Food Handler Training Study Notes

You must study and learn the contents of these study notes before attending the training session to maximize your efforts to pass the exam on the first try.

Failure to pass the exam will result in additional $75 to retake the exam!

Introduction: Foodborne illness is a disease that is carried or transmitted by food. An outbreak is defined as foodborne illness that involves 2 or more people.

Any kind of food can cause a foodborne illness. Generally high-protein foods, commonly referred to as to **potentially hazardous foods) cause** foodborne illness.

A is for AIDS

AIDS is not a foodborne illness. A HIV positive person can and should work in food service industry. AIDS is NOT transmitted by personal contact.

B is for Biological Hazards

There are three types of food hazards: (1) biological, (2) chemical and (3) physical. Biological hazards include harmful bacteria, virus, parasites, fungi (molds & yeast), natural toxins, and spores. Spores may survive some cooking temperatures, and freezing.

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Bacteria waste is unaffected by cooking and can cause a person to become ill. Bacteria can be classified as pathogenic when it contains live microorganisms, or as toxigenic when the food contains bacteria waste. Pathogenic is defined as “capable of causing disease”. Toxigenic is defined as “producing toxins”.

Viruses are microorganisms that need a living host to grow. Parasites need to live on or inside a host. Trichinella spiralis parasite contaminates pork and game meats. The parasite Anisakis is transmitted from eating raw or under-cooked fish.

Spores, a thick walled protective structure that is resistant to heat, cold and some chemicals. Bacteria covered spores, cannot be killed by cooking, freezing or drying. They can survive these conditions to cause a foodborne illness. Examples include bacillus cereus, botulism and clostridium perfringen.

Conditions which bleed bacteria - **F.A.T. T.O.M.**
F for Food (high protein potentially hazardous food)
A for Acidity (most bacteria need a pH of > 4.6 to grow
T for Time (usually 4 hours)
T for Temperature (danger zone between 40 degrees F to 140 degrees F)
O for Oxygen (i.e. botulism needs no oxygen to grow. Some bacteria can multiply with or without oxygen)

- Aerobic bacteria — Oxygen
- Anaerobic bacteria — NO oxygen
- Facultative — With or without oxygen

M for **M**oisture (bacteria **need water** activity of at least 0.85)

C1 is for Cleaning & Sanitizing

All surfaces coming into contact with food i.e. plates, pots, tables, utensils, trays, and potato peelers must be washed, rinsed, clean and sanitize food contact surfaces after every use, or after 4 hours of continuous use. We recommend continuous cleaning.

Cleaning process includes scraping, sort, pre-rinse, wash, rinse, sanitize and air dry.

C2 is for Cooking & Cooling

Recommended temperatures are minimum temperatures that must be reached for at least 15 seconds for items on cooking chart.

The internal cooking temperatures should be checked in several places in roasts and other large foods.

Cooked foods should be chilled to 40 degrees F, RAPIDLY. The thickness or distance to center of food mass has greatest influence on cooling rate.

To cool, reduce the mass. Cut large roasts into smaller pieces. Use ice water baths (stir frequently). Cooling paddles are also effective in cooling hot foods. Chill foods in shallow pans **no more than four inches deep. The** product depth should be **no more than two inches** on the top shelf of the refrigerator. DO NOT STACK PANS!

Summary of cooling method: separate into small batches using an ice paddle in an ice bath.

Rapidly reheat previously cooked foods, such as beef stew that has been refrigerated, to a minimum of 165 degrees F. (190 degrees F in a microwave)

Hot food must be held at 140 degrees F or above—check temperature every 2 hours

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Acceptable ways to thaw food:

- Safest way is refrigeration (< 40 degrees F) i.e. turkey and large foods
- Under potable (drinkable) running water at 70 degrees F or below if food is small enough so that it remains≤40 degrees F, 2 hours or less (California is 75 degrees F).
- In a microwave oven, but only if food will be transferred immediately to be cooked using ovens, etc.
- As part of the cooking process
- NEVER THAW AT ROOM TEMPERATURES

C3 is for Contamination & Hazards

Biological hazards are described above.

