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A Walk Down Foodborne Outbreak Investigation Lane: Foods Prepared from Private Residences

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CONTRA COSTA COUNTY - California

- Contra Costa County is located in California, in the San Francisco Bay Area
- The county is home to ~1.2 million residents.
 - It is the 9th most populous county in the state out of 58 counties
- The county is a mix of urban, suburban and rural.
 - Comprised of 19 cities and many established communities unincorporated areas
- Contra Costa County has an integrated Health
 Department (Contra Costa Health) which includes a
 Regional Hospital, Public Health, Environmental
 Health, Health Plan, etc.





Importance of a Collaborative Response

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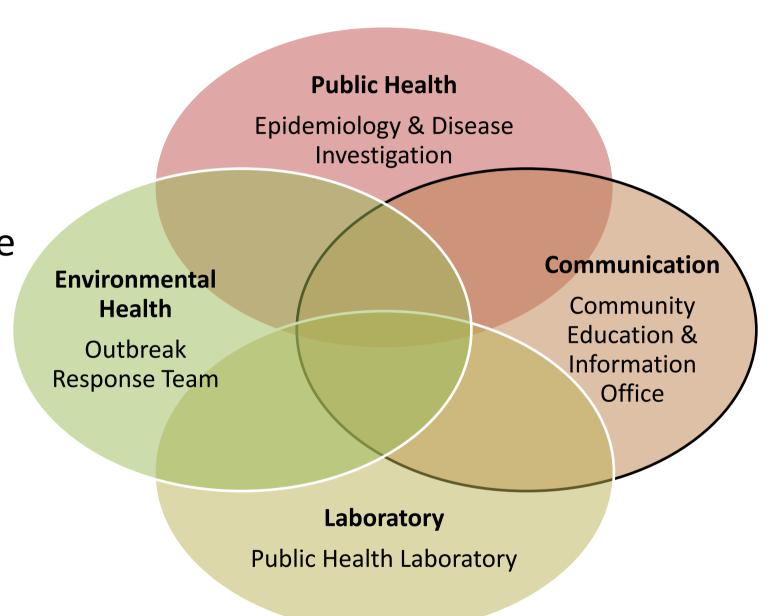
- Department Outbreak Response Team (now CCHOMPP) formed in the late 1990's
 - Team included Environmental Health (EH), Epidemiology, Public Health Communicable Disease (CD) Programs, Public Health Laboratory and Other health response partners
 - In 2001, the group continued to expand to include additional Response Partners – Public Health Emergency Preparedness Team, Emergency Medical Services, and County Sheriff's Office
- Ongoing coordinated responses with California State and Federal Agencies:







U.S. Department of Health and Human Services Centers for Disease Control and Prevention











Outbreak Scenario: Raw Milk Products Prepared at Home for Children

Organism(s): ???

Initial Outbreak Report:

- Public Health staff detected two epi-linked cases during routine public health disease surveillance activities
- Case-patient investigation interviews after receipt of a positive presumptive Escherichia coli (E. coli) O157 lab reports



Timeline of Events:

Friday 10/21/2011

Monday 10/24/2011

Tuesday 10/25/2011

Thursday 10/24/2011



Case Study #1

Symptom onset of 1st locally detected case

• 1st locally detected case is hospitalized and transferred to regional children's hospital to treat for HUS

Symptom onset of 2nd locally detected case

 Public Health receives lab report for the 1st and 2nd case patients



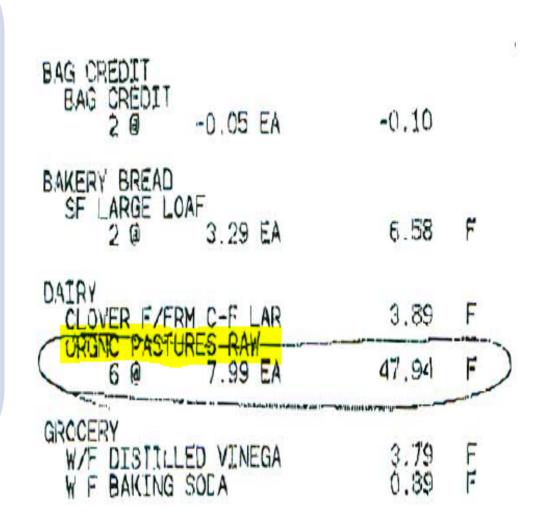


Timeline of Events: (cont.)

