



UC DAVIS ARBORETUM AND PUBLIC GARDEN

FOOD SAFETY TRAINING AND INFORMATION GUIDE

JULY 2015

INTRODUCTION

The ways in which we think about growing food are constantly being redefined as we strive to use land efficiently while producing enough food to feed our communities. Edible landscaping offers an alternative approach to food production by utilizing everything from our front yards and center medians to rooftops and vacant lots to grow edibles.

A major component of creating a viable community-based edible landscape program is a focus on food safety. Interns, volunteers and participants in this program will not only learn best practices for maintaining a safe food supply, they will also be expected to follow, share and enforce them.

The following guidelines have been produced by the UC Davis Environmental Health and Safety Department and the UC Davis Arboretum and Public Garden for project sites on campus associated with the Arboretum and Public Garden's Edible Landscaping Internship to ensure Good Agricultural Practices (GAP) are met and upheld. Special thanks go to Susan Cummings and Devon Zagory for their invaluable contributions to this guide's development.

TABLE OF CONTENTS

Food Safety Program Requirements Overview	Page 4
Garden Entry Requirements	Page 5
Cleaning and Personal Hygiene Procedures	Page 6
Injury and Illness Procedures	Page 9
Exhibit A – Signage at Edible Garden Entries	Page 10
Exhibit B – Food Safety Training Documentation	Page 11
Exhibit C – Good Agriculture Practices Inspection Form	Page 12
Exhibit D – Cleaning Checklist	Page 13
Food Borne Illness Information	Page 14

FOOD SAFETY PROGRAM REQUIREMENTS OVERVIEW

Once fruits and vegetables have been contaminated with pathogenic bacteria or viruses we have no way to thoroughly decontaminate them other than cooking them. Because so many fruits and vegetables are eaten raw or lightly cooked, prevention of contamination is of the utmost importance. It is required that our Edible Landscape Interns, volunteers and program participants treat every edible landscape project with care and follow these food safety best practices for preventing contamination.

1. All edible garden entries will notify visitors that the area is for food production and that food safety rules must be followed. (See Exhibit A.)
2. Edible Landscaping Interns, in addition to individuals that would like to volunteer in any campus Edible Landscaping Site, must read and comply with the safety training materials presented in this document and provide documentation of its completion (Exhibit B).
3. In order for individuals to participate in outreach activities or events, they must be notified of the same information that visitors receive on the required posting (Exhibit A). This is the responsibility of the Edible Landscaping Intern that manages the site.
4. Edible Landscaping Interns must inspect their sites on a regular basis for verification of compliance with health and safety standards. Interns will complete a GAP inspection (Exhibit C) at the beginning of each academic quarter and keep a copy for the site's records, as well as submit a copy electronically to the Internship Supervisor.
5. All harvesting must be conducted with washable trays or buckets and adhere to the washing and sanitizing harvest guidelines presented in this document. After cleaning, the Cleaning Checklist (See Exhibit D) must be completed. If any fruits or vegetables are dropped on the ground during harvest, they must be discarded.
6. No domestic animals will be allowed in any Edible Landscape Site and actions shall be taken to minimize the intrusion of pests.
7. Compost must not contain manure unless the composting process has been CCOF certified and there is supporting documentation. If no manure has been used in the production of compost, and production methods and standards have been complied with, then it is suitable for use.
8. Any phytosanitary or other products applied to crop plants to prevent disease must be mixed with potable water. Contaminated water used to mix phytosanitary products can contaminate the entire crop being sprayed and therefore must not be used.
9. Before harvesting any fruits or vegetables, a visual inspection must be conducted in the area being harvested.

GARDEN ENTRY REQUIREMENTS

Following these procedures will ensure that all persons entering the work area have taken the necessary precautions to prevent food borne pathogens from contaminating the produce.

