



**Roadmap
to Foodborne
Illness Reduction
via
Healthy People
2030
Ernest Julian Ph.D.**



Making a Difference

Focus on What Will Have the Greatest Impact in
Reducing Deaths, Long Term Disabilities, and
Illnesses

January 7-9, 2020 Meeting

Why Did AFDO Have this Meeting?

- Illnesses were not decreasing
- Outbreaks keep occurring from same sources
 - Romaine from Salinas and Yuma, papayas...
 - Need to change agricultural systems in place for generations (manure as fertilizer, contaminated water...)
- To make a major impact in reducing illnesses, a coordinated response is needed
 - Federal, state and local government
 - Professional associations
 - Consumer groups
 - Academia
 - Industry from farm to table
 - Scientists, People who can think out of the box, Leaders who can make things happen



Why Use Healthy People 2030?

- Focuses efforts on the pathogens of greatest concern
- Foods and factors most often associated with illness
- Develop short-, mid-, and long-term plan to achieve illness reduction

- Opportunity
 - Whole Genome Sequencing is a game changer
 - Baseline illnesses will be broken into numerous reoccurring illnesses from the same sources
 - Romaine, Blue Bell Ice Cream...



Healthy People 2030 Objectives

Reduce infections caused by *Campylobacter* – FS-01

- Reduce the incidence of laboratory-diagnosed, domestically-acquired *Campylobacter* infections
- **Baseline:** 15.8 lab-diagnosed, domestically-acquired *Campylobacter* infections per 100,000 population occurred on average annually 2015-17
- **Target:** 10.6

Roadmap to Foodborne Illness Reduction via Healthy People 2030



Healthy People 2030 Objectives

Reduce infections caused by:

- Shiga toxin-producing *E. coli* – FS-02
- *Listeria* – FS-03
- *Salmonella* – FS-04

Roadmap to Foodborne Illness Reduction via Healthy People 2030



HP 2030 Developmental Objectives

- Reduce outbreaks of Shiga toxin-producing *E. coli*, *Campylobacter*, *Listeria*, and *Salmonella* infections linked to
 - beef – FS-D01
 - ... dairy – FS-D02
 - ... fruit and nuts – FS-D03
 - ... leafy greens – FS-D04
 - ... poultry – FS-D05

Roadmap to Foodborne Illness Reduction via Healthy People 2030



HP 2030 Developmental Objectives

- Reduce the number of norovirus outbreaks – FS-D06
- Reduce the number of food allergy reactions requiring emergency treatment – FS-D07

Roadmap to Foodborne Illness Reduction via Healthy People 2030



Healthy People 2030 Objectives

- **Increase the proportion of delis where employees wash their hands properly - FS-D08**
- ... surfaces that touch food are properly cleaned and sanitized - FS-D09
- ... foods are refrigerated at a safe temperature - FS-D10
- ... hot foods are kept at a safe temperature – FS-D11

Roadmap to Foodborne Illness Reduction via Healthy People 2030



How Are We Doing?

- With change to Culture Independent Diagnostic Tests (CIDT), hard to evaluate trends
- Increases up to 2020
 - Campylobacter
 - Salmonella – no significant decrease in 20 years
 - E. coli
 - Yersinia
 - Cyclospora
 - Co-infections (e.g. Salmonella and Campy)
- To What Extent were Increases Due to Changes in Testing?



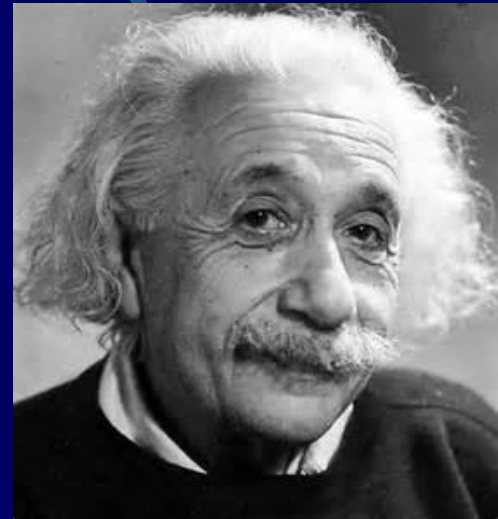
With COVID, Foodborne Illnesses Decreased in 2020

- Decrease in eating out
- People not going to doctors for fear of COVID
- Decreased investigation due to epis pulled into COVID response
- Decreased lab testing due to work on COVID



- Insanity: doing the same thing over and over again and expecting different results.

