Module 3: Environmental Assessment

Bureau of Environmental Services

Food, Milk, and Lodging Division

Epidemiology Division
Bureau of Clinical Laboratories
Bureau of Environmental Services

DETECT
Decrease Foodborne Illness Threats with Environmental Controls and Testing
ALABAMA DEPARTMENT OF PUBLIC HEALTH

Module Learning Objectives

- Foundational Knowledge Review
- Describe Differences & Priorities Between Process I, II, and III Foods
- Describe Environmental Assessment Objectives
- Describe Basic Steps of Environmental Assessment
- Construct a Well Documented Environmental Report
- Perform Group Exercise

Various Sources of FBO

- Restaurants
- Grocery store delis
- Church potluck suppers
- Summer camps
- Food processors
- Farms
- Trucks

Know the Agent to Target Investigation & Control Measures

HAZARD	Contributing Factors to Investigate During Field Visit
Spore-Formers Preformed Toxins (i.e. Clost perf, B cereus, staph)	Cooling, Re-Heating, Hot Holding, Bare Hand Contact, Room Temp Storage, Cold Holding
Viral Infections (i.e. norovirus)	Ill Food Worker, Bare Hand Contact, Handwashing, Contaminated Raw Product
Bacterial Infections	Ill Food Worker, Bare Hand Contact, Handwashing, Contaminated Raw Product, Cross Contamination, Cooking
Parasitic Infections	Contaminated Raw Product and Source

See IAFP manual for details on specific diseases

Contributing Factors Associated with FBO

- Improper holding temperatures
- Inadequate cooking
- Contaminated equipment
- Unsafe source
- Poor personal hygiene
- Cross contamination

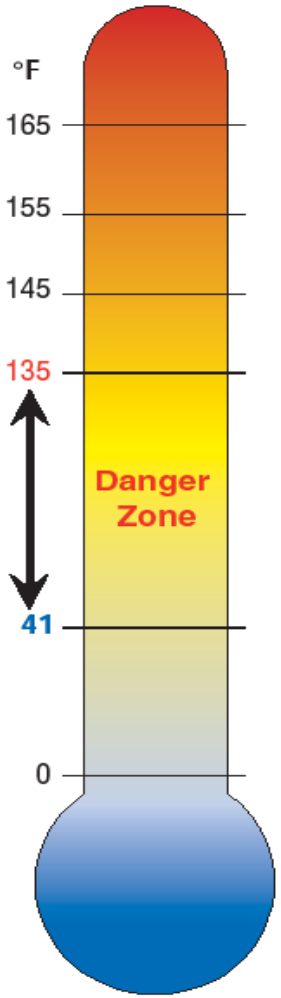
Food Safety Management Systems: The Prerequisites

- Employee Health
- Personal Hygiene Program
- Time Temperature Management
- Cleaning and Sanitizing of Food Contact Surfaces
- Cross Contamination Prevention
- Date Marking

Routine Inspection

- Emphasis has evolved
- Old days - legal compliance checklist mentality
- Current recommendations are risk-based inspections to identify cause foodborne illness

Control Time & Temperature



165°F Reheat for holding

165°F Cook for 15 seconds

- Poultry, stuffed meats, stuffed fish, and stuffed pasta
- Stuffing containing meat, poultry, or fish
- Ground poultry or turkey
- Any animal food cooked in a microwave

155°F Cook for 15 seconds

- Ground meats (beef and pork)
- Injected meats, comminuted fish and meats
- Game meats
- Raw, pooled shell eggs

145°F Cook for 15 seconds

- Fish, seafood, pork, beef (cubes, slices, etc.), veal, lamb, mutton
- Raw shell eggs for a single order

145°F Cook for 3 minutes

- Whole roast beef, whole pork roasts and corned beef roasts

135°F Hold

- All hot foods

135°F to 70°F Cool all foods

- within 2 hours

70°F to 41°F

- within 4 hours

41°F

- Hold all cold food

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See Document Library or http://adph.org/foodsafety/Default.asp?id=1140

Process 1:
No Cook Step

Receiving → Store → Prepare → Hold → Serve

Example: Sandwiches w/ RTE Fillings

Canned Tuna

Canned Chicken

Lunch Meat

etc.