Chemical hazards are harmful substances, i.e. naturally occurring in foods, cleaning solutions, sanitizers, metals and excessive amounts of food additives. If food service chemicals are transferred to smaller containers or spray bottles, each new container must be properly stored and labeled with the contents.

Chemicals used require a material Safety Data Sheets (MSDS). The MSDS must have chemical name, physical hazards, health hazards and emergency procedures to be followed in case of exposure. Food additives and preservatives such as sulfites, nitrites and MSG can cause chemical poisoning and allergic reactions.

Physical hazards are foreign particles such as glass, metal particles, fingernails, hair, toothpicks, paint chips and jewelry.

Cross-contamination from raw to cooked foods and ready to eat food. Cross contamination can occur via hands, equipment, surfaces and utensils.

Origins of Contamination:

- Within food living in the animal
- In the food or shell
- Unsafe water supply
- Human and animal feces
- Sponges, dish towels, aprons
- Cutting boards
- Sinks
- Countertops and wooden utensils

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10 Top Hazards

1. Improper cooling and hot holding procedures
2. Prolonged holding of prepared foods & leftovers
3. Poor hygiene habits
4. Keeping food at bacteria incubation temperatures
5. Contaminated raw ingredients
6. Use of food from an unapproved source
7. Improper cleaning of equipment and utensils
8. Cross contamination from raw to cooked
9. Inadequate cooking or reheating food
10. Un-sanitized cloths and sponges

D is for Dairy

Store milk and dairy products at 40 F or below. Do not reuse or refill original containers. Butter and cheeses must be refrigerated.

E is for Equipment

Equipment must have NSF or other safety approvals. Copper, or brass must not be used with food that has a pH below 6.0 (i.e. vinegar, fruit juice, wine, tomato products, pickles, etc.).

Galvanized metal may not be used for food contact surfaces.

Use hard or equally hard, closed grained wood for cutting boards, blocks, baker's table, rolling pins, salad bowls, doughnut dowels, chopsticks, confectionery paddles, etc.

Rubber and rubber like materials must be durable, should not chip, scratch and should survive cleaning and sanitizing under normal use conditions.

Floor mounted equipment maybe sealed to the floor or have at least 6 inches between the floor and bottom of the equipment.

Table mounted equipment must be raised four inches above the table surface for easy cleaning.

F is for Facilities (Food Bars, Flooring, Walls & Ceilings)

Food bars: Reusing plates contributes to increased risk of foodborne illness outbreaks. Hand out fresh clean plates for return visits to food bar to discourage customers from reusing their soiled plates. Proper design of self-service areas should contain sneeze guards/food shields over display counters and salad bars.

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Salad dressings and condiments should be identified. Individual long handled scoops provided. Rotate foods on a frequent basis. Best controls for food bars: monitor for proper temperatures on a regular basis, keep it clean, only allow beverage cups to be reused, check your customers unsanitary behavior.

Flooring should be nonabsorbent or nonporous. No carpeting should be in the food processing areas. Floors should be nonslip surfaces and easy to clean. All foods must be off the floor at least 6 inches off the floor.

Walls and ceilings should be cleanable, smooth and light colored to reveal dirt.

G is for Good Food

Potentially hazardous foods (PHF) include any food that consists in whole or in part of milk, milk products, shell eggs, meats, poultry, fish, shellfish, edible crustacean (shrimp, lobster, crab, etc.) baked or boiled potatoes, tofu or other soy protein foods, plant foods that have been treated with (i.e. beans or rice), sliced melons, unpasteurized juices, raw seed sprouts. Even, pasteurized products can be considered potentially hazardous.

Ready to eat foods are cooked potentially hazardous food, raw, washed, cut and whole fruits and vegetables that are ready to be served to the public without any further cooking.

Quick service operations should implement standardized procedures for food safety. Prepare small batches of foods prepared in advance.

For off site delivery, caterers should implement test control practice to monitor time and temperature during the start of the food preparation, delivery until received on customer's plate. All foods must be prepared at restaurant or approved central kitchen. Central kitchen facilities serving children or elderly customers (high risk category person) are required to implement HACCP program.

