Causes and Prevention of Foodborne Illness

Lucas Tafoya, REHS, CP-FS
Inspection & Compliance Manager
Bernalillo County Environmental Health
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Leading Causes of FBI

- Improper Holding Temperature
- Poor Personal Hygiene
- Contaminated Equipment
- Inadequate Cooking
- Food from Unsafe Sources

Active Managerial Control

- Certified Food Protection Managers
- Training of employees in sanitation, personal hygiene and employee health program
- Compliance with Food Code
- Quality control
- Unauthorized access to food operations
- Continuous equipment and facility maintenance
- Temperature control of food
Food Safety Hazards

**Biological**
- Bacteria
- Virus
- Parasites

**Chemical**
- Naturally Occurring
- Environmental
- Added
- Allergens

**Physical**

Food Safety Hazards

**Allergens**

*Major Food Allergens:*
- Milk
- Eggs
- Fish (e.g., bass, flounder, cod)
- Crustacean shellfish (e.g., crab, lobster, shrimp)
- Tree nuts (e.g., almonds, walnuts, pecans)
- Peanuts
- Wheat
- Soybeans
- Protein derived ingredient

Symptoms of Allergic Reaction:
- Hives
- Tingling in the mouth
- Swelling in the tongue and throat
- Difficulty breathing
- Abdominal cramps
- Dizziness
- Vomiting and/or diarrhea
- Flushed skin or rash
- Coughing or wheezing
- Loss of consciousness
- Dizziness

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Temperature Danger Zone

- 41°F to 135°F
- Majority of pathogens are mesophilic bacteria
- 60°F - 110°F
- Maintain safe temperature of food from receiving to customer

Pathogen Growth

- Little or no growth in the lag phase – maintain PHF/TCS foods no longer than 4 hours in TDZ
- Rapid growth in the log phase

Potentially Hazardous Food / Time-temperature control for safety (PHF/TCS)

- Rapid and progressive growth of pathogens
- Growth & toxin production of C. botulinum, and/or
- Growth of S. Enteridis in shell eggs
- Includes: Animal foods, heat treated plant foods, raw seed sprouts, cut melons, garlic in oil
Foods that are **NOT** PHF / TCS

- $A_w$ of 0.85 or less
- pH of 4.6 or less
- Unopened hermetically sealed container
- Product Assessment Required
- Food that can cause illness but not support growth of pathogens (contaminated or otherwise adulterated)
- Air cooled hard boiled egg with shell intact and pasteurized eggs to destroy salmonella

**Control Measures**

**Cooking**

- Chicken 165°F for 15 seconds (Salmonella)
- Ground Beef 155°F for 15 seconds (E.coli)
- Pork 145°F for 15 seconds (parasites)
- Fish 145°F for 15 seconds (parasites)
- Whole muscle meat – see Food Code

**Cooling - Cooked PHF/TCS**

- 135°F to 41°F in 6 hours provided that
- 135°F to 70°F in 2 hours

To 41°F within 4 hours if working with PHF / TCS ingredients at ambient temperature
Control Measures

Reheating - 165°F for 15 seconds within 2 hour
Hot Holding - 135°F or above
Cold Holding - 41°F or less
Defrost
- Under refrigeration ≤ 41°F
- Microwave as part of continuous cooking process
- Under cool running water ≤ 70°F
- As part of continuous cooking process

Control Measures

Climate Control
- Refrigerators ≤ 41°F
- Freezers ≤ 0°F
- Dry 50°F to 70°F with relative humidity 50-60%

Time alone as a Public Health Control

Maximum up to 4 hours
- ≤ 41°F cold or ≥ 135°F hot
- Marking to identify 4 hour time limit, discard unused and unmarked containers
- Cooked and/or served within 4 hours

Maximum up to 6 hours
- Must be ≤ 41°F
- May not exceed 70°F in 6 hour period
- Periodic monitoring and recording
- Marking to identify 6 hour time limit
Personal Hygiene

- 1 in 5 FBI outbreaks linked to infected food employee
- Prevention of viral transmission
- Exclusion/restriction of ill food workers
- Proper hand washing
- No bare-hand-contact with RTE food

Reportable symptoms

- Vomiting
- Diarrhea
- Jaundice
- Sore throat with fever
- Lesion containing pus or open infected wound

Symptomatic Food Handlers

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Serving HSP</th>
<th>Not Serving HSP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vomiting</td>
<td>Exclude</td>
<td>Exclude</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>Exclude</td>
<td>Exclude</td>
</tr>
<tr>
<td>Jaundice</td>
<td>Exclude</td>
<td>Exclude</td>
</tr>
<tr>
<td>Sore Throat with Fever</td>
<td>Exclude</td>
<td>Restrict</td>
</tr>
<tr>
<td>Infected Wound with Pustular Boil</td>
<td>Restrict</td>
<td>Restrict</td>
</tr>
</tbody>
</table>
**Personal Hygiene**

- **Exclude** – prevent food employee from working
- **Restrict** – limit activities of food employee

**Reportable illness diagnosed by Health Practitioner**
- Norovirus – leading cause of FBI
- Hepatitis A
- Shigella spp.
- EHEC or STEC
- Salmonella Typhi – (Typhoid Fever)

**Food from Unsafe Sources**
- No food from private home
- Food packaging label
- Maintain records for fish and shellfish intended for raw consumption
**Food from Unsafe Sources**
- Beef intended for undercooked service obtained from whole muscle intact beef food processor
- Handling instructions for eggs not treated to destroy salmonella

**Vector/Pest Control**
- Rodents
- Roaches
- Flies
  - Disease reservoir
  - Host for other vectors

**Emergency Planning**
- Planning for emergencies
  - Power outage
  - Water supply
- Understand techniques used in emergencies (e.g. flooding, power failures, fires)
- Food and bio security associated with the food service industry
References

- http://www.cfsan.fda.gov/~mow/intro.html
- http://www.cdc.gov/rodents/rodent_images/