Update from the FoodNet Outbreak Working Group

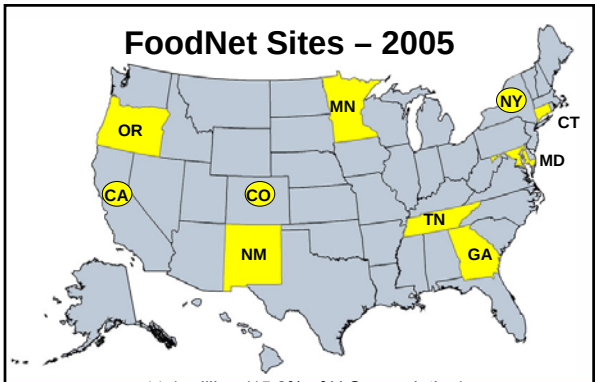
Katie Fullerton, MPH
FoodNet, CDC
April 6, 2006

SAFER • HEALTHIER • PEOPLE™

What is FoodNet?

- Foodborne Diseases Active Surveillance Network
- Established in 1996
- Foodborne disease component of CDC's Emerging Infections Program (EIP)
- Collaborative project
  - ten state health departments
  - CDC
  - United States Department of Agriculture (USDA)
  - Food and Drug Administration (FDA)
- Active surveillance for 7 bacteria and 2 parasites at >600 laboratories

FoodNet Sites – 2005



44.1 million (15.2% of U.S. population)

FoodNet Outbreak Working Group

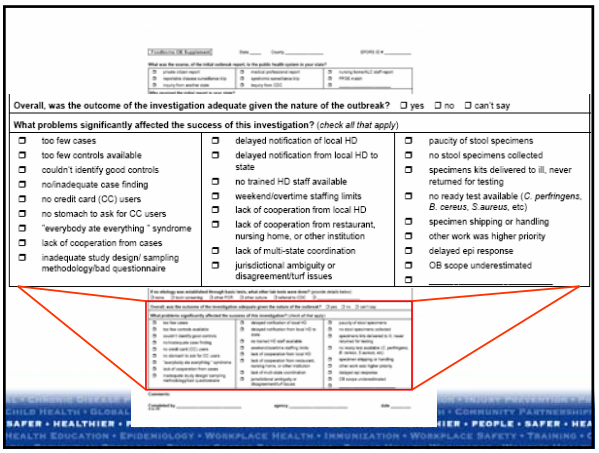
- Representatives from
  - FoodNet
  - Outbreak Unit of Foodborne Branch
  - Environmental Health Specialists Network (EHS-Net)
  - FDA/Center for Food Safety and Nutrition (CFSAN)
  - USDA/Food Safety and Inspection Service (FSIS)
- Serve as laboratory for testing ideas related to outbreak reporting and detection

Overview

- Outbreak Supplemental Form
- Contributing Factor Data
- *Listeria* Case History Form
- *Salmonella* Incubation Period Project
- Outbreak Isolate Submission
- Outbreak Reporting Performance Standards

Outbreak Supplemental Form

- 1 page form with additional information for all FoodNet reported foodborne outbreaks
  - Agencies involved
  - Details on specimen collection and testing
  - Barriers to investigations
- Collected in FoodNet sites since 2001
- Continually revised with input from partners
  - 2006 revision, January 1

