Source Investigations

The Follow-Up to Tracebacks from Foodborne Outbreaks
Anatomy of an Outbreak Investigation

- Surveillance
- Epidemiological investigation
- Laboratory analysis
- Environmental investigation
- Response/recall
- Traceback/traceforward
- Source investigations
Lessons Learned From Past Investigations

- Challenges associated with tracebacks:
  - Poor and incomplete record keeping
  - Slow response in providing records
  - Multiple sources of the same product at the same time at various steps in the system
  - Records from one point in the supply chain do not always agree with records from adjacent points
  - Processors cannot match finished product with incoming raw ingredients
  - Tracebacks often require huge amounts of resources
From Traceback Investigation to Source Investigation

- Ideally...
  - traceback data analysis will converge to a common supplier, source, farm, etc. where the initial contamination may have occurred
Source Investigations

- **Purpose of Source Investigation:**
  - *Note:* Not your typical inspection
  - Sources of Microbial Contamination

- **Lessons Learned:**
  - Team approach is critical
    - Multi-disciplinary
    - Multi-organizational
  - Planning and Coordination is key
Source Investigations Highlights

- Produce farm layout
- Water sources
- Animal management
  - Manure use and management
- Harvest tools and equipment
  - Pesticide application equipment
Source Investigations Highlights

- Processing & packing facilities
  - Transportation of product

- Worker health and hygiene
  - Sewage management

- Environmental and product sampling
Source Investigation: Farm Layout

- Possible sources of contamination
- Geography (eg. land gradient), wind blown sources
- Weather, flooding, drought
Examples of Farm Layout
Source Investigation: Water Source, Distribution & Storage

- **Water sources**
  - Wells protected from contamination, tested
  - Surface sources protected from contamination
  - Irrigation water sources

- **Water distribution and storage**
  - Holding ponds
  - Storage tanks
Examples of Water Source and Distribution
Source Investigation: Animal and Manure Management

- Evidence of animal activity near or around fields
  - Domestic or wild animals in fields
  - Grazing in harvested fields

- Fences or barriers

- Manure use and management
  - Run-off from manure storage and treatment areas
  - Manure source, treatment, storage on-site, and timing of applications
Animal Management
Source Investigations: Field Sanitation

- Harvest tools and equipment
- Field Equipment, Sanitation, and Transportation
  - Processing, packing equipment
  - Construction, cleaning, sanitizing
Field Sanitation
Source Investigation: Worker Health & Hygiene and Sewage Management

- Community disease surveillance
- Worker health and hygienic practices
- Firm’s training program for worker health and hygiene
- Waste/sewage disposal for both the field and packing facility
Source Investigation: Product and Environment Testing

- Environmental sampling
  - Water sources, soil, drainage ditches
  - Animal feces or swab of animal

- Product sampling
  - Same or similar products
Lessons Learned From Past Investigations

- Environmental vs. Regulatory Investigation
  - Standardized protocols and forms
  - Investigation VS Inspection
  - Multi-disciplinary, coordination among multiple organizations
    --Rapid Response Teams
How are Source Investigation Findings Utilized?

- Regulatory actions
  - Import alerts
- Stimulating action by stakeholders
- Stimulate Research
  - Prevention approaches by FDA, academia, and others
- Outreach – states, consumers, and industry

*Source Investigation findings lead to changing practices to minimize potential for contamination!*
What FDA Recognizes

- Respect for cultural differences
- Gathering and analyzing scientific data is an ongoing process
- Different regulations
- Continuous dialogue is critical
Conclusions

- Source Investigations used to determine how the pathogen may have contaminated the crop and/or how the contamination may have been spread

- Frequently find multiple means by which contamination may have occurred
  - Seldom find “smoking pig or pepper”

- Coordination and Team Approach is essential
Questions?