

# Foodborne Outbreak (FBO): Challenges in Detection and Epidemiologic Response

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# What Public Agencies Are Involved ?

	<b>Local</b>	<b>State (CDPH)</b>	<b>Federal</b>
Communicable Disease	CD Control PHN Epidemiologists	Infectious Diseases Branch	CDC Enteric Diseases Epi Branch
Environmental Health + Foods	EHS	FDB CDFA	FDA USDA
Laboratory	Local PHL (+ clinical labs)	MDL, VRDL, FDLB	PulseNet CDC labs
Public Information	Local PIO and Health Educators	Office of Public Affairs	Office of Public Affairs

# Overview of Steps Involved in FBO Detection and Epidemiologic Response

- Early phase:
  1. Detection of outbreak
  2. Confirmation of outbreak
  3. Decision point: Investigate further? Available resources?
- Epidemiologic/Investigative phase:
  4. Identification of a team leader
  5. Coordination of Epi/EH/Lab/Risk Communication
  6. Determination of extent of outbreak
  7. Determination of source of outbreak

# Step 1: Detection of a FBO

- From public complaints/calls: increased number of complaints/calls to local complaint hotline or 24/7 number (LHDs/EHs)
- From laboratories: increased number of rare *Salmonella* serotype or PFGE pattern of an enteric pathogen (CDPH, some LHDs, CDC)
- From surveillance: higher than expected number of cases for similar time period in previous years (LHDs, CDPH)
- From another public health agency such as CDC