1. Only those individuals feeling healthy and well are allowed to enter any Edible Garden Sites.
2. No individual will be allowed to enter an Edible Garden Site if he/she is coughing or sneezing, has an upset stomach, an open and exposed cut or sore on his/her hands, or is otherwise feeling unwell.
3. Anyone entering an Edible Garden Site must be wearing shoes and clothing that are clean.
4. Anyone entering an Edible Garden Site must wash his/her hands thoroughly, following proper hand washing procedures immediately prior to entering.
5. Anyone whose hands become contaminated must leave the Edible Garden Site and comply with steps 1-4 before re-entering.
6. Anyone feeling unwell must leave the work area immediately and not return until he/she can comply with steps 1-4.

CLEANING & PERSONAL HYGIENE PROCEDURES

WASHING AND SANITIZING

Ironically, one of the most common ways to contaminate fruits and vegetables is through washing. If the water used to wash fruits or vegetables becomes contaminated due to a single contaminated fruit or vegetable being put in it, all subsequent fruits/vegetables washed in that water would become contaminated.

Many people believe that washing produce in water or water containing chlorine or other sanitizers can decontaminate it. This is not true. Washing is more likely to contaminate produce than to decontaminate it. Adding chemical sanitizers, such as chlorine bleach, to the water does not decontaminate fruits or vegetables much better than pure water. The real function of the sanitizer is to ensure that, should a pathogen be introduced into the water, pathogens are killed on contact with the chlorine before they can cross contaminate other produce in the water. Because maintaining adequate sanitizer activity in produce wash water at all times can be an operational challenge, a simpler alternative is to limit the reuse of produce wash water.

TRAYS AND BUCKETS

Following these procedures will safeguard the cleanliness of the trays and buckets we use to wash our produce and ensure that they do not act as a source of contamination.

Procedure frequency: Daily or after each use.

Tools and Equipment: Potable water, food grade soap, stiff plastic brush.

Procedure:

1. Rinse trays and buckets with a hose until all loose soil, bits and pieces have been removed.
2. Mix soap in a separate container as directed.
3. Spray on soap.
4. Scrub trays/buckets vigorously with a brush and rinse with potable water.
5. Allow to air dry before storage.
6. Inspect the trays/buckets before every use.

7. Sign the Cleaning Checklist (Exhibit D) and write the time and date.
8. If any trays/buckets do not pass inspection, re-wash and dry completely.

PROPER HAND WASHING

Edible Landscaping Interns, in addition to anyone working in an Edible Garden Site, or handling produce from an Edible Garden Site, must wash their hands using the proper handwashing technique listed below before beginning work, returning to work, after taking breaks, using the restroom, eating, or otherwise compromising the sanitary nature of their hands.

Any restroom facility on campus is clean and properly supplied with single-use towels, hand soap or anti-bacterial soap and potable water for hand washing.

Procedure:

1. Wet hands with clean water (warm is preferred if available), apply soap, and work up a lather.
2. Rub hands together for at least 20 seconds.
3. Clean under the nails and between the fingers.
4. Rub fingertips of each hand in suds on palm of opposite hand.
5. Rinse under clean, running water.
6. Dry hands with a single-use towel.

Side Note:

Current research indicates that proper hand washing with soap and water is the most effective method of removing potential pathogens from the hands. Hand sanitizers may be used in addition to good hand washing, but not as a substitute because soil and dirt on hands may actually decrease their effectiveness. Frequent use of hand sanitizers can also strip the outer layer of oil from hands, leading to cracking and dryness, which can trap germs and bacteria.