Albert Einstein



Establishing Effective Policies

- Relative Risk – Where is the Threat to Public Health the Greatest?
 - Severity – Death vs. an upset stomach
 - Probability of occurrence
- Where can you have the greatest impact?
- Cost/Benefit
- Pareto Principle (80/20 Rule)
 - One study: 80% of the crime from 20% of the criminals
 - Can often achieve 80% of the benefit with 20% of the effort
 - E.g. Beach Program – 85% of closures were from 15% of beaches
 - Focused efforts on those beaches and reduced closures by over 80%
 - Identify low effectiveness time and direct time to high impact activities



- What has been accomplished since HP 2030 meeting last year
 - States sampling romaine from Salinas in Fall 2020 led to Tanimura and Antle STEC recall
 - STEC WGS CA strain dropped from 167 in 2019 to 40 in 2020
 - Yuma – didn't see major romaine outbreak in March and April this year, but have illnesses shifted to other crops?



HP 2030 Steering Committee Formed

- *10 HP 2030 Food Safety Objectives*
- *11 Developmental Objectives*
- *Steering Committee Decided to Focus on:*
 - *Salmonellosis Reduction (especially from poultry)*
 - *Norovirus Reduction through Retail Activities*
 - *Produce and *E. coli* O157:H7*
- Charter Developed
- Workgroups Formed
- FDA funding for meeting January 2022



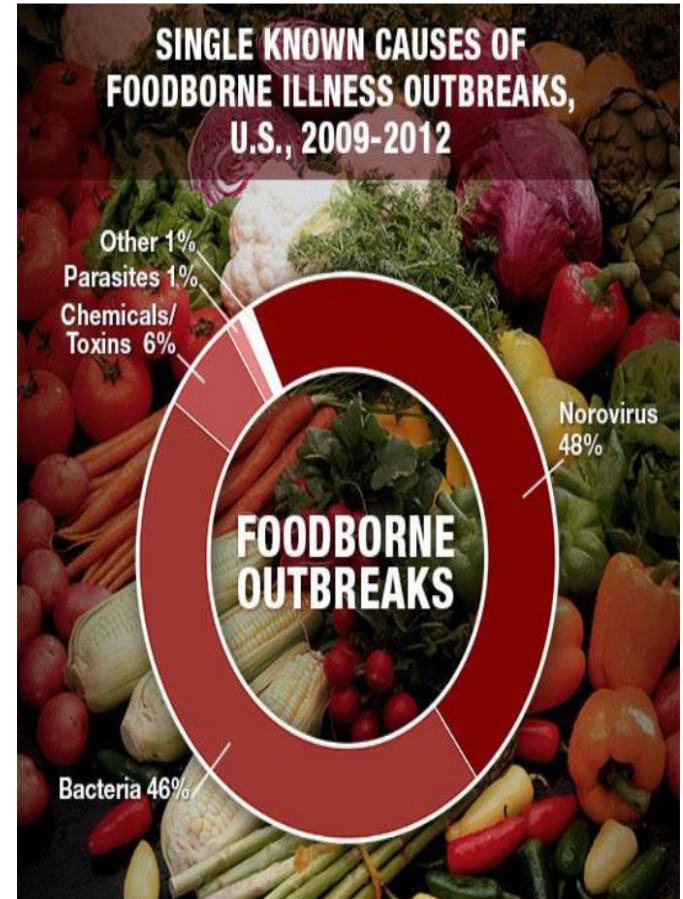
Reduction of Salmonellosis from Chicken Workgroup

- Reducing Salmonellosis from poultry may also help reduce Salmonellosis from other foods
- Preharvest interventions should be prioritized including
 - **targeted vaccines for poultry** and
 - other on-farm strategies, including bacteriophage
- Improved post-harvest interventions should be targeted to reduce *Salmonella* in chicken products to reduce the burden of control at the point of service or consumption.
 - May consider: feed, antibiotic resistance, alternative interventions, cross contamination, regulatory and other incentives, and performance standards



