Lace Up your Slip Resistant Boots and Solve an Outbreak!

AFDO AEC Phoenix 2020

Foodborne Illness, Environmental Assessments (EA's) and Case Studies

Presenters

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Introduction

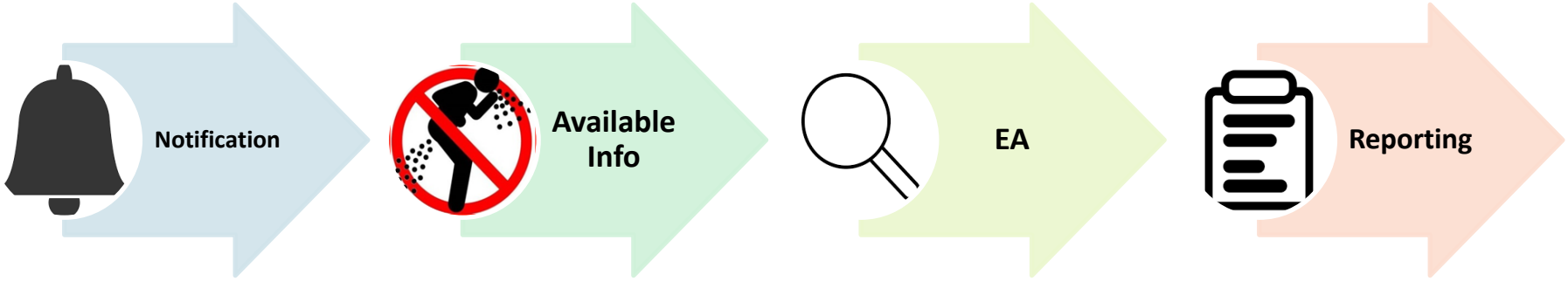
Notification

Available Info

EA

Reporting

Introduction



- **What is an appropriate response time?**
  - 24-48 hours. It is important to consider all available information and consult with foodborne outbreak team before the site visit.

- **What activities should be done to prepare for the EA?**
  - Consult with lab/epi –
    - How can lab data inform the EA?
    - How can Epi data inform the EA?

- **How many times should the site be visited?**
  - Depends. Multiple visits are usually required as more epi/lab data become available and to develop a risk management plan

- **What are the communication expectations during the outbreak?**
  - How quickly should findings be disseminated?
  - Who is this information communicated to?

Complaint vs Pathogen Notification

Notification

How does the time between notification and exposure impact the environmental assessment (EA) and outbreak investigation in general?

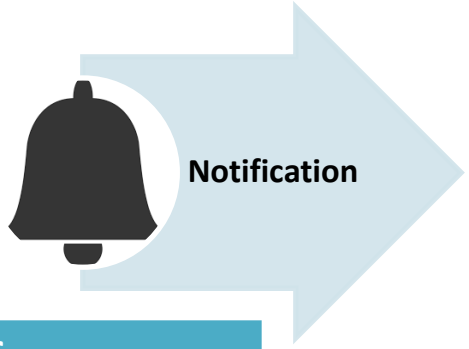
1. No impact at all

2. It may be more difficult to identify contributing factors and environmental antecedents the more time has passed between the exposure date and date of EA.

3. Old habits die hard – we can still identify contributing factors and environmental antecedents even if it has been a long time since the exposure.

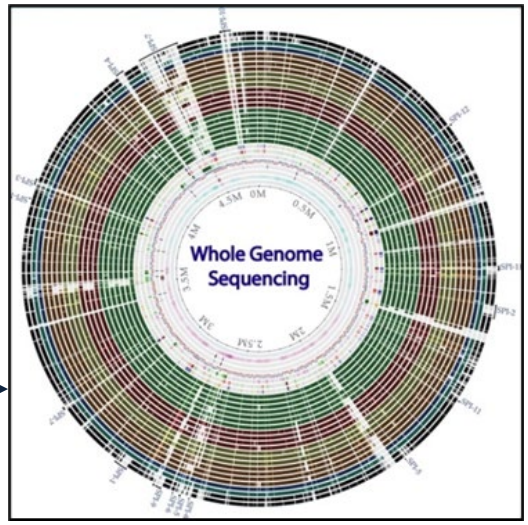
4. It doesn't matter - either way we will do a complete inspection that will fix everything that may have contributed to the outbreak.