PEST MANAGEMENT

Animals, including mammals, birds, reptiles, and insects, are potential sources of contamination in produce environments because they harbor, or could be a vector for, a variety of pathogenic agents, such as Salmonella. In general, pest problems can be minimized by taking precautions such as:

1. Maintain the grounds in good condition.
 - Grounds in the immediate vicinity of all produce growing and handling areas should be kept clear of waste, litter, and improperly stored garbage. Keep grasses cut to discourage the breeding, harboring, and feeding of pests, such as rodents and reptiles.
 - Remove any unnecessary articles, including old/inoperative tools or equipment that is no longer used, to eliminate areas that harbor rodents and insects.
 - Periodically clean the area to remove produce or produce remnants that attract pests in and around the growing and handling areas.
 - Maintain adequate surface drainage to minimize breeding places for pests.
 - Maintain a clear area around the growing area to discourage entry of some rodents and other pests. Open areas that are devoid of cover deter movement of voles and other small animals. A clear strip 1-2 meters across can effectively reduce the entry of those rodents into a field. However, open strips do not deter mice and ground squirrels. They can be deterred by preventing development of potential nesting areas through removal of weeds and piles of vegetation on site.
2. Monitor regularly.
 - Regularly inspect all areas to check for evidence of pest populations or animal contamination. Minimize the availability of food and water to pests.
 - Notify your supervisor immediately for removal of dead or trapped birds, rodents, or other pests to ensure clean and sanitary facilities and to avoid attracting additional pests.
 - As much as practicable, ensure that potential nesting or hiding places for pests have been eliminated.
3. Block access of pests into enclosed facilities.
 - Exclude pests by blocking areas such as holes in walls, doors, flooring, etc., and vents that allow entrance into sheds or storage facilities. Consider the use of screens, wind curtains, and traps.
4. Know how to prevent, identify and properly respond to pre- and post-harvest potential hazards including ducks, squirrels, dogs, rabbits, etc.
 - When trench watering, plant to prevent produce from growing in standing water.
 - Select a watering method that will prevent contamination of produce.
 - Visually inspect area and plants to identify potential problems from chemical (e.g., bait) and physical (glass) hazards to foods and people.
5. Before harvesting any fruits or vegetables, visually inspect the area.
 - Note any evidence of animal intrusion such as including animal tracks, feces or partially eaten plants.
 - If there are animal feces, place a flag on a stake in the ground and do not harvest anything within two feet of the feces.
 - Make a written note of the evidence found and what animal was responsible.
 - For help in identifying animal tracks, visit: <http://www3.ag.purdue.edu/entm/wildlifehotline/pages/TrackID.aspx>
 - For help in identifying animal feces, visit: <http://icwdm.org/Inspection/Scat1.aspx>

LAND USE

Prior and current land use can impact the safety of fruits and vegetables grown on the land.

1. The land should not have previously been used for industrial activities, refuse handling, animal grazing or other activities incompatible with fruit and vegetable production.
2. Activities on adjacent lands can impact the safety of fruits and vegetables. Concentrated animal feeding operations, manure storage, human activities, water runoff or use of chemicals can all impact produce safety.
3. Prior to planting each season perform an onsite evaluation of any activities on adjacent lands that may impact the safety of the planted crops and complete the Good Agriculture Practices Inspection Form (Exhibit C). To the degree possible minimize the identified risks or alter the planting plans to minimize the risks. This may mean, as an example, planting crops whose edible portion does not contact the soil to address a risk of contaminated runoff water entering the field.
4. Identify any sources of risk on the land prior to planting. Piles of vegetation which may attract vermin should be removed. Cleanliness and freedom from weeds will help reduce the attractiveness to animals as well as help to reduce pest pressure from insects and plant diseases.
5. Overhead trees house squirrels and birds which can lead to an increase in droppings. As tree foliage impairs sunlight and negatively affects plant growth, edible items will not be planted beneath the tree limbs.
6. Edible Landscaping Internship garden locations are in non-traditional garden areas including areas located outside academic buildings with dedicated walking paths through and/or between planted areas and in a Housing area with personal gardens. To identify the footprint of the Edible Landscaping Internship garden and to reduce unintended intrusion, providing a system of notification (e.g., visual barrier such as sort wire fence or signage) clarifying the area would work. In areas with personal gardens, clarification that these gardens are not part of the project and the produce belongs to individuals using signs or other methods, are needed.

