FOOD SAFETY 101: THE ESSENTIALS

What you need to know about food safety;
not just for beginners
POOR FOOD SAFETY PRACTICES IMPACT

Lives  Bottom Line  Customer Trust  Brand Reputation
3 Top Food Safety Concerns: Your Role

Temperature Control

Cross Contamination

Personal Hygiene
TEMPERATURE CONTROL
TEMPERATURE CONTROL

WHY IT’S IMPORTANT & PRINCIPLES

**SCIENCE** of *C. perfringens* spores –

- Common in raw meat and poultry
- The spores need activation – such as with a heat step (= cooking) germinate the spores and infective bacterial colonies develop and grow
- Prefers to grow in conditions with very little or no oxygen, and under ideal conditions can multiply very rapidly.
  - In a deep pan of food
  - Cells can grow very rapidly between 109°F–117°F (43°C–47°C).

**ILLNESS**

- If the food is served without reheating to kill the bacteria, live bacteria may be eaten.
- The bacteria produce a toxin inside the intestine that causes illness.
**CASE STUDY**

**TEMPERATURE CONTROL:**

**TACO MEAT SICKENED AT LEAST 108**

### Situation
- Symptoms: nausea, abdominal cramps, diarrhea
  - *C. perfringens* and its toxin were isolated from fecal samples
- Median onset = 7 hours, some 1 hour after eating
  - Cases more likely to have consumed chicken taco meat mixture
  - OR = 55.79, 95% CI (19.72, 157.83), p < .001

### Contributing Factors (Identified by EHS)
- Leftovers 2-3 days old were combined, brought to a simmer and placed in large steel pans 4–6 in. deep, temporarily placed on a rack in the freezer for an undisclosed period of time, and then covered in plastic wrap and placed in the walk-in cooler
  - On day of service, use of a malfunctioning hot holding unit
  - Temperature of meat mixture was 90F
  - *C. perfringens* toxin isolated from food samples

### Previous Inspection Watch Outs
- Time and temperature control deficiencies - faulty equipment, failure to date mark food
- Inadequate sanitizing process for dishware
- Poor utensil storage

**TEMPERATURE CONTROL:**

- **SCOMBROID TOXIN - HISTAMINE**
  - **Symptoms:** vomiting, diarrhea, allergy-like reactions (puffiness around eyes, itchiness/tingling in mouth)
  - **Histamine is produced in fish after death when improperly cooled**
    - Warm storage allows native bacteria in fish to grow and produce an enzyme that reacts with naturally occurring amino acids
  - Fish associated with scombroid poisoning have high levels of certain amino acid (Mahi mahi, tuna, bluefish, marlin, etc.)
  - The toxin is not destroyed in cooking – undetectable to consumer
  - **Contributing Factors**
    - Outbreaks in ground tuna – 2001 study
      - Meat - thawed thin slices or scraps that were refrozen after being formed into patties, introducing several freezing and thawing cycles.
      - Meat came from the belly of the fish
        - Area especially vulnerable to contamination.
      - Grinding process might raise the temperature of the meat through friction and mix bacteria in with uncontaminated material
  - **Situation**
    - **Science**
    - **CASE STUDY**

PROPER TEMPERATURE CONTROL

- Identify the risks, understand critical control points and how to control them
- Monitor
- Take corrective action
MANAGERS

Responsibilities:

- Explain the **significance and connection of maintaining time and temperature control** of TCS food and the **prevention of foodborne illness**

- State the **required food temperatures** and times for storage, holding, cooking and cooling of TCS food

- Identify the **risks, understand critical control points and how to control them**

- Monitor behaviors time and temperature

- Take corrective action

Best Practices:

- Purchase products from an **approved source, with proper temperature control systems** (Partner with purchasing)

- Set and maintain a policy for proper receiving temperatures and storage of food during **key drops**

- Schedule proper amount of people to safely and quickly put away delivery

- Monitor time and temperature of product from receipt to storage

- Understand receiving and storage responsibilities in shared kitchens
Responsibilities:

- Limit the amount of time cold product is out of temperature control. Maintain cold product frozen or <41°F before storage and in production.
- Hold cold food <41°F and hot food >135°F.
- Label TCS food for TPHC with preparation and discard time (4 hours for cold held 6 hours for cold held not exceeding 70°F. 4 hours for hot held).
- Cook food to the required temperature.
- Cool food to <70°F within two hours and to <41°F within an additional 4 hours.
- Understand the risks.
- Have access to solutions.
- Monitor.
- Take Corrective Action.
TEMPERATURE CONTROL

