete review of the Federal Food Code, or state and local health department regulations, nor is there any guarantee that everything that will be asked on the certification exam is covered in this booklet.*

While it is probable that most people who ready and study read this booklet will be able to pass the certification examination. Wheelwright Consultants believes that food safety is so important to your business that it warrants reading this booklet and spending the time in a food safety training program. Your presence in a food safety class will send a strong message to others in your organization about your commitment to food safety and your professionalism. It is very likely that you will learn some new things in the class and there is always value in networking with your fellow industry professionals.

It is Wheelwright Consultants' belief that food safety saves a food service operation money in many different ways. Operations that are closed as a result of failing a health department inspection tend to experience a 30% or greater loss of business when they reopen. Statistics indicate that it may take several years to build back up to pre-closure business volumes. Food safety saves you money by protecting the reputation of your business and the existing levels of business activity. Anything that enhances the safety of food will also enhance the quality of the food and that is the major competitive advantage for any operation.

Food safety training and safe food handling practices are a good investment for your business. It is extremely important that you pass on the information you know about food safety to each and every one of your co-workers and associates. To paraphrase the Vulcan greeting from Star Trek – "ServSafe® and prosper!"

# DEFINITIONS

Active Managerial Control – a six step program to promote food safety in foodservice operations. It is more approachable than H.A.C.C.P., which it essentially replaces.

A.L.E.R.T. – A new acronym developed by the FDA to combat deliberate contamination of foods by reminding operators to: **A**ssure safe food, **L**ook for security issues, verify that the **E**mployees are working safely, **R**eport generation and maintenance, and performing **T**hreat assessments.

Allergen – a component of food, often a protein, to which a person is allergic. Typical reactions to allergens include: a burning sensation in the mouth, difficulty breathing, swelling, and hives. In severe cases, an allergic individual may go into anaphylactic shock and could die.

Contamination – the presence in food of products that should not be present in the food at all, or the presence of excessively high levels of certain other components. Contaminants can be biological, chemical, or physical.

Corrective Action – an action taken when monitoring reveals that food or a process is unsafe – the corrective action is required to make the food or process safe and prevents food borne illnesses.

Cross Contact – occurs when one of the eight major allergens is transferred to a food that does not contain the allergen by using utensils for multiple products or other improper food handling practices.

Cross Contamination – occurs when one food becomes inadvertently contaminated, often with viruses or bacteria from a different food as a result of improper food handling practices such as bare hand contact with ready to eat food, using contaminated equipment or utensils, preparing dissimilar items (particularly those that involve raw meat products and those that will be served without cooking) at the same time, in the same space, or with the same equipment.

Critical Control Point (CCP) – a point in the "flow of food" where an operator must take an action to make sure that the food is safe to eat or that the food contact surface is sanitary. Often it is the "last" point in the flow of food where the safety of the food can be controlled. [Note: this is one of the basic definitions and principals of HACCP and is often misunderstood.]

Critical Limit – an upper or lower limit (such as temperature or sanitizer concentration) that is established as a reference point for people to verify to make sure that the food is safe for human consumption or that the food contact surfaces are sanitary. Defining and monitoring the critical limits are two of the basic requirements of an Active Management Control or HACCP program.

Danger Zone – the temperature range from 41° F to 135° F at which bacteria reproduce most rapidly. In the center of this range (70° F to 125° F) some food borne-illness causing bacteria can reproduce in as little as 20 minutes.

Hemorrhagic Colitis – a medical condition caused by shiga-toxin producing bacteria living in the body where the toxins damage the lining of the blood vessels and the kidneys. In high risk populations, this condition may be fatal. The bacteria most commonly associated with this condition are *E. coli* O157:H7 and *E. coli* O158:NM. These bacteria live in the intestinal tract of mammals. The illness is commonly associated with undercooked ground beef, water contaminated by animal manure, and increasingly, raw produce and raw milk products.

FAT-TOM – an acronym made up of the words "Food", "Acidity", "Time", "Temperature", "Oxygen", and "Moisture" that represent the six factors that must be present for bacterial to grow in number.

FDA – an abbreviation for the Food and Drug Administration, the federal agency with primary responsibility for protecting the people of the United States by writing recommended food safety standards, notably the "Food Code". Other federal agencies include the: USDA – United States Department of Agriculture – responsible for regulating the production, processing, and distribution of meat and dairy products, and eggs; CDC – Centers for Disease Control and Prevention – responsible for collecting information on illness in the population and determining the cause and preventative measures; and PHS – Public Health Service – responsible for providing assistance in investigation and educating the public and professionals about public health issues.

FIFO – an acronym standing for **F**irst **I**n, **F**irst **O**ut, a system of rotating food so that the oldest is always the easiest to get to and therefore is used first. This helps ensure product freshness and quality while at the same time minimizing the likelihood of food borne illness.

Flow of Food – all the steps or stages that food has to go through in a business from receiving through to consumption by the guest including: receiving, storage, pre-preparation, preparation, cooking, holding, service, cooling, and reheating.

Food Borne Illness (FBI) – occurs when two or more people become ill from eating the same food products or after eating in the same place and where medical examination and diagnosis identifies the organism causing the illness or the source of the illness.

Food Code – a model food safety code produced by the Food and Drug Administration (FDA), it is made available to the states which can adopt it for their use with or without modification. The code is approximately 700 pages long and covers all aspects of building design, maintenance, food handling, etc. The food code is subject to review at a conference called the Conference on Food Protection (CFP) held every four years.

HACCP – an acronym for **H**azard **A**nalysis **C**ritical **C**ontrol **P**oint, a highly effective, but not foolproof, food safety and quality system that is required in many food processing plants and which can be adapted for use in foodservice establishments. Operations that process fresh vegetable juices, salsa, or use reduced oxygen packaging (ROP), etc. *must* have HACCP plans. Federal regulations require that ***all*** public schools that receive agricultural commodities have

HACCP programs in place although the specific definitions and requirements are still being finalized.

Hazard Analysis – the first step in a HACCP program is to conduct a hazard analysis which means identifying where in the flow of food, foods can become contaminated or where contaminants can survive and replicate to dangerous levels. Typically, one groups similar foods or foods that are processed in similar ways together to simplify the process.

High Risk Populations – these are individuals or groups of individuals who are likely to be at "high risk for contracting a food borne illness" because their immune systems may not be fully developed or functioning fully. The three high risk groups are: senior citizens; infants and pre-school aged children; and people with cancer, on chemotherapy, with organ transplants or illnesses that affect the immune system such as HIV and AIDS or who are taking medicines that affect the immune system.

Infection – an illness that occurs because living microorganisms have gotten into another living organism (for our purposes, a person) and are living and reproducing in that individual. Symptoms associated with infections are the results of the body's efforts to destroy these foreign organisms and almost always include a fever. Symptoms of bacterial infection typically appear within 18-24 hours of introduction into the body. Viral infections may take much longer before symptoms appear.

Monitoring – a term used as part of a HACCP program and Active Managerial Control, it involves verification that the critical limit has been satisfied or met. Examples of monitoring include such things as taking the temperature of food to ensure that it has been cooked and/or held properly, taking a reading of the sanitizer concentration, etc. Unlike simple checking, monitoring implies a planned, on-going process of routine measurement, rather than an occasional activity and failure to meet or exceed the critical limit stops the process until the situation has been corrected.

Pasteurization – a process of treating foods to kill 99.9% of the biological contaminants that may be in the food. When heat is used there are combinations of time and temperature that accomplish this with shorter time periods being required with higher temperatures. For example, in the shell eggs can be pasteurized by holding them at 130° F for four (4) hours, whereas cooked eggs undergo a similar reductions in biological contaminants at 155° F for 15 seconds!

Pathogen (pathogenic) – an illness-causing organism such as a bacteria, virus, or parasite.

Potentially Hazardous Foods (PHF) – foods that are good sources of protein (cooked beans, potatoes or rice; dairy products; eggs; fish and shellfish; meat; poultry; and soy products) with a pH between 4.6 – 7.5, and that are moist (water activity level above 0.85) will support the rapid growth of bacteria if not properly handled. In the most recent edition of the Food Code the Federal government refers to these foods as TCS (Time and Temperature Controlled for Safety).

Ready-to-Eat (RTE) Foods – these are foods that will be eaten without further cooking and include deli meats, cold salads, melons, and similar items. Since they will not be cooked before service there is no way to kill microorganisms that are present and extra care should be taken when handling and serving these items.

Reduced Oxygen Packaging (ROP) – this term refers to foods that have been packaged in sealed containers with less than the amount of oxygen in air. The two variants of this type of packaging are: *sous vide* and MAP. *Sous vide*– French for "under vacuum" is a process that involves the complete or near complete cooking of foods and vacuum sealing them in plastic pouches. With *sous vide* foods there can be a concern about botulism so the product should have its temperature checked upon delivery and all of the manufacturer's recommendations about storage and reheating should be followed. MAP refers to "Modified Atmosphere Packaging" whereby some of the air in the package is replaced by inert gases prior to sealing to prolong the shelf life of the food product. An example of MAP packaging is the packaging used for pre-cut salads sold in retail grocery stores and now becoming available for commercial food service.

Spores – are created by some bacteria as a means of survival. Spores are smaller than the actual bacteria and are covered by a tough cell wall that protects the spores from dehydration, freezing, and heating. When the spore's environment becomes suitable for bacterial survival and growth, the spore becomes an active bacterium. In effect, spores are like seeds although they are produced when a bacterium is under stress and each bacterium can produce only one spore.

Standard Operating Procedures (SOPs) – are methods or procedures that an organization has adopted and trained its staff to follow on a consistent basis. Having such procedures is a foundation for any food safety and quality program as they ensure that things are done in a safe and consistent manner.

Time – Temperature Abuse – a condition that occurs when food is held in the **Danger Zone** too long. The time in the danger zone is additive. Actual limits of how long food can be held at various temperatures are dependent upon the processes being applied to the food. Foods that have been time-temperature abused must be discarded.

Time and/or Temperature Control for Safety (TCS) – a new classification of foods that recognizes that many foods recently involved in food borne illness outbreaks are ones not traditionally involved in the past. Included in this group are foods such as: peeled, cut melons; untreated peeled, chopped garlic in water or oil; cut leafy greens such as cabbage, lettuce, and spinach. In general, these foods have only two of the three characteristics that are necessary to classify a food as a potentially hazardous food. All PHFs are included as TCS foods.

Toxin – this term refers to a naturally occurring harmful substance or one produced by a living organism. A number of food borne illnesses are the result of these toxins and the symptoms that appear are the body's response to the presence of these toxins somewhere in the body. Some toxins can cause fatal illnesses if a sufficient amount of the toxin is consumed. Most toxins act upon the body relatively quickly and symptoms generally appear with 30 minutes to 8 hours after

consuming the food containing the toxin. Most toxins are not destroyed by cooking. The term **intoxication** is used to describe this type of food borne illness.

UHT – is an abbreviation for Ultra High Temperature and refers to a pasteurization process that uses higher than typical temperatures to kill bacteria and other living contaminants. Foods processed this way include milk, creamers, and certain juices. The sealed containers of these foods do not need to be refrigerated in storage and in some cases may be shelf-stable for as long as 15 months. Once the packages are opened they must be refrigerated.