Process 1:
No Cook Step Priorities

- Cold Holding or Time Alone as a Control
- Food Source
- Datemarking
- Receiving Temperatures
- Freezing to Destroy Parasites (Fish for Sushi)

Process 2:
Same Day Service

Receiving → Store → Prepare → Cook → Hold
↓
Serve

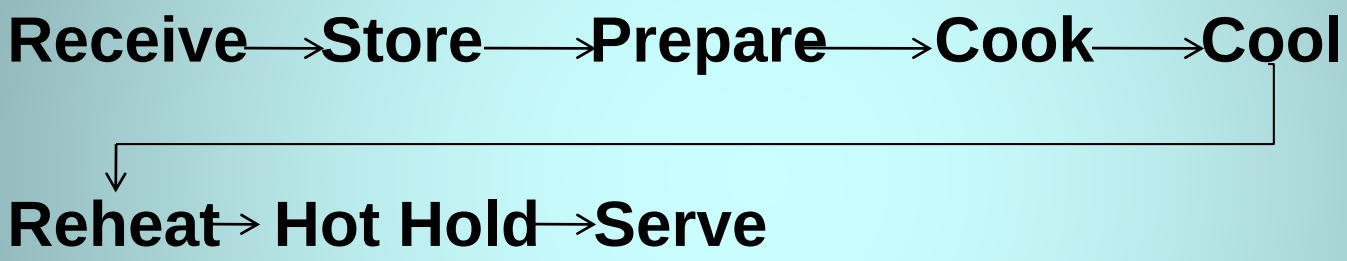
Example: Hamburgers

Most Fast Foods

Process #2:
Same Day Service Priorities

- Cooking
- Hot Holding
- Time Alone as a Microbial Growth Barrier

Process 3:
Complex Food Preparation



Example: Hot Catered Meal
Casserole

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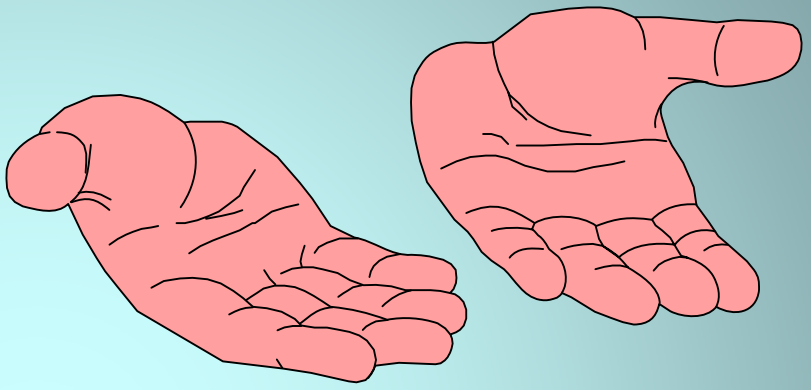
Process 3:
Complex Food Prep Priorities

- Cooking
- Hot Holding
- Time Alone as a Microbial Growth Barrier
- Cooling
- Reheating

Risk Factors in Process Flows



All Processes

- No bare hand contact with RTE food
- Proper handwashing
- Restriction and exclusion of ill employees
- Prevention of cross-contamination