Complaint vs Pathogen Notification

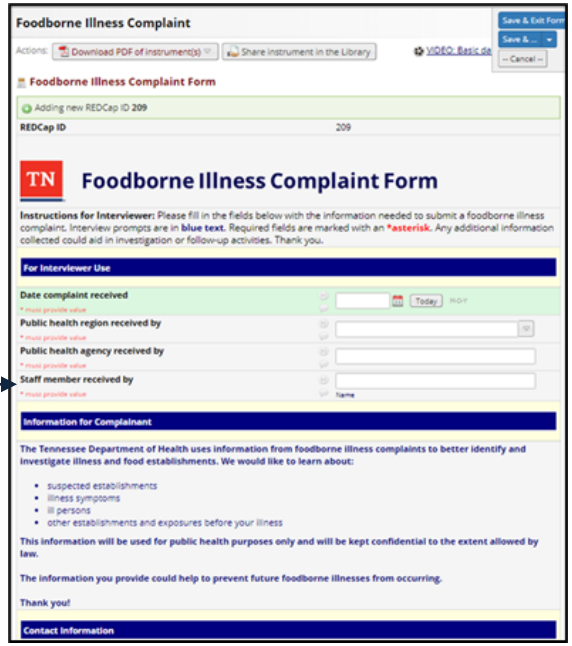


	Pathogen Known?	Time since exposure?	Barriers	Good for identifying
Complaint	No	Days	Last meal bias	Illnesses with short incubation
Pathogen	Yes	Weeks to Months	Recalling food history	Illnesses with long incubation