Variance – a legal term meaning that the operation that has legal permission to do something that is typically not allowed by code. Variances are issued by different regulatory agencies including Boards of Health and Zoning Commissions. In the case of a restaurant the following require a variance: packaging fresh juice for on-site sale without a warning label; cold smoking or curing of meats; using food additives to preserve or alter foods; custom processing of meats for personal use; packaging foods using ROP, *sous vide*, or MAP; sprouting seeds or beans; or holding live shell fish for service in a display tank.

## THE CURRENT STATE OF AFFAIRS

Over the past forty years the percentage of meals that Americans prepare at home has fallen. Currently about 40% of all the meals consumed by Americas are prepared away from home in schools, camps, the military, hospitals, retirement centers and nursing homes, restaurants, hotels, snack bars, and correctional institutions. Our tables are stocked with foods from around the world as an increasing percentage of the food we consume is grown and/or processed outside the United States.

While the vast majority of food served in the United States is safe, we continue to hear of many cases of food borne illnesses and food recalls and the challenge of providing safe food is constantly changing due to the evolution of threats, changes in our population, changing sources of food, and changing methods of food production and processing. The Centers for Disease Control and Prevention (CDC) has determined that there are five primary causes of food borne illness in the United States:

1) Purchasing food from unsafe sources – food service operations should source all their foods from reliable, licensed, inspected wholesalers who are in compliance with all federal, state, and local codes. Reputable suppliers should be willing to share information on their food safety practices as well as their most recent inspection reports with clients and potential clients.

2) Failing to properly cook food – because of the press of business, or poor procedures, or because the customer wants food cooked a certain way, it is sometimes the case that undercooked food is served. While proper cooking reduces the number of most pathogens to safe levels, failure to reach the recommended minimum internal temperatures can result in serving unsafe food.

3) Improper Holding - once food is properly cooked it must be held at temperatures that prevent the growth of spores, which may be present and which are not inactivated by normal cooking procedures, and to prevent the growth of bacteria that have been introduced to food after cooking. Holding foods at the correct temperatures, properly cooling the foods, and properly reheating the foods as well as protecting food during holding will significantly reduce the risk of food borne illness. Failure to properly hold, cool, or reheat foods correctly leads to Time-Temperature Abuse.

4) Using contaminated equipment – there are many reasons why equipment and food contact surfaces may not be properly washed, rinsed, and sanitized between uses. No matter what the reason, the use of contaminated equipment and food contact surfaces can lead to cross contamination and food borne illnesses.

5) Improper personal hygiene – although there has been a general trend to better personal hygiene practices among most Americans, the fact of the matter is that there are still many people with poor personal hygiene habits. This can include a wide variety of inappropriate behaviors such as coughing and sneezing in food production areas as contaminants can be spread in droplets of saliva. A poor hygiene habit of concern to the food service industry is that there are still many people who do not wash, or who improperly wash, their hands after having a bowel movement. This can result in the hands being contaminated with bacteria, viruses, and parasites and can lead to food borne illnesses as the contaminated hands handle food, utensils and food contact surface. This is referred to as the “fecal-oral” transmission route and is a major factor in the spread of viruses and other infectious illnesses. Food handlers must have access to conveniently located, properly supplied handwashing facilities and must be trained on how and when to wash their hands as frequent, proper handwashing can reduce the risk of food borne illnesses.

# CONTAMINANTS

Food contaminants are products that should not be in the food at all or are in the food in excessive levels. Contaminants can be living (biological) or non-living (chemical or physical). Contaminants get into the food as it is grown, shipped, processed, stored or otherwise handled. When the conditions are such that these contaminants survive or increase in number or remain in the food it is possible for them to cause people to become ill.

The following are the major symptoms of Food Borne Illnesses:

- Diarrhea.
- Vomiting.
- Fever.
- Nausea.
- Abdominal cramps.
- Jaundice.

Although most contamination of food occurs "naturally" or accidentally, the Federal government has become increasingly concerned about possible deliberate contamination of food by: terrorists and activists; disgruntled current and former staff; and competitors. The Food and Drug Administration (FDA) has developed a food defense (safety) program called A.L.E.R.T. to help food processing and food service operations guard against deliberate or intentional contamination. The program includes the following elements:

**Assure** – receipt of safe food by: purchasing only from approved vendors; having good receiving procedures; requiring that delivery vehicles be kept locked at all times except when actively loading or unloading and monitoring the temperature of TCS foods when they are delivered.

**Look** – monitor the security of food production facilities by: limiting access to storage and production areas; creating procedures for handling damaged or suspicious products; storing chemicals in a secure location; and training staff to recognize food safety threats. Review security tapes on a regular basis.

**Employees** – protecting food by: knowing who is in the facility at all times; limiting access to storage and production areas; identifying all visitors and verifying credentials of inspectors; conducting background checks on staff to reduce the likelihood of their participating in a deliberate act of contamination; and training and supervising them in safe food handling practices.

**Reports** – keeping reports that document: the source of all foods used in the operation; procedures and practices used to protect food; staff files including training and attendance; and inspections and random food defense checks.

**Threats** – operations should respond to possible threats *before* an incident occurs by developing emergency action plans and training staff in the proper response. In addition, operations should establish contact with regulatory agencies and develop and keep current an emergency contact list.

BIOLOGICAL CONTAMINANTS

There are four types of living contaminants:

- Viruses – single-cell organisms that are found almost everywhere and which can survive in food or on surfaces, but which can only reproduce in a living plant or animal.

  Viruses account for the majority of cases of food borne illnesses and are often associated with the consumption or use of water that has been contaminated with human or animal feces, consumption of shellfish harvested from contaminated water or poor personal hygiene. Viruses are difficult to isolate in part because they are so small (an influenza virus is 1/10,000 of a millimeter in diameter) and because the symptoms may resolve very quickly, even before people see a doctor. They are easily spread and can be difficult to destroy as normal cooking temperatures may not kill them. Some viruses can survive on dry surfaces for months, some can become airborne and can be spread by ventilation systems.

  There are two different viral-caused food borne illnesses of concern:

1) Hepatitis A – a rarely fatal illness characterized by yellowing of the whites of the eyes and the hands and face (jaundice), rust-colored or brown urine, and a low fever. Hepatitis A is a disease that one gets once and then has near perfect immunity. There are other forms of Hepatitis that are not of concern to the foodservice industry as they are not spread through food.

2) Norovirus – characterized by a fever and periods of severe vomiting and diarrhea that can result in such loss of fluids as to result in dehydration, kidney damage and failure and even death. Recovering from Norovirus does

not confer any immunity upon people and it is possible to contract Norovirus over and over again.

- Bacteria – single cell living organisms that are found almost everywhere and which can survive in food, on surfaces, and can reproduce in food. Not all bacteria cause illnesses, many do not, and some actually have positive effects upon the human body. There are currently less than two dozen bacteria that are considered pathogenic when consumed in food.

  Bacteria account for many food borne illness outbreaks, particularly those that get a great deal of attention in the media and those that include fatalities.

  Bacterial growth can best be controlled by controlling the cooking and holding times and temperatures of food. Bacteria are typically destroyed by dehydration, although their spores are not.

  The four food borne illness caused by bacteria of most concern to foodservice professionals are:

  1) Typhoidal Salmonellosis - a.k.a Typhoid Fever – caused by *Salmonella typhi* or *Salmonella paratyphi* are forms of *Salmonella* that can only reproduce in the human intestinal tract, but may survive in water.

     This illness is typically characterized by extremely high fever, nausea, vomiting, and diarrhea and is spread from one ill human to others through poor hand hygiene or water contaminated with human feces.

  2) Non-Typhoidal Salmonellosis – caused by one of approximately 100 different species of *Salmonella* that can live in mammals, birds, reptiles, or amphibians. The illness is spread by eating unwashed or uncooked produce, undercooked poultry, cross contamination, etc. The symptoms are the same as for Typhoidal Salmonellosis – an extremely high fever, nausea, vomiting and diarrhea.

  3) Shigellosis – caused by bacteria called *Shigella* found in the intestinal tract of infected humans and primates. The bacteria are shed in feces and poor hand hygiene, spreading in water that is contaminated with the feces or flies and other insects that feed upon the contaminated feces and then transfer the bacteria to foods and food contact surfaces. Symptoms of the illness include a fever and watery, black or bloody diarrhea.

4) Hemorrhagic Colitis caused by any of six forms of *E. coli* the most famous of which is *E. coli* 0157:H7, that have evolved to produce shiga toxin (STEC – shiga toxin producing *Eschericha coli*). Originally these bacteria were associated with undercooked ground beef, they have since been found in water contaminated by animal manure and on produce. The symptom of the illness is watery or black or bloody diarrhea.

**Note:** Any foodservice worker with any of the six illnesses just listed must be excluded from work – they cannot be in any food handling area (the kitchen, dishroom, storage areas, or employee only areas) although they may be in the business as customers. The fact that these employees have these illnesses must be reported to the local health department and the employees must have clearance from the health department and a medical professional in order to return to work.

Living organisms are often referred to using their Latin names that have two parts, their genus and their species. The genus is always capitalized and may be abbreviated as a single capital letter. The species is never capitalized. Latin names are usually italicized. The following are some examples of how different organisms are listed in scientific or medical reports; *Clostridium botulinum* or *C. botulinum*. Related organisms may be classified as being in the same genus with each organism being a member of a different species or sub-species. The organisms *C. botulinum* and *C. perfringens* are closely related and share a number of characteristics – such as being similarly shaped, spore-forming anaerobic bacteria. Sometimes only the genus is listed as in *Salmonella*. In the case of *Salmonella* where there are multiple species they may be referred to collectively using the abbreviation "*spp.*" Finally, some species have sub-species and these are identified by listing the subspecies after the genus and species using letters and numbers that might not be italicized as in *E. coli* O157:H7.

- Parasites – single or multi-cell living organisms that live off other living organisms, plants or animals. The organism in which the parasite lives is called a "host". Many parasites can survive outside the host for a period of time, particularly in water, and some are actually able to move from one place to another on their own.

  A number of parasites are in water and cause water borne illnesses. These are prevented by obtaining water from a safe source such as a municipal water supply system, a tested well, bottled water, or by boiling water.

  The parasite, *Anisakis simplex*, can be found in certain saltwater fish and squid and can be controlled by proper purchasing and cooking. Wild game animals such as bear and boar can carry a parasite, which also can be inactivated by proper cooking.

  Parasites account for only a small percentage of all food borne illnesses.

- Fungi – single-cell living organisms that are found almost everywhere and which include molds, mushrooms, and yeasts.

  Certain molds are deliberately added to curds (milk solids) to flavor cheeses. The fungi of concern are those that are not desirable such as mold on bread, fruits and vegetables, or on cheese that aren't supposed to have mold, etc. These organisms and wild yeasts are referred to as "spoilage" organisms in that they spoil the quality of the food. Some molds create toxins that may cause food borne illnesses, although these are more likely to be issues for food processors, not retail food operations.

  Where mold is present on food that it doesn't belong (i.e.: on cheddar cheese), the mold plus 1" of product must be removed and discarded if you want to use the remaining product. After removing the mold, the food should be wrapped in fresh plastic film or foil or put into a sanitized container and properly stored. It should be used as quickly as possible.

  Yeasts are an essential ingredient in raised-dough products such as most breads, rolls, and pizza crust. Yeast is also essential when one wants to transform sugar into alcohol to create beer, wine, and hard liquor. When wild yeasts get into food inadvertently, they will ferment the sugars in foods and create small amounts of alcohol and noticeable off flavors. Since these flavors are undesirable, the yeasts spoil the food and it has to be discarded.