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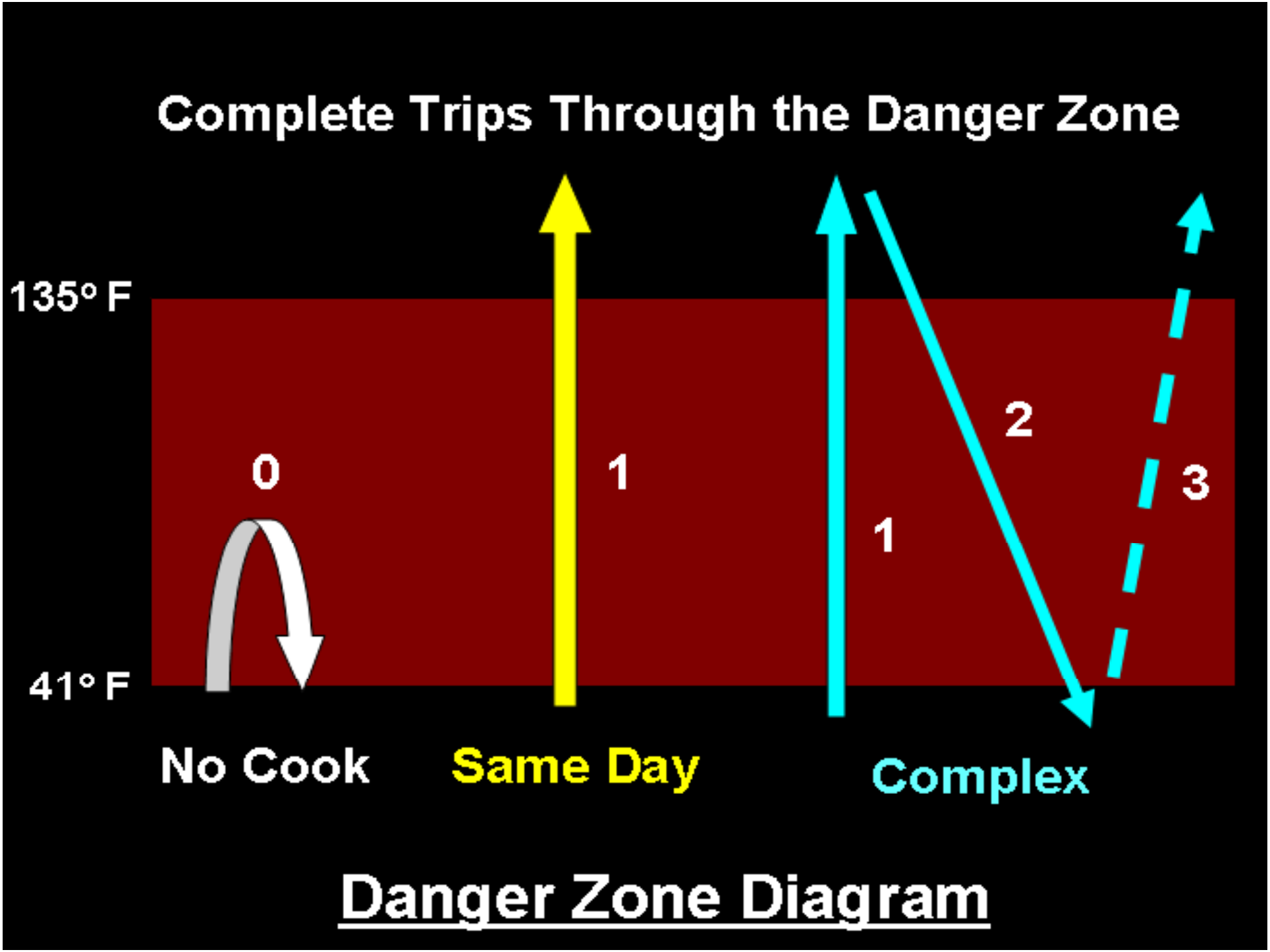

Danger Zone Diagram

Conducting Risk-based Inspections

1. Inspection focus
2. Identify food process categories present
3. Establish priorities
4. Determine risk factors in process flows
5. Assess active managerial control of risk factors in process flows

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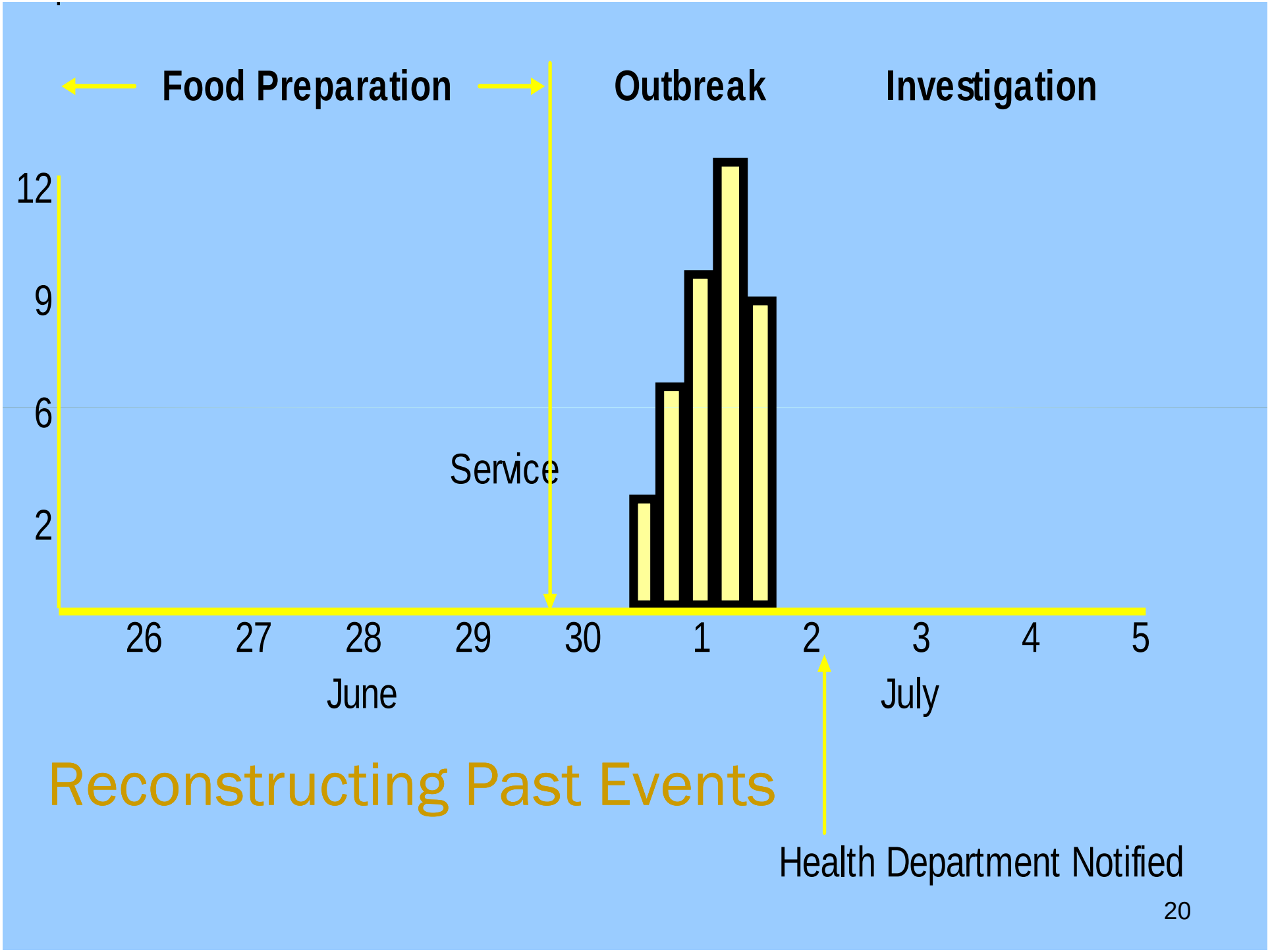
Environmental Assessment (Food Preparation Review)