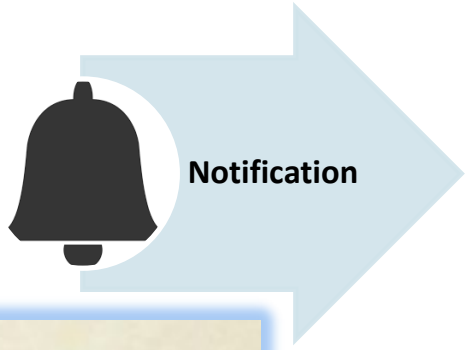
Pathogen Notification

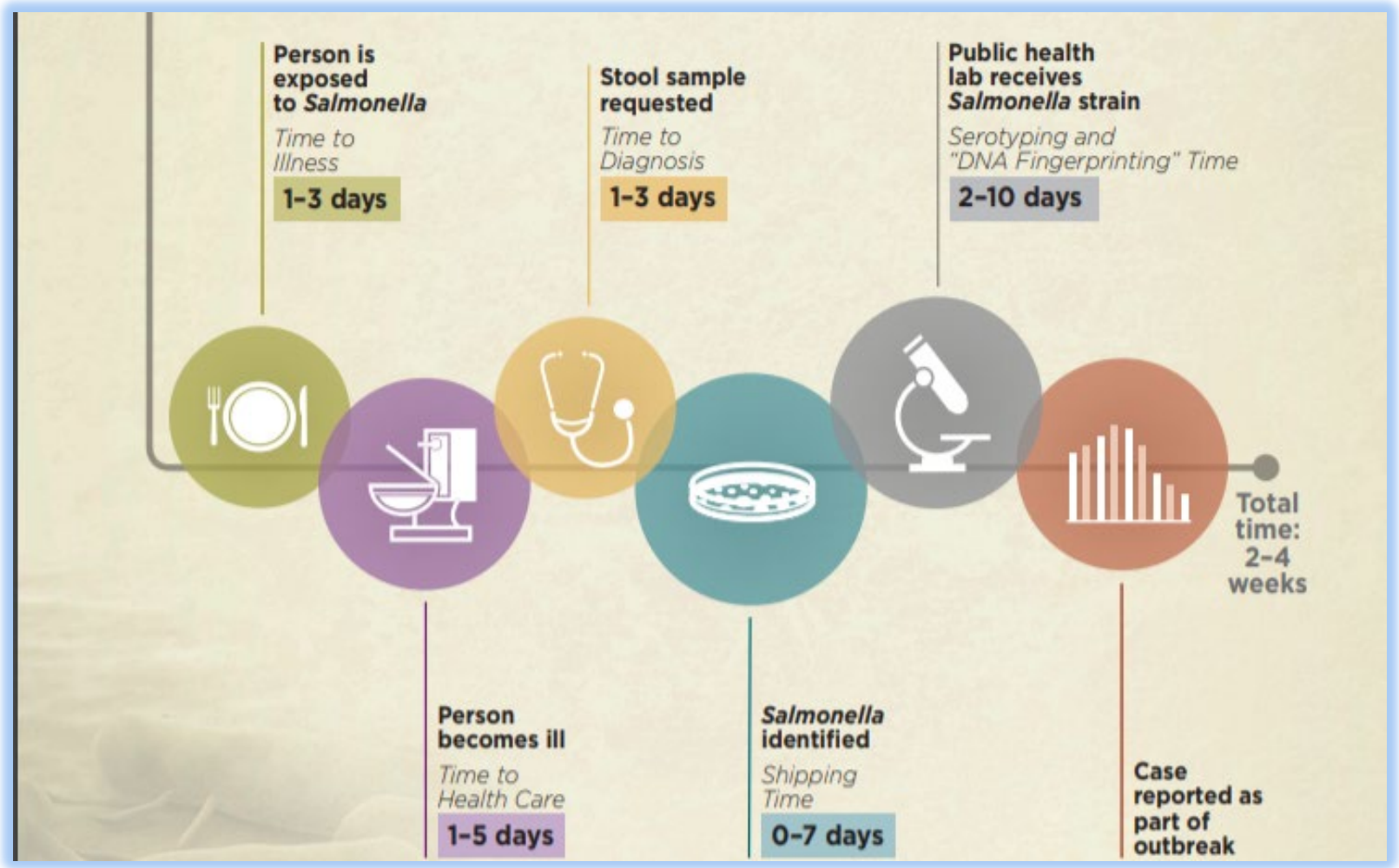


Complaint Notification

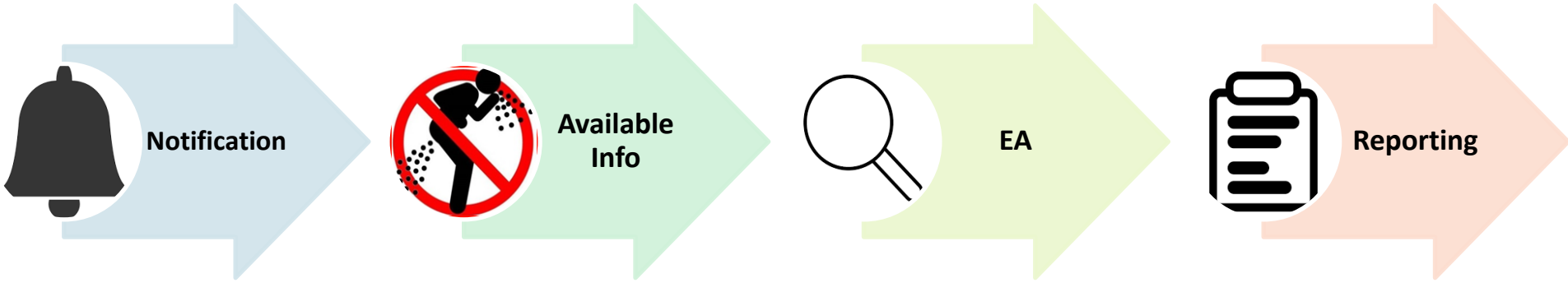


Pathogen Notification Timeline

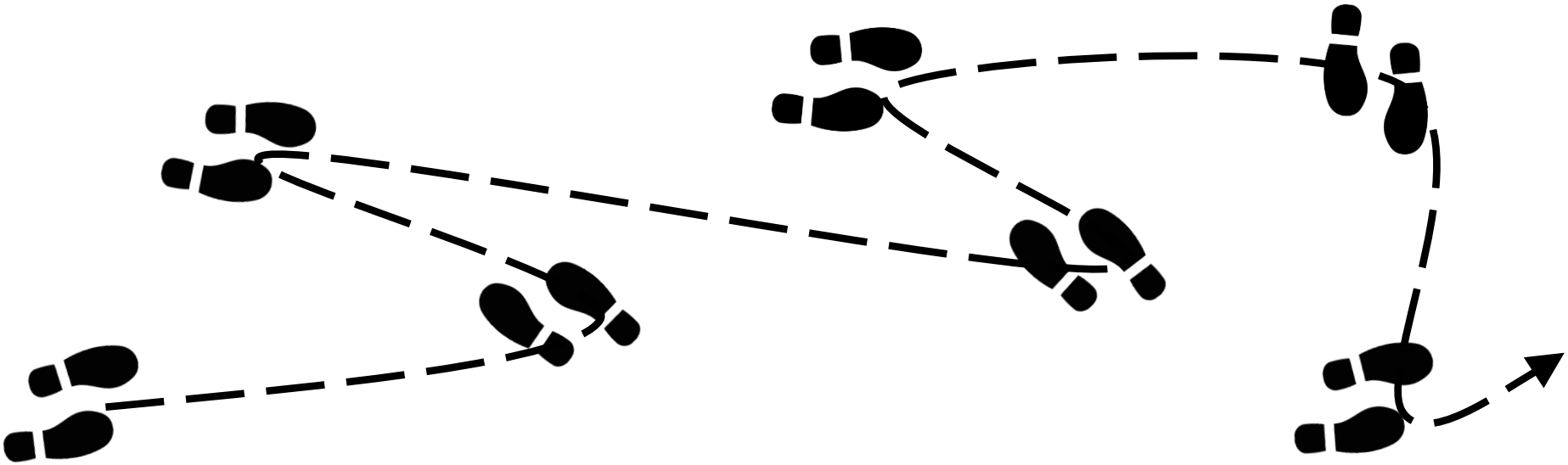




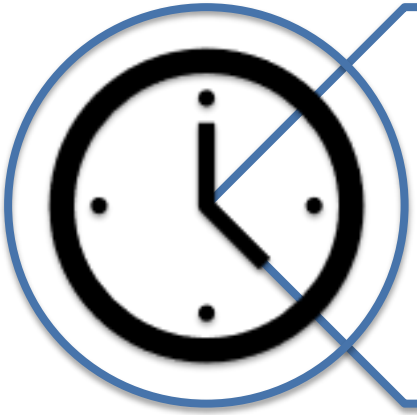
Source CDC: [Timeline for Salmonella Reporting]



Let's lace up our boots and walk through a real-world outbreak investigation in Tennessee!



Complaint Outbreak Notification



Notification date: Afternoon of 9/16/19

Notifications Type

- Customer complaint of group illness to regional health department

Initial complaint summary

Available Info

**Pay close attention – questions are coming!

58 Women from Alabama visited a restaurant/hotel in Tennessee for a church retreat

9/14 (Saturday)

17 people became ill between 4:30pm and 7:00pm with diarrhea, abdominal cramps, nausea, vomiting, and fever

Common meals consumed

- 9/14 Breakfast buffet at 7:00am
- 9/14 Lunch catered by restaurant in private dining room from 10:30am – 11:00am.

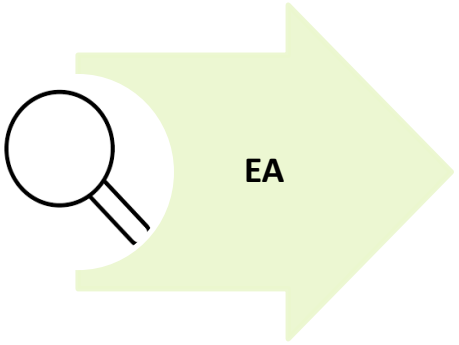
Considerations with the Available Information

- **What are the approximate incubation times for the dinner?**
  - 6 – 8 hours

- **With the available information would you open an investigation?**
  - Yes. There is a report of more than two ill with common exposures and symptom profile

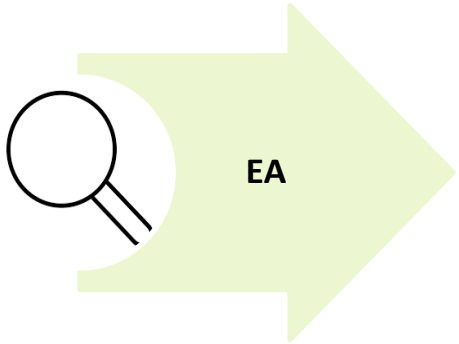
- **What are some other questions that should be asked of the cases?**
  - Other common exposures?
    - Did you travel together on the same bus?
    - Was anyone at the retreat ill with GI symptoms before the other's got sick?

Environmental Assessment (EA) Preparation