INJURY & ILLNESS PROCEDURES

FIRST AID

If someone is injured at an Edible Garden Site, a first aid kit will be available for use on location.

1. Any individual working in an Edible Garden Site must be notified of the exact location of the first aid kit.
2. First aid kit supplies must be checked and restocked by an Edible Landscape Intern on a regular basis.
3. Any cut, abrasion, or other injury incurred while working must be treated immediately to preserve the health and well being of the worker and to minimize the risk of contamination to the produce.
4. Edible Landscape Interns must notify their supervisor immediately of any incidents requiring first aid to ensure proper treatment of any cuts, abrasions, or injuries.

ILLNESS

Any individual working in an Edible Landscape Site who becomes ill must notify the internship supervisor immediately and must not handle fresh produce.

1. Any individual working in an Edible Landscape Site must report to the staff supervisor if he/she has any of the following symptoms:
 - Diarrhea
 - Fever
 - Vomiting
 - Jaundice
 - Sore throat
 - Lesions containing pus (including boils or infected wounds, however small) on their hand(s), wrist(s), or any exposed body part
2. Individuals who have mild symptoms but are still healthy enough to work will be allowed to do so providing there is no contact with produce or if he/she will be appropriately covered with adequate bandages or gloves to reduce the risk of contamination.

3. If a job where a worker won't be in contact produce is not available, or it is not possible to adequately reduce the risk of contamination to the produce, or the worker is too sick to work, then he/she must be sent home.
4. If an individual worker is recognized as having any of the conditions listed above, these conditions will be recorded on an Illness/ Injury Report Form.

BLOOD AND BODILY FLUIDS

This procedure must be followed should any blood or other bodily fluid come in contact with the field or the produce.

1. The individual worker who discovers blood or bodily fluid in the field or on the produce must immediately manage the problem.
2. If an individual Edible Garden Site worker is bleeding, either the affected individual or another worker will provide first aid or call 911.
3. If that individual is not able to immediately manage the contamination, that person will mark the area with the materials supplied for this purpose at each Edible Garden Site and immediately notify a supervisor who will then take appropriate action.
4. If there is blood in the field, all contaminated surfaces will be removed to a plastic bag with a shovel or gloved hands and placed in a trash can.
5. All the affected soil must be shoveled and removed, including the area around and under the contamination.
6. All incidences of bleeding must be reported to a supervisor.
7. Any produce exposed to blood or bodily fluids will be destroyed or disposed of properly.
8. Any tools or equipment exposed to blood or bodily fluid must be thoroughly cleaned and sanitized before reuse.

EXHIBIT A

SIGNAGE AT EDIBLE GARDEN ENTRIES



Please respect the health and safety of the people who will be consuming the food grown here:

1. Keep domestic animals out of the garden.

2. Only enter the garden if you are feeling well.

(For example, do not enter if you are coughing or sneezing, have an upset stomach, and/or an exposed sore on your hands, or are otherwise feeling unwell.)

3. Do not handle the plants.

This garden site is part of the UC Davis Arboretum and Public Garden's Edible Landscape Internship student leadership program. If you would like to get involved, please contact Stacey Parker, at sparker@ucdavis.edu.

(530) 752-4880 arboretum.ucdavis.edu

UC DAVIS
ARBORETUM AND
PUBLIC GARDEN

EXHIBIT B

FOOD SAFETY TRAINING DOCUMENTATION

SAFETY TRAINING ATTENDANCE RECORD

Training Topic: **UC Davis Edible Gardens Food Safety Training** Date: _____
(attach a copy of the training session curriculum)

Instructor: _____ Training Aids: • **UC Davis Arboretum and Public Garden Food Safety Training and Information Guide, July 2015**

Location: _____ Time: _____

Attendees – Please print and sign your name legibly. Use additional sheets if necessary.

