

chapter 1

Providing Safe Food

😊 WHAT IS A FOODBORNE ILLNESS?

A foodborne illness is a disease transmitted to people by food.

😊 WHEN IS IT CONSIDERED AN OUTBREAK?

It is considered an outbreak when:

- 2 or more people have the SAME symptoms from eating the SAME food
 - The outbreak has been confirmed by a laboratory analysis (generally doctor or hospital)
 - Your health inspector has investigated your operation
-

WHAT ARE THE CHALLENGES WE FACE DAILY TO KEEP OUR FOOD SAFE?

- Fast operation pace (especially during volume)
 - Short staff
 - Language, culture, literacy, education
 - Global pathogens
 - Unapproved suppliers
 - GROWING NUMBER of high risk customers
 - Staff turnover and less than optimal training
-

Over 50 % of all American meals are now eaten outside the home or purchased as a prepared item to be eaten at home

WHAT ARE THE COSTS TO COMPANY? HOW ABOUT YOU?

- Loss of customers
- Loss of reputation
- Social media spreads quickly
- Lawsuits
- Insurance premiums
- Staff missing work
- Staff retraining
- Long term disability, even DEATH

Over 50% of all food we now purchase for our food service operations is now provided by suppliers OUTSIDE of this country



HOW FOODBORNE ILLNESSES OCCUR

😊 **CONTAMINATION:** The presence of harmful substances in food

CONTAMINANTS

😊 **3 Categories:**

- Biological
- Chemical
- Physical

Biological:

- Viruses
- Bacteria
- Parasites
- Fungi



Chemical

- Cleaners
- Sanitizers
- Polishes



Physical

- Metal
- Plastic
- Bandages
- Glass
- Dirt



Consider using COLORED bandages that stand out in food products.

How Food Becomes Unsafe

The FDA has identified the 5 most common ways food becomes unsafe in our operation:

1. **Purchasing** food from unsafe sources
2. Failing to **cook** food to proper temperatures
3. **Holding** food at incorrect temperatures
4. Using contaminated **equipment**
5. Poor personal hygiene of **staff**

THESE 5 ARE KNOWN AS THE
5 CDC RISK FACTORS



😊 What is Time and Temperature Abuse?

- Food staying too long at temperatures where pathogens grow quickly
- Food being stored at incorrect temperature
- Food not cooked or reheated to high enough temperatures
- Food not cooled correctly

😊 What is Cross-contamination?

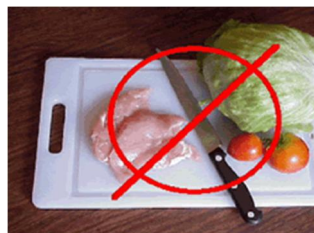
- When contaminants are transferred from one food service surface to another
- When contaminants are transferred from a food surface to food
- When contaminants are transferred from one food to another
- When our staff transfers contaminants to food from food, equipment or their body

😊 What is the most common forms of Poor Personal Hygiene?

- Infrequent hand-washing
- Coughing or sneezing on food
- Dirty uniforms
- Bad personal habits, such as touching body parts and then food
- Staff working when sick

😊 What constitutes poor Cleaning and Sanitizing?

- Equipment and utensils not washed, rinsed and sanitized between uses
- Food contact surfaces not being washed, rinsed and sanitized between uses
- Not using wiping cloths stored in a sanitizer solution
- Not using sanitizers at proper levels of dilution



Food Most Likely to Become Unsafe: TCS Food

Pathogens grow well in the food pictured below. It needs time and temperature control to limit this growth. For this reason, this food is called TCS food—food requiring time and temperature control for safety.