- **Activities done to prepare for the EA**
  - **Consult with lab/epi**
    - At the onset of the investigation there was limited/no lab or epi information available
  - **Consult with routine inspector/review past inspections**
  - **Menu review**
  - **Assemble a team**
    - 2-person team visited on initial visit
    - Environmentalist trained on conducting environmental assessments
    - Discussed if environmental sampling should be conducted (swabbing and or food collection)
  - **Pathogen Hypothesis**
    - Even with limited information we could still develop a hypothesis about which pathogen is causing the illnesses

EA Preparation: Pathogen Hypothesis



Guidelines for Confirming Cause of Foodborne Disease Outbreaks

Bacterial | Chemical | Parasitic | Viral

Etiologic Agent	Incubation Period	Clinical Syndrome
Bacillus cereus – Vomiting toxin	1-6 hrs	Vomiting; some patients with diarrhea; fever uncommon
Escherichia coli – Enterohemorrhagic (*E. coli* O157:H7 and others)	1-10 days; usually 3-4 days	Diarrhea (often bloody), abdominal cramps (often severe), little or no fever
Clostridium botulinum	2 hrs-8 days; usually 12-48 hrs	Illness of variable severity; common symptoms are diplopia, blurred vision, and bulbar weakness; paralysis, which is usually descending and bilateral, might progress rapidly
Clostridium perfringens	6-24 hrs	Diarrhea, abdominal cramps; vomiting and fever uncommon
Listeria monocytogenes – Invasive disease	2-6 wks	Meningitis, neonatal sepsis, fever
Listeria monocytogenes – Diarrheal disease	Unknown	Diarrhea, abdominal cramps, fever
Nontyphoidal *Salmonella*	6 hrs-10 days; usually 6-48 hrs	Diarrhea, often with fever and abdominal cramps