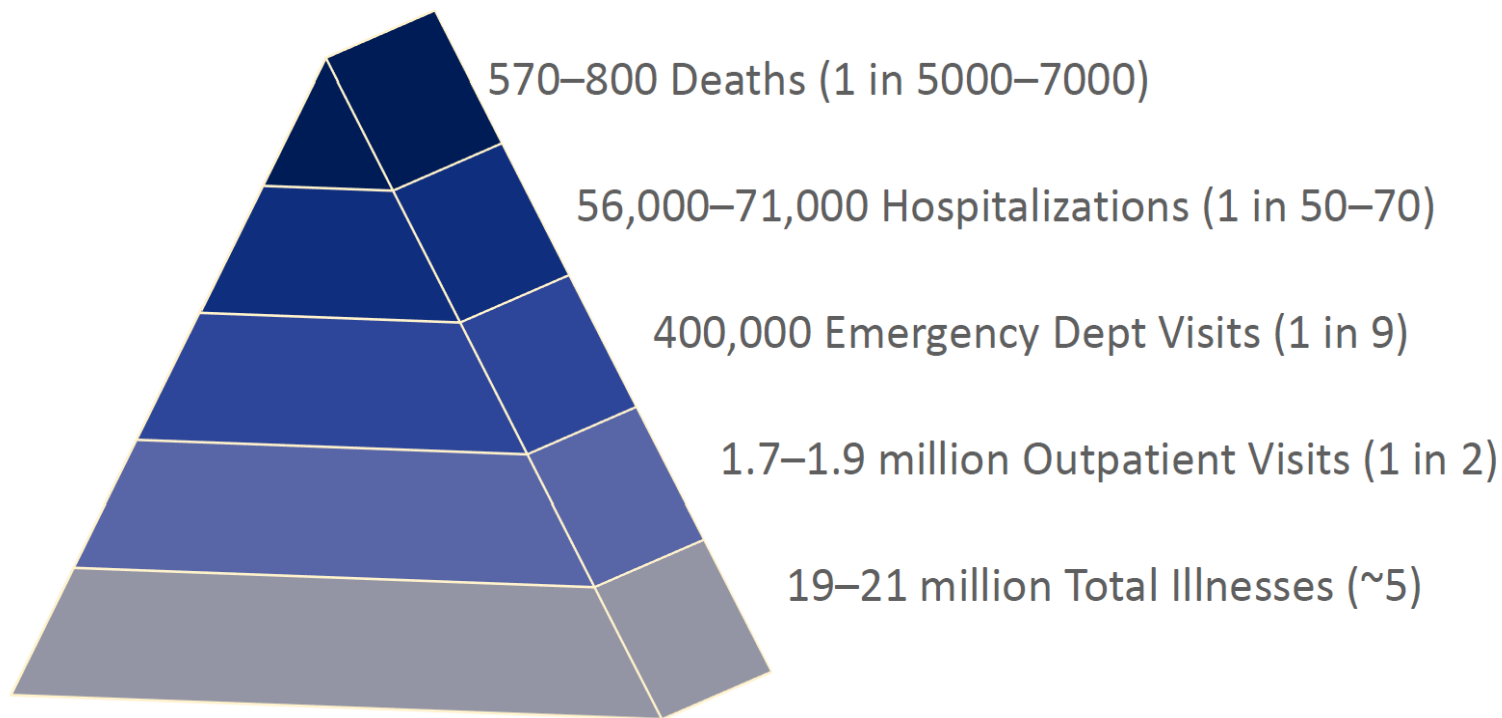
Foodborne Norovirus in the United States

- #1 cause of foodborne disease outbreaks
- #1 cause of foodborne illnesses
- #4 cause of foodborne hospitalizations
- #5 cause of foodborne deaths
- Costs \$2 billion annually in healthcare expenses and productivity losses