No.	Print Name	Signature	Date
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
9.	_____	_____	_____
10.	_____	_____	_____
11.	_____	_____	_____
12.	_____	_____	_____
13.	_____	_____	_____
14.	_____	_____	_____
15.	_____	_____	_____
16.	_____	_____	_____
17.	_____	_____	_____
18.	_____	_____	_____
19.	_____	_____	_____
20.	_____	_____	_____
21.	_____	_____	_____
21.	_____	_____	_____
22.	_____	_____	_____
23.	_____	_____	_____
24.	_____	_____	_____
25.	_____	_____	_____

Exhibit B

July 2015

Completed copies of this form should be kept on file by the Garden Manager as well as submitted to Internship Coordinator.

EXHIBIT C

GOOD AGRICULTURE PRACTICES INSPECTION FORM

**UC Davis Arboretum and Public Garden
Good Agricultural Practices Food Safety Inspection Form
UC Davis Edible Gardens**

Garden Name:

Date of Inspection:

Name of Inspector:

Edible Crops Being Grown:

1. Have steps been taken to limit untrained people having free access to the garden?

- a. If yes, are signs posted instructing visitors as to what they may and may not do?

2. Has any compost, compost teas, emulsions, meals or other bio-fertilizer been added to the soil?

- a. Are the composts free of animal wastes or animal products and compliant with the food safety program guidelines?

3. What steps have been taken to reduce habitat for unwanted animals (rodents, cats, dogs, rabbits or birds)?

- a. What kinds of animals have you observed around the farm and with what frequency (rare, infrequent, frequent, common)?
- b. Have thickets of unnecessary vegetation been thinned, raised or removed?
- c. Have piles of vegetative material, such as thinned brush or harvested fruits/vegetables been removed?
- d. Have piles of wood, tools, concrete, plastic, food containers or other materials been cleaned up or removed?
- e. Have any other steps been taken to deter animal ingress or animal residence?
- i. If so, what steps have been taken?
- f. Have any sources of contaminated runoff been eliminated or diverted from the farm?

4. Have individuals authorized to work in the garden been trained in basic food safety practices?

- a. What training has occurred?

- b. Did the training include:

- i. Proper hand washing technique?
- ii. That workers feeling ill or experiencing symptoms of illness are not allowed in the gardens?
- iii. That composts containing animal wastes or animal products are not allowed for use in the gardens?
- iv. That food scraps/food waste or other waste is not being directly added to the garden soil?
- c. Is there written evidence that the training has been completed?

5. Is there an individual with responsibility for food safety training and practices in the garden?

- a. What is the name of that individual?
- b. What is the name of an alternate person in case the primary responsible individual is not available?
- c. What training have those individuals received?
- d. Are those individuals familiar with the UC Davis Arboretum and Public Garden's Food Safety Training and Information?

6. Hygiene Practices

- a. Are restrooms and hand washing facilities available and within a five-minute walk of all workers?
- b. Are proper personal hygiene practices confirmed by observation?
- c. Are all containers used to handle or carry produce food-grade, properly cleaned and in good condition?

7. Plant Protection Compounds

- a. If pesticides are being used are they only applied by a licensed pest control operator?
- b. Are label instructions being followed for all compounds being applied to the plants or soil?

8. Please provide the most recent dates for the following documents required for inspection.

- UC Davis Food Safety Training date: _____
- UC Davis Student Gardens GAP Inspection Form date: _____
- Cleaning Checklist for cleaning harvest and handling containers date: _____

- a. Where are the above documents located and are they available for review?

- b. Who is responsible for documentation maintenance and storage?

FOOD BORNE ILLNESS TRAINING

FOOD BORNE ILLNESS TRAINING

The US Centers for Disease Control and Prevention (CDC) estimates that 48 million Americans get sick from food each year. Pathogenic microorganisms, mainly bacteria or viruses, cause all of these food borne illnesses. Understanding the causes, sources and symptoms of food borne illness is key to minimizing the incidence of illness.