- Definition: a systematic evaluation of a food establishment suspected of causing a FBO.
  - A cluster of consumer complaints of illness.
  - Lab and/or epidemiological information associated and causative agent identified.

Environmental Assessment Objectives

1. Identify foods and beverages offered

2. Reconstruct past events - when food(s) were produced



Reconstructing Past Events

Environmental Assessment Objectives

3. Identifying Contributing factors

What happened?

- Contamination
- Survival
- Proliferation

Contamination

- Receiving, storage, preparation, transport, service
- Worker hands, ill workers
- Equipment, utensils
- Cross-contamination
- Use of leftovers, returned food

Survival

- Ingredients that inhibit growth: acids, salts, and preservative
- Time/temperature abuse
- Survival on contaminated surfaces, ingredients
  - Bacteria: spores, toxins
  - Viruses and parasites
- Will the agent survive the process?

Proliferation

- Food -Nutrients
- Acidity - pH
- Temperature
- Time
- Oxygen – or Lack of Oxygen
- Moisture - Water activity (a_w)

FAT TOM

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Environmental Assessment Objectives

4. Identify environmental antecedents
   Why did this happen?

- What happened?
  - Cutting board and knife used to cut raw chicken were then used to slice carrots for the salad.
- Why did it happen?
  - Employee was unaware of the dangers of cross-contamination

Environmental Assessment Objectives

5. Implement effective control actions

- What can be done now?
  - Improve food safety education for employees

Environmental Assessment Steps

- Planning
- Site Visit
  - Interviews – Food Workers
  - Assessment of Food Preparation (CSP)
- Collecting Samples
- Control Strategies

Planning/Preparation

- Review available Epi information
  - Dates of onset
  - Incubation period
  - Likely exposure dates/meals
- For commercial food products
  - Exact product description
  - Purchase dates

Review Food Facility Information

- Existing regulatory records
  - Employee work schedules
  - Menus, recipes, product formulations
  - Weekend menus

Review Causative Agent Information

Bacterial

Bacillus
Campylobacter
Clostridium
Escherichia
- e-coli
Listeria
Salmonella Typhi
Shigella
Staphylococcus
Vibrio

Parasitic

Crypto-sporidium
Cyclospora
Giardia
Toxoplasma
Trichinella

Viral

Norovirus
Rotavirus
Astrovirus
Hepatitis A

Chemical

Scombrotoxin
Ciguatoxin
Mushroom poisoning
Heavy metals

Mode of transmission

Sneeze, dirty hands, ill worker, etc.