There are a number of different non-living contaminants which are biological in origin, including:

- Seafood Toxins of which there are a number:

  - Algae* toxins may make shellfish that feed upon the algae unsafe to eat. These toxins are not destroyed by cooking, but the shellfish can be cleansed of the toxin if the water is free of toxin for a period of time. An example of this would be the "red tide" that sometimes affects parts of New England and closes shellfish beds contaminated by the algae. After a period of time without the algae in the water the shellfish beds are reopened and it is safe to eat the shellfish again. (Note: red tide affects oysters, clams, mussels, and scallops but not lobsters, crabs, or shrimp.)

  - Ciguatera toxin is produced by certain plankton that grow in warm salt water. These are eaten by small fish that are in turn eaten by larger fish. The toxin can't be smelled, tasted, or destroyed by cooking. Its incidence

can be reduced by purchasing fish from licensed, reputable suppliers. Fish associated with this include: barracuda, jacks, grouper, and snapper.

* Algae are organisms that grow in water. They range from microscopic in size to the giant kelp that can grow to be up to 100 feet long! Mollusks (clams, mussels, oysters, and scallops) are filter feeders and they remove algae from the water. Not only does this clean the water, but it results, if properly managed, in a sustainable food supply.

- Scombroid toxin is the result of the breakdown of certain proteins into smaller compounds when certain species of fish (such as tuna, bonito, mackerel, mahi-mahi, etc.) have been time-temperature abused. The scombroid toxin is a form of histamine, and is the by-product of the partial decomposition of the fish. It is also associated with frozen fish that has been thawed improperly. This toxin is not destroyed by cooking.

❖ Mushroom Toxins – a number of species of mushrooms create toxins. Some of these mushrooms are remarkably similar to edible mushroom species that are found and picked in countries other than the United States. Confusion between species can be fatal. Purchase mushrooms from a reputable produce supplier.

❖ Allergens – are proteins that are found naturally occurring in specific foods. Approximately 15 million Americans have legitimate food allergies. It is estimated that 300 people die each year in the United States as a result of food allergies and food allergies are responsible for more than 300,000 visits to emergency rooms! The eight most common food allergen are: peanuts, tree nuts, eggs, dairy products*, fish, shellfish, wheat protein (gluten), and soy products. Less common are allergies to: chocolate, strawberries, coconut, oregano, mushrooms, tomatoes, onions, garlic, vegetable gums, peppers, celery, and coffee. In short – if you can eat it, someone is probably allergic to it!

All staff members should know what is in each dish or there should be a designated person on each shift who can answer questions. A written list of ingredients in each dish might also be available to concerned guests and no dish should have “secret” ingredients.

Servers should suggest that guests with food allergies order more simply prepared foods as there will less chance of accidental contamination. They should also “flag” orders for guests with food allergies and personally make the manager and/or kitchen aware of the special request. Food prepared for

guests with food allergies should be brought to the table on a separate tray or hand carried so that allergens in other meals do not contaminate the food of the guest with the food allergy.

* Note: Lactose intolerance is the result of the body's inability to process lactose, a sugar found in milk. It is *not* the same as a dairy allergy and it is not life threatening. Many other people have physical reactions to other ingredients including nitrites and sulfites, MSG, etc. but these are not currently classed as allergens.

NEVER substitute one ingredient for another as there have been cases where a guest asked about a dish ate it and was fine, and later returned to the establishment and ordered the same dish only to have a severe, possibly fatal, reaction because of a substitution. NO SUBSTITUTIONS!

Be aware that cooking foods in the same pot or pan or using a single utensil, such as a pair of tongs, with different foods can result in transferring enough molecules of an allergen to a "safe" food to cause an allergic reaction. This is called "cross contact". There have been cases where frying seafood in the same deep fat fryer used to cook French fries has resulted in allergic reactions.

Food preparation staff should use cleaned and sanitized utensils when preparing food for guests with food allergies and may want to consider using disposable cookware (i.e.: aluminum foil or disposable aluminum pie plates). Food preparers should wash their hands and change their gloves prior to preparing foods for guests with food allergies.

Effective July 1, 2010 all foodservice operations in Massachusetts with printed menus, defined as a listing of foods for sale and prices whether printed, posted on the wall, or on line, must have the following warning on their menus:

> Before ordering, please inform your server if anyone in your party has a food allergy.

Foodservice operations must also post an approved food allergy information poster in their staff areas. The poster is available in English and Spanish and may be downloaded from: www.faan.org. All individuals in an operation who are ServSafe® certified must complete the Massachusetts' Allergy Awareness Training Program on-line webinar or as a part of a food safety training program. The certificate of completion must be posted next to their ServSafe® certificate and food license.

- ❖ Celiac Disease is an auto-immune disease associated with the inability to tolerate gluten – a non-digestable protein found in wheat, rye, barley, and other grains.

NON-LIVING CONTAMINANTS

There are many different non-living contaminants that can contaminate food and food contact surfaces. Improperly designed, stored, and used products can contaminate food and food contact surfaces. The following are some of the more common non-living contaminants: Toxic Metals, Chemicals, and Physical items.

- ❖ Toxic Metals – many metals including antimony, arsenic, brass, cadmium, copper, lead, mercury, and zinc can lead to health problems and even death if they are consumed in excessive amounts. This is especially true if acidic food comes into contact with these metals. The acids dissolve the metals and increase the contamination levels.

    - ▪ Copper pipes are frequently used for supplying water, but acidic water will eat away the copper and cause anemia. Municipal water suppliers "sweeten" the water to increase its pH above 7.0 to prevent this problem. However, this is not the case with private water supplies so they should be checked periodically. Carbonation makes water acidic, so there should always be backflow interrupters between the copper water supply line and the carbonator in soda systems to prevent carbonated water from coming in contact with the copper pipe. It is generally the case that the piping switches from copper to plastic after the backflow interrupter and this is so that if there is any back-up in the machine the carbonated water does not come in contact with copper. There may be a set amount of plastic tubing required, resulting in coils of tubing behind the soda dispenser. (The pH of carbonated sodas is approximately 2.5.)

      Never store or display acidic foods such as tomato products, fruit juices, or pickles in copper containers.

    - ▪ High levels of lead in the diet or blood can cause mental retardation in children and loss of memory, and many other problems, in adults. It gets into the water supply from old pipes that used lead solder to join them together and from certain paints and glazes used on pottery.

- Mercury causes mental retardation in children and insanity in older individuals. The environmental sources of mercury include old batteries, fluorescent lights, metal finishing industries, and coal-fired electric plants. Many old glass thermometers used mercury, but these are outlawed now. Connecticut has considered placing warning signs at the entrances to grocery stores and restaurants warning women who are pregnant or who might become pregnant and children under the age of 12, from consuming more than 12 oz. a week of king mackerel, tile fish, tuna, shark, and swordfish as mercury can accumulate in these fish at levels that may cause mental retardation in fetuses and young children. (Some environmental groups also advise limiting the intake of pollock which is the "white" fish used in many frozen breaded fish products and imitation crab and shrimp for the same reason.) In addition, the warnings advise these women and children to avoid eating more than 6 oz. of white (albacore) tuna a week for the same reason. It is interesting to note that the level of mercury in these fish has remained relatively stable for the last 100 years, but our understanding of the sensitivity of the body to mercury has changed.

- Although essential to the functioning of the immune system, zinc in excessive levels can cause mental retardation in children and anemia and even death in any human. A zinc coating may be applied to prevent iron and steel products such as shelves and nails from rusting in a process called "galvanization". These products should not be used in food handling areas, particularly where they can come in contact with acidic liquids. Under the Federal Food Code, galvanized (zinc-treated) containers may be used only for storage or transport of dry ingredients such as flour, sugar, rice, etc., but some state health codes prohibit the use of zinc in all food service operations.

❖ Chemicals and Pesticides - can all contaminate foods and must be handled carefully. Most of these chemicals are safe when used properly, but herbicides, cleaners, sanitizers, and lubricants, are dangerous when they get into the food. Chemicals must be stored away from foods and food contact surfaces. Chemicals should remain in their original containers if possible. When it is necessary to transfer chemicals to other containers, such as when they are purchased in bulk, the new container should be clearly labeled in multiple languages if there is a multi-lingual staff. The container should be easily identified as being for chemical use only, and it should have a closed top. Chemicals used in the kitchen or other food-handling areas need to be

kept below the level of counters and food handling surfaces or food or utensil storage areas.

Commercial businesses are required to have Safety Data Sheets (SDS) on each and every chemical that is used in their business. These sheets indicate both the chemical and common names of the chemicals, the hazards associated with the use, or misuse, of the chemicals, safety precautions, safety equipment (personal protective equipment (ppe)), what steps to take in case of an accident (first aid treatments to be applied), and procedures for proper disposal of any excess product. These SDS must be available to all employees at all times as they are intended to help employees become informed of the hazards of using the chemicals and aware of safe and proper handling procedures. These regulations are overseen by OSHA – the Occupational Safety and Health Administration.

In August 2005 Massachusetts implemented regulations that require <u>all</u> chemicals to be stored in a separate storeroom or closet. Many health agents are allowing the chemicals to be placed in a general storeroom provided that they are in a separate cabinet with latching doors. Note that fire regulations may require that the closet be fireproof (metal).

- Physical Contaminants – refers to such things as stones in rice or dried beans, twist ties from bread, staples from produce boxes, broken glass, etc. that get into the food and could cause injury to those consuming the food. Bones in "boneless" foods are considered to be a physical contaminant as are shell fragments from shellfish or nuts, and pits in fruits.

  Physical contaminants in foodservice operations generally affect only one or two people and are relatively rare. The best practice to follow in the event of someone finding a physical contaminant in the food is to stop serving the food that the physical contaminant was in, prepare a detailed incident report with photos of the object, and to inform your insurance carrier. Under no circumstances should anyone offer to pay for any damages without the express permission of the insurance carrier.

## PERSONAL HYGIENE

At one time or another, food handlers come in contact with most of the food served as it flows though the business. Making sure that food handlers are healthy and

practicing good personal hygiene habits is extremely important. Some food safety experts indicate that the most common cause of food borne illnesses is poor employee hygiene and work habits. Some of the people who are employed in our industry have not been exposed to what most of us would consider "proper" personal hygiene habits. This includes those who have forgotten what they were taught, those who have not developed good hygiene habits, or immigrants who come from countries where the standards are different. Poor personal hygiene is not limited to under-educated or poor people. Wealthy, well-educated people are just as likely to practice poor hygiene as anyone.

It is advisable to provide information on acceptable personal hygiene practices as part of your hiring, orientation and training program. It will save time and prevent embarrassing situations if your personal hygiene standards are provided in written form and discussed during the interview process and then reinforced on the first day or work and periodically thereafter.

You may also want to include the following in any handbook or written material provided to your staff:

All employees should:

- ✓ Have a daily bath or shower.
- ✓ Use deodorant.
- ✓ Shampoo their hair.
- ✓ Have their hair restrained by a hat or net while working. (The Federal Food Code requires that hair be restrained if it is long enough to touch a stand-up collar – the acceptable restraints are a hair net or to have the hair under the hat – pony tails and braids are no longer allowable. The Federal Food Code also requires that facial hair (beards and mustaches) be covered by a beard net. This is always enforced in food processing plants and is starting to be enforced in retail food service businesses.)
- ✓ Refrain from touching their hair or other parts of the body while working.
- ✓ Wear a clean uniform, perhaps made with anti-bacterial material.
- ✓ Change into their uniform at work. (Employees who wear aprons should remove the apron when not working – such as when on break, eating, or using the restroom, handling trash – leaving the apron in the workplace.)
- ✓ Remove all watches, bracelets, rings, dangling earrings (or hoops larger than 1" in diameter), and piercings before starting work (a plain wedding band may remain on the hand).