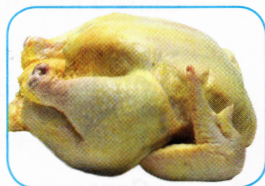
- Milk and dairy products



- Shell eggs (except those treated to eliminate nontyphoidal *Salmonella*)



- Meat: beef, pork, and lamb



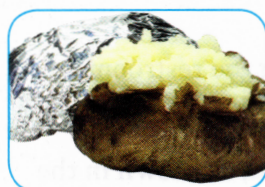
- Poultry



- Fish



- Shellfish and crustaceans



- Baked potatoes



- Heat-treated plant food, such as cooked rice, beans, and vegetables



- Tofu or other soy protein
- Synthetic ingredients, such as textured soy protein in meat alternatives



- Sprouts and sprout seeds



- Sliced melons
- Cut tomatoes
- Cut leafy greens



- Untreated garlic-and-oil mixtures

Uncooked rice can contain spores of *Bacillus cereus*, a bacterium that can cause food poisoning. When the rice is cooked, the spores can survive. If the rice is left standing at room temperature, the spores can grow into bacteria.

Like TCS food, ready-to-eat food also needs careful handling to prevent contamination. Ready-to-eat food is exactly what it sounds like: food that can be eaten without further preparation, washing, or cooking. Ready-to-eat food includes cooked food, washed fruit and vegetables (whole and cut), and deli meat. Bakery items and sugar, spices, and seasonings are also included.

WHAT IS TCS FOOD

The FDA has established guidelines for foods that need time/temperature control for safety (TCS).

The following foods are those that are most likely to become unsafe :



Milk, Dairy and Eggs



Meat and Poultry



Fish and Shellfish



Cooked Vegetables, Rice
and Baked Potatoes



Soy and Tofu Products



Sprouts and
Sprout Seeds



Garlic in Oil



Cut Greens,
Tomatoes and
Melons

Populations at High Risk for Foodborne Illnesses

Certain groups of people have a higher risk of getting a foodborne illness.

ServSafe refers to this group as HIGH RISK groups. The FDA and other organizations can refer to these as: HIGHLY SUSCEPTIBLE POPULATIONS (HSP)

Recognize these as the same group

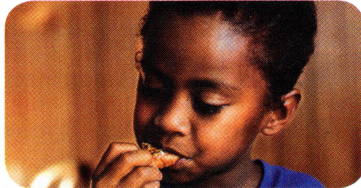
Elderly people

People's immune systems weaken with age. The immune system is the body's defense against illness.



Preschool-age children

Very young children have not built up strong immune systems.



People with compromised immune systems

- People with cancer or on chemotherapy
- People with HIV/AIDS
- Transplant recipients
- People taking certain medications



The acid in our digestive system helps destroy microorganisms. People with acid reflux have less acid. Conversely, people who take Ant-acids are more susceptible to a foodborne illness.

Apply Your Knowledge

What's the Cause?

Write an **X** next to the 5 most common causes of foodborne illness.

- | | |
|---|--|
| ① _____ Purchasing food from unsafe sources | ⑤ _____ Using contaminated equipment |
| ② _____ Allowing pests to enter the operation | ⑥ _____ Holding food at incorrect temperatures |
| ③ _____ Failing to cook food correctly | ⑦ _____ Practicing poor personal hygiene |
| ④ _____ Failing to rotate food during storage | ⑧ _____ Failing to store dry food correctly |

Which Is It?

Write an **X** next to the food that needs time and temperature control to keep it safe.

- | | |
|---------------------------|------------------------|
| ① _____ Chopped lettuce | ④ _____ Flour |
| ② _____ Sliced watermelon | ⑤ _____ Cooked carrots |
| ③ _____ Dry rice | ⑥ _____ Cheese |

For answers, please turn to page 1.13.

KEEPING FOOD SAFE

Focus on these areas:

- Control Time and Temperature
- Prevent Cross-Contamination
- Practice Person Hygiene
- Purchase from Approved, Reputable Suppliers
- Wash, Rinse, Sanitize

COMPLIANCE:
conforming to or
obeying food safety
rules and regulations

Training:

- It's NOT enough to know food safety, you must teach it
- Train your staff when they are first hired
- Keep food safety training ongoing
- Document food training

Government Agencies Responsible for Safe Food

☺ The Food and Drug Administration (**FDA**) Inspects all food except meat, poultry and eggs. They also write the suggested food code.

☺ The US Department of Agriculture (**USDA**) inspects meat, poultry and eggs

The Center for Disease Control and Prevention (**CDC**) and the US Public health Service (**PHS**) do investigation, research and tracking

The State of Ohio writes the LAWS based on FDA recommendations.