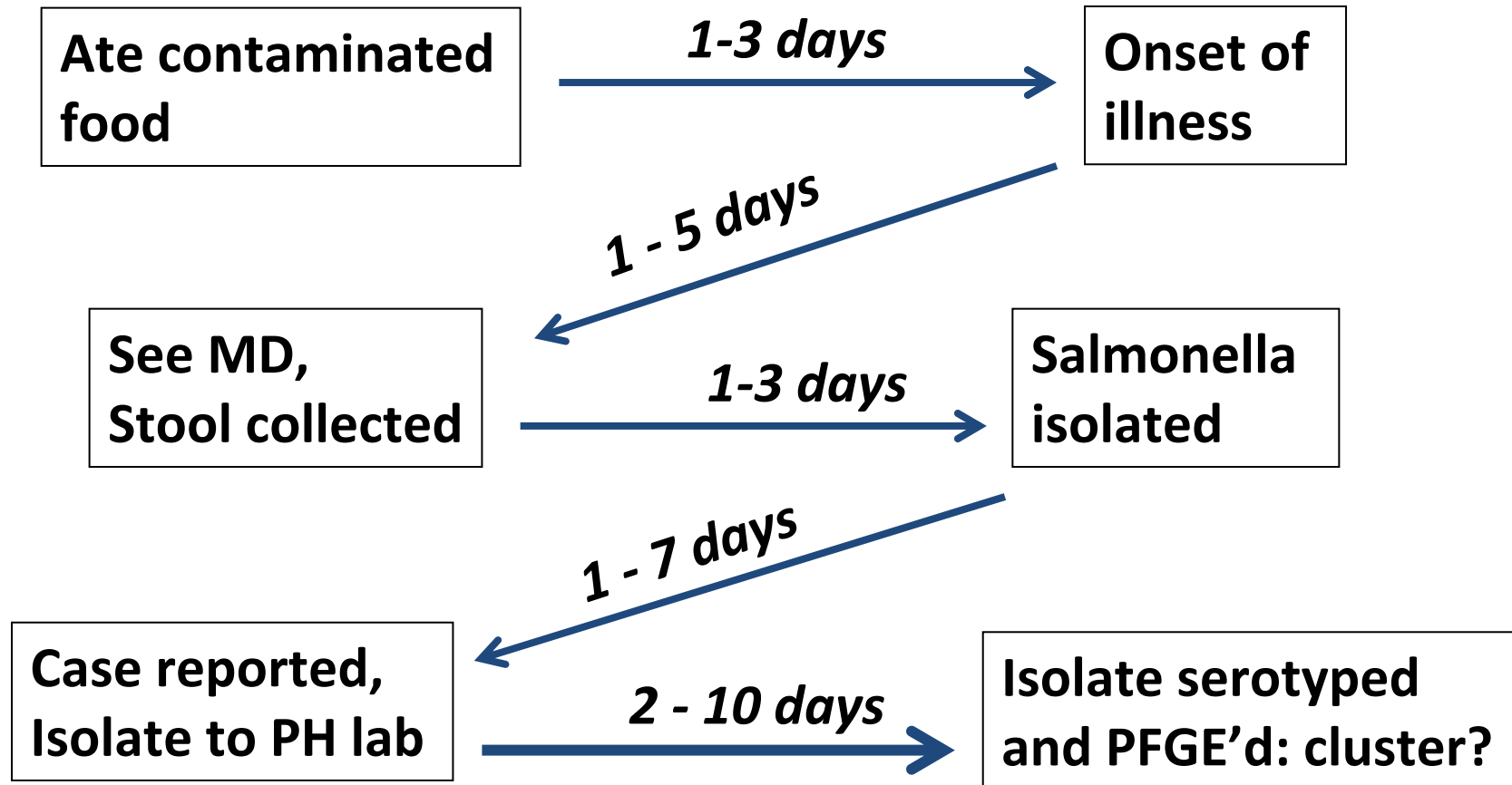
# Challenges in Detection of a FBO

- Main challenges: local and state set ups for timely detection? timely information sharing?
- Using public complaints/calls: cannot suspect FBO based on singular complaints; may suspect FBO if several complaints related to same food facility; communication between EH and CD?
- Using laboratory data: *Salmonella* isolates take time to get to LHDs, to CDPH MDL, and for serotyping; not all *Salm* isolates PFGE'd at MDL; communication between lab and CD?
- Using surveillance data: limited staff resources to check data routinely or timely enough to detect FBO; data lagging from reporting to entry.

# Examples of Recent FBO Detections

- CDC PulseNet: multi-state *Salm* Typhimurium and frogs, multi-state *Salm* Panama and cantaloupes, ....
- Public complaints to LHD: *Salm* Enteritidis and eggs (Santa Clara and Santa Cruz counties),

# *Salmonella* case reporting timeline



***Estimated time from exposure to report: 2 – 3 weeks or longer***

# SE Outbreak Detection Timeline

- May 28-29: two exposure events in Santa Clara
- June 10, 2010: Santa Cruz contacted Santa Clara regarding Santa Cruz resident ill after eating at one event in Santa Clara.
- June 17, 2010: at CDPH, MDL informed DIS of SE increase and sent the first list of PFGE-matched patients. CDPH called Santa Clara regarding those patients and was informed about some *Salmonella* Group D patients and possible association with the two May events. Serotyping and PFGE pending.
- June 25, 2010: First PFGE-matched patient associated with exposure events identified.

## Step 2: Confirmation of a FBO

- From brief follow ups of ill persons: a common restaurant or event identified.
- From clinical and public health laboratory results: supportive if common enteric pathogen found in  $\geq 2$  ill persons of cluster; probable if rare *Salm* serotype or PFGE pattern in  $\geq 2$  (LHDs and CDPH).
- From surveillance data: supportive if the number of cases higher than expected for same time period in recent years (LHDs and CDPH).

# Challenges to Confirmation

- From follow up of ill persons: some LHDs do not follow up on *Salm* cases; no common event or food facility identified; case reports not set up to identify all suspect food vehicles.
- From laboratory results: most ill persons were not tested; of the few tested, one or no enteric pathogen found; *Salm* isolates not yet serotyped or PFGE'd.
- Using surveillance: data not up to date, not timely.

# Step 3: Decision Point

- Should this FBO be investigated further or not?
  - Mortality
  - High morbidity
  - Public concern, media attention
  - Suspecting involvement of a commercial food product
  - Ongoing
  - Novel pathogen identified
- If yes, are there resources available at the local, state, or federal level to support investigation?

# Challenges to Decision Point

- Main challenges: No epidemiologist/epi trained staff available; no laboratory capacity for culture, for PFGE; too many other competing priorities.
- Epidemiologists: some but not all LHDs have access to an epidemiologist; local epidemiologist may not be familiar with FBOs; too few epidemiologists with FBO experience at CDPH.
- CD controllers and EHSs: FBO point person varies by LHD; FBO investigation experience varies.
- Laboratory capacity: only ~half of LHDs have a PH lab; only 4 local PH labs do PFGE.
- Other competing priorities always present

# Challenges to Decision Point

- Whether resources are available or not, decision to investigate further occasionally comes down because of:
  - Mortality,
  - High morbidity, or
  - Public concern, media attention
  - Multi-jurisdictional involvement
- Then the next step is to identify a lead investigator or an investigation team leader

## Step 4: Identifying a Team Leader (1)

- Experienced Investigation Team Leader is needed for timely coordination and response:
  - Identify Epi/CD Control activities and staff needed
  - Review laboratory results, interviews, surveillance
  - Involve EH with clues on what pathogen may be involved and what food specimens to collect
  - Involve the PH Laboratory to identify suspect pathogen, test suspect patients and environmental specimens, and further molecular test of isolates
  - Involve the Press Information Officer if needed

## Step 4: Identifying a Team Leader (2)

- At the local level, this Investigation Team Leader may be either the local Health Officer, an epidemiologist, a CD Controller, or an EH specialist who has had epidemiology and outbreak investigation training or experience
- At the CDPH level, the Investigation Team Leader of a foodborne outbreak response is usually an experienced epidemiologist (PH Medical Officer or Research Scientist)

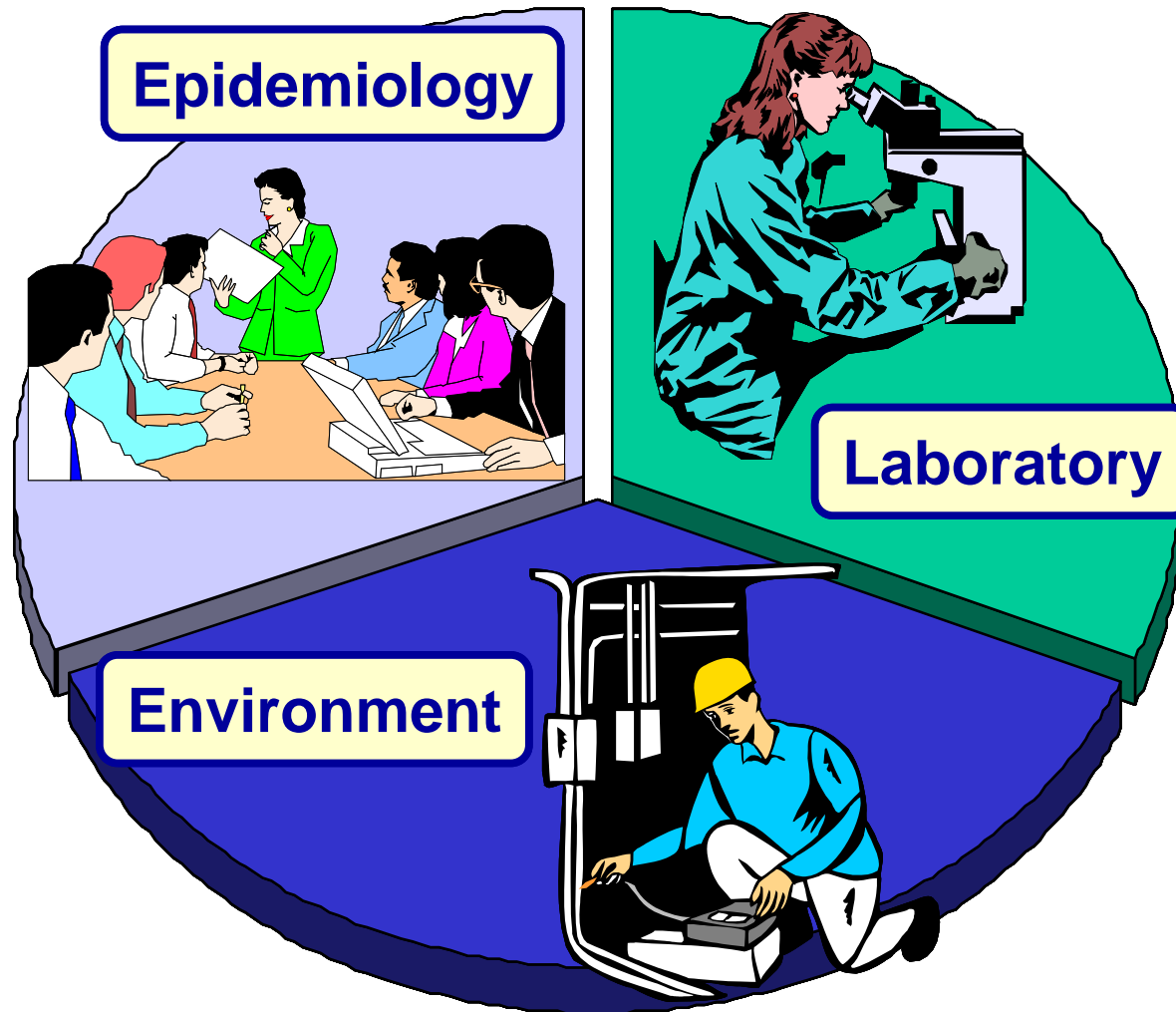
# Challenges to Identifying a Team Leader

- At the local level: may identify point person but no team leader designated; team leader may not be experienced with FBOs or may not be familiar with other local partners.
- At the CDPH level: only 3 epidemiologists with FBO experience available.

# Step 5: Coordinate All Parties Involved

	<b>Local</b>	<b>State (CDPH)</b>	<b>Federal</b>
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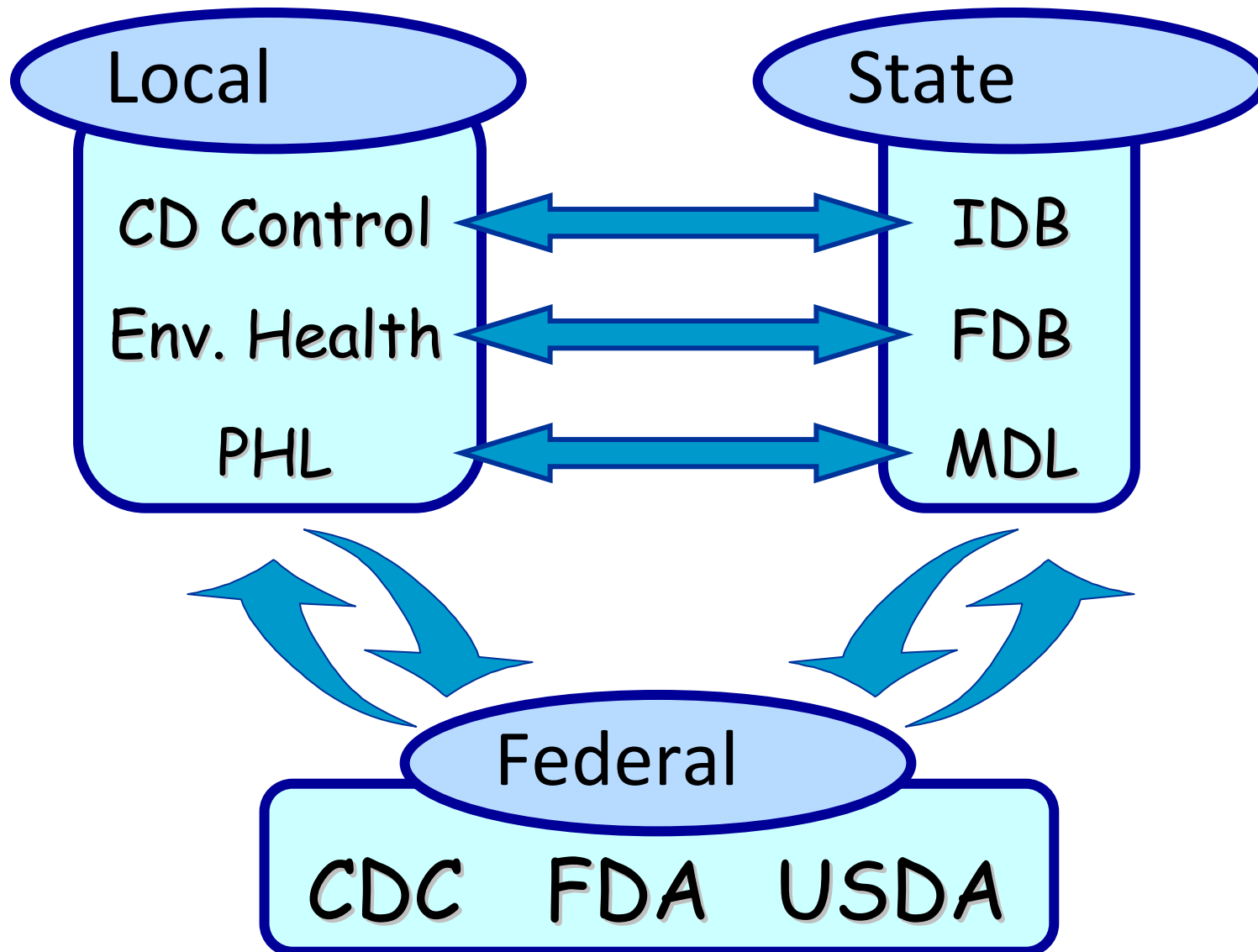
# The Outbreak Investigation Team



# Challenges to Coordination

- No pre-designated FBO Response Team (including at least a CD controller, an EH specialist, and a laboratorian if having a PH lab).
- Communications within and between local and state team members not timely or frequent enough.

# Communication is Crucial!



# Step 6: Determine Extent of FBO

- Person: how many ill? how many hospitalized? how many deaths?
- Place: common event or food facility? Is this place still serving potentially contaminated food(s)? What is distribution of cases by residence/jurisdiction?
- Time: when was earliest onset of illness? When was latest onset of illness?
- Laboratory characterization: key to finding cases
- Digging deeper: review surveillance data and interviews, contact ERs/clinics, contact managers/customers,...

# Challenges to Determining Extent

- Person: little info on early cases; number of ill persons requires follow ups with ERs, event coordinator, others.
- Place: No common event or food facility.
- Time: Patients cannot remember time/date of onset of illness when followed up.
- Laboratory characterization: time for isolates to get to PH Lab, and then for serotyping and PFGE; some serotypes and PFGE patterns too common to suggest common exposure.
- No staff resources to review surveillance data and interviews, to follow up with ERs/clinics, managers and customers.

# Step 7: Determining Source of a FBO

- Hypotheses generation: may require in-depth and repeated interviews.
- Case-control or Cohort study or educated lab testings: all require resources and expertise.
- Finding cases and controls for interviews and filling out questionnaires: using short questionnaire if given a menu, or using a long, detailed questionnaire if no common event/place.
- Data entry, analyses and interpretation.
- Coordination with Lab and EH for testing.

# Challenges to Determining Source (1)

- Hypotheses generation interviews: may take time and repeated attempts.
- Case-control/Cohort study or educated lab testings: not always successful; require resources and experience which vary by LHD.
- Finding cases and controls for interviews and filling questionnaires : limited number of interviewers available; controls more difficult to find than cases; some persons not at home number during the day; many no longer remember what they ate when interviewed (2-4 weeks after exposure).

## Challenges to Determining Source (2)

- Data entry, analyses and interpretation: more staff, expertise, and time needed.
- Coordination with Lab/EH: more time needed to get additional specimens to lab.
- And again, limited staff and epidemiology resources at some LHDs with other competing priorities.

# Example of Challenging Epidemiologic Investigation of a FBO

- November 2009, national number of *Salm* Montevideo cases above baseline → CDC Outbreak Response Team began investigation.
- November-December 2009: Hypothesis generating interviews with Shotgun Questionnaire ~10 days: 53 interviews, 18 states, >300 food exposures → no hypothesis identified!
- December 16, 2009 – January 14, 2010: Redo Hypothesis generating interviews with Open-Ended Questionnaire: 16 interviews, 8 states → 75% shopped at Costco: most bought same brand of Italian-style deli meat/salami.
- Subsequent Case-Control study implicated these products leading to recall.

# Summary

Many challenges to detection of a FBO and to implementing an epidemiologic investigation, including:

- 1.using complaints/lab/surveillance information for timely Detection,
- 2.having a pre-designated multi-disciplinary Team for response,
- 3.designating a team leader at the outset who can coordinate and communicate with partners
- 4.finding appropriate laboratory support
- 5.finding appropriate epidemiologic support
- 6.finding time and staff among other priorities

# Communication is Crucial!