- ✓ Keep fingernails neatly trimmed and avoid wearing false nails (in Connecticut it is illegal to wear fingernail polish or false nails unless the individual wears gloves at all times).
- ✓ Cuts and infected sores should be covered with a waterproof bandage and if the bandage is on the hands, it should be protected by a disposable glove or "finger cot" (finger glove).
- ✓ Refrain from smoking, eating, chewing gum or drinking while working. Saliva may contaminate the hands and then foods that are handled. (Food handlers may drink only from closed, unbreakable cups or sports bottles in food handling areas.)

Mangers should model correct personal hygiene for their staff by dressing appropriately, washing their hands properly and frequently, having restrained hair, etc. They should also remind staff of the acceptable practices and be alert to changes in hygiene recommendations that result from new scientific research.

Employees should be encouraged to eat a balanced diet, get plenty of exercise and rest, and to take care of themselves so that they are healthy and able to work. Employees with communicable diseases (especially food borne illnesses) should not be working. Symptoms such as diarrhea, vomiting, fever, and infected cuts and lesions should be reported to management *before* an employee starts work. Employees experiencing vomiting or diarrhea should remain home for 24 hours after the last episode of vomiting or diarrhea*. Operations should require a release from a medical practitioner indicating that the employee may return to work.

Jaundiced employees must be reported to the health department and excluded from work if they have been jaundiced for less than seven days. A medical release and health department approval should be required for the employee to return to work. Employees with a sore throat and fever should be restricted from handling food, although they may be permitted to work in some operations, but never in one that serves a large number of high-risk individuals.

* 72 hours in Connecticut.

Some Massachusetts communities require operations to have a "Food Employee Reporting Agreement" on file for each employee (a sample is in the handouts at the back of this booklet). **Employees with identified food borne illnesses must be excluded from work and, under Federal law, the local health department must be informed of this, even if the employee did not contract the illness at work.** The six reportable/excludable illnesses are: Hemorrhagic colitis,

Shigellosis, Salmonella typhi, Non-typhoidal Salmonellosis, Hepatitis A, and Norovirus. It is necessary to follow Health Department approval prior to allowing any individual diagnosed with these illnesses to return to work.

Note: The fact that one employee may have been exposed to Hepatitis A may require treatment and monitoring of *all* employees.

Where employees prepare food for high risk populations such as children's day care centers and health care feeders, food service employees who live with an individual who has experienced a highly contagious food borne illness should be restricted from handling ready-to-eat food, clean dishes, etc. and may actually be excluded from work until their housemate has recovered.

Probably the **SINGLE** most effective action that can be taken to reduce the incidence of food borne illness is to get employees to wash their hands frequently and properly. Employees should be required to wash their hands:

- BEFORE starting work.
- When changing tasks.
- After touching contaminated objects (such as refrigerator handles).
- After handling waste products.
- After handling raw foods.
- After breaks.
- When changing gloves.
- After using toilet facilities. (Aprons should be removed and left in the kitchen when going into the restroom.)
- After eating, drinking, smoking, or using a telephone.

Employees should follow the following practices when washing their hands:

- ✓ Use warm ($100^{o}$ -$120^{o}$ F) running water.
- ✓ Have the soap on the hands for 10 seconds and scrub between the fingers and over the wrists.
- ✓ Wash under the fingernails – using a fingernail brush, if available.
- ✓ Rinse under warm running water.
- ✓ Dry with a disposable paper towel or room temperature air dryer.

Since washing removes only 90% of the dirt and bacteria on a surface, washing twice at the start of a shift, after using the restroom, or after a break is advisable.

**According to a 2004 report by The Food and Drug Administration improper and insufficient hand washing was observed in 34% of all hospital kitchens**

**and in 73% of all full service restaurants!**

Note: In health care facilities, employees are required to wash their hands after using the restroom in the restroom sink and a second time in the kitchen at the hand washing station. At least two national restaurant chains have now adopted this policy in their company-owned units.

Gloves

The use of gloves does not eliminate the need for good personal hygiene and good hand washing practices. Gloves are a *supplement*, not a substitute, for good personal hygiene. Gloves must be changed after extended use, when changing tasks, after touching a contaminated surface, etc. The hands must be washed each and every time the gloves are changed. Please note that in Massachusetts the use of latex gloves is discouraged, as approximately 10% of the population appears to be allergic to latex, vinyl gloves are preferred. Bare hand contact with ready-to-eat foods (foods that will be consumed without further cooking) is prohibited by the Federal Food Code and most states. Ready-to-eat foods must be protected by using disposable gloves, utensils, or disposable paper when preparing and serving them. The one exception to this is that glove may not be worn while washing produce.

Hand Antiseptics (Sanitizers)

Like gloves, hand sanitizers are a *supplement*. Hand sanitizers only work when all food waste and organic matter on the hands has been removed prior to the application of the hand sanitizer. They should be used *after* washing the hands. Sanitizers must be allowed to dry on the hands before touching anything or handling food. A number of medical professionals have stated that the overuse and improper use of sanitizers and antibiotics are creating stronger, more dangerous microorganisms and have suggested that the use of these products should be limited.

Cuts and Bandages

Cuts on the hands and arms create challenges for food handlers. They are likely to get infected because of the presence of bacteria on food and kitchen surfaces and because most healthy people have harmful, food borne illness causing, bacteria (*Staphylococcus aureus* – a toxin producing organism) on their hands (25-30%) and in their nose (30-50%) even though they show no symptoms of being ill. In some rare cases there may be concern about the transfer of blood and other body fluids, but for the most part, the most common concern is the presence of food borne illness causing bacteria on the hands. Cuts should be:

- Washed thoroughly with soap and water.
- Treated with an anti-biotic.

- Covered with a tight, waterproof bandage, preferably a different color than the skin.
- Covered with a 'finger cot', a tight-fitting single finger glove of durable material meant to be worn for 3-4 hours or covered with a disposable glove.

## THERMOMETERS

One of the most important aspects of food safety is an understanding of the proper temperatures for foods to be received at, stored at, cooked to, or held at for service. In addition it will be important to know the standards for cooling and reheating foods that are to be held for extended time periods.

Temperatures can only be measured using a thermometer. Foodservice managers and employees should know the following about thermometers.

- The use of glass-stemmed or mercury-filled thermometers is prohibited – thermometer stems must be made of stainless steel.
- Thermometers should have a range of 0° F to 220° F and must be accurate to $\pm$ 2° F.
- Thermometers must be washed, rinsed, and sanitized between uses. (Typically, the sanitizer must be in contact with the thermometer 20-30 seconds and must dry on the surface before the thermometer can be put into the food.)
- Bi-metallic stem thermometers must be calibrated when new, when dropped, and approximately every two weeks, using the ice point (32° F) or boiling point (212° F) method. (The 7th Edition of the ServSafe® text recommends that they be calibrated before each shift!)
- Bi-metallic stem thermometers generally have a sensing area approximately 1 ½" long and this is often indicated by a couple of indentations or "dimples" on the stem. The entire sensing area must be surrounded by food to take the temperature accurately (in other words they may not work on thin products).
- A "tip sensitive thermocouple" may be needed to take the temperature of thin foods such as hamburgers, chicken breasts, etc.
- When taking the temperature of foods held on a steam table, it is necessary to stir the food before taking the temperature as the surface temperature will often be 15-25° F cooler than the internal temperature.
- Infrared temperature 'guns' measure only the surface temperature and will be inaccurate if used more than a few inches away from food or if pointed at bubbles or though glass.

- Refrigerators and freezers should have external and internal thermometers and the internal one should in the warmest part of the unit. If the temperature there meets code, the rest of the unit will also meet code.
- In some jurisdictions, older sandwich and pizza units must be replaced with newer units that provide a layer of cold air on top of the food.
- Some foods are now being shipped with time-temperature indicators (TTI). These are small tags that change color irreversibly when the temperature exceeds a certain level for a set period of time. They can indicate if the food has been time-temperature abused in shipment or if the temperature of the dishmachine is at the correct level. (An alternate way to verify the dishmachine temperature is use of a maximum/minimum thermometer that records the highest or lowest temperature on a memory chip.)

## • PURCHASING AND RECEIVING

The first step in the 'flow of food' under your control is purchasing and receiving. All operations, no matter how small, should have written specifications that detail your standards for each food product purchased. Having specifications makes you define what you want, makes sure that all suppliers will be providing you with the products you *really* want, and will make sure that the prices quoted by different purveyors are actually comparable. Specifications communicate your professionalism to purveyors.

You should purchase foods only from approved purveyors. Your approval process should include determining that each and every purveyor operates in a responsible and safe manner. Purveyors of certain products such as meat, fish, and certain dairy products may be required to be licensed and inspected. You should determine that their licenses are current, that they follow good food handling procedures, and that their staff is properly trained. It is a good practice to inspect your purveyors' plants and warehouses on an annual basis as well as checking the trucks that bring you your supplies. You may also want to ask for copies of their most recent food safety inspection report.

The following information sets out current temperature requirements per the Federal Food Code; *please* remember that your local health department may have different required temperatures:

- ✓ Potentially Hazardous Foods (PHFs) and Time Temperature Controlled for Safety (TCS) foods must be received at or below 41° F. It is especially

important to check the temperature of deli meats and reject those that do not meet this standard.

- ✓ Eggs must be received at or below 45º F and stored at or below that level.
- ✓ Milk must be received at or below 45º F and cooled to below 41° F in four hours or less.
- ✓ Live or shucked shellfish must be received at or below 45º F and must be cooled to below 41° F in four (4) hours or less. If live shellfish are open, their shells should close when tapped. All shellfish should have a shellstock tag attached to the package. This tag must remain with the shellfish while in storage and for 90 days after the last piece is served.
- ✓ Certain fish, those that support the *Anasakis* worm, that are to be served raw must come in frozen and should have a "Certificate of Parasite" destruction from the wholesaler if required. This certificate should be kept on file for 90 days after the last piece of raw fish is served.
- ✓ Frozen foods must be received solidly frozen and show no evidence of thawing and refreezing (large ice crystals) or water stains on the packaging.

It is important to get into the habit of taking the temperature of foods to ensure that they come in at the right temperature. This will require a clean, calibrated thermometer. Staff should be trained how to take the temperature – such as holding a thermometer between two packages of food or wrapping a bag of liquid around the thermometer. Staff should record the temperature of foods and their initials either directly on the invoice or in a receiving log.

When receiving foods, it is advisable to check for damage and signs of insect or rodent infestation, including checking some sealed packages, and to reject any packages that show evidence of this type of problem.

In some chain operations food is delivered when there is no staff to check the delivery and the driver puts the food in designated locations. This is known as a "Key Drop Delivery". Where this type of delivery is used the food must be checked as soon as the staff comes in. They should verify that the delivery came from an approved source, that the products were placed in the correct areas at the correct temperatures, that the food was protected from contamination, and that the order and delivery are correct.