Your city or county inspectors do this:

- Inspect your operation
- Enforce State Laws
- Investigate illnesses and complaints
- Issue licenses and permits
- Approve construction
- Grant variances and examine HACCP plans



OTHER GOVT, ACRONYMS TO
BE FAMILIAR WITH:

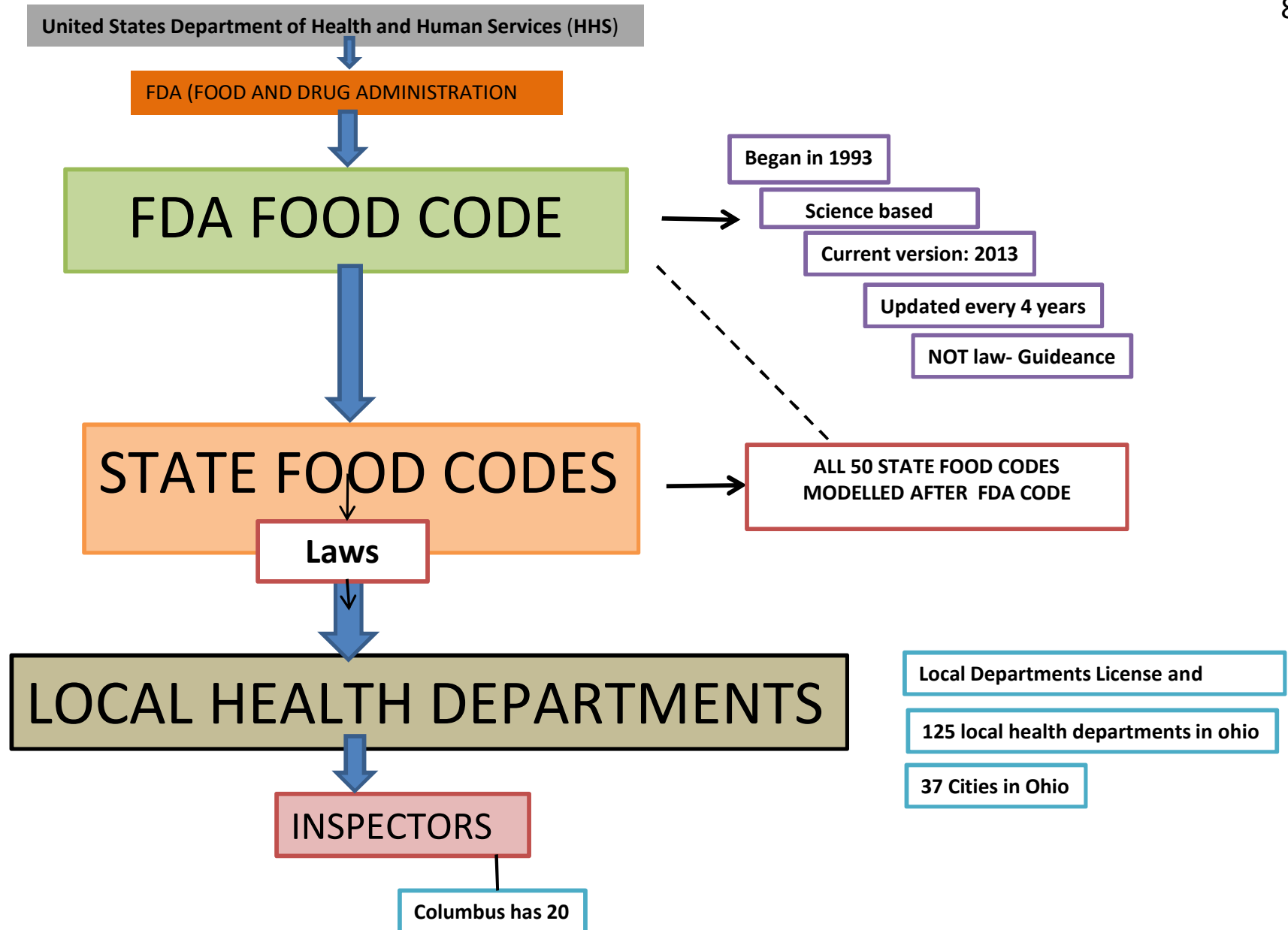
CFP: Conference for Food
Protection (Input to FDA Food Code)

FSMA: Food Safety Modernization
Act (2011 Reform of Food Safety
Laws)

FSIS: Food Safety and Inspection
Service (USDA Agency responsible
for safe meat, poultry and eggs)

The FDA regulates food that
crosses state lines, and foods
grown or manufactured
involving more than 1 state. FDA regulates all

*Restaurants *Retail Stores *Schools and Day Care *Hospitals and Nursing



Study Questions

Circle the best answer to each question.