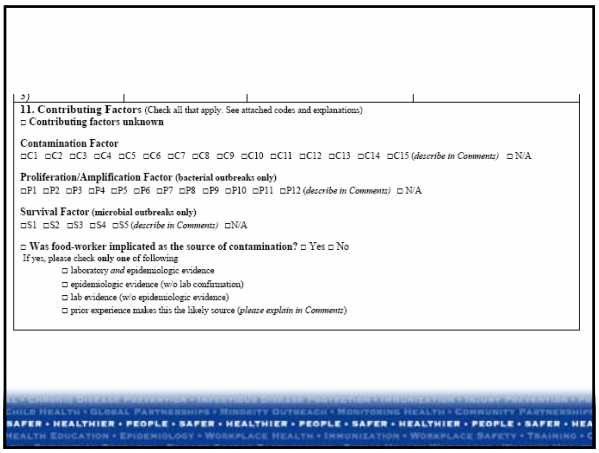


- Manuscript: Factors Associated with Confirming an Etiology during Foodborne Outbreak Investigations, FoodNet Sites, 2001-2004 (Snider, et al)
  - Outbreaks with confirmed etiology more likely to be
    - Larger (≥10 persons)
    - Stool specimens collected ≤7 days
    - Reported by health care provider
- Abstract presented
  - IDSA, San Francisco, October 2005
  - National Foodborne Epi Meeting, April 2006

- Future Analyses
  - Summarize data through 2005
  - Review source of notification for outbreaks
    - Who detects outbreaks
      - Consumer complaints
      - Subtype clusters
      - Clinical surveillance
    - How is public health department notified
  - Summarize most common barriers to an adequate investigation
    - resources available to overcome barriers?

Contributing Factor Data

- Collected on eFORS form (spoon and fork)
- 3 categories
  - Contamination
    - Toxins, bare-hand contact, contamination of raw product from animals/environment, cross-contamination from raw foods
  - Proliferation
    - Time/temperature abuses
  - Survival
    - Time/temperature abuses
- Separate ill foodworker question



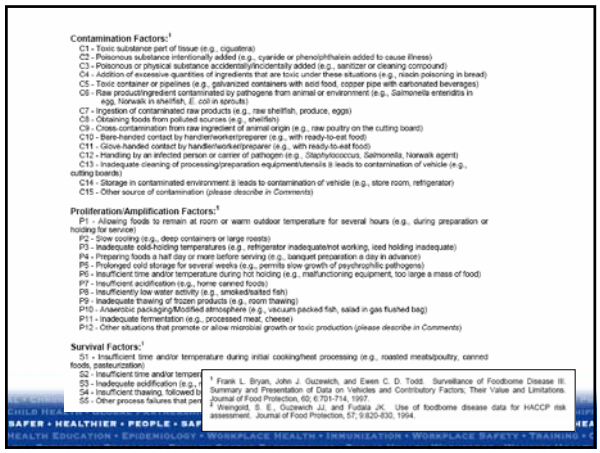
11. Contributing Factors (Check all that apply. See attached codes and explanations)
□ **Contributing factors unknown**

Contamination Factor
□C1 □C2 □C3 □C4 □C5 □C6 □C7 □C8 □C9 □C10 □C11 □C12 □C13 □C14 □C15 (*describe in Comments*) □ N/A

Proliferation/Amplification Factor (bacterial outbreaks only)
□P1 □P2 □P3 □P4 □P5 □P6 □P7 □P8 □P9 □P10 □P11 □P12 (*describe in Comments*) □ N/A

Survival Factor (microbial outbreaks only)
□S1 □S2 □S3 □S4 □S5 (*describe in Comments*) □N/A

□ **Was food-worker implicated as the source of contamination?** □ Yes □ No
If yes, please check **only one** of following
□ laboratory *and* epidemiologic evidence
□ epidemiologic evidence (w/o lab confirmation)
□ lab evidence (w/o epidemiologic evidence)
□ prior experience makes this the likely source (*please explain in Comments*)