Never use homemade or home canned foods.

H is for Humans, Hygiene & Health

Staphylococcal food intoxication: Staphylococcus is most commonly found in the nasal passages, on hands and skin and in cuts, bums, bolls and pimples.

The most important aspect of personal hygiene is frequent and thorough hand washing. Wash your hands for at least 20 seconds. Wash hands often, after touching your hair, face, eyes, nose, and touching anything that is not sanitary.

Hepatitis A is contracted via infected food workers. Employees who are ill with Hepatitis A are highly contagious and should not be serving or preparing food. Hepatitis can be fatal or can make a person extremely ill for months. A person can be a carrier and show no symptoms. A vaccination is the only reliable measure to control Hepatitis A.

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Gloves are not a substitute for proper hand. Change gloves after touching anything that may contaminate them. Wash hands. Keep nails clean and trimmed.

Wounds and open sores must be bandaged. NO EXCEPTIONS. Bandages must be covered with waterproof, and covered with disposable plastic gloves. If necessary, move employee to a non food-handling job until the wound or burn heals.

Clothing should be clean, hair restraints worn, hands should be washed frequently.

Manager's responsibility is to set the example by his or her own behavior and attitudes.

I is for Infection or Intoxication

A foodborne infection is a disease that results from eating food containing living harmful microorganisms.

A foodborne intoxication results when toxins, poisons, waste from bacteria or mold, or chemicals are in food.

Shigellosis: (infection) Humans are the prime reservoir for Shigella. Carriers excrete Shigella in their feces. Is transmitted when employee fails to wash their hands after using the bathroom.

Campylobacter jejuni: (infection) insufficiently cooked meat and poultry, unpasteurized dairy products, and foods that have been cross-contaminated. Infected food sources to animals, chicken and raw milk. Best control: use grade A pasteurized milk and dairy products.

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Norwalk virus: (infection) comes from sewage. Contaminates vegetables, raw shellfish and processed water.

E. Coli 0157:H7 (infection): is found in infected cattle, hamburger, lettuce, bean sprouts and other vegetables. Best control: cook to correct temperature, and check meat upon delivery.

Salmonella spp (infection) is commonly found on chicken. Best control: wash and cook chicken. Don't use cracked or dirty eggs.

Listeria monocytogenes: (infection) found in soil, infected animals. Found in raw milk, cheese and vegetables. Also known as the "deli disease". Best control: keep refrigerators clean, sanitized and dry. Personal hygiene.

Vibro vulnificus: (infection) found in raw oysters, clams, and shellfish. Best control: buy your fish from reputable fish suppliers. Cook thoroughly.

Staphylococcus aureus: (intoxication) is most commonly found in the nasal passages, on hands and skin and in cuts, bums, bolls and pimples. Can be found ham, cold cuts, salads, cream filled pastries, ready-to-eat foods, and milk. Best control: good personal hygiene.

Ciguatoxin: (intoxication) is produced by what the fish eats. Found in barracuda and amberjack.

Scombroxtoxin or histamine poisoning: (intoxication) in mahi-mahi, tuna, mackerel, bluefish and amberjack. Also comes from poor refrigeration.

Bacillus Cereus: (intoxication) found grains, rice, pasta, cereals, potatoes, and vegetables in soil or dust. Spores.

Clostridium botulium: (intoxication). Found in soil, lakes, ocean bottoms, human intestines, fish and animals. Usually comes from canned foods i.e. fish, meat, vegetables, poultry, where oxygen has been processed out. It is anaerobic (occurs without oxygen). Best control: don't use dented cans.

Clostridium perfringens: (infection/intoxication) found in soil, dust, air, sewage human and animal intestines and raw foods. Found in cooked meat, poultry, casseroles, stews, gravies and unwashed vegetables. Best control: properly cook, rapid cooling and washing of vegetables.

J is for Jack & Jill of all Trades - Plumbing

Backflow is caused when there is a sudden drop of pressure in the potable water lines, causing non-potable water to be sucked into the potable water lines. The only completely reliable backflow prevention device is the air gap.