Source CDC: Guidelines for Confirming Cause of Foodborne Disease Outbreaks

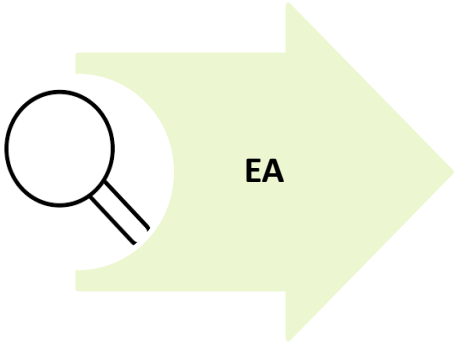
EA Preparation: Pathogen Hypothesis

EA

Using the initial complaint information what pathogen do you think we are dealing with (select all that apply)?

a. *Bacillus cereus*
b. *Listeria monocytogenes – invasive disease*
c. *Clostridium perfringens*
d. Nontyphoidal *Salmonella*

Environmental Assessment Preparation: Contributing Factor Hypothesis



From our pathogen hypothesis can we develop a contributing factor hypothesis?

- Are there common food associations with *Salmonella* and *Clostridium perfringens?*
- Are there common contributing factors associated with these pathogens?

EA Preparation: Contributing Factor Hypothesis

EA

Meat or Poultry	Retail Store/Food Service/Home											
	Contamination				Holding/Storage				Processing			
	Cross Contamination	During Reconstitution	Improper Cleaning of Equipment	Worker/Person	Improper Hot Holding	Inadequate Refrigeration	Prolonged Storage	Room/Outdoor Temperature Holding	Heat Process Failure	Improper Cooling	Inadequate Reheating	Organism/Toxin Survives Process
MEAT												
Cooked, Pasteurized, and Other Heat Processes												
Bacteria												
Bacillus anthracis												✕
Clostridium botulinum						✕		✕		✓	✓	✕
Clostridium perfringens	▲		▲	▲	✕	✕		✕		✕	✕	✕
Escherichia coli STEC/VTE	✕		✓	▲	✕	✕		✕	✕	✕	✕	
Listeria monocytogenes	▲		▲			✓	✕	▲	✓	▲	▲	
Salmonella	✕		✓	▲	✕	✕		✓	✕	✕	✕	
Staphylococcus aureus	▲		▲	✕	✕	✕		✕	▲	✕		✕
Yersinia enterocolitica	▲		▲			✕		▲	✕	✓	✓	
Parasite												
Taenia spp.	▲								✕			
Toxoplasma gondii	▲								✕			
Trichinella spiralis	▲								✕			

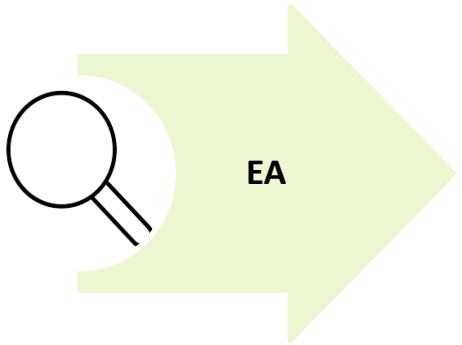
✕ = Principal Factor to Consider
✓ = Factor to Consider
▲ = Potential Factor to Consider
● = Source of contamination, but likely to be destroyed during later processing
T = Toxin Survives Heat Processes

Environmental Assessment Summary

EA

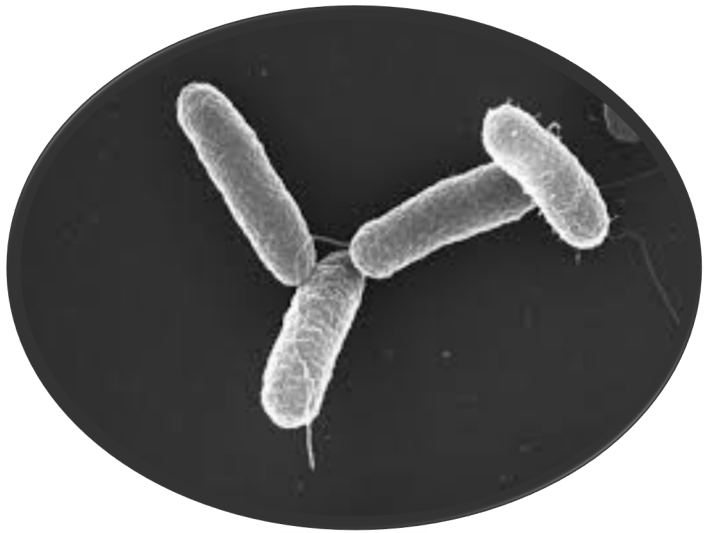
- **Site visit conducted on 9/17/19**
- **Initial site visit found numerous food safety issues:**
  - Improper cooling of meats from smoker served at catered lunch (not from the same batch)
  - Vacuum packing meats without variance
  - Cooler on cookline and walk-in cooler at +50˚ F
- **Control Measures put into place for proper cooling, reemphasizing proper hygienic practices, and sanitation**
- **NEARS data collected**