Annual Burden (Lifetime Risk) of Norovirus Disease in the United States



Hall 2013 EID

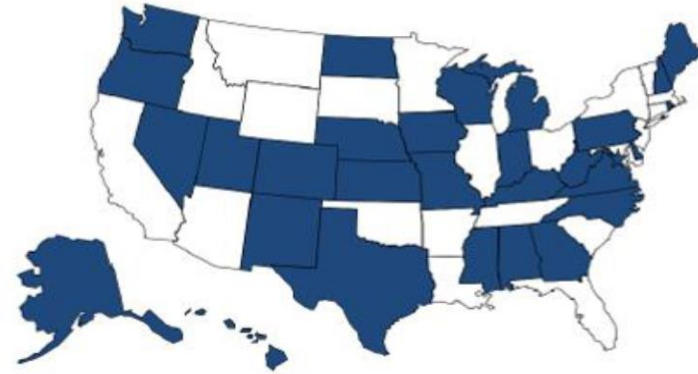
Implementation of Norovirus Controls



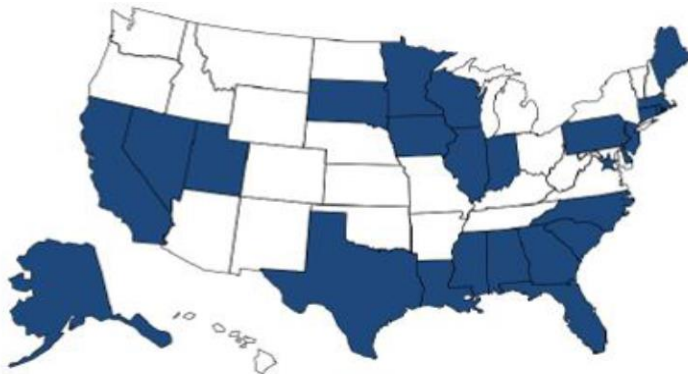
Prohibition of bare-hand contact



Exclusion of food workers with vomiting/diarrhea



Certified Food Protection Manager



Contamination event response plan



Norovirus Reduction at Retail

- **Objective 1: Controlling Source Contamination**
Reduce the norovirus load on food entering retail facilities.
- **Objective 2: Preventive Controls**
Identify and document interventions that may help reduce or eliminate norovirus at retail settings.
- **Objective 3: Regulatory Foundation**
Expansion of the **adoption and enforcement of the latest version of the FDA Food Code** to include the full adoption and enforcement of chapter 2 and 3 interventions, or equivalent.
 - Require managers certified in food safety
 - No hand contact of ready-to-eat foods
 - Conduct an Independent Review of the National U.S. Retail Regulatory System.



Norovirus Prevention



- Require Certified Managers
- Exclude food employees with Norovirus, vomiting, and diarrhea until 48 hours after symptoms stop
- Sick time for employees or can make up time
- Call in plan for ill employees
- No hand contact of ready-to-eat foods
- Excellent handwashing
- Vomitus cleanup procedures
 - Read the label to assure sanitizer effective against Norovirus
- Working on a vaccine



Higher Risk Facilities

- Large, independent sit-down restaurants
- History of outbreaks, illness complaints
- Preparing foods in advance
- No certified manager
 - Higher frequency of critical violations
- Not training employees
- No written procedures

CDC data show links between procedures and food safety.



- Written slicer cleaning policy** → **Slicers cleaned more frequently**
- Staffing plans for absent workers** → **Workers less likely to work while ill**
- Policy requiring workers to tell managers when they are ill** → **Workers less likely to work while ill**
- Policy or schedule for cleaning** → **Smaller outbreaks**

Source: Beth Wittry, CDC

Brown 2016 MMWR; Sumner 2011 JFP; and Hoover 2020 JFP



CDC data show links between certification/trainings and food safety.

- Certified kitchen manager** → **More likely to have proper refrigerator temperatures**
- Certified kitchen manager** → **Fewer critical violations on inspections**
- Kitchen manager food safety training** → **More likely to use recommended food cooling methods**
- Food worker food safety training** → **Workers more likely to wash hands when needed**
- Food worker food safety training** → **Smaller outbreaks**

Source: Beth Wittry, CDC

Brown 2018 FPD; Cates 2009 JFP; Reed 2020 JEH; and Hoover 2020 JFP

CDC data show links between monitoring and food safety.