There are seven main food borne illness organisms that are known to be able to contaminate food via infected food handlers. Supervisors should be aware of the symptoms of these food borne illnesses so that they can recognize them in workers. If any food handlers appear to exhibit symptoms of any of these illnesses, they should be sent to the doctor for diagnosis and should, under no circumstances, be allowed to continue to work in contact with food until a negative diagnosis has been returned or the symptoms abate.

SALMONELLA

Associated foods: Raw meats, poultry, eggs, milk and dairy products, fish, shrimp, frog legs, yeast, coconut, sauces and salad dressing, cake mixes, cream-filled desserts and toppings, dried gelatin, peanut butter, cocoa, and chocolate. Outbreaks on melons, tomatoes, alfalfa sprouts, orange juice (probably due to use of manure in field).

Where it comes from: Fecal contamination, contact with infected workers, contaminated water, and manure.

Infectious dose: As few as 15 – 20 cells; depends upon age and health of host and strain differences among the members of the genus. It is estimated that from 2 to 4 million cases of salmonellosis occur in the U.S. annually.

Target Populations: All age groups are susceptible, but symptoms are most severe in the elderly, infants, and the infirm. AIDS patients suffer salmonellosis frequently (estimated 20-fold more

than general population) and suffer from recurrent episodes.

Nature of Disease: Acute symptoms – Nausea, vomiting, abdominal cramps, minimal diarrhea, fever, and headache. Chronic consequences – arthritic symptoms may follow 3 – 4 weeks after onset of acute symptoms. Onset time 6 – 48 hours.

E.COLI

Associated foods: Undercooked or raw hamburger (ground beef) has been implicated in nearly all documented outbreaks and in other sporadic cases. Raw milk was the vehicle in a school outbreak in Canada. Un-pasteurized apple juice. Other meats may contain E. coli O157:H7.

Where it comes from: E. coli is a normal inhabitant of the intestines of all animals, including humans. When aerobic culture methods are used, E. coli is the dominant species found in feces. Normally E. coli serves a useful function in the body by suppressing the growth of harmful bacterial species and by synthesizing appreciable amounts of vitamins. A minority of E. coli strains are capable of causing human illness by several different mechanisms. E. coli serotype O157:H7 is a rare variety of E. coli that produces large quantities of one or more related, potent toxins that cause severe damage to the lining of the intestine. A recent outbreak in apple juice was probably from apples picked up off ground with fecal contamination. Also has been found on melons, iceberg lettuce, red cabbage, leaf lettuce, Mesclun mix, carrots (maybe). Strain (O157:H7) is usually associated with meat. When found on produce it is probably from cross contamination in the kitchen or from manure or animals in the field.

Infectious dose: Unknown, but from a compilation of outbreak data, including the organism's ability to be passed person-to-person in the day-care setting and nursing homes, the dose may be similar to that of Shigella spp. (10 organisms).

Target Populations: All people are believed to be susceptible to hemorrhagic colitis, but larger outbreaks have occurred in institutional settings.

Nature of Disease: The illness is characterized by severe cramping (abdominal pain) and diarrhea, which is initially watery but becomes grossly bloody. Occasionally vomiting occurs. Fever is either low- grade or absent. The illness is usually self-limited and lasts for an average of 8 days. Some individuals exhibit watery diarrhea only.

SHIGELLA

Associated Foods: Salads (potato, tuna, shrimp, macaroni, and chicken), raw vegetables, milk and dairy products, and poultry. Contamination of these foods is usually through the fecal-oral route. Fecally contaminated water and unsanitary handling by food handlers are the most common causes of contamination. Outbreaks on lettuce from contaminated raw materials, probably in the field has been found on scallions, perhaps through use of non-potable water.

How it gets around: Most often through contaminated food handlers or contaminated water.

Infectious dose: As few as 10 cells depending on age and condition of host. The *Shigella* spp. are highly infectious agents that are transmitted by the fecal-oral route.