Rejection and Recalls:
In all operations there are likely to be times when some food products delivered are not correct and have to be rejected or when products are recalled by the manufacturer because of possible contamination. Any foods that are being held for

rejection or recall need to be segregated from other foods (removed from inventory) and marked with labels that indicate: “Do Not Use” and possibly “Do Not Discard”. They should be segregated from other foods so that they are not inadvertently used.

The following are causes for rejecting foods at the time of delivery:

- □ Tears, holes, or punctures in the packaging or evidence of spills or contamination.
- □ Cans that are dented on the rim or seam, leaking, rusty, or with swollen ends.
- □ Vacuum packed or ROP packages that are bloated or leaking.
- □ Liquid products whose packaging show evidence of leaks and stains.
- □ Packages that show evidence of pest damage or infestation.
- □ Items that are missing use-by or expiration dates or that are close to or have passed these dates.
- □ Items that do not meet quality standards.

Items that have been rejected should be noted on the invoice and in the receiving log, if one is used. The driver should sign or initial the invoice and it is advisable to note the reason for the rejection. Documenting the fact that food has been rejected and why will help establish the operation’s reputation for food safety and show a pattern of actions that promote food safety. A review of the record can also provide insight into the supplier’s attitude towards food safety and food safety practices.

PLEASE remember that <u>you</u> are now the customer and that you are going to be charged for this food. You deserve to get good, safe, wholesome food. If the temperature is not correct, the product is damaged, or incorrect, you must stand your ground and send it back. If you do not, you are endangering your guests, your business, and your reputation. If you accept ‘garbage’ you will become a dumping ground for poor quality products.

Sometimes manufacturers recall products after they have been shipped because information has come to light that indicates that these foods may be unsafe. Sometimes when the recalled food is the suspected cause of a Food Borne Illness there is major national media attention to the recall. In other instances the recall may be handled more quietly and the operator may get contacted by the supplier who delivered the foods. In the event that you get informed of a recall: check the brand(s) of the food product(s); the production or use-by date, or lot number, and if the product you have matches the recalled products:

- Separate these products from other food items, keeping them at the proper temperatures and storage conditions.
- CLEARLY mark them with labels that indicate: “Do Not Use” and “Do Not Discard”.
- Contact the supplier who delivered the product for instructions on what to do with the product – sometimes they will arrange for the product to be picked up, sometimes they will direct you to discard or destroy the product. Ask for and follow detailed instructions as to how to do this!
- Document the actions you have taken when informed of the recall even if the product you received was not part of the recall. Communicate, as directed, if some or all of the product recalled has been used or served.

Food Storage:

- Frozen foods should be held at or below 0° F, except ice cream and frozen yogurt, which should be held for service between 6° F and 10° F.
- Refrigerators and freezers should not be overloaded – some air circulation is important in order for the units to maintain temperature.
- There must be at least one thermometer inside every storage unit and it should be placed in the warmest part of the unit and where it can be read. These thermometers must be accurate to within +/- 3° F.
- Refrigerators and freezers should have their temperatures checked and recorded regularly.
- Refrigerated food must be stored at or below 41° F, except for eggs which can be held at 45° F, and must be used within seven (7) days of receipt, unless there is a different expiration date on the food’s label.
- Vacuum packed foods should meet manufacturers’ standards for temperature and shelf life.
- Shellfish must be stored at or below 41° F and shellstock tags must remain with the food while in storage and kept on file for 90 days after the last piece is served (date used should be noted on the tag).
- Dry storage spaces should be kept between 50° F and 70° F with a relative humidity of 50% or less. Direct sunlight should be kept out of the storeroom as it can raise the temperature of some products and ultraviolet light can destroy nutrients in food in glass or clear plastic containers.
- Foods may be stored in their original packaging or container, in stainless steel containers, or in food grade plastic containers. Tight fitting lids are strongly recommended. Non-food containers may not be used for the storage of food.

- Raw meat products must be stored on shelves below cooked or ready to eat (RTE) food to prevent possible cross contamination. (A general rule is: the higher the temperature the food will be cooked to, the lower it should be stored in the refrigerator.)
- All food items should be labeled and dated and rotated using FIFO.
- Any food not in its original container must be labeled with the common name of the food. It is recommended that it also have a produced on or use-by date.
- ALL RTE or TCS foods must be labeled with the product name and a discard date if they will be held more than 24 hours.
- Where items are packaged for on-site retail sale there are a number of additional labeling requirements:
  - □ The common name of the food must be on the package.
  - □ The quantity of food must be indicated.
  - □ The ingredients must be listed in order of descending weight starting with the item that there is the most of.
  - □ The use of any artificial colors, flavorings, or chemical preservatives must be listed.
  - □ The label must list the name and place of business of the manufacturer, packer, or distributor.
  - □ If the product contains any of the major allergens, they must be listed.
- All items must be stored at least 6" (12" in Connecticut) off the floor to allow for cleaning under the shelves. (New Federal codes require that the bottom shelf of all storage units be solid to prevent water and other spilled items from splashing up onto the bottom of packages.)
- Dirty linen may not be stored in food storage areas.
- Chemicals should never be stored in food storage areas or above food contact surfaces.

## PROPER FOOD HANDLING PRACTICES

Food Safety and Food Quality will be enhanced in any operation by following these proper food handling practices:

- Know how busy you expect to be and prepare your food based upon that forecast. (It is better to "run out" of food than to "throw out" excess.
- Limit trips into the walk-in and the opening of reach-in doors.
- Take out of refrigeration only the food you are going to work on immediately and take out only as much as you can prepare or work within a short period of time.

- Plan your preparation to handle raw produce before getting out meat, poultry or fish.
- Prepare one thing at a time, clean up, and move on to the next item – "clean as you go, or don't go".
- When preparing a single item over an extended period of time or using a piece of equipment for a long period of time, take a cleaning break every four (4) hours where you wash, rinse, and sanitize all surfaces and tools.
- Finish one batch of a product before getting out another one and don't mix batches.
- Hold foods at the proper temperature – "hot food hot, cold food cold".
- Rotate your stock and use all stock within its shelf life (7 days including the date the product was made, or less, for potentially hazardous foods you've prepared).
- When in doubt, "throw it out".
- Frozen foods should be thawed in the refrigerator or under cool (less than 70° F), running water. If frozen foods are thawed in a microwave they must be fully cooked *immediately* after thawing. Frozen foods may be thawed as part of the cooking process.
- Turkeys weighing 20 pounds or more should not be stuffed, rather the turkey and stuffing should be cooked separately.
- ALL fruits and vegetables should be washed in potable (safe to drink) water before being prepared or served even if the packaging indicates that the produce has already been washed. There are treatments that are approved by the FDA to "sanitize" produce. These include use of a commercial or on-premise created produce sanitizer or the use of ozone gas that is introduced into the water that will be used to wash produce. Note: some jurisdictions do not allow the use of these techniques, so prior to using them, check with your local health department.
- Ice must be made from potable water and must be handled with clean, sanitized, properly stored scoops.
- Ice that has come in contact with the outside of food containers cannot be used for human consumption.

Cooking Foods:

- ✓ Vegetables or fruit to be held hot for service must be cooked to an internal temperature of 135° F and then held at or above 135° F until service.

- ✓ Commercially prepared ready-to-eat food that will be held and served hot (pre-cooked appetizers, entrees, etc.) must be cooked to an internal temperature of 135° F for 15 seconds.
- ✓ Eggs cooked for immediate service must be cooked to an internal temperature of 145° F for 15 seconds. (If the eggs will be held for service they must be cooked to an internal temperature of 155° F for 15 seconds.)
- ✓ Whole muscle Beef, Fish, Lamb, and Pork* must be cooked to an internal temperature of 145° F for 15 seconds.

* Years ago pork was often contaminated with a parasite called *Trichinella spiralis* that caused an illness known as *Trichinosis*. This parasite and its eggs are resistant to high temperatures, so pork had to be cooked well-done (165° F) to make it safe. As a result of changes in Federal regulations related to the commercial production of pork this parasite has been eliminated from the US food supply and domestically raised pork only has to be cooked to the same temperatures as beef, fish, and lamb. This may create a conflict between a younger culinary staff who has been taught this, and customers who have become accustomed to more well-done pork. This conflict needs to be addressed by company policy and staff training. Wild boar must be cooked to 165° F.

- ✓ Ground, or mechanically tenderized or injected, Beef, Fish, Lamb, Pork, Ratites (emu and ostrich) must be cooked to an internal temperature of 155° F for 15 seconds.
- ✓ Poultry, Stuffed Items, Baked Pasta, and Reheated items must be cooked to an internal temperature of 165° F for 15 seconds.
- ✓ Items cooked in a microwave must be cooked to an internal temperature of 165° F, stirred or rotated halfway through the cooking process, and held for 2 minutes in the kitchen before being served to the guest. The temperature of the food should be taken in two places.
- ✓ Where food is partially cooked and then held cold until ordered and the cooking is completed there are some special considerations:
  - □ Do not cook the food for more than 60 minutes in the initial cooking.
  - □ Cool the food immediately after cooking.
  - □ Hold the food refrigerated or frozen after cooking.
  - □ Cook the food to an internal temperature of 165° F before serving it.
  - □ Understand that the local health department may impose other restrictions

[In many jurisdictions, food cooked to a guest's specification may be cooked to lower internal temperatures provided that the guest is not a member of a "high risk population" and if the proper warnings about food borne illnesses are provided to the guest by being printed on the menu. Foods traditionally served cooked to lower temperatures (i.e.: "rare" roast beef) may be cooked to a lower than specified temperature although they may require use of warnings such as those noted above or by labeling them as "rare".]

## Holding Foods for Use or Service:

- Eggs may be broken and pooled for use provided that a clean, sanitized container is used for each batch of eggs and that the pooled eggs will be held at or below 41° F until used.
- Where eggs will not be fully cooked, consideration should be given to the use of in-the-shell-pasteurized eggs. A similar consideration should be given to using these products when serving high-risk populations.
- All produce must be washed in potable water slightly warmer than the temperature of the produce and then held at or below 41° F. Special attention should be held to leafy greens where the structure of the greens can trap dirt and microorganisms. Consideration should be given to using chemicals or procedures that will reduce the presence of microorganisms on these products.
- Cold foods must be held at or below 41° F.
- Hot foods must be held at or above 135° F (140° F in Massachusetts). Under Federal Code, foods served cold (salads, etc.) are considered to be time-temperature abused if they have been in the "Danger Zone" for six or more hours, or if their temperature has exceeded 70°F. Foods held hot for service are considered to be time-temperature abused if they have been in the "Danger Zone" for four or more hours. (Massachusetts and Connecticut make no distinction and considers all foods that have been in the "Danger Zone" four or more hours to be time-temperature abused.) **Time-temperature abused foods must be discarded.**
- TCS foods being held for service without temperature control must have the time the food was set out and the discard time noted on the food container.
- Foods being set out for display or service must be protected from contamination by breath guards, covers, being wrapped, etc.
- Foods being held on a hot line must have their temperatures taken at least every four hours. Foods being held on a cold line or a salad bar must have their temperature taken every six hours. It is, however, recommended that temperatures be taken every two hours as this allows corrective action if necessary. Hot food whose temperature has fallen to below 135° F must be reheated to 165° F within two (2) hours.