Contamination Factors:[1]
C1 - Toxic substance part of tissue (e.g., ciguatera)
C2 - Poisonous substance intentionally added (e.g., cyanide or phenolphthalein added to cause illness)
C3 - Poisonous or physical substance accidentally/incidentally added (e.g., sanitizer or cleaning compound)
C4 - Addition of excessive quantities of ingredients that are toxic under these situations (e.g., nitrate poisoning in bread)
C5 - Toxic container or pipelines (e.g., galvanized containers with acid food, copper pipe with carbonated beverages)
C6 - Raw product/ingredient contaminated by pathogens from animal or environment (e.g., Salmonella enteritidis in egg, Norwalk in shellfish, *E. coli* in sprouts)
C7 - Ingestion of contaminated raw products (e.g., raw shellfish, produce, eggs)
C8 - Obtaining foods from polluted sources (e.g., shellfish)
C9 - Cross-contamination from raw ingredient of animal origin (e.g., raw poultry on the cutting board)
C10 - Bare-handed contact by handler/worker/preparer (e.g., with ready-to-eat food)
C11 - Glove-handled contact by handler/worker/preparer (e.g., with ready-to-eat food)
C12 - Handling by an infected person or carrier of pathogen (e.g., Staphylococcus, Salmonella, Norwalk agent)
C13 - Inadequate cleaning of processing/preparation equipment/utensils ⇓ leads to contamination of vehicle (e.g., cutting boards)
C14 - Storage in contaminated environment ⇓ leads to contamination of vehicle (e.g., store room, refrigerator)
C15 - Other source of contamination (*please describe in Comments*)

Proliferation/Amplification Factors:[1]
P1 - Allowing foods to remain at room or warm outdoor temperature for several hours (e.g., during preparation or holding for service)
P2 - Slow cooling (e.g., deep containers or large roasts)
P3 - Inadequate cold-holding temperatures (e.g., refrigerator inadequate/not working, iced holding inadequate)
P4 - Preparing foods a half day or more before serving (e.g., banquet preparation a day in advance)
P5 - Prolonged cold storage for several weeks (e.g., permits slow growth of psychrophilic pathogens)
P6 - Insufficient time and/or temperature during hot holding (e.g., malfunctioning equipment, too large a mass of food)
P7 - Insufficient acidification (e.g., home canned foods)
P8 - Insufficiently low water activity (e.g., smoked/salted fish)
P9 - Inadequate thawing of frozen products (e.g., room thawing)
P10 - Anaerobic packaging/Modified atmosphere (e.g., vacuum packed fish, salad in gas flushed bag)
P11 - Inadequate fermentation (e.g., processed meat, cheese)
P12 - Other situations that promote or allow microbial growth or toxic production (*please describe in Comments*)

Survival Factors:[1]
S1 - Insufficient time and/or temperature during initial cooking/heat processing (e.g., roasted meats/poultry, canned foods, pasteurization)
S2 - Insufficient time and/or temperat
S3 - Inadequate acidification (e.g., v
S4 - Insufficient thawing, followed b
S5 - Other process failures that per

[1] Frank L. Bryan, John J. Guzewich, and Ewen C. D. Todd. Surveillance of Foodborne Disease III: Summary and Presentation of Data on Vehicles and Contributory Factors; Their Value and Limitations. Journal of Food Protection, 60; 6:701-714, 1997.
[2] Weingold, S. E., Guzewich JJ, and Fudala JK. Use of foodborne disease data for HACCP risk assessment. Journal of Food Protection, 57; 9:820-830, 1994.

Contributing Factor Projects

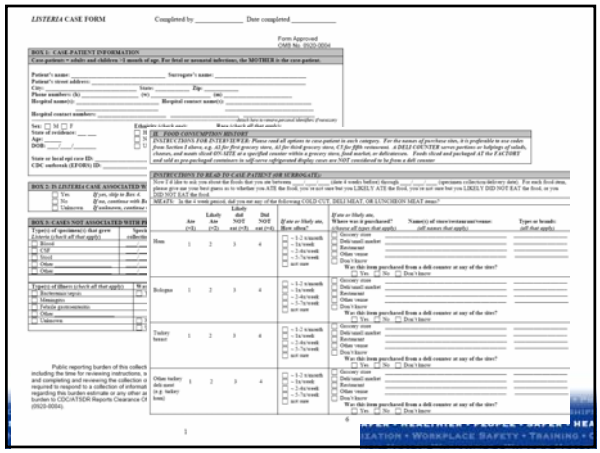
- FoodNet
  - Analysis of FoodNet CF data from eFORS. (Pat McCarthy (FDA), 2005)
  - Supplemental form improve/better understand filling out of CFs in eFORS. (2006)
- EHS-Net
  - Survey of who fills out eFORS CFs. (David Nicholas, 2005)
  - Levels of Evidence for CF (James Mack, OR, ongoing)
  - Evaluate aspects of routine inspections potentially predictive of/related to subsequent outbreaks. (Value of Inspections Program WG, Ryan Mason, 2006)
  - Define CFs (EHS-Net WG, ongoing)
  - EHS-Net Outbreak/Non-Outbreak Restaurant Study. Evaluation of "gold-standard" inspections. (ongoing)
- Enteric Disease Timeline Study (EDITS)- Six-state survey to assess time delays and other factors associated with outbreak investigations. (Craig Hedberg, final report August 2005)