EMPLOYEES BEST PRACTICES

- Food must be received at the proper temperature
- Alert a manager of broken/dripping boxes or food received out of temperature
- Do not let deliveries sit outside in warm/hot temperatures
- Organize storage areas before deliveries to help store food into cold storage as soon as possible
- Do not prop open doors on freezers and coolers
- Do not shut off the temperature controls on the freezer, may interrupt the defrost cycle
- Minimize multitasking in preparation
- Work with small batches of product and monitor temperatures with a calibrated thermometer
- Date label time control product with a preparation / discard time
- Ensure the equipment is working properly, unit plugged in, turned on and at the proper temperature setting
- Precool or preheat equipment before placing product in holding unit

- Confirm product temp before placing in cold holding equipment
  - Holding units maintain temperature, not cool or reheat food
  - Do not constrict airflow, overstock or block internal fans
- Ensure ice baths are effective, around the product container and maintained
- Do not place product put out for service too early
- Close cover(s) before opening and/or during non-peak hours, do not prop open doors
- Do not stock containers too full
- Adjust according to volume to limit waste and last-minute preparation
- Do not allow food to sit out before starting the cooling process
- Transfer food into a shallow pan <2 inches deep
- Place into a cooler, away from the door if possible
- Do not stack, leave room for air circulation to cool
- Use a cooling paddle
- Place into a blast chiller
- Cool using an ice bath
CROSS CONTAMINATION
CROSS CONTAMINATION

WHY IT’S IMPORTANT

& PRINCIPLES

WHAT IS IT?

- Accidental transfer of contaminants from one surface or substance to another, usually as a result of improper handling procedures.
- In a food setting, the term refers to the transfer of contaminants from a surface, object or person to food.
- Cross-contamination usually refers to biological contamination but can also be physical or chemical.

ROUTES of CROSS CONTAMINATION

- Food Handlers (e.g. microorganisms from sweat, sneezing/coughing, hands, hair, clothing)
- Food handling techniques (e.g. reusing cutting boards or utensils for raw and cooked food or for different types of food)
- Cleaning and sanitizing (e.g. not properly rinsing cleaning chemicals from preparation surfaces, dishware, glassware or equipment)
- Food storage (e.g. storing raw meat on shelves above ready-to-eat food)
- Waste disposal (e.g. allowing garbage containers to overflow)
- Pests
SIGNIFICANCE: RECENT RESEARCH REVEALS GAPS

448 Restaurant Managers Surveyed

1 in 3 managers did not wash and rinse surfaces before sanitizing them

Common organisms on surfaces can include
- Salmonella
- Listeria monocytogenes
- Norovirus

• Found in some foods and come from people
• Lead to illness if not managed appropriately

Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5578440/#
COMMON FOOD BORNE PATHOGENS PESTS TRANSFER

LARGE FLIES
- E.coli (Escherichia coli)
- Salmonella spp.

SMALL FLIES
- E.coli (Escherichia coli)
- Salmonella spp.
- Listeria

RODENTS
- E.coli (Escherichia coli)
- Salmonella spp.

COCKROACHES
- E.coli (Escherichia coli)
- Salmonella spp.
- Bacillus subtilis
- Clostridium perfringens
- Serratia marcescens
- Pseudomonas aeruginosa
MANAGE RISKS WITH PROPER SANITATION

THE PROBLEM: Contamination of surfaces contributes to 13% of all foodborne illnesses

- Unclean surfaces can harbor harmful microorganisms that can be transferred to foods
- Food Contact surfaces – buffets, salad bars - Food Code requires cleaning at least every 24 hours – assuming temp is maintained

Cleanliness cited 20% of time by inspectors

4-602.11 Equipment Food-Contact Surfaces and Utensils

(D)(3) Containers in Serving situations such as salad bars, delis, and cafeteria lines that hold ready-to-eat time/temperature control for safety food that is maintained at the proper temperatures and are intermittently combined with additional supplies of the same FOOD that is at the required temperature, and the containers are cleaned at least every 24 hours

Non-food contact surface cleanliness cited 22% of time by inspectors

4-602.13 Nonfood-Contact Surfaces.

Non-food-contact surfaces of equipment shall be cleaned at a frequency necessary to preclude accumulation of soil residues.