Friday 10/28/2011

- Public Health (PH) notifies Environmental Health (EH) of case-patients and recent history of commercially produced raw milk consumed at home
- Joint investigation by PH and EH:
 - Collected food samples from patient's house (kefir and other milk products)
 - Impounded specific raw milk products (sealed) from local grocery store

Saturday 10/29/2011 The 2nd locally detected case is hospitalized at regional children's hospital, also with HUS





Outbreak Scenario: Raw Milk Products Prepared at Home for Children

Organism(s): E. coli O157:H7

Outcomes:

- 11/14/2011: The California Department of Public Health sent out statewide notices regarding recent cluster of E. coli O157:H7 infections amongst 5 young children with a single strain via PFGE pattern
- 11/15/2011: The California Department of Food and Agriculture issued a statewide recall notice

CDFA > Public Affairs > Press Release

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News Release



CALIFORNIA DEPARTMENT OF FOOD AND ADRICULTURE

Media Corriacta: Sheve Lyle, CDFA Public Affairs, (916) 654-0462, style@odfa.ca.gov Antia Gore, Caulfornia Department of Public Health, Office of Public Affairs, 916-440-7259, Anka,Gore@odph.ca.gov

ORGANIC PASTURES RAW MILK RECALL ANNOUNCED BY CDFA



Consumers urged to dispose of raw dainy products due to suspected E. coli 0157:H7 bacterial contamination

SACRAMENTO, November 15, 2011 - Raw milk products produced by Organic Pastures of Presno County are the subject of a statewide recall and quarantine order announced by California State Veterinarian Dr. Annette Whiteford.

Under the recall, all Organic Pastures raw dairy products with the exception of cheese aged a minimum of 60 days are to be pulled immediately from retail shelves and consumers are strongly urged to dispose of any products remaining in their refrigerators. Until further notice, Organic Pastures may not produce raw milk products for the retail market. The order also affects Organic Pastures raw butter, raw cream, raw colontrum, and a raw product labeled "Oephor."

The quarantine order came following a notification from the California Department of Public Health of a cluster of five children who were infected, from August through October, with the same strain of £, coil O157:H7. These children are residents of Centro Costa, Kings, Sacramento, and San Diego countries. Interviews with the families inclosed that the only common reported food exposure is unposteroid (raw) milk from Organic Pastures dairy. Three of the five children were hospitalized with hemolytic uremic syndrome, a serious condition that may lead to kidney failure. There have been no deaths. Surveys indicate that only about three percent of the public report drinking raw milk in any given week so finding 100% of these children drank raw milk and the absence of other common foods or animal exposures indicates the Organic Pastures raw milk is the likely source of their infection.

While laboratory samples of Organic Pastures raw milk have not detected E. coli 0157:H7 contamination, epidemiologic data collected by the California Department of Public Health link the illnesses with Organic Pastures raw milk.

The great majority of milk consumed in California is pasteurized. Raw milk is not pasteurized. Pasteurization is a process that kills harmful becteria. In California, state law requires that raw milk and raw milk products shall bear the following warning on the label: "Warning - raw (unpasteurized) milk and raw milk dairy products may contain disease-causing micro-organisms. Persons at highest risk of disease from these organisms include newborns and infants; the elderly; pregnant women; those taking corticosteroids, antibiotics or antacids; and those having chronic filnesses or other conditions that weaken their immunity."

http://www.edfa.ca.gov/egov/Press_Releases/Press_Release.nsp?PRnum=11-064&print=... 11/16/2011





Outbreak Scenario: Community Thanksgiving Meal Event

Organism(s): ???