Relative Frequency of Disease: An estimated 300,000 cases of shigellosis occur annually in the U.S.. The number attributable to food is unknown, but given the low infectious dose, it is probably substantial.

Target Populations: Infants, the elderly, and the infirm are susceptible to the severest symptoms of disease, but all humans are susceptible to some degree. Shigellosis is a very common malady suffered by individuals with acquired immune deficiency syndrome (AIDS) and AIDS-related complex, as well as non-AIDS homosexual men.

Symptoms: Abdominal pain; cramps; diarrhea; fever; vomiting; blood, pus, or mucus in stools. Onset time 12 – 50 hours.

STAPHYLOCOCCUS AUREUS

Associated foods: Foods that are frequently incriminated in staphylococcal food poisoning include meat and meat products; poultry and egg products; salads such as egg, tuna, chicken, potato, and macaroni; bakery products such as cream-filled pastries, cream pies; sandwich fillings; and milk and dairy products.

Foods that require considerable handling during preparation and that are kept at slightly elevated temperatures after preparation are frequently involved in staphylococcal food poisoning.

How it gets around: Staphylococci exist in air, dust, sewage, water, milk, and food or on food equipment, environmental surfaces, humans, and animals. Humans and animals are the primary reservoirs.

Staphylococci are present in the nasal passages and throats and on the hair and skin of 50 percent or more of healthy individuals. This incidence is even higher for those who associate with or who come in contact with sick individuals and hospital environments. Although food handlers are usually the main source of food contamination in food poisoning outbreaks, equipment and environmental surfaces can also be sources of contamination with *S. aureus*. Human intoxication is caused by ingesting enterotoxins produced in food by some strains of *S. aureus*, usually because the food has not been kept hot enough (60C, 140F, or above) or cold enough (7.2C, 45F, or below).

Infectious dose: The disease is caused not by infection by the bacterium but rather by ingestion of a toxin formed by the bacterium in food. A toxin dose of less than 1.0 microgram in contaminated food will produce symptoms of staphylococcal intoxication. This toxin level is reached when *S. aureus* populations exceed 100,000 per gram.

Target population: All people are believed to be susceptible to this type of bacterial intoxication; however, intensity of symptoms may vary.

Symptoms: The onset of symptoms in staphylococcal food poisoning is usually rapid and in many cases acute, depending on individual susceptibility to the toxin, the amount of con-

taminated food eaten, the amount of toxin in the food ingested, and the general health of the victim. The most common symptoms are nausea, vomiting, retching, abdominal cramping, and prostration. Some individuals may not always demonstrate all the symptoms associated with the illness. In more severe cases, headache, muscle cramping, and transient changes in blood pressure and pulse rate may occur. Recovery generally takes two days. However, it is not unusual for complete recovery to take three days and sometimes longer in severe cases.

HEPATITIS A

Associated Foods: HAV is excreted in feces of infected people and can produce clinical disease when susceptible individuals consume contaminated water or foods. Cold cuts and sandwiches, fruits and fruit juices, milk and milk products, vegetables, salads, shellfish, and iced drinks are commonly implicated in outbreaks. Water, shellfish, and salads are the most frequent sources. Contamination of foods by infected workers in food processing plants and restaurants is common.

How it gets around: Contaminated water, sewage, infected food handlers. Hepatitis A has a worldwide distribution occurring in both epidemic and sporadic fashions. About 22,700 cases of hepatitis A representing 38% of all hepatitis cases (5-year average from all routes of transmission) are reported annually in the U.S. In 1988 an estimated 7.3% cases were foodborne or waterborne. HAV is primarily transmitted by person-to-person contact through fecal contamination, but common-source epidemics from contaminated food and water also occur. Poor sanitation and crowding facilitate transmission. Most individuals 18 and older demonstrate an immunity that provides lifelong protection against reinfection. In the U.S., the percentage of adults with immunity increases with age (10% for those 18-19 years of age to 65% for those over 50). The increased number of susceptible individuals allows common source epidemics to evolve rapidly.