Source: CDC
CASE STUDY

CROSS CONTAMINATION: E. coli OUTBREAK

- Wisconsin restaurant linked to 60 illnesses and 1 death
- Causative agent *E. coli* O157:H7
- Likely source –
  - Uncooked beef – outbreak strain isolated from samples of raw taco meat and sirloin tri-tips
  - Cross-contamination of fresh fruit with raw meat products likely occurred
  - Meat processing area in the restaurant was in close proximity to ready-to-eat food preparation area
CROSS CONTAMINATION: CAMPYLOBACTER

- Cafeteria meal sickened 55 due to *Campylobacter*
  - Raw chicken was washed and cooked on the day it was served
  - Inspection of the food service facility found that the drainpipe under the meat cleaning sink did not work, allowing water to escape from the drainpipe and onto the floor.
  - Cross-contamination likely occurred via the countertop, hands of food handlers, and kitchen utensils.
  - Fresh fruit and vegetables were prepared on the same countertop and were in contact with cookware
CROSS CONTAMINATION

**MANAGER RESPONSIBILITIES**

- Describe the relationship between the prevention of foodborne illness and the management and control of
  - Handwashing
  - Cross contamination
  - Bare hand contact with RTE food
  - Maintaining the food establishment in a clean condition and in good repair

- Identify the source of water used and measures taken to ensure that it remains protected from contamination such as providing protection from backflow and precluding the creation of cross connections

- Identify chemicals and the procedures necessary to ensure that they are safely stored, dispensed, used, and disposed of

- Monitor and Take Corrective Action

**EMPLOYEE RESPONSIBILITIES**

- Practicing proper personal hygiene
- Use of proper food handling techniques (preventing cross contamination of RTE food from raw food, contaminated surfaces including contaminated hands and utensils) Ice Is Food.
- Executing proper cleaning and sanitizing methods (e.g. not properly rinsing cleaning chemicals from preparation surfaces, dishware, glassware or equipment)
- Ensuring proper food storage through hierarchy’s (RTE food stored above raw fish and beef. Chicken on bottom shelf)
- Taking proper measures with cleaning and garbage disposal to avoid attracting pests
## POOR SANITATION PRACTICES

### MANAGER

**Responsibilities:**
- Explain the relationship between food safety and providing equipment that is sufficient and properly designed, constructed, located, installed, operated, maintained, and cleaned.
- Explain correct procedures for cleaning and sanitizing utensils and food contact surfaces.

**Best Practices**
- Proven SOPs and Food Safety Management Systems
- Certified Food Protection Managers
- Compliance with Food Safety Practices Associated with the Control of *Listeria monocytogenes* in Foods at Restaurants

### EMPLOYEE

**Responsibilities:**
- Maintaining the cleanliness of equipment and operation to prevent foodborne illness caused by contamination and illnesses associated with poorly kept foodservice establishments.

**Best practices:**
- Follow the pre-determined cleaning procedures. Short cuts and improper cleaning can lead to food and debris build up, foul odors, pests and damaged equipment.
- Clean as you go, turn up dim lights to clean properly, use a flashlight when needed to double check surface sanitation, such as for undersides of equipment and inside of ice machines.
- Work visual cues into the cleaning and sanitizing responsibilities
- Understand cleaning and upkeep responsibilities for shared spaces and kitchens
- Use the proper procedure to Wash Rinse and Sanitize food Contact Equipment

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In an FDA study of 821 US Restaurants, **higher numbers of out of compliance** were observed in restaurants **without a certified manager** and/or a comprehensive **food safety management system**.
HOW TO PREVENT PEST RISK

LARGE FLIES
- Locate and eliminate exterior breeding sites
- Reduce fly entrance opportunities
- Harvest or kill the flies after they get in

SMALL FLIES
- Clean drains weekly
- Clean and sanitize floors daily
- Minimize exterior breeding opportunities, entry points, breeding grounds

RODENTS
- Properly cover and store garbage
- Eliminate standing water
- Reduce clutter & excess vegetation
- Seal doors
- Fill holes and gaps

COCKROACHES
- Inspect incoming goods
- Reduce food & water sources
- Reduce entry & available harborage sites
- Use Insecticide applications
PERSONAL HYGIENE
WHY IT’S IMPORTANT & PRINCIPLES

**Staph aureus**
- 20% of us persistently carry *Staph aureus* in our noses
- People who carry *Staph* can contaminate food if they don’t wash their hands before touching it.
- If food is contaminated, the bacteria can multiply and produce toxins that make people ill.
- Bacteria are killed by cooking, but the toxins are not destroyed and will still be able to cause illness.
- Foods that are not cooked after handling, such as sliced meats, puddings, pastries, and sandwiches, are especially risky if contaminated with *Staph aureus*
- Food contaminated with toxin may not smell bad or look spoiled.
- *Staph aureus* can cause GI illness if cells contaminate food and produce toxin