Contributing Factor Data - FoodNet

- FoodNet CF proposal
  - Modify Outbreak Supplemental Form
    - How, when, by whom CF data are captured
    - Assessment of level of certainty
    - Which definitions used
  - Complete for all outbreaks
- Synergize efforts between FoodNet, Outbreak Unit, EHS-Net, FDA/CFSAN

Listeria Initiative

- FoodNet piloted the *Listeria* Case History Form during the first three months of 2004.
- Continue to complete the form and fax directly to Mike Lynch at 404.639.2205
- Form has been OMB – approved
  - Introduced nationwide, 2006
- *Listeria* database (Access) created 2005
- Data used as controls in outbreak investigation (August, 2005)
  - Data aided in timely identification of food vehicle (turkey deli meat) for a small cluster (13 cases)
  - EIS 2006 abstract (Schmitz, et al)



LISTERIA CASE FORM

Salmonella Incubation Period Project

- Compile data on range of incubation periods seen for non-typhoidal salmonellosis
- Incubation period 6-72h, "usually" 12-36h
- Calculate incubation
  - Onset of symptoms
    - First feel sick, first 'hard' symptom
  - Date and time of onset
- Data collected since Jan 1, 2005
  - Also collecting retrospective data
- Summary and analysis ongoing
- Open to all states
- Contact Bill Keene: keene@cluemail.com

ONSET AND DURATION

Get precise answers for onset time. If you don't get a date and time, it can't be placed on an epi curve. Estimates are OK. Prompt as needed: "What is your best guess of the time?" Don't let them get away with vague stuff like "morning" or "after midnight." Be careful with times such as "midnight" or early morning hours – which day do they mean? By "2am Friday night," for example, do they mean Saturday morning? Keep probing until it is unambiguous. Midnight exactly will be graphed as 11:59 pm.

On what date did you first (begin to) feel sick? _____

At what time did you first feel sick? [*ENTER A SPECIFIC HOUR IF POSSIBLE!!!*]

❒ _____ am ❒ noon ❒ _____ pm ❒ midnight (very *end* of day)

[*If applicable*] On what day did you start having the vomiting or diarrhea [or measured fever >101F] – whichever came first; we don't care which]? _____

[*If applicable*] At what time did the vomiting/diarrhea begin? [*BE SPECIFIC!!!*]

❒ _____ am ❒ noon ❒ _____ pm ❒ midnight (end of day)

Outbreak Isolate Submission

- Outbreaks serve as a good source of data for examining the relationship between multidrug resistant strains of *Salmonella* and food vehicles
- Beginning January 1, 2004, for every *Salmonella* outbreak reported in eFORS with 3 or more laboratory confirmed cases, FoodNet sites will submit 3 isolates to the NARMS laboratory for susceptibility testing.

Outbreak Performance Standards

- FoodNet developed performance standards for the reporting of foodborne outbreaks to eFORS
  - Timeliness of reporting (≤ 2 months from first illness onset)
  - Completeness of data
    - Number of lab-confirmed cases
    - Age-group, sex
    - Number hospitalized, number of deaths

Questions?

Katie Fullerton, MPH
FoodNet Epidemiologist
1600 Clifton Rd, MS D-63
Atlanta, GA 30333
Phone 404.639.3363
Email: kfullerton@cdc.gov