Only potable water (drinking quality) can be used in food production and to clean equipment and utensils.

Only non-potable permissible uses are for air conditioning and fire protection. Plumbing must be according to local codes.

Plumbing must prevent cross connection of potable with non-potable water.

K is for Kid proof

Kid proof your self service food bars

L is for Lights & Labels

There should be bright lighting in the processing area. Do NOT change light bulbs where chips can contaminate food.

Check label for date and time for freshness. Rotate food so the older food is out in front. FIFO stands for first in, first out (FIFO). Use food in the order it was received or prepared.

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M is for Meats

Escherichia coli 0 1 57:H7 (infection/intoxication): raw or **under-cooked ground beef and red meats are main vehicles** of transmission. Cook ground meat thoroughly to a minimum internal temperature of 155 degrees F. E. Coli 0 1-57:H7 kills hundreds of children in the USA each year.

NSF

NSF stands for National Sanitary Foundation. It is an organization that publishes and designs standards for food service equipment. All food equipment should contain the approved NSF seal.

P is for Pest

Integrated Pest Management (IPM) is a system that combines preventive tactics with control measures to reduce pest infestation. The IPM approach corrects sanitary procedures. Seals cracks, and crevices. Pesticides should be a last resort and should only be applied by PCO (Pest Control Operator).

There are three types of sprays, i.e. residual, contact and fogger. Never spray near food. Keep outside areas clean. Prevention is the best policy.

Q is for Questions

When in doubt, apply common sense.

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R is for Rinsing & Sanitizing

Always rinse after cleaning. Sanitary means that a surface is free from harmful levels of microorganisms and contaminants.

Recommended concentration levels for chemical sanitation agents - manual:

Hot water:	171 F or above for 30 seconds
Chlorine	50 to 100 parts per million (ppm)
Iodine:	12.5 to 25 ppm
Quaternary Ammonium (quats) compound:	200-220 ppm or per manufacturer's instructions.

(Also see changes below under Study Note Alerts. Learn both. Will explain changes in class.)

Use test kits or test strips to make sure that the concentration of chemical sanitizers are correct.

Hot water sanitizing by machine - The temperature of the water for final rinse must be at least 180 degrees F but no higher than 195 degrees F.

Steps for manual immersion washing in sinks:

1. Clean and sanitize sinks and work surfaces before each use
2. Scrape and presoak
3. Wash in first sink using clean detergent solution at 120 degrees F
4. Rinse in second sink using clear potable water at 120 degrees F. All food and detergent must be removed.
5. Sanitize in third sink by immersing items in a chemical sanitizing solution according to manufacturers instructions
6. Air-dry - DO NOT WIPE DRY.
7. Air-drying is part of sanitizing process.

S is for Storage

Frozen foods	0 degrees F or below
Freezer	-10 degrees F
Dry foods	(ask me) degrees F or less (low humidity)
Raw foods	Store raw foods below cooked foods or foods that receive no further cooking and cover foods to help prevent cross contamination of refrigerated foods.
Refrigerator	36 degrees F or below
Refrigerated foods	40 degrees F or below
Canned foods	Free of dents
Modified atmosphere packaged foods	Vacuum packed or sous vide will not stop the growth of bacteria in food. Check the temperatures of modified atmosphere packaging (MAP) foods by holding thermometer tightly between 2 packages being careful not to puncture or break wrapping. Check manufacturer use date.

T is for Time, Temperature and Thermometers

The temperature danger zone is from 40 degrees F to 140 degrees F. Most rapid growth of bacteria occurs within this range. No more than four hours in the time zone from preparation, cooking and serving.

The single most effective is the thermometer. The most common is the bimetallic thermometer with a stem. It must be numerically scaled, accurate to within +/- 2 degrees F. Use a glass with slush ice, half water, half ice to calibrate. Use the ice point method (32 degrees F +/- 2 degrees). Boiling point method (212 degrees F +/- 2 degrees)

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A bi-metallic-stemmed thermometer with a plastic lens cover should not be left in food during cooking in an oven, microwave or stovetop range. Mercury-filled or other glass thermometers should NEVER be used to measure food temperatures because they can break. Always take the temperature in the thickest part or center of food. The temperature range is from 0 degrees F to 220 degrees F.