Environmental Assessment Summary

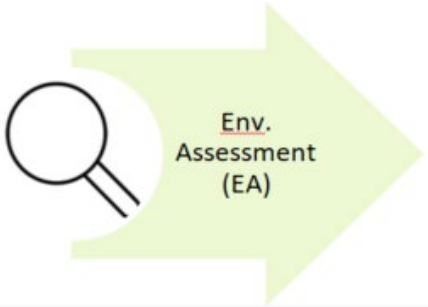


- **9/17: (Same day after EA was conducted) *Salmonella* is confirmed in one case**

- **9/23/19: Survey results from party implicate roast beef**
  - Should another site visit take place?
    - Yes/No
    - If yes, what should be done?
      - Environmental sampling
      - Detailed food flow of roast beef



Environmental Assessment Summary



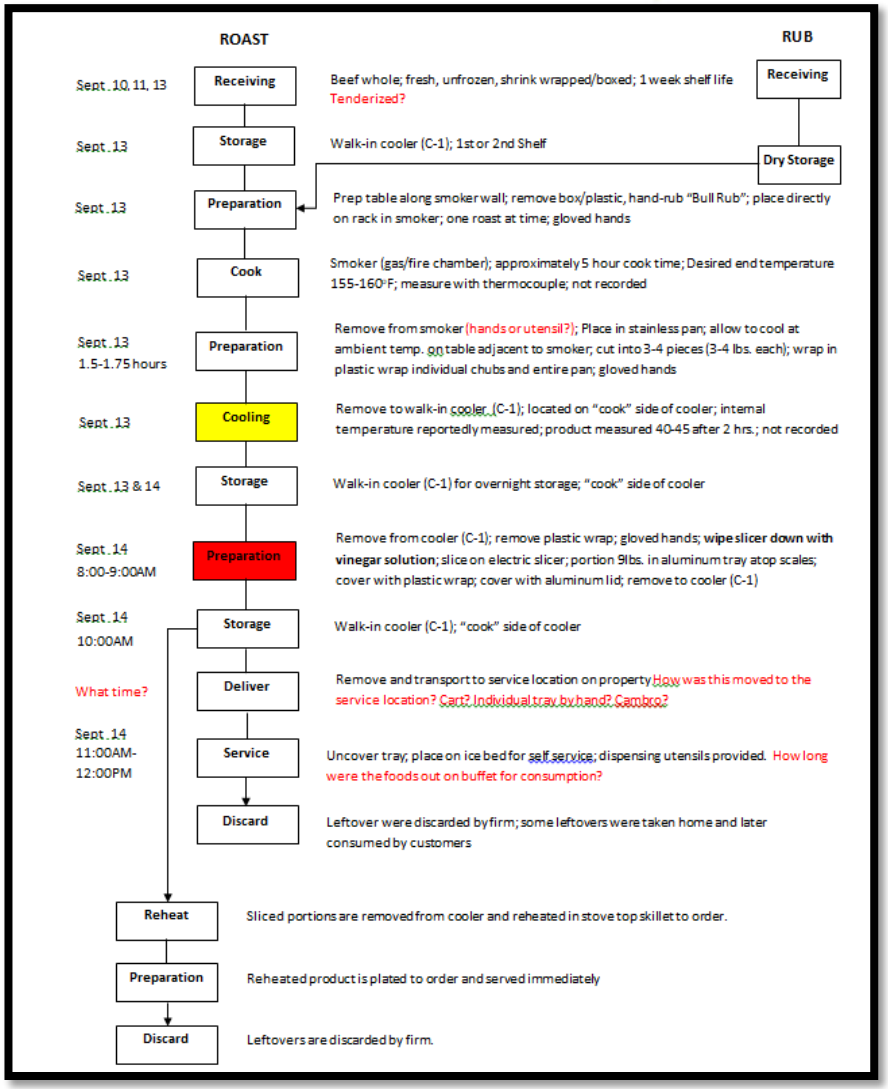
- **9/26**: Second site visit done to conduct a food-flow on roast beef and collect environmental swab samples (all swabs were negative)