- ① **Why are preschool-age children at a higher risk for foodborne illnesses?**
 - A They have not built up strong immune systems.
 - B They are more likely to spend time in a hospital.
 - C They are more likely to suffer allergic reactions.
 - D Their appetites have increased since birth.
- ② **Which is a TCS food?**
 - A Bread
 - B Flour
 - C Sprouts
 - D Strawberries
- ③ **The 5 common mistakes that can lead to foodborne illness are failing to cook food adequately, holding food at incorrect temperatures, using contaminated equipment, practicing poor personal hygiene, and**
 - A reheating leftover food.
 - B serving ready-to-eat food.
 - C using single-use, disposable gloves.
 - D purchasing food from unsafe sources.
- ④ **What is an important measure for preventing foodborne illness?**
 - A Serving locally grown food
 - B Using new equipment
 - C Measuring pathogens
 - D Controlling time and temperature
- ⑤ **Raw chicken breasts are left out at room temperature on a prep table. What is the risk that could cause a foodborne illness?**
 - A Cross-contamination
 - B Poor cleaning and sanitizing
 - C Poor personal hygiene
 - D Time-temperature abuse
- ⑥ **A server cleans a dining table with a wiping cloth and then puts the cloth in an apron pocket. What is the risk that could cause a foodborne illness?**
 - A Cross-contamination
 - B Poor cleaning and sanitizing
 - C Poor personal hygiene
 - D Time-temperature abuse

For answers, please turn to page 1.13.

Chapter 2

Forms of Contamination

Biological, Chemical and Physical Contaminants

DEFINITIONS:

☺ **CONTAMINATION:** The presence of harmful substances in food

☺ **MICROORGANISMS:** Small, living organisms that can only be seen with microscope

☺ **PATHOGENS:** Harmful microorganisms

☺ **TOXINS:** Poison produced by bacteria, either secreted by them or left as they die

SPORES: Genetic material left by a dead bacteria. Will come back to life under right conditions.

☺ **READY-TO-EAT FOOD:** Food that will be served without any further preparation or cooking

FECAL-ORAL ROUTE: The main way people pass contaminants on to food

Biological Contamination:

4 types of biological contamination:

- BACTERIAL
- VIRUS
- PARASITE
- FUNGI

The Big 6:

1. *Shigella* spp.
2. *Salmonella* Typhi
3. Nontyphoidal *Salmonella*
4. Shiga toxin-producing *Escherichia coli* (*E. coli*)
5. Hepatitis A
6. Norovirus

Foodborne Infection: Bacteria grow inside us and make us sick

Foodborne Intoxication: We eat toxins that bacteria have left behind and get sick

Toxin-Mediated Infection: Bacteria produce toxins inside us and we get sick

Symptoms of Foodborne Illness

- Diarrhea
- Vomiting
- Fever
- Nausea
- Abdominal Cramps
- Jaundice

Onset times vary from 30 minutes to six weeks

The Big 6 have 3 things in common: (1) Even a low dosage will make you sick, (2) they contaminate the gastro-intestinal area and (3) they are shed in human feces by high numbers