**Norovirus**
- Norovirus sufferers typically shed >10^8 viral particles per gram of stool
- It only takes a few viral particles to cause illness
- An infected person may be contagious for 2 weeks after recovery
- Shedding of virus particles in feces may continue for as long as 2 months

PERSONAL HYGIENE

WHY IT’S IMPORTANT & PRINCIPLES

Norovirus

- Difficult to inactivate
  - Persists in chlorinated drinking water
  - Persists in the environment
  - Survives freezing and refrigeration
  - Requires very high temperature to inactivate
  - Survives in acidic environments
  - Survives > 15 days on carpet
  - Survives longer under cold, wet conditions
  - Titers reduced >4.5 logs at room temperature within 7 days
  - Observed only a 3 log reduction at 45ºF after 70 days

PERSONAL HYGIENE
WHY IT’S IMPORTANT & PRINCIPLES

*Salmonella*

- Study conducted demonstrated that transmission can occur by ill food handlers
- Higher proportion of *Salmonella*-positive food workers (22 versus 8%) identified in outbreaks with positive environmental samples.
- Prolonged outbreak duration suggests a persistent reservoir of contamination.
- Takeaway - Keep ill food handlers out of the kitchen!

1998 Dinner Party Outbreak
- 126 people attended a dinner at a large hotel.
- During the meal, a guest vomited onto a polished wooden floor.
- It was immediately cleaned with a mop and disinfectant.
- THE MEAL CONTINUED.
- Within 48 hours, 52 people reported norovirus symptoms.

Lesson Learned:
Appropriate clean up procedures essential to help prevent spread of contamination.

Case Study

Personal Hygiene: Ill Employee

- Employee returned to work the day norovirus symptoms ended
  - Same employee sliced lettuce
  - Lettuce prep sink also used for handwashing
- 170 people ill
  - 3 different lunch events
  - Restaurant closed twice for cleaning

Lessons Learned:
- Employees must stay home 3 days after symptoms resolve
- Need to use enhanced disinfection procedures

Source: MMWR 55(14):395-7
On Health Inspections from January 2017 to December 2018, hand sinks were not accessible at a higher rate in the month of December through Norovirus season.

Describe the connection between prevention of foodborne illness and the personal hygiene of an employee

- Explain their responsibility for preventing the transmission of foodborne disease from an employee who has a disease or medical condition that may cause foodborne illness
- Describing the symptoms associated with the illness that are transferred through food
- Explain how to comply with reporting responsibilities of exclusion and restriction

Monitor and track Employee symptoms and illnesses to identify trends and keep to foster great communication across management. Include the return to work date.

Notify the local health department if an employee reports that a physician has diagnosed them with one of the above six foodborne illnesses, or those identified by the local jurisdiction.

Exclude an employee from work if they have vomiting, diarrhea, jaundice, fever, respiratory symptoms, Hepatitis A, Typhoid Fever, symptomatic nontyphoidal Salmonella, symptomatic Shigella, symptomatic E. coli, and symptomatic Norovirus. A written clearance from a physician is required before an employee can return to work if an employee reports that a physician has diagnosed them with one of the above six foodborne illnesses, or those identified by the local jurisdiction. Exclude if a household member has tested positive for COVID-19.

Restrict an employee from working with food and clean equipment if they have a sore throat with fever, infected wound (if not covered with a bandage and glove), asymptomatic Shigella, asymptomatic E. coli, asymptomatic nontyphoidal Salmonella, and asymptomatic Norovirus.

Informing the person in charge if they have any of the following symptoms or illnesses:

- **Symptoms:**
  - Diarrhea
  - Vomiting
  - Sore throat with fever
  - Jaundice (yellow color to the eyes and/or skin)
  - Infected wound
  - Fever and Respiratory Symptoms

- **Foodborne Illnesses:**
  - Shiga toxin producing E. coli Shigella spp.
  - Hepatitis A
  - Salmonella
  - Typhi Norovirus
  - Nontyphoidal Salmonella

Complying with the illness policy, not returning to work until at least 24 hours symptom free or cleared by the Health Department

Practicing Good Personal Hygiene

- Proper handwashing
- Proper care, cleanliness and uniform standards
POOR PERSONAL HYGIENE

MANAGER RESPONSIBILITIES

- Describe the connection between prevention of foodborne illness and the personal hygiene of an employee
  - Explain their responsibility for preventing the transmission of foodborne disease from an employee who has a disease or medical condition that may cause foodborne illness
  - Describing the symptoms associated with illness that are transferred through food
  - Explain how to comply with reporting responsibilities of exclusion and restriction
- Monitor and track Employee symptoms and illnesses to identify trends and keep to foster great communication across management. Include the return to work date.
- Notify the local health department if an employee reports that a physician has diagnosed them with one of the above six foodborne illnesses, or those identified by the local jurisdiction.
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EMPLOYEE RESPONSIBILITIES