Food workers actively monitor cooling food temperatures



Foods more likely to cool within recommended timeframe

Workers record refrigerator temperatures



Refrigerators more likely at appropriate temperatures

Source: Beth Wittry, CDC

Schaffner 2015 JFP and Brown 2018 FPD

Reducing E. coli O157:H7 from Produce

- Leafy Green Focus and 3 Task Groups Formed
- Root Cause/Prevention
 - Prevent Recurring, Emerging and Persisting (REP) outbreaks
 - Identify what actions should be taken to prevent reoccurrence
- Water Safety
 - Pre-harvest
 - Harvest
 - Processing
- One Health
 - Reduce pathogens from animals (e.g. STEC from cattle)



Reducing E. coli O157:H7 from Ground Beef

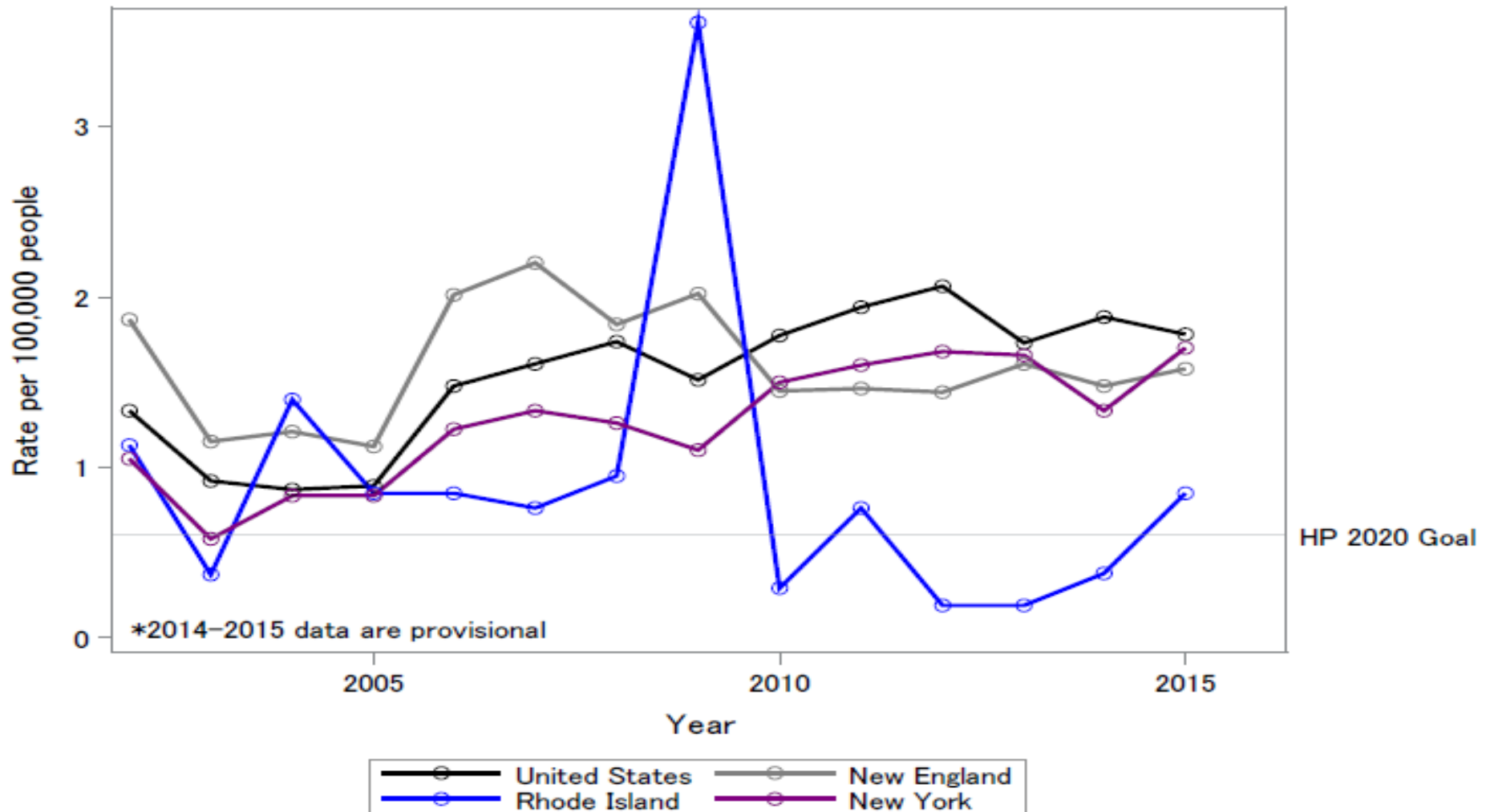
- Don't serve undercooked hamburgers to kids
 - RI prohibited undercooked ground beef from being served to children 12 years of age and younger in 1993 after Jack in the Box outbreak.
 - In 2009, RI middle school children went to a camp in a neighboring state and were served undercooked hamburgers which led to the large increase in illnesses.
 - RI used this data to submit an issue to change the national Food Code to prohibit undercooked foods of animal origin from being served on children's menus.