[In Massachusetts one may, with prior approval of the local health department, use time as a food safety procedure. Food may be held for a maximum of four hours at 'room temperature' provided it is consumed, discarded or reheated to 165° F at the end of the four hours. The starting temperature and time of the food concerned must be known precisely, not guessed at.]

Cooling Foods for Storage or Re-use:

Improper cooling of foods that are cooked and then cooled for later service constitutes one of the leading causes of food borne illness. This is because

bacterial spores are often heat resistant and slow cooling produces ideal conditions for their regeneration and growth. Proper cooling also reduces the chance of the cooked food becoming re-contaminated from other sources. The *only* allowable method of cooling food uses what is called the "Two Step Method". This method requires that food be cooled from 135° F to 70°F or less within two (2) hours and from 70°F to 41°F or below in an additional four (4) hours for a total cooling time of no more than six (6) hours.

Putting large amounts of hot food in a walk-in or reach-in refrigerator could raise the temperature of the refrigerator above 41°F resulting in a situation where much of the food in the refrigerator could support rapid bacterial growth. This could result in a large amount of 'spoiled' food and many cases of food borne illness. Therefore, the code prohibits putting hot food (above 70° F) in refrigerators.

Putting large containers of hot food in a freezer may result in the formation of an ice crust on the surface of the food. Ice is an excellent insulator and this crust will keep the internal temperature high. Hot food should only be placed in a freezer if it is in shallow layers less than 2" thick and only if there are no other options for rapid cooling.

Factors that affect the rate of cooling include: temperature difference between the product and the surrounding environment, viscosity of food (thin liquids cool faster than thick sauces), depth of product, surface area, rate of fluid (usually air) movement around product, and venting of steam.

Procedures that will help food cool quickly include:

- ✓ Using shallow, preferably metal, pans for holding food during cooling.
- ✓ Using multiple containers to increase surface area, which hastens cooling.
- ✓ Allowing the steam to come off the food product by *not* coving pots with tight-fitting lids and by *not* wrapping foods lightly in aluminum foil or with plastic wrap.
- ✓ Placing the pan in an ice bath (a larger container partially filled with ice and water) ***and*** stirring the food every 15 minutes. Remember that the stirring process must move food from the center of the container to the edges and from the top to the bottom so that the food comes in contact with the coldest portions of the container!
- ✓ Placing a "ice paddle" or "ice bullet" in the food.
- ✓ Using a "blast" or "deep" chiller.

- ✓ Eliminating some of the water from the recipe and adding ice later (one gallon of water weighs 8 pounds 5.6 oz.) – one pound of ice will cool one pound of hot food 100° F in 30 minutes.
- ✓ Pre-chilling items such as the cans of tuna and the mayonnaise that will be used to make tuna salad.

Other good cooling practices include:

- Placing cooling food high up in the refrigerator so that other products don't drip or fall into it and contaminate it.
- Loosely "tenting" the cooling food with aluminum foil to allow the steam to escape and covering it tightly once it has cooled.
- Labeling all foods being held with a "use by" date.
- Storing all foods using FIFO.

Foods that are not cooled to below 70° F in less than two (2) hours must be reheated to 165° F in two (2) hours or less and then properly cooled.

Reheating Foods:
Foods that are reheated and served immediately may be reheated to any temperature. As an example, cooked roast beef that will be used for a French dip can be reheated to take the chill off it but the meat does not have to reach a specific temperature.

Commercially prepared and packaged RTE food must be reheated to 135°F (57° C). Examples of this would be pre-cooked cheese sticks, soup, pre-prepared entrees, etc.

All foods that are prepared within the operation, reheated and held for service must be heated to an internal temperature of 165° F in two (2) hours or less. This can be accomplished by:

- Reheating in small batches.
- Stirring the food frequently to equalize temperature.
- Reheating using cooking equipment such as a stove, steamer, or microwave oven.

THE FINAL TEMPERATURE MUST BE VERIFIED WITH A CALIBRATED, CLEANED, SANITIZED THERMOMETER!

Food can be cooled and reheated as many times as desired, provided that it is done properly. This is because proper cooling and reheating "resets" the clock on how long the food can be held. Having said this, it should be noted that each time food is reheated and cooled the food passes through the "Danger Zone" at least twice, which can result in the food becoming contaminated. Also, the repeated cooling and heating will result in a loss of food quality and nutrition, so multiple cycles of cooling and reheating should be avoided on the basis of maintaining food quality.

[Your customers may not be aware of safe food handling practices relative to food that they take home with them. You may want to provide labels or information instructing them about proper refrigeration and re-heating of leftovers or home replacement meals. Additional information on this is given in the handout section.]

## Serving Food Safely

Just as you can no longer count on your staff knowing what is considered good personal hygiene, you can no longer count on your staff to know how to handle food, utensils, and serviceware. The following represent good food safety practices that need to be taught to employees and, where appropriate, guests:

- Minimize bare hand contact with ready-to-eat foods – use utensils, disposable deli or patty paper, or gloves.
- When using gloves make sure that they are changed frequently and that the hands are washed whenever gloves are changed.
- Handle cups and mugs by their handles and do not stack cups and saucers on top of each other as the bottom of the saucer might be contaminated, which would contaminate the rim of the cup. (While the actual likelihood of this resulting in a food borne illness is small, it is an unacceptable practice.)
- Make sure that staff touches only the bottom third of glasses and handles forks, knives, and spoons only by their handles.
- Handle plates by the rim only, avoiding hand contact with those parts of the plate that may come in contact with food.
- Have enough serving implements so that each item has its own serving piece, this will help prevent cross contact issues with allergens.
- Store utensils in the food with the handles above the level of the food and clean and sanitize, or replace them, at least every four (4) hours.
- Scoops for mashed potatoes and ice cream can be held in running water provided the temperature of the water is 135° F or higher.
- Where tables are pre-set with flatware or dishes, these items must be protected from contamination by being wrapped or covered unless a) all excess serviceware is removed when guests are seated, or b) all serviceware

whether used or not is removed and washed as part of the process of clearing and resetting the table.
- Train staff and customers on buffet etiquette: using a fresh plate for each trip to the buffet, no reusing of plates for repeat trips, use the serving utensil for only one item, no sampling or eating while at the buffet, etc.
- All items on a self-service buffet must be labeled.
- Discard all food products that were exposed to possible contamination by guests other than those that are in completely sealed containers (i.e.: wrapped butters, jellies, etc.). [In healthcare settings, hospitals, nursing homes, etc. all food sent out of the kitchen and not consumed by patients or residents must be destroyed.]

Off-Site Food Service

Where food is prepared in one location and shipped to an off-site location for service the following food safety practices are now required:

- Food must be shipped in insulated, spill-proof, food-grade containers that are designed and maintained so that the food cannot mix or spill.
- If raw foods and cooked foods are both shipped in the same vehicles they must be in separate packages.
- Delivery vehicles must be clean and in good repair. (Some jurisdictions require that these vehicles have mechanical refrigeration or heating units.)
- The temperature of the food must be checked upon delivery and food that does not meet standards must be discarded.
- Foods must be labeled with the use-by date and time as well as reheating and service instructions.
- The site where the food is served should have proper utility connections – safe water for cooking, cleaning, and hand washing; and proper trash containers.

Vending Machines

Food in vending machines must be properly labeled and wrapped. All items should be checked every day for use-by date as should the temperature of the units.

## FOOD SAFETY SYSTEMS

It is no longer enough to be trained in food safety yourself. You must make sure that you train your staff and monitor their activities and actions. This is referred to as "Active Managerial Control" and in the 7th Edition (published in 2017) of

ServSafe® Manager it replaces HACCP. Active Managerial Control is less difficult and less expensive to implement than HACCP. It will be discussed first as this is what will be asked about on the ServSafe® certification exam. A discussion of HACCP is also included because certain food processors are required to have HACCP programs.

As part of any food safety and quality program it will be necessary to have Standard Operating Procedures or SOPs that all employees are trained in and that all follow. Typical standard operating procedures would include such things as procedures for checking deliveries, including taking the temperatures of potentially hazardous foods, storage and rotation policies, cleaning and sanitizing procedures, etc. In each case it will probably be necessary to have some sort of log or recording sheet to document that the SOPs are being followed.

## ACTIVE MANAGERIAL CONTROL

There are six steps to an Active Managerial Control program and all must be in place and used for the program to be effective.

1. Identification of Risks – in order to control a risk, it must first be identified. Identify those foods that are most likely to cause food borne illness, eliminate those that can be eliminated, and identify those that you can control. The controls must be stated explicitly on recipes and reminder cards and include such things as cooking and holding temperatures and times, etc.

2. Monitor – identify those activities or actions where monitoring can improve safety. Actions that might be monitored are time and temperature of food being received, held, cooked, cooled, etc., sanitation concentrations, etc. Define and implement monitoring procedures and schedules.

3. Corrective Action – establish the corrective actions that must be taken where the results of monitoring does not meet the desired standards – that is when it requires corrective action.

4. Managerial Oversight – managers must commit to making sure that all employees follow all policies, procedures, and corrective actions. Included in this are entries in logs and other forms to document that staff is following all established procedures.

5. Training – train all staff in all relevant procedures and retrain as necessary.

6. Re-evaluation – it is necessary to re-evaluate all aspects of the program when menu, equipment, or staff changes, when new risks are identified, or when the procedures do not seem to be working to keep food safe.

## HACCP

All food processors that ship foods interstate or use ROP, *sous vide*, or MAP packaging must have HACCP programs. Operations producing and/or serving unpasteurized juices must have a HACCP program. HACCP has been proven to be very effective in food processing operations and many national restaurant chains have started to adopt HACCP procedures as a way of improving both food safety and food quality. All public school food service operations must have HACCP programs. HACCP can be an effective training tool and helps management work more effectively by assigning responsibility for performance to specific employees. One major drawback to HACCP is the cost to implement the program – it is estimated to cost in excess of $25,000 - $30,000 per operation.

HACCP is not a "one-time, flavor of the month" task. It is an on-going program which will take some time to implement, but afterwards will save both time and money. HACCP programs need to be developed by a "team" of employees and it may be necessary to hire an outside consultant to help in the initial phase of the planning and implementation of the program. There are seven steps in developing, implementing, and maintaining a HACCP program and all of them have to be followed and in place to have an effective program. Even with an effective HACCP program it is still possible to experience a food borne illness outbreak. As a prerequisite to a HACCP program an operation will need to have in place standard operating procedures.

The seven steps in implementing a HACCP program are:

1. An analysis of food safety hazards.
2. An identification of critical control points in the flow of each food item (or group of similar food items) as they move through the operation.
3. The establishment of critical limits (temperatures, holding times, sanitizer concentrations, etc.) to control the safety of food and sanitation at the Critical Control Point(s) (CCP(s)).
4. A program of *monitoring* the critical limits at the critical control point(s) to make sure that the food and facilities are safe and sanitary.
5. Training the staff to take corrective actions on their own in the event that a critical limit is not met.

6. Management verification that the staff is following the SOPs and properly monitoring the critical limits and a periodic review that verifies that the procedures established are still in place and valid.
7. A record keeping system (logs) that documents that the critical limits are being routinely verified and met and that proper corrective actions are followed when a critical limit is not met. (An example of two types of logs can be found in the appendix of this booklet.)

HACCP programs are most workable and effective when they are customized to the particular hazards, foods, and business patterns of an operation. It is not possible to simply buy a computer program that prints out a HACCP program for a business. In order to get employees to follow and use the program it will be necessary to train them on using the system and to get them involved in the planning and implementation of such a program.