Organism	Common Name of Illness	Onset Time After Ingesting	Signs & Symptoms	Duration
<i>Clostridium botulinum</i>	Botulism	12-72 hours	Vomiting, diarrhea, blurred vision, double vision, difficulty in swallowing, muscle weakness	Variable
<i>Clostridium perfringens</i>	Perfringens food poisoning	8–16 hours	Intense abdominal cramps, diarrhea	Usually 24 hrs
<i>Cryptosporidium</i>	Intestinal cryptosporidiosis	2-10 days	Diarrhea (usually watery), stomach cramps, upset stomach, slight fever	Can Relapse
<i>Cyclospora cayetanensis</i>	Cyclosporiasis	1-14 days, usually at least 1 week	Diarrhea (usually watery), loss of appetite, substantial loss of weight, stomach cramps, nausea, vomiting, fatigue	Can Relapse
<i>E. coli</i> (<i>Escherichia coli</i>)	<i>E. coli</i> infection	1-3 days	Watery diarrhea, abdominal cramps, some vomiting	3-7 + days
<i>E. coli</i> O157:H7	Hemorrhagic colitis	1-8 days	Severe (often bloody) diarrhea, abdominal pain and vomiting	5-10 days
Hepatitis A	Hepatitis	28 days average (15-50 days)	Diarrhea, dark urine, jaundice, fever, headache, nausea, and abdominal pain	Variable, 2 weeks-3 months
<i>Listeria monocytogenes</i>	Listeriosis	9-48 hrs gastro-intestinal symptoms, 2-6 weeks for invasive	Fever, muscle aches, and nausea or diarrhea.	Variable
Noroviruses	Variously called viral gastroenteritis, food poisoning, and food infection	12-48 hrs	Nausea, vomiting, abdominal cramping, diarrhea, fever, headache.	12-60 hrs
<i>Salmonella</i>	Salmonellosis	6-48 hours	Diarrhea, fever, abdominal cramps, vomiting	4-7 days
<i>Shigella</i>	Shigellosis or Bacillary dysentery	4-7 days	Abdominal cramps, fever, and diarrhea. Stools may contain blood and mucus	24-48 hrs
<i>Staphylococcus aureus</i>	Staphylococcal food poisoning	1-6 hours	Sudden onset of severe nausea and vomiting. Abdominal cramps. Diarrhea and fever may be present	24-48 hours
<i>Vibrio parahaemolyticus</i>	<i>V. parahaemolyticus</i> infection	4-96 hours	Watery (occasionally bloody) diarrhea, abdominal cramps, nausea, vomiting, fever	2-5 days
<i>Vibrio vulnificus</i>	<i>V. vulnificus</i> infection	1-7 days	Vomiting, diarrhea, abdominal pain, bloodborne infection. Fever, bleeding within the skin, ulcers requiring surgical removal	2-8 days

Some other bacteria facts:

Bacteria are larger than viruses but still can't be seen, smelled or tasted

Bacteria grow by DIVIDING IN 2

Bacteria divides approx every 20 minutes

They become DORMANT when frozen or freeze dried, but will come back to life at temperature danger zone

Bacteria

Bacteria that cause foodborne illness have some basic characteristics.

Location Bacteria can be found almost everywhere. They live in and on our bodies. Some types of bacteria keep us healthy, while others cause illness.

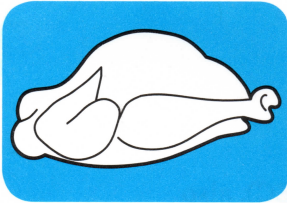
Detection Bacteria cannot be seen, smelled, or tasted.

Growth If FAT TOM conditions are correct, bacteria will grow in rapid numbers.

Prevention The most important way to prevent bacteria from causing a foodborne illness is to control time and temperature.

What Bacteria Need to Grow

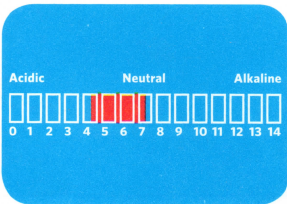
Bacteria need six conditions to grow. You can remember these conditions by thinking of the words FAT TOM.



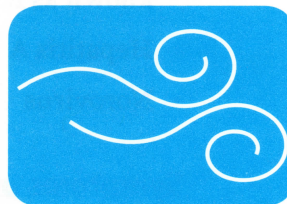
Food Most bacteria need nutrients to survive. TCS food supports the growth of bacteria better than other types of food.



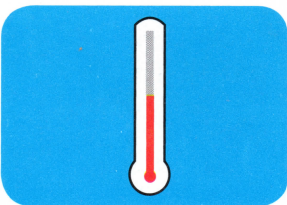
Time Bacteria need time to grow. The more time bacteria spend in the temperature danger zone, the more opportunity they have to grow to unsafe levels.