E. coli 0157:H7 in the Northeast



Rates of Shigatoxin-producing E. Coli (STEC) in Rhode Island, New York State, New England, and the US (2002–2015*)





Find and Eliminate the Root Cause

- Ill Employee
- Contaminated ingredient (leafy greens...)
 - Environment (irrigation water, manure...)
- Equipment – slicers, refrigeration...
- Facility – Listeria, Salmonella
- Lack of Knowledge
- Motivation – Food Safety Culture
- Are preventive systems in place

Undercooked Chicken Liver - Source of Campylobacter and Salmonella Cases





CHEFS, COOKS, AND CATERERS: COOK CHICKEN LIVER LIKE IT'S CHICKEN (IT IS)

Cook Chicken Liver to 165°F



ALWAYS COOK CHICKEN LIVER ALL THE WAY THROUGH



Use a **food thermometer** (you can't tell by looking)

Cook the inside of the liver to **165°F**, just like you would for other chicken parts

BACTERIA INSIDE + PARTIAL COOKING = RECIPE FOR ILLNESS

You might be used to leaving the middle rare when cooking chicken liver for **pâté** and similar dishes.

But **Campylobacter** is a type of bacteria that can live **inside** chicken liver. If the middle isn't cooked to **165°F**, bacteria can survive and cause illness.




most often




cramps, diarrhea (sometimes bloody), fever

less often



life-threatening illness, or even death

At higher risk




PROPER COOKING CAN PREVENT ILLNESSES



U.S. outbreaks from eating undercooked chicken liver are **on the rise**. Most are associated with restaurants.



In one outbreak, the restaurant went out of business after customers ate undercooked chicken liver and got sick.



Chefs, cooks, and caterers are **key** to helping prevent these outbreaks.



Centers for Disease Control and Prevention
National Center for Environmental Health



Learn more:
www.fsis.usda.gov/ChickenLiver

Washington Salmonella Outbreak: Hobart Series 2000 Slicer – Washington swabbed clean and sanitized meat slicer



Then unscrewed and swabbed again



Silicone seal – degraded - did not keep meat scraps or dirt out - This area was swabbed



Lab Results

- Slicer sample results:
 - Salmonella positive on handles, the press, the goo
 - Negative on the blade and guard



Globe Slicer - Area under white plastic piece (secured with screw) tested + for Salmonella in Georgia Outbreak



RI Outbreak May 2010

Globe Slicer-Model 3600



Blade side view of slicer blade guard



Non-removable, non-cleanable white plastic on inside of blade guard was Salmonella + PFGE match to outbreak

Greatest Predictor for Listeriosis is Consuming Luncheon Meat Sliced at Deli

- Role of slicers in question
 - Hollow spaces inside of handles and knobs that retain liquids
 - Failed seals and gaskets
 - Poor maintenance and cleaning
- NSF national standards for slicers changed November 2012
- Take unsafe slicers out of service

Improperly Designed Pastry Display Cases in Outbreak Facility Temps 55-64 F on Top Shelves



Improper Cooling Due to Shelves Too Far Apart



Root Cause Person in Charge Knowledge

- If PICs have unsafe practices and cannot answer basic food safety questions, ask who trained them
- Evaluate instructors – many are creating problems and mass producing unsafe practices
 - Some may be selling certificates and not training or testing

What You Can Do – Regulators



- Mandate Food Manager Certification
 - CDC EHS-Net found association between not having a manager certified and having outbreaks
 - FDA found association with lack of a certified manager and presence of certain foodborne illness risk factors
 - Reduce frequency of targeted risk factor violations
- Improve Rapid Traceability
 - Mandate leafy green source labeling
 - Food Code “Approved” source
 - Require production of shopper card/product purchase info during illness investigation
- “Go After Bad Guys” (Highest risk of causing illness)
 - Chain/corporation evaluations and coordinated enforcement
 - A few hurt the entire Romaine industry