Comment:
You will note that the biggest difference between Active Managerial Control and HACCP is that Active Managerial Control combines the first three steps of HACCP into a single step and that it is imposed upon the staff by management, not created by the employees. This saves time and make sense in certain operations, but requires much more management input and time and may be difficult to get certain employee groups to abide by. In the discussion in the 7th Edition text, there is no discussion of how Managerial Oversight is implemented and documented. It can be argued that the order of the steps might be altered to provide training as part of the Monitoring and Corrective Action steps and include how to fill out logs.

[Most food safety codes do not presently require that foodservice operations have HACCP programs, but they do require managers to be familiar with HACCP principles. In some communities, residential facilities catering to high-risk populations (daycare facilities, nursing homes, retirement centers, etc.) are required to have HACCP programs. Also establishments that have had "issues" with food safety may be required to implement HACCP programs.]

## CRISIS MANAGEMENT

One of the unfortunate facts of today's mass media is that if there is a suspected or actual incident (such as a food borne illness) at a foodservice establishment, it is likely to get rapid and widespread media attention. Such attention is generally very bad for business and how a business responds to this situation may determine whether or not it remains in business. The National Restaurant Association

recommends that each operation develop a crisis management team and plan before an incident occurs. The plan should cover dealing with public, press, employees, and future of the business in the event of such crisis as fire, food borne illness outbreak, robbery, weather-related disaster, etc. It is recommended that *only* the General Manager or a legal representative be allowed to talk to the media and that all employees be informed, and reminded, of this in advance of any crisis.

You should be aware that your current business insurance may not cover you for expenses related to the costs of a food borne illness outbreak – lost revenues, training costs, cleaning expenses, public relations, etc. Some insurance agencies are now providing specialized insurance, called "Outbreak Insurance", that covers these costs and you may want to consider asking your insurance agent about this type of coverage.

## BUILDING ISSUES

Many details must be observed when building or renovating a foodservice establishment. The complexity of the requirements is such that it is always a good idea to meet with the local health department and other regulatory agencies (ADA compliance, Building Inspector, Fire Marshall, etc.) to discuss your ideas and plans *before* you finalize plans or sign a contract to purchase or renovate a building. In most cases the health department and other inspectors will be required to approve plans before you can obtain a permit to start construction and there may be regulations that require substantially greater investment than you had planned.

[Note: there is no "grandfather" clause related to health or fire codes and inspectors have the right to insist that each and every operation be brought into compliance with current health and fire codes! Often inspectors will allow an existing operator to operate without meeting all codes, but will require a new owner to meet updated codes.]

In most cases only equipment and utensils specifically designed and approved for use in commercial foodservice operations can be used in commercial kitchens. These items have been designed to withstand the use and abuse that occurs in commercial operations. In many cases these items are required to be tested and approved by various testing agencies such as Underwriter's Laboratories (UL), Environmental and Public Health (UL EPH), National Sanitation Foundation (NSF or NSF International) or the American National Standards Institute (ANSI).

One of the major issues in foodservice areas is the proper selection of surface finishes and sub-surfaces. Due to the high level of use and abuse that these

surfaces are subject to, it is important to select those that will withstand the use and abuse that they are likely to experience. It is important that the surfaces are easy to clean and can stand up to the harsh cleaning chemicals used. Surfaces should be non-porous, smooth, and impervious to commercial cleaning chemicals. Floors should meet the same criteria and should be non-slip. In most cases residential grade finishes (and appliances) are not acceptable in commercial operations. The joint between the floor and wall needs to finished in such a way that food waste cannot build up here. This is often done by installing cove base or "coving" which results in a curved joint rather than a sharp one, making it easier to clean. Similarly, all tables and shelving need to have curved edges rather than 90° angles for easier cleaning. Adequate lighting must be provided to allow for cleaning and inspection of food contact surfaces such as after dishes come out of the dishwasher and light fixtures must have "explosion" shields on them to prevent shattered glass from contaminating food.

Each and every year there are numerous food borne illnesses spread through contaminated water. Included in the list of water borne pathogens are viruses such as hepatitis A and Norovirus as well as parasites such as *Giardia duodenalis*. It is important to make sure that the water used in a foodservice operation comes from a safe source such as a municipal water supply or well that is tested (at least once a year) for water purity and safety. It is important to appreciate that even water from these sources may be contaminated and can result in food borne illness outbreaks, but the likelihood is much less than if the water is from a source of unknown quality and safety. Water that has been tested and found safe for human consumption is referred to as "potable". All water used in a foodservice establishment must be potable with the possible exception of water used in an automatic fire protection system.

Once the water is known to be safe at the source it is important to make sure that the water stays safe. Health and plumbing codes regulate the way that water supply systems and waste removal systems are installed in buildings. Typically, drain lines from food preparation sinks, ice machines, salad bars, etc. must not be directly connected to the waste water system. There must be an indirect drain with an air gap (vertical separation of 1-1½" between the bottom of the outlet pipe from the piece of equipment and the top of the pipe leading to the sewer) so that if there were to be a sewage back-up it would flow out onto the floor rather than into the food service equipment, potentially contaminating food contact surfaces or the foods themselves. There must also be a similar air gap between the bottom of a faucet and the upper rim of the sink, also called the "flood rim" of sinks.

Where flexible hoses are used, such as on dishwashers and ice machines or with pressure washers for cleaning the floors, vacuum breakers must be installed so that hoses cannot siphon contaminated or waste water back into the water supply system. Such a situation would be called a "cross-connection" and could result in the contamination of the potable water supply pipes which would in turn contaminate the water flowing through them.

It is also important to know what happens to the wastewater that leaves your equipment and building. Most food service operations need to have grease interrupters (a.k.a. "grease traps") installed between sinks and dishwashers and drains to prevent grease from entering the sewers. High levels of grease in sewers can result in damage to sewer lines and wastewater treatment plants as well as increased costs of operating the wastewater treatment plants. Improper installation of grease traps and failure to properly clean and service them can result in slow draining sinks, wastewater back-ups, and cross contamination of surfaces. The problem can be so severe as to result in legislative action: many states, including Connecticut have mandated that all food service operations have external, underground grease interceptors that are routinely serviced by outside companies. Installation costs for these systems can run into the tens of thousands of dollars. The Town of Longmeadow, MA has mandated installation of either external grease traps or internal, automatic, self-cleaning units.

Where a private water source (well) is used, state regulations will mandate the frequency of testing for contaminants. Federal requirements indicate that the water must be tested at least once a year, although most state regulations require more frequent testing.

Options for providing potable water in situations where there is a disruption in the water supply (such as a water main break) include: boiling water, using commercially bottled water, or contracting with a certified and licensed trucking company that can bring in tanker trucks of potable water.

## PEST CONTROL

The first line of defense against a pest (insect or rodent) infestation is to keep them out of the building. This can be done by making sure that the physical facility is maintained in good shape with self-closing doors, screens on the windows, and that all openings are properly sealed or protected. The next step is to inspect deliveries and to reject those that show signs of pest activity such as box corners being

chewed on by rodents or corrugations in the cardboard being blocked, which could be a sign or the presence of insect nests or egg cases.

The second line of defense against insect and rodent infestation is good sanitation. Since these are living creatures that need food, denying them food will prevent their populations from growing. Similarly keeping foodservice areas dry and minimizing pests' access to water will reduce their numbers. Food storage areas should be kept cool ($50^{o}$ F to $70^{o}$ F). Cool temperatures retard the chemical breakdown of foods reducing the odors that attract pests in the first place and improving the taste and maintaining the nutritional qualities of foods. Furthermore, certain insect eggs may not develop at these lower temperatures, thus reducing the frequency of reproduction.

Most insects and rodents spend the majority of the daylight hours hiding. They come out to forage when it is dark. Keeping a few fluorescent lights on overnight may reduce their foraging and help starve them out. The cost of leaving a few lights on is this is much less than the cost of extermination services.

Only those individuals who have successfully passed pesticide application licensing examinations may apply pesticides in food handling areas. The use of sprays or baits is always the last resort and should be done in conjunction with correcting the problem that led to the infestation in the first place because once the chemical wears off, the pests will return if the situation is not corrected. A good PCO will provide "consulting" services that will explain the source of the infestation and how to correct the situation. Prior to spraying pesticides, all food must be removed from the area and all dishes, plates, and similar food contact surfaces must be covered. Food contact surfaces such as tabletops and counters must be thoroughly washed after pesticide application and before reuse.

The use of insect zappers is prohibited in food handling areas or within 50 feet of a food handling area unless separated by a self-closing door or screened window. This is because the insects are blown apart by the electrical energy of the zapper and their body parts have been known to travel for distances up to 50 feet. There are now ultra-violet insect traps that attract insects using special wavelengths of light. The insects fly towards the light and are trapped on an adhesive strip. These units, which can be quite attractive, may be used in food handling areas.

## CLEANING and SANITIZING

Cleaning and sanitizing are not the same process nor do they have the same results: Cleaning removes visible dirt and soil from surfaces; Sanitizing reduces the number of harmful microorganisms (the things you can't see) to safe levels. Cleaning must always occur before sanitizing because most sanitization processes are not effective when there is organic matter, such as food waste, present. The effectiveness of chemical sanitizers (chlorine, iodine, and quaternary ammonium compounds ("Quats")) is greatly reduced by the presence of even small amounts of soap residues, so it is important to thoroughly rinse cleaned surfaces before attempting to sanitize them. The effectiveness of chemical sanitizers (and many cleaning products) is impacted by the "hardness" (amount of minerals dissolved in the water) with "harder water requiring higher levels of sanitizers.

All surfaces in a foodservice establishment should be kept clean while all food surfaces must be cleaned and sanitized.

To be effective, sanitizing should follow a five-step process:

1. Remove as much dirt and soil as possible by scraping or sweeping – this makes the next step more effective and results in the use of less soap.
2. Wash in hot ($\geq$110° F) soapy water (if there are no visible soap suds there is not enough soap).
3. Rinse in clean hot ($\geq 110^{o}$ F), clear water (in sinks it is important to periodically change the rinse water).
4. Sanitize using a chemical sanitizer mixed according to the manufacturer's instructions and checked for concentration using the correct test kit. There are different test kits for the different sanitizers and each sanitizer has a recommended temperature range. Excessively hard water may reduce the effectiveness of chemical sanitizers. (It is possible to use very hot 171° F water to sanitize, but this is not recommended as water at this temperature can cause scald injuries in less than 1 second.)
5. Allow to air dry completely before moving or using. Store clean items upside down if at all possible as this minimizes the likelihood of food contact surfaced being contaminated.

This process is used with either a three-compartment sink or a dishwasher (also called a "warewasher" or dishmachine). When using a dishwasher, one must check the temperature of the wash and rinse water as well as to make sure that there is enough soap available to the automatic dispenser. Please note that when using heat to sanitize in a dishwasher, there is a maximum allowable temperature (194° F) as well as minimum temperatures for rinse water. In smaller dishwashers were racks are put into the machine, doors closed, and a cycle run (known as

"stationary rack" machines), the final rinse temperature must reach at least 165° F. In larger capacity dishwashers where racks are moved through the machine by a conveyor (known as "conveyorized" machines) the final rinse temperature must be at least 180° F. Water that is too hot will evaporate off the surface of plates and other service ware before it has enough time to kill microorganisms. Many people make the mistake of not scraping the plates, thinking the machine will take care of this task. Not only could excessive food waste end up getting "baked on" to the surface of a plate, but this results in increased use of soap. Overloading the dishmachine will result in some surfaces not being touched by wash and rinse water, so the dishes will have to be re-washed taking up extra time and using additional energy, soap, and chemicals. The following table provides guidance on the concentration of common sanitizers (others are coming on to the market).