Target Population: All people who ingest the virus and are immunologically unprotected are susceptible to infection. Disease however, is more common in adults than in children.

Nature of Disease: Hepatitis A is usually a mild illness characterized by sudden onset of fever, malaise, nausea, anorexia, and abdominal discomfort, followed in several days by jaundice. The infectious dose is unknown but presumably is 10 – 100 virus particles.

NOROVIRUS

Associated Foods: Seafood, especially undercooked clams and oysters, salads.

How It Gets Around: Previously known as Norwalk-like viruses. These viruses are common causes of food and water borne gastrointestinal illness. They move easily through a fecal-oral route and are associated with poor personal hygiene. Norwalk gastroenteritis is transmitted by the fecal-oral route via contaminated water and foods. Secondary person-to-person transmission has been documented. Water is the most common source of outbreaks and may include water from municipal supplies, well, recreational lakes swimming pools, and water stored aboard cruise ships. Shellfish and salad ingredients are the foods most often implicated in Norwalk outbreaks. Ingestion of raw or insufficiently steamed clams and oysters poses a high risk for infection with Norwalk virus. Foods other than shellfish are contaminated by ill food handlers.

Nature of Disease: The disease is self-limiting, mild, and characterized by nausea, vomiting, diarrhea, and abdominal pain. Headache and low-grade fever may occur. The infectious dose is unknown but presumed to be low. A mild and brief illness usually develops 24 – 48 hours after contaminated food or water is consumed and lasts for 24 – 60 hours. Severe illness or hospitalization is very rare.

Shedding of the virus is thought to begin with the beginning of symptoms and may continue for up to two weeks after symptoms recovery. For further information see the attached Technical Fact Sheet from the Centers for Disease Control.

TOXOPLASMA GONDII

What is toxoplasmosis?

A single-celled parasite called *Toxoplasma gondii* causes a disease known as toxoplasmosis. While the parasite is found throughout the world, more than 60 million people in the United States may be infected with the *Toxoplasma* parasite. Of those who are infected, very few have symptoms because a healthy person's immune system usually keeps the parasite from causing illness. However, pregnant women and individuals who have compromised immune systems should be cautious; for them, a *Toxoplasma* infection could cause serious health problems.

How do people get toxoplasmosis?

A *Toxoplasma* infection occurs by:

- Eating undercooked, contaminated meat (especially pork, lamb, and venison).
- Accidental ingestion of undercooked, contaminated meat after handling it and not washing hands thoroughly (*Toxoplasma* cannot be absorbed through intact skin).
- Eating food that was contaminated by knives, utensils, cutting boards and other foods that have had contact with raw, contaminated meat.
- Drinking water contaminated with *Toxoplasma gondii*.
- Accidentally swallowing the parasite through contact with cat feces that contain *Toxoplasma*. This might happen by
 1. cleaning a cat's litter box when the cat has shed *Toxoplasma* in its feces
 2. touching or ingesting anything that has come into contact with cat feces that contain *Toxoplasma*
 3. accidentally ingesting contaminated soil (e.g., not washing hands after gardening or eating unwashed fruits or vegetables from a garden)
- Mother-to-child (congenital) transmission.
- Receiving an infected organ transplant or infected blood via transfusion, though this is rare.

DISCHARGES FROM THE EYES, NOSE, AND MOUTH

Discharges from the eyes, nose, or mouth through persistent sneezing or coughing by food employees can directly contaminate exposed food, equipment, utensils, linens, and single-service and single-use articles. When these poor hygienic practices cannot be controlled, the employee must be assigned to duties that minimize the potential for contaminating food and surrounding surfaces and objects.

Source: U.S. Food & Drug Administration, Center for Food Safety & Applied Nutrition, Foodborne Pathogenic Microorganisms, and Natural Toxins Handbook. Bad Bug Book.
www.fda.gov