- Informing the person in charge if they have any of the following symptoms or illnesses:
  - **Symptoms:**
    - Diarrhea
    - Vomiting
    - Sore throat with fever
  - **Foodborne Illnesses:**
    - Shiga toxin producing *E. coli* Shigella spp.
    - Hepatitis A
    - *Salmonella*
  - Jaundice (yellow color to eyes and/or skin)
  - Infected wound
  - Fever and Respiratory Symptoms
  - Typhi Norovirus
  - Nontyphoidal *Salmonella*
- Complying with the illness policy, not returning to work until at least 24 hours symptom free or cleared by the Heath Department
- Practicing Good Personal Hygiene
  - Proper handwashing
  - Proper care, cleanliness and uniform standards
HEALTH DEPARTMENT PARTNERSHIPS

Establish and maintain a working partnership with the local health department

Before the Inspection

- Keep updated / current contacts readily available
- Involve as many managers and senior employees in walkthroughs and inspection as possible

During the Inspection

- Ask the health inspector or other jurisdiction visitors for the proper identification.
- Ensure all comments made by the health inspector are understood and clear.
- Correct violations immediately. If you have a question or an issue cannot be corrected during the inspection, communicate your plan with the inspector. Call the appropriate technician to service equipment.

After the Inspection

- Meet with your managers and supervisors to communicate the deficiencies that were found. Develop a long-term plan of correction for each violation.

Join our September Food Safety and Public Health Matters webinar to learn more about Health Inspections and best practices.
RECAP

- Properly executing on temperature control, prevention of contamination, excellent hand washing and personal hygiene and sanitation practices.
- Monitoring
- Corrective Action
- Modeling Best Practices
- Coaching
- Developing and maintaining working partnerships with the Health Department

Manager responsibilities are to understand why food safety procedures are in place and how to prevent disease
GENERAL INFECTION PREVENTION GUIDELINES

Preventative measures that may help avert an outbreak of COVID-19 as well as other illnesses.

1. MONITOR NEWS AND ADVICE FROM PUBLIC HEALTH AGENCIES
   Follow local public health recommendations related to local infection activity and need for isolation and closing.

2. IMPLEMENT GOOD INFECTION PREVENTION PRACTICES
   Reinforce personal hygiene throughout your operation.
   Provide hygiene materials such as tissues, hand soap and sanitizer.
   Stock effective disinfectant products and follow protocols.

3. COMMUNICATE WITH AND MONITOR EMPLOYEES
   Educate and inform employees.
   Closely monitor employee health.
   Encourage symptomatic employees to stay home.
STEPS TO HELP PROTECT YOURSELF, YOUR EMPLOYEES, AND YOUR GUESTS

Public health recommendations focus on **standard infection control practices, training and compliance**.

**Good News**
Coronavirus is a small-enveloped virus. Enveloped viruses are the least resistant to disinfection, which means **disinfectants can be used to effectively kill coronavirus on surfaces**.
Ecolab recommends that customers take the following steps based on the risk profile of their operations. This 3-tiered guidance is informed by public health reports and our understanding of the scientific characteristics of underlying causes.

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>GREEN: Standard Prevention</th>
<th>YELLOW: Risk Reduction</th>
<th>RED: Remediation</th>
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<tbody>
<tr>
<td>DESCRIPTION</td>
<td><strong>RISK PROFILE:</strong> No known outbreak in your geographic area</td>
<td><strong>RISK PROFILE:</strong> The potential exists for an outbreak in your geographic area</td>
<td><strong>RISK PROFILE:</strong> A publicly declared outbreak in your facility or region is disrupting normal business</td>
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| ACTIONS | - Follow current procedures  
- Regularly revisit training to ensure compliance  
- Maintain standard hygiene and sanitizing/disinfection practices | - Educate employees on infection control, PPE use and communicate Infection Control Procedures  
- Assess your preparedness status and collaborate with vendor partners on response readiness  
- Evaluate facility usage, lead times and stock shelf life and their impact on ordering supplies  
- Increase frequency of standard procedures | - Enhance procedures to respond to an outbreak in your facility, designed to break the chain of infection or illness  
- Facilitate training for heightened procedures  
- Perform heightened procedures using approved products  
- Plan for deep cleaning and reopening procedures after down time or quarantine |

Increase frequency of cleaning and disinfection of high-touch surfaces

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