Investigation Approaches

- No Implicated Food:
  - Can't focus on a single item in food prep review in the early stages, if no food association established.
  - Conduct general risk-based assessment using most up to date information available
  - Determine which samples investigators are most interested in (food, clinical, environmental, water/ice)
- Implicated Food:
  - Food Preparation Review is Key!

Other Actions

- Develop initial plan and timetable
- Assemble materials/personnel
  - Pre-meetings w/ Lab and Epi
- Be sure your DETECT kit is stocked (Epi to provide forms and kits)
- List documents you want
- Alert laboratory
- Alert other agencies

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Site Visit

- Manager Interview
- Facility walk through
- Assessment of food preparation
- Observe operations
- Worker interviews
- Collect records

Manager Interviews

- Explain reason for the investigation
- Outline investigation objectives
- Create cooperative relationship

Manager Interviews (cont.)

- Food safety knowledge
  (Is he/she Food Safety Certified?)
- Attitude
- Credibility of information being provided

Manager Interviews (cont.)
Food Worker Health

- Review health, hygiene and education practices
- Identify who worked with the implicated food(s)
- Worker ill during time period of interest?
- Document findings

Facility Walk Through

- Initial facility walk through
- Measure critical operations before modified
- Collect samples while available
- Verify who worked with implicated foods

Observe Operations- General

- What process do the foods fit into?
  - Process 1 – No Cook Step
  - Process 2 – Same Day Service
  - Process 3 – Complex Foods
- What controls are essential for the foods in this process?

Observe Operations - Specific

- How the same items are prepared today
- Attempt to reconstruct how they were prepared during the time period of interest
- Take measurements (time, temperature, product, dimensions, locations)

Food Worker Interviews

- Interview without manager present
- Ask questions in chronological sequence
- Reconstruct timeline
- Let them tell their story

Food Worker Interviews (cont.)

- Ask about any unusual circumstances that may have occurred that day--equipment that wasn't working, short-staffing, someone ill
- Reword questions when needed, if information isn't provided or inconsistencies are identified
- Inconsistent information may indicate sensitive areas. Consider addressing at end of interview

When Food Workers Cannot Remember Details

- Ask about typical work practices and routines
- Then ask about any unusual events or changes during time period?
- Remember that outbreaks frequently occur the system was “stressed”

Concluding the Interviews

- Ask if individuals have unanswered questions or additional comments
  - May have information not previously considered
  - May reveal other useful information

Leave your business card for future contact

Records & Other Information Sources

- What SOPs or food safety systems are in place?
  - HACCP
  - Buyer Specifications/Approved Sources
  - Personal Hygiene
  - Cleaning & Sanitizing
  - Time/Temperature Procedures
  - Recipe Instructions
  - Menu

Collecting Samples

- Plan your approach in advance as much as possible (in consultation with Epi & Lab)
  - Type (food, water)
  - Size
  - Number

Sampling Issues

- After reviewing product flow, adjust sampling plan as needed
- Consider need for sampling to pinpoint contamination source

Environmental Sampling Strategies

- In-line
- Bracketing
- Environmental
- Finished product

Environmental Sampling Strategies (cont.)

- Take environmental samples early in the investigation
- Have equipment disassembled for environmental swabs
- Focus on hard-to-clean areas
- Chain of custody

How to Collect a Sample

1. Gloves
2. Sterile Containers
3. Sterile Utensils
4. Representative selection of implicated food

Precautionary Controls Needed?

Take action to prevent additional cases !

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Control Actions

- **Immediately stop the outbreak:**
  - Hold
  - Seize
  - Cease/Desist
  - Menu Limitation
  - Closure
  - Exclusions/ Restrictions
  - Recalls
- **Long term strategies to prevent recurrence:**
  - HACCP
  - Risk Control Plans [“Mini-HACCP”]
  - Training
  - Menu/Supplier/Recipe Modifications

Constructing a Report

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Compile Information

- Compare information gathered from different sources (Env, Lab, Epi)
- Level of confidence in information gathered?
- What is known and what remains unknown?
- Organize information needed for report

Analyze findings - CSP

- Identify CSP at each step
- Determine what happened and what did not
- Interpret:
  - Laboratory findings
  - Time/temperature procedures
  - Food flow diagrams
  - Food preparation reviews/diagrams

Write your report

- Brief narrative
- Contributing factors (“What happened”) – CSP
- Environmental antecedents – “Why it happened”

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In Conclusion

Documentation of findings is important for immediate control of the outbreak and is a key to enlist procedures, education, and/or policies to prevent future outbreaks.

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Group Exercise

Process I, II, and III