What You Can Do – Regulators

- Anticipate and Prevent Worst Case
 - Behavior and systems are very resistant to change
 - Follow-up is critical to assure new safe systems are implemented
 - Prevent reoccurring outbreaks, or not only will the industry look bad
 - Can explain routine inspections not done due to lack of staff, cannot explain serious problems were found, no reinspection, and more became ill



Effective Enforcement

- Managers certified and staff trained
- Determine root cause of reoccurring hazards
 - Refrigerator not working
 - Some designed to operate in 78-degree environment
 - If no air conditioning, they may be keeping food at 60 in a heat wave
- Motivate and provide resources (hyperlinks for violations)
- Post inspection reports on web or at facility
- FOLLOW-UP to Stop unsafe practices
- Support is critical for inspectors or burnout occurs
- Hire inspectors with good people skills and who can deal with conflict

Illness Complaint/Outbreak Response



- When in doubt, send someone out now!
 - Look at incubation period – generally not the last meal
- Preventing more illnesses always a higher priority than conducting routine inspections
- 3 outbreaks from same CT facility in 5 years
 - Were training culinary students and leaving food out at room temp from lunch through dinner
- If reported to press
 - What happened, then
 - What did you know?
 - When did you know it?
 - What did you do?
 - Response should not be, there was delayed response and more became ill
 - Response to 6 ill in nursing home on Friday



Outbreak Response

- Send 2 people
 - Interview employees to exclude/restrict ill
 - Assure RTE no hand contact and foods served are safe
 - 3 more groups made ill while inspectors were in caterer
 - Embargo/sample suspect foods
 - Determine what happened
- Check history of outbreaks, complaints, inspections
- History of noncompliance and can't trust to implement controls = closure until can assure foods served are safe
 - Consultant to oversee the operation needed?
 - Assure staff trained and have procedures in place
- Report in case unsafe food in commerce



What You Can Do – Food Service

- Certified Managers
- Trained staff
- Sick time for employees or can make up time so no economic incentive to work while ill
- No bare hand contact of ready-to-eat foods
- Purchase from safe sources
- Have a system in place to assure food safety and verify it works



Program Evaluation

- Choose metrics for evaluation carefully as some metrics can make a program ineffective
 - Inspection numbers and frequency can drive not doing follow-up inspections to eliminate critical hazards in order to meet targets
 - **Reducing illnesses, disposals, the frequency of foodborne illness risk factors, and putting systems in place to prevent recurring outbreaks and serious hazards needs to be the clear priority**
 - Evaluate the number ill after you learn of illnesses/hazard to improve effectiveness and response time
 - If acting quickly and effectively, the number ill/outbreak and the number of recurring outbreaks should decrease



Program Evaluation

- Town program manager willing to eat anywhere in town
- If not willing to eat somewhere because food may be unsafe, why are others being allowed to eat there?
- Go to unsafe facilities and make them safe

Congress/Legislatures



Change laws to eliminate barriers to reducing illnesses:

- Provide greater latitude on releasing info needed by industry and others to research causes and prevent additional outbreaks
- Highest Priority for Inspection Resources
 - Immediately respond to outbreaks to find and eliminate the source to prevent additional illnesses
 - Prioritize follow-up to eliminate imminent hazards to health, and foodborne illness risk factors, over conducting lower risk routine inspections
- Need a better way to tell our story than frequency and number of inspections
 - Need better metrics effective at reducing illnesses

Goals for 2022 Meeting

- **Move from recommendations to implementation of actions that will reduce illnesses (tactics)**
 - Salmonella poultry vaccines
 - Effective enforcement and follow-up to prevent persisting and reoccurring outbreaks
 - Manager certification in all states (63% in survey)
- Identify issues for Congress
 - EPA – deal with animal waste and contaminated irrigation water
 - Authority to get onto ranches causing contamination...
- Invite individuals and organizations who can take **ACTION** to implement priorities and reduce illnesses
 - Poultry vaccine companies, poultry industry...



Questions?

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