HACCP - Hazard Analysis Critical Control Point food safety system

A critical control point (CCP) is an operation—practice, preparation, step or procedure that becomes a preventive or control measure which eliminates, reduces or prevents a biological, chemical or physical food hazard.

There are 7 major principles involved in a HACCP system:

1. Assess and analyze hazards at each step in flow of food and develop procedures that control reasonably likely hazards.
2. Identify Critical Control Points (Caps)
3. Set up control procedures and standards for each CCP.
4. Monitor Caps (i.e. maintain temperature logs).
5. Take corrective actions if there is a break from procedures set up as Caps.
6. Develop and maintain record keeping system that documents the HACCP plan.
7. Verify that HACCP system is working.

LAST MINUTE STUDY NOTES ALERT

The Food Drug Administration (FDA) publishes the model food code that contains recommendations and minimum standards for the food industry. The standards are contained in the Model food Code. In California, the California Uniform Retail Food Facility Law (CURFFL) contains the standards for the state.

Special notes due to recent changes:

All foods containing molded parts should be thrown out.

New 1999 FDA Food Code recommendations for sanitizing in sanitizer solution are:

- Chlorine: 7 seconds at 50 ppm at temperatures between 75 degrees F – 115 degrees F
- Iodine: 30 seconds at 12.5-25 ppm at temperatures 75 degrees F – 120 degrees F
- Quats: 30 seconds at with 200 ppm above 75 degrees F
- Heat: 30 seconds with hot water of at least 170 degrees F for manual sanitizing in a 3 compartment sink.

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California requirements:

- Chlorine: 30 seconds at 100 ppm at temperatures between 75 degrees F – 115 degrees F
- Iodine: 1 minute with iodine of 25 ppm at temperatures 75 degrees F – 120 degrees F
- Quats: 1 minute with 200 ppm quaternary ammonium above 75 degrees F
- Heat: 30 seconds contact with hot water of at least 180 degrees F
- Bleach 1 oz. unscented household beach (5% solution) mixed to 4 gallons of water

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Pronunciation Key

aerobe	AIR-robe
alkaline	ALK-a-lyne
anaerobe	AN-air-robe
Anisakis	ANN-iss-ake-iss
Anisakiasis	ANN-i-say-KY-a-sis
Bacillus cereus	bass-IL-lus-SEER-us
bacterium	Back-teer-ee-um
botulinum	BOTCH-al-line-um
botulism	BOTCH-al-iz-um
Campylobacter	Cam-PEE-low-back-ter
Campylobacteriosis	Cam-PEE-low-BACK-teer-ree-oe-sis
ciguatera	SIG-you-a-tear-a
Clostridium	KLOE-strid-ee-um
coving	KOE-ving
Escherichia coli	ESH-er-ritch-ee-a-KOLE-eye
facultative	fack-ul-tay-tiv
FIFO	Fie-fo (rhymes with "hi-ho")
fungi	FUN-guy
HACCP	HAS-sip
hepatitis	HEP-a-tite-iss
immuno-compromised	IM-you-no-COMM-promized
incubation	IN-cube-bay-shun
jejuni	je-JUNE-ee
Listeria	LIS-teer-ree-a
listeriosis	LIS-teer-ree-oe-sis
meningitis	MEN-in-jite-is
perfringens	per-FRIN-jens
quaternary ammonium	KWAT-er-nare-ee-ah-MOAN-ee-um
reservoir	REZ-i-vor
Salmonella	SAM-on-el-a
Salmonellosis	SAM-on -EL-oe-sis
scombroid	SKOM-broyd
Shigella	shig-EL-la
Shigellosis	shig-EL-low-sis
sous vide	SOO-veed
staph	staff
Staphyloccocal	staff-low-COKE-ul
staphyloccocus aureus	staff-low-COCK-sus-OR-russ
Trichinella spiralis	TRICK-in-el-la-SPEAR-al-iss
trichinosis	TRICK-in-oe-sis
vegetative	VEDGE-a-tay-tiv

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