Initial Outbreak Report:

Public Health received a phone call (after-hours) from a local Acute Care Hospital Emergency Room (ED) reporting a suspect gastrointestinal outbreak of unknown etiology

- 7 patients had presented to the ED from a small consortium of small adult Residential Care Facilities (RCF)
- Patients had presented with the major symptoms of diarrhea and/or vomiting

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Case Study #2

The Washington Post

forning Mix

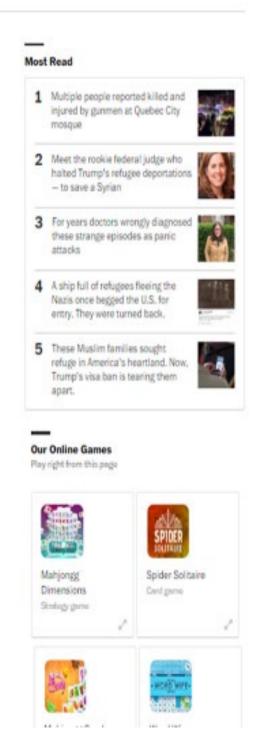
3 dead, 5 ill in Calif. after Thanksgiving charity dinner, health officials say

By Derek Hawkins November 29, 2016



A Thanksgiving spread. (Matthew Mead/AP)

On Thanksgiving Day, the American Legion hall in Antioch, Calif., opened its doors to anyone who didn't have a place to go for the holiday. With the help of a local church, the veterans' organization hosted a dinner for those who would have otherwise dined alone, complete with turkey, stuffing, green beans and other Thanksgiving fare.





Timeline of Events

| Thursday 11/24/2016 Thanksgiving Day | Friday 11/25/2016 | Saturday 11/26/2016 | Monday 11/28/2016 | Tuesday 11/29/2016 | Friday 12/02/2016 |
|--|---|--|---|---|--|
| An estimated 800 individuals were served a holiday meal hosted by a local churchTurkey, turkey gravy, stuffing, mashed potatoes, sweet potato casserole, & pies. | 2:30PM to 4:30PM, 7 patients from RCF admitted at hospital ED complaining of diarrhea and/or vomiting2 case patients reported as dead -Stool specimens requested by CCCPHL for testing. *Initial hypothesis formulated. | A total of 3 case patients now reported as dead by CCC Coroner's Office. | *CCH PH reported Norovirus negative stool samples (3). *Environmental Health conducted Environmental Assessment. Event organizer (church) identified. *CCHPH created questionnaire. *Hypothesis reformulated. | *CCH EH interviewed event coordinator and Church pastor. *Church members prepared food at event center and within their private residencesTurkey, turkey gravy, sweet potato casserole, and pies. *Autpsies revealed acute hemorrhagic and necrotizing enterocolitis. *Coordination with CDPH for C. perfringens testing. | *CDC Enteric Diseases Laboratory Branch reported 4 of 6 patient stool samples + C. perfringens foodborne enterotoxin (CPE) by reversed passive latex agglutination11 (46%), including 3 deceased, reported taking 1 or more atypical antipsychotic medications - which are known to slow gut motility. |



Figure 1. Example of colon with necrosis. Fatal Necrotizing Colitis Following a Foodborne Outbreak of Enterotoxigenic Clostridium perfringens Type A Infection