Table of Common Sanitizer Concentrations

| | | |
|---|---|---|
| Chlorine | 50-99 ppm | 7 seconds |
| Iodine | 12.5-25 ppm | 30 seconds |
| Quats | 150-450 ppm | 30 seconds |

You should always check the label and follow manufacturer's directions.

When an item cannot be cleaned in a three-compartment sink and must be cleaned in place, the same procedure listed above should be used. If the item being cleaned is powered by electricity the item should be unplugged before cleaning. Any parts of the equipment that can safely be removed and washed in the three-compartment sink or dishwasher should be cleaned this way and the remaining parts of the equipment should be cleaned in place. After all items have been washed, rinsed, sanitized, and allowed to air dry they should be reassembled. At that point any part that has been touched in the process should be re-sanitized using spray sanitizer.

Tables and similar items are best sanitized after washing and rinsing by applying sanitizer from a spray bottle. Again, note that the surface must be free of dirt and soap residue and the sanitizer must dry on the surface to be effective. If you are using chlorine or iodine as an immersion sanitizer (i.e.: in the three-compartment sink) and want to use them as spray sanitizers it is recommended that you double the concentration (measured in parts per million or ppm) as these chemicals evaporate very quickly and may not last long enough on the surface to effectively sanitize it. For this reason, many sanitarians and health agents recommend the use of quaternary ammonia compounds (a.k.a. "quats") which are used at the same concentration for both immersion and spray sanitation. In some jurisdictions it is illegal to use chlorine-based sanitizers in food service operations probably because

if they come in contact with ammonia-based compounds the two may react and give off toxic or explosive gasses. Any chlorine products used as sanitizers must be approved by the FDA as indicated by a registration number on the label. In addition, it may be that the product must also have an EPA registration.

## CODES and INSPECTIONS

The federal government publishes a recommended set of guidelines for designing and operating safe foodservice establishments. This document is known as "The Food Code" and, as noted in the definitions, this is revised every four years based upon new information and "best practices" for food safety. One reason for re-certification requirements is to be kept informed of changing codes and requirements. States and even municipalities may have regulations that are more strict than those in the Food Code.

The Food Code recommends that each establishment be inspected *at least* twice a year although in some jurisdictions inspections are done quarterly or even monthly. Please remember that the health agent or inspector's job is to protect the public health by making sure that minimum standards of food sanitation are being followed. Maintain a professional relationship with your inspector by participating in the inspection process, asking questions for clarification where appropriate, and responding honestly to questions from your inspector in a professional manner.

Please note that there are no "grandfather" clauses in Health and Fire/Life Safety Codes. Your health agent is totally within the law to require that your operation meet all current codes. More and more localities are requiring that there be at least one food safety trained individual on duty at all times and one Massachusetts city requires all cooks to be certified. (At least four states presently require some sort of personal hygiene and food safety training for all employees.)

Operations that fail their health inspection must follow the directions of local health officials with respect to staying open or reopening. In some cases it may be possible to remain open while you correct the deficiencies. Typically, there will be a requirement that the deficiencies be corrected within a specified time period and there will have to be a re-inspection of the business and an acceptable score must be obtained. IF the operation is closed because of failing an inspection or as a result of a food borne illness, it will be necessary to make the corrections and pass a re-inspection prior to re-opening.

There are typically three levels of violations:

- ❖ Red Code Items – these are situations that are not likely to cause a food borne illness, but indicate that the operation is not being run in a clean and sanitary manner. Things such as dirty walls and floors are red code items. These items need to be corrected, but don't necessarily count towards closing.
- ❖ Critical Items – these are situations that are likely to cause a food borne illness and if an operation has more than four they are subject to being closed. Most operations will have one or two of these each inspection. Often there are work arounds that are allowed, such as icing down food if a refrigerator isn't operating properly – but the refrigerator will need to be repaired.
- ❖ Imminent Risks – these are situations that place the health of diners at risk. If there is one imminent risk the operation is closed and cannot reopen until the situation is corrected and the operation is re-inspected. If you have an imminent risk, you are required to close voluntarily, arrange to get it corrected, and schedule a re-inspection.

[Note: Operations that are closed by the Health Department because of health code violations or a food borne outbreak typically experience a decrease in business volume of 30% for three years.]

It is advisable to conduct your own inspections between health department inspections. This can be done by copying the inspection forms and using them to inspect your operation. You should be as honest and as critical as the health inspector would be and make sure that any discrepancies found are addressed immediately.

## Some Final Thoughts

- ✓ Food safety does not *cost* you money, it <u>saves</u> you money by protecting your guests, your staff, your business, and your reputation.
- ✓ Safe food is generally of a higher quality than unsafe food – it is more attractive to look at, tastes better, has better nutritional qualities, and <u>brings guests back to your business</u> (or reduces complaints from captive populations).
- ✓ Food safety requires a commitment from the top to the bottom. It is ABSOLUTELY essential that you pass on the information provided in this booklet and received from any other source to <u>all</u> your employees. Otherwise, it is likely that additional regulations requiring that additional employees be trained will be instituted.
- ✓ **PLEASE NOTE:** The information presented in this booklet conforms, to the best of our knowledge, with the FDA Food Code and is in line with the

ServSafe® Examination Materials. There are differences between this material and some other codes, such as State Food Codes, State Plumbing Codes, etc. In addition, local regulatory authorities may have their own codes or their own interpretation of a code. If you run into this situation in your business, do what the person who is signing your inspection form tells you to do. It's not worth arguing.

## Study Guide

PLEASE TAKE THE TIME TO READ AND STUDY BECAUSE CERTIFICATION CANDIDATES SOMETIMES FAIL THE EXAM. IF ENGLISH IS NOT YOUR NATIVE LANGUAGE OR IF YOU WORK IN AN OPERATION WITH A LIMITED RANGE OF FOODS YOU MAY WANT TO TAKE SOME EXTRA TIME STUDYING THE MATERIAL TO BECOME MORE FAMILIAR WITH TERMS OR PRODUCTS YOU DON'T USUALLY WORK WITH. WE HAVE SOME SIMPLIFIED MATERIALS IN OTHER LANGUAGES – CALL FOR MORE INFORMATION.

THE EXAMS COME SEALED, WE DO NOT KNOW WHAT WILL BE ON THE EXAM, AND DO NOT TEACH TO THE EXAM. WE COVER WHAT WE THINK YOU NEED TO KNOW TO KEEP FOOD AND YOUR CUSTOMERS SAFE.

The date, time, and location of your program is listed on a separate sheet with directions to the site of your program. We will start promptly at the time listed. We will have a five-to-six hour program, including the Massachusetts Food Allergen Certification. We will attempt to answer any questions you have, but understand that this is for educational, not operational consulting, purposes. An *answer sheet and pencil will be provided at the session.* ***Please bring a photo ID with you to the program.***

We will review everything in ServSafe in each program. We also try to cover the changes that the FDA has made to the Food Code, which is updated every four years. The most recent significant changes to the Food Code are:

- Increased stress on allergen awareness.
- A new requirement to protect from deliberate contamination called A.L.E.R.T.
- Redefining the FEDERAL DANGER ZONE as 41º F to 135º F.
- Development of a class of foods called TCS that need to have their time/temperature controlled – includes all PHF foods plus other foods such as pre-packaged produce.
- Requiring hands to be washed when changing gloves.
- Requiring employees diagnosed with: Hepatitis A, Norovirus, Salmonella typhi, Shigellosis, Enterohemorrhagic colitis to be excluded from work and reported to the health department.

If you have any questions about the material presented here or about the ServSafe® Certification Examination, please feel free to call us at:

(617) 938-8668

Monday through Friday between the hours of 8:00 AM and 6:00 PM.

## RECENT CHANGES IN MASSACHUSETTS

Temperatures – now conform to FDA Food Code – cold food at or below 41° F, hot food at or above 135° F (5° C and 57° C, respectively).

Inspection Reports – all food service operations must now post in plainly visible language that the most recent food safety inspection report is available upon request.

Diarrhea and Vomit Clean-up Procedures – all food service operations must have a written diarrhea and vomit clean-up procedures. A model program is included in the supplemental information.

Time/Temperature Control for Safety (TCS) – this term replaces Potentially Hazardous Foods (PHFs) and includes cut tomatoes and leafy greens such as cut, shredded, chopped, or torn lettuce, but not herbs such as cilantro and parsley. All cold TCS foods, including cut or peeled fruit and melons, must be held at or below 41° F.

Date Marking and Disposal of Foods – All TCS food held more than 24 hours must be clearly marked with the date by which the food must be sold, consumed, or discarded.

Time only as a Public Health Control (TPHC) – variances are no longer needed for hold food without temperature control, although written control plans must be prepared in advance and approved by the local board of health. Plans must be available for review upon request and the food must be marked with the time (and temperature) when removed from temperature control. Federal guideline for time and temperatures apply.

**MEMORIZE THE FOLLOWING:**

- Cold foods must be held at or below 41° F.
- Hot foods must be held at or above 135° F.
- Whole muscle meats (beef, fish, lamb, pork, shellfish) must be cooked to a temperature of 145° F for 15 seconds.
- Ground meats, pin-tenderized, and flavor injected meats must be cooked to a temperature of 155° F for 15 seconds.
- Poultry, stuffed products, baked pasta, reheated items and foods cooked in a microwave oven must be cooked to a temperature of 165° F for 15 seconds.
- Eggs for immediate service need to be cooked to 145° F for 15 seconds, those held on a buffet must be cooked to 155° F for 15 seconds.
- Items that are commercially prepared outside your facility (i.e.: cooked, frozen items) must be reheated to a temperature of 135° F for 15 seconds.
- Eggs, milk, and live shellfish may be received 45° F, with milk and shellfish being cooled to 41° F or below within four hours, all other TCS foods must be received at/below 41° F.
- Items that you prepare that are TCS foods may be kept for seven (7) days including the day they are made on if they are kept at or below 41° F.
- If you mix two products made on different days, the seven days starts with the oldest product.
- Microwaved foods must be: cooked to 165° F; rotated halfway through the cooking process; and held in the kitchen 2 minutes before serving to guests.

## TESTING HINTS

The certification is a 90-question, multiple-choice exam, passing score is 75% correct. Please remember the following:

- Select the "best" answer – the one that makes food the safest without destroying its quality.
- There will be only one "best" answer for each question.
- If any part of the answer is incorrect, the entire answer is incorrect.
- If it seems that there are three good answers, you have probably misread the question and the exam is looking for the "incorrect" or "wrong" practice – so reread the question.
- Use the process of elimination and eliminate answers you know are wrong.
- Skip a question if you are unsure of the answer as a later question will trigger your memory and you will be able to get the correct answer.
- Use common sense and don't be surprised that there is a lot of repetition.
- Don't look for answer patterns or be surprised if you find one (I.e.: a string of the same letter answers in a row).
- Don't panic.
- "Follow manufacturer's directions" is usually the "best" answer.
- Answer every question even if you have to guess.
- PUT THE ANSWERS ON THE ANSWER SHEET!