Rapid Detection Tools

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Outline

- Detection challenges
- Anatomy of an outbreak
- FDA’s role during an outbreak
- The importance of rapid detection tools
Detection Challenges

■ Outbreak situations
  • Human samples
  • Food samples
  • Environmental samples (e.g., soil, water)
  • Animal samples
■ Routine situations
  • Sampling during inspections
    • Domestic/Imports

Detection Challenges

■ Speed
  • In the early stages to identify cases
  • To determine *Salmonella* in food samples
  • To serotype and genetically type isolates
■ Ease of use in the field
  • During investigations
  • During import inspections
Anatomy of an Outbreak

Consumer Illness
- Consumption of contaminated food
- Development of symptoms
- Visit physician
  - Take stool sample
  - Analyze sample in a clinical microbiology laboratory
  - Find a pathogen (e.g., *Salmonella*)

Case Finding
- Clinical lab sends bacterial isolate to local/state lab
- Local/state lab confirms the isolate
- Local/state lab does genetic fingerprinting (PFGE)
- Fingerprint submitted to central database (PulseNet)
- States report cases to CDC daily

Case Exposure Information
- Local health department interviews patient using a standard questionnaire – collects consumption and product information
Anatomy of an Outbreak

Multiple Case Finding

• Multiple patients have the same pathogen
• Food histories reviewed for common feature
• Same genetic fingerprints found in multiple states
  ▪ Determine which foods are the most likely
  ▪ Set up a case control study
  ▪ Identify most likely food

FDA takes next steps

FDA’s Role

Discuss recall with firm if source identified
  • Issue press
  • Communicate with the public/media

Product Tracing

• Determine where product came from and where it went
• Secondary recalls
• Food preparation review; processor, distributor and farm investigations

Testing

• Leftover product from case-patients
• Food samples obtained during inspections
• Environmental samples
Anatomy of an Outbreak

*FDA’s Role*

- Source Determination
  - Inspect and take samples in the plant
  - On the farm
- Consumer Communication
- Prevent Reoccurrence
- Learn from what went wrong
  - How and where did the contamination occur

Salmonella – 2008

- 1450 + cases
- 43 states + DC
- Multiple food types
- Complex traceback to identify source
**Sequence of Events**

- Late May 2008 - CDC gave FDA an early alert of *Salmonella* Saintpaul illnesses in NM & TX
  - Tomatoes a likely vehicle
- May 31st, CDC notifies FDA that tomatoes are implicated
- FDA initiates product tracing on Tomatoes
- Many tomato samples tested for *Salmonella*

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**Sequence of Events**

- Tomatoes trace to FL and Mexico
- Inspections initiated
- Outbreak continues
- CDC/states undertake second case control study
  - Tomatoes still implicated
  - Jalapeno and Serrano peppers now implicated as well
Sequence of Events

- July traceback of peppers
- July 21 positive sample found at distributor in TX
  - Trace back to MX
- Inspection and sampling on farms in MX
- July 30th positive samples found on farm in MX

Summary

- Rapid detection
  - During the formative stages of an outbreak
  - For food and environmental samples
- Identify the problems faster
- Eliminate negatives faster
- Public health gains
  - Better protection
  - Great availability of products not implicated in an outbreak