- **Detected issues with:**
  - Cooling
  - Bare-hand contact
  - Sanitation of slicer

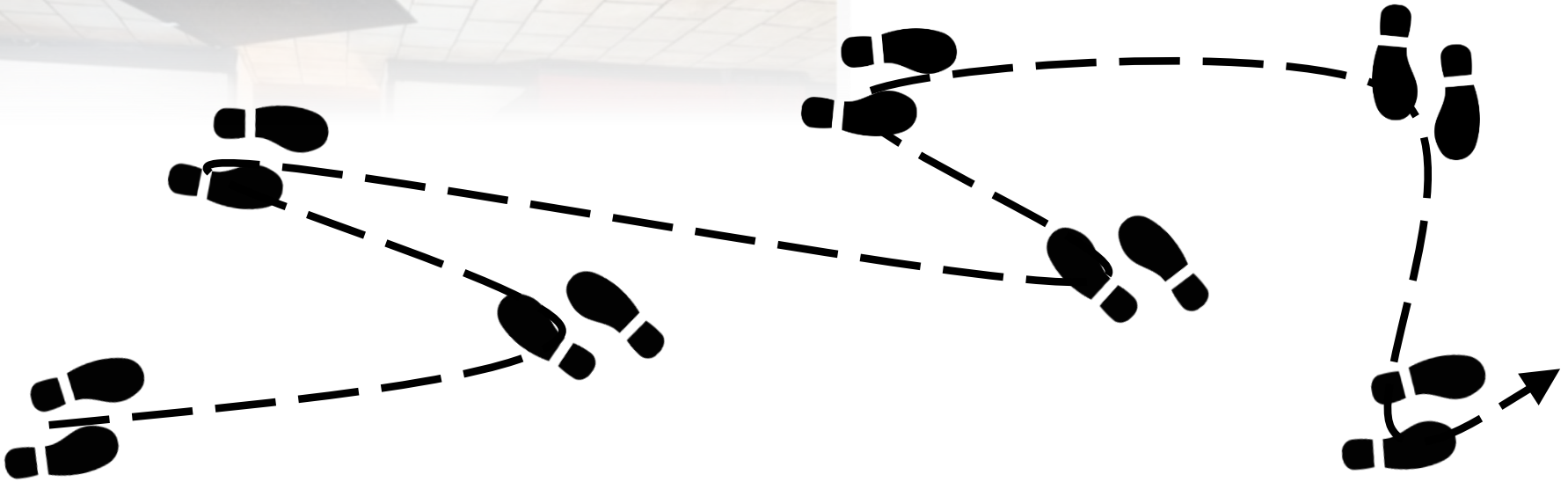
  Immediate control measures put in place

- **9/27:** Leftover roast beef collected from case is positive for outbreak strain

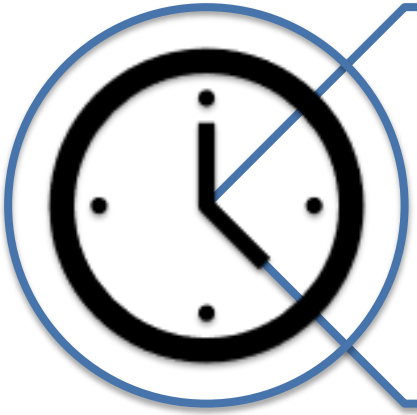
- **10/3:** Third site visit conducted to initiate a formal written risk management plan (long-term control measures)



Outbreak 2
North Carolina



Complaint Outbreak Notification



Notification date:

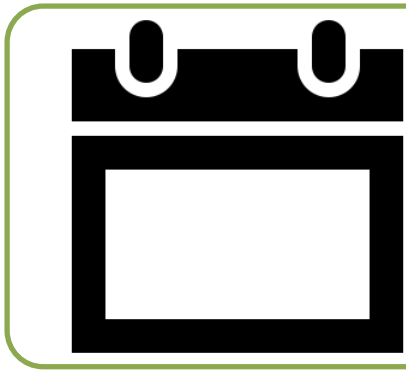
10/29/2019

Notification Type

- Call to NC DHHS from local health department after noticing periodic ***Salmonella London*** cases

Initial complaint summary

Available Info



Review of illness cases found **14 cases** of unusual serotype of ***Salmonella (S. london***) over a **6-month period**

WGS confirmed relatedness (0-4 alleles)

Food??