Source: CID 2005:40 (15 May) DOI: <u>10.1086/429829</u>

Case Study #2

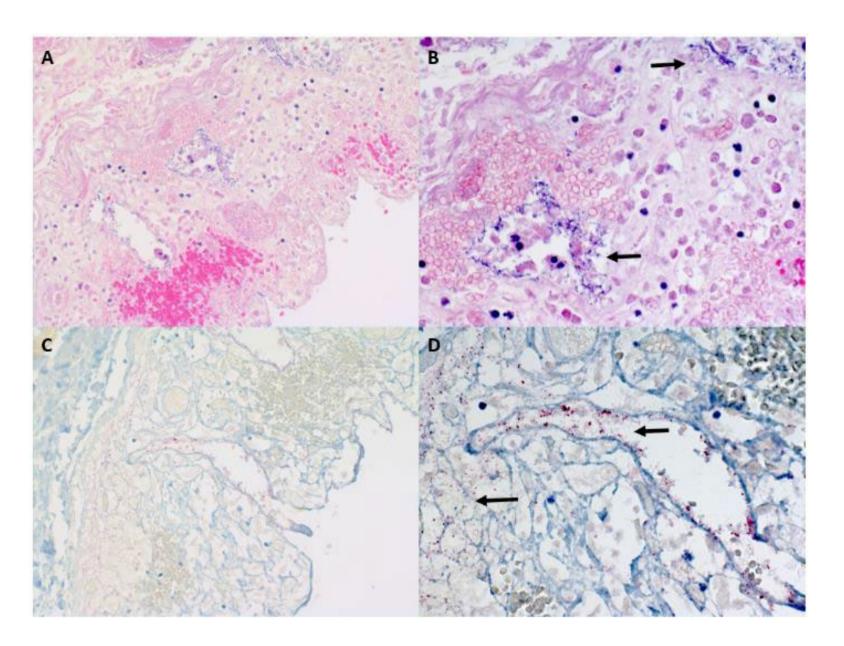


Figure 2: H and E and immunohistochemical (IHC) staining targeting Clostridium spp. in the colon of one autopsy case. A, 20X - H and E staining shows hemorrhagic and necrotizing colitis with abundant bacterial rods in crypts. B, 40X – Higher magnification of the hemorrhagic and necrotizing colitis with large bacterial rods within crypts. C, 20X - Bacterial rods within crypts label by an IHC assay targeting Clostridium spp. with invasion into the lamina propria. D, 40X – Higher magnification of the bacterial rods within the crypts, labeled by an IHC assay targeting Clostridium spp. Arrows point to the positive immunostaining of bacteria.



Outbreak Scenario: Community Thanksgiving Meal Event

Organism(s): Clostridium perfringens

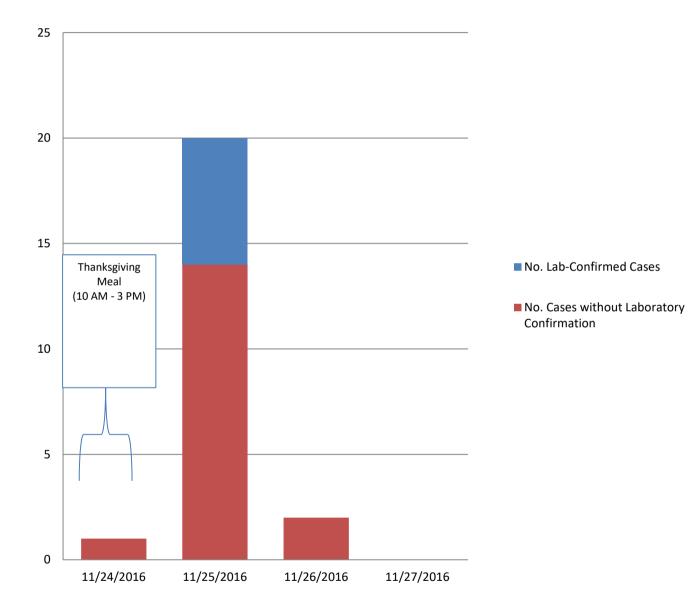
Outbreak Summary

- Case Count: 23 (of ~800 attendees)
 - 13 cases were hospitalized
 - 3 cases deceased

Outcomes:

- Public Health wrote up response as white paper for potential publication
- Environmental Health performed outreach to community organizations including churches ahead of future holiday seasons for food safety education and event permitting

Dates of symptom onset among cases (n=23) of gastroenteritis associated with a Thanksgiving meal—Contra Costa County, November 2016







Implications for future Public Health & Environmental investigations:

- Patients on atypical antipsychotic medications may be more vulnerable to severe health outcomes from *C. perfringens*. Persons caring for patients on these drugs should be aware of their risk for adverse outcomes when exposed to enterotoxin-producing *C. perfringens*
- Food-service operators of large-scale events, including charitable community meal events, should be aware of the risks associated with improper preparation and storage of food and the need for diligent monitoring of food temperatures during food preparation, storage, and handling. Event organizers and operators would benefit from education on food safety

practices

Centers for Disease Control and Prevention

CDC 24/7: Saving Lives, Protecting People,™

Morbidity and Mortality Weekly Report (MMWR)

Persons using assistive technology might not be able to fully access information in