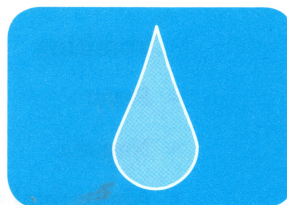
Acidity Bacteria grow best in food that contains little or no acid. pH is the measure of acidity. The pH scale ranges from 0 to 14.0. A value of 0 is highly acidic, while a value of 14 is highly alkaline. A pH of 7 is neutral. Bacteria grows best in food that is neutral to slightly acidic.



Oxygen Some bacteria need oxygen to grow. Others grow when oxygen is not there.



Temperature Bacteria grow rapidly between 41°F and 135°F (5°C and 57°C). This range is known as the temperature danger zone. Bacteria grow even more rapidly from 70°F to 125°F (21°C to 52°C). Bacteria growth is limited when food is held above or below the temperature danger zone.



Moisture Bacteria grow well in food with high levels of moisture. The amount of moisture available in food for this growth is called water activity (a_w). The a_w scale ranges from 0.0 to 1.0. The higher the value, the more available moisture in the food. For example, water has a water activity of 1.0.

You can help keep food safe by controlling FAT TOM. In your operation, however, you will most likely be able to control only time and temperature. To control temperature, you must do your best to keep TCS food out of the temperature danger zone. To control time, you must limit how long food spends in the temperature danger zone.

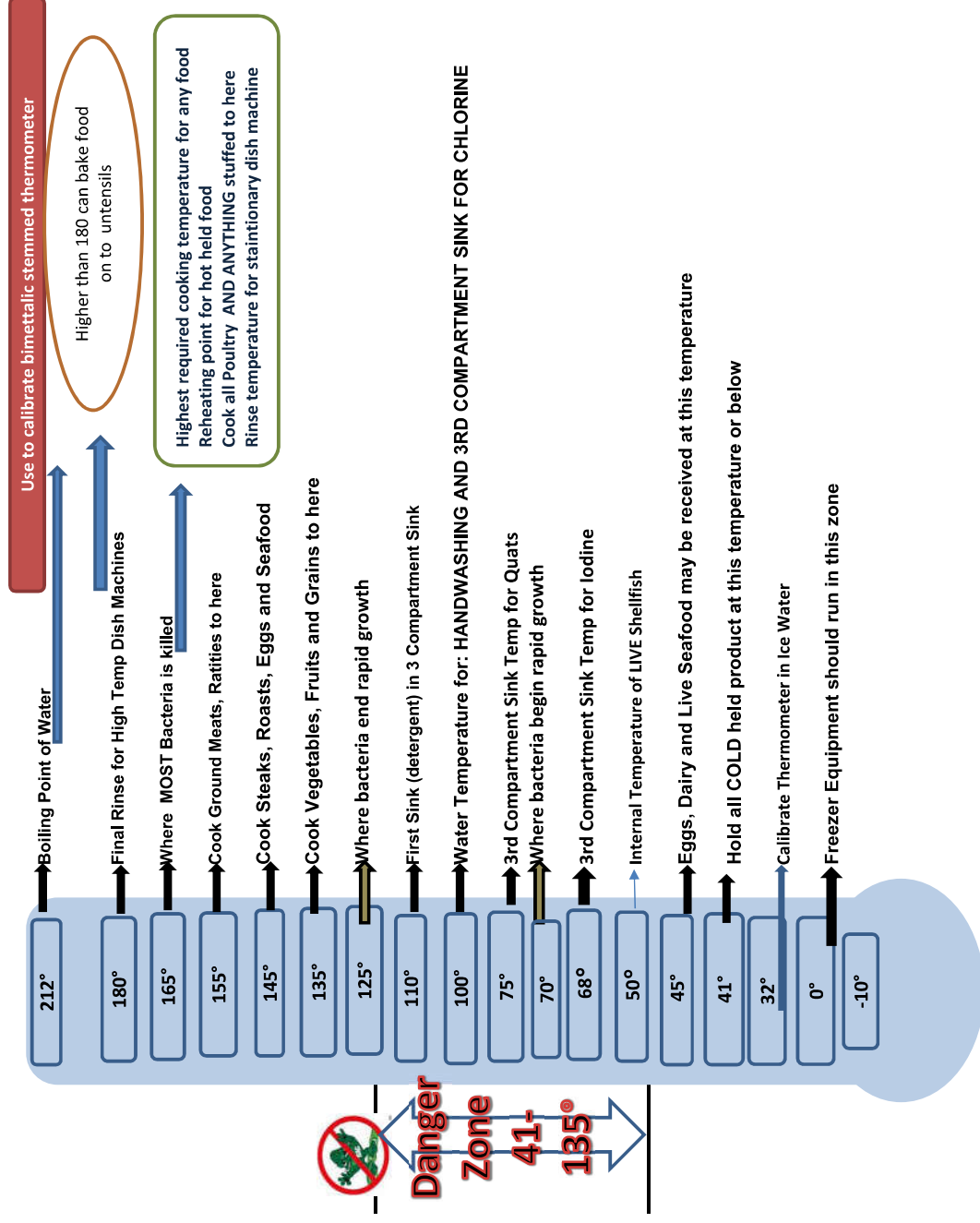


If you analyze this chart, you can see which food items are more vulnerable to microorganisms and which are not. The numbers to key in on are 4.6 to 7.5. By keeping close watch on food that falls in the 5 and 6 categories, you can go a long way to keeping your food safe.

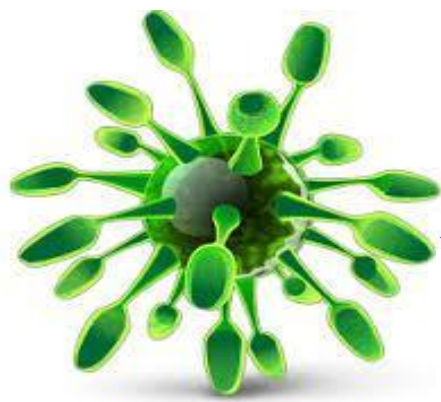
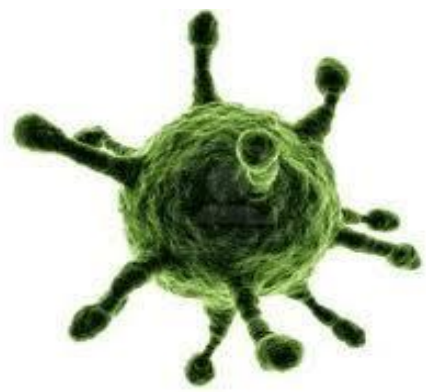
Many fruits and vegetables have a high pH in their uncooked state, and may seem quite safe from quick microorganism growth. But caution needs to be exercised, since the pH of these foods can fall after being cooked and microorganisms can now grow quickly. For example, raw potatoes can be held at room temperature when raw. But if cooking, serving and possibly reserving later, they need to be held at 135° or above and cooled and refrigerated following all the rules of cooling and reheating.

a^w	BACTERIUM THAT WILL GROW ABOVE	FOOD EXAMPLES
0.95	SHIGELLA, BACILLUS, CLOSTRIDIUM PPERFRINGENS	MEAT, SEAFOOD, DAIRY
0.91	SALMONELLA, VIBRIO, BOTLINUM, E.COLI	HARD CHEESES, FRUITS, ORANGE JUICE
0.87	YEASTS	DRY CHEESES, DELI MEATS, BACON, HAM
0.8	STAPHYLOCOCCUS	JUICES, SYRUPS, FLOUR, RICE
0.75	MOST MOLDS	JELLY, MARSHMALLOWS
0.65		OATS, GRAINS, DRY FRUITS, NUTS
0.6		CARAMELS, HONEY, GOUND COFFEE
0.5	NONE	PATAS, SPICES
0.4		POWDERS
0.3		COOKIES, CRACKERS
0.03		CEREALS, DEHYDRATED FOODS

Every Temperature You Need To Know



THE BIG 6

Bacteria	
 Salmonella Typhi	 Shigella spp.
Bacteria	
 Nontyphoidal Salmonella	 E.coli
Virus	
 Hepatitis A	 Norovirus