Difficulty determining common meals because length of time elapsed

Initial complaint summary

Illness onset date
Reports eating at Restaurant X 3 days prior to illness onset
Dates Restaurant X is open

2019

January

S	M	T	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

February

S	M	T	W	Th	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

March

S	M	T	W	Th	F	S
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17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

April

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28	29	30				

May

S	M	T	W	Th	F	S
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12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	
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June

S	M	T	W	Th	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

July

S	M	T	W	Th	F	S
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7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

August

S	M	T	W	Th	F	S
				1	2	3
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11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

September

S	M	T	W	Th	F	S
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8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

October

S	M	T	W	Th	F	S
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13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November

S	M	T	W	Th	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

December

S	M	T	W	Th	F	S
1	2	3	4	5	6	7
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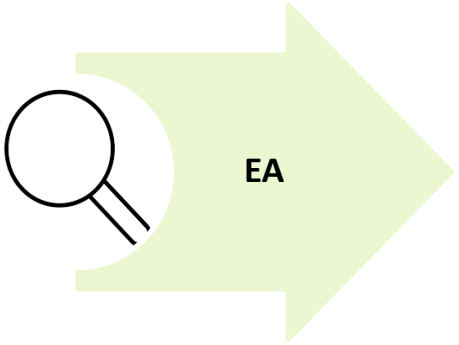
Environmental Assessment Preparation



What activities should be done to prepare for the EA?

1. Consult with routine inspector/review past inspections
2. Menu review
3. Assemble a team
    1. How many people should perform the EA?
    2. Who should perform the EA?
    3. Will environmental sampling be conducted (swabbing and or food collection)?

Determining Likely Source of Illness

Based on the initial complaint information what risk factors should be investigated:

1. Poor personal hygiene
2. Unapproved source
3. Improper cook temperatures
4. Improper holding temperatures
5. Contaminated equipment

Environmental Assessment Summary

EA

- Site visit conducted on 10/30/19

- Initial site visit found numerous food safety issues:
  - Hand sinks not working properly
  - Improper cooling: BBQ between 63˚F - 79˚F
  - Large bins and BBQ gloves were not being properly washed, rinsed and sanitized

- Risk control plan put in place for cleaning and sanitizing large bins, BBQ gloves

Environmental Assessment Summary

EA

- Survey results difficult because of long time frame
- Food samples were not tested
- 11/12/19 – 73 environmental samples were collected by experienced NCDA inspectors
  - First time environmental samples were used in retail establishment
  - Important partnerships

Environmental Assessment Summary

EA

- 9 out of 73 (12%) returned positive for *Salmonella*
- Restaurant was closed by local health department 11/22/19 for cleaning
- Repeat samples were taken 12/2
- All staff members had to submit stool sample before returning to work

Reporting Findings of the EA

- **Communication during the outbreak**
  - What information should be included on the EA summary report?
  - How quickly should findings be disseminated during the investigation
    - As soon as possible (within 24 hours)
  - How can the EA information inform the Epi investigation?
  - Who should receive the update?
    - Minimum core investigative team
  - How will you communicate the findings?
    - Email
    - Conference call
    - In person
    - Combinations of these
- **Communication after the outbreak**
  - Should an after-action review (AAR) or hot-wash be conducted?
  - Why is collecting NEARS data important?

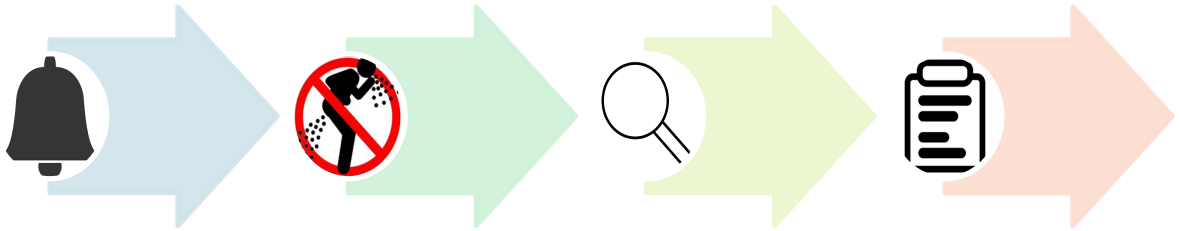
Conclusions

Outbreak notification type (complaint vs. pathogen) can influence initial environmental assessments in different ways.

There are numerous tools available to help generate hypotheses about possible pathogen and contributing factors.

Gather all possible information and consult with outbreak team before first site visit.

Conclusions



Old habits die hard! Don’t let long lag-times between notification and exposure deter you from conducting an environmental assessment

Multiple site visits are likely needed as more information becomes available

Control measures, control measures, control measures

Acknowledgements

Paster Training, Inc.
- Melissa Vaccaro

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THANK YOU!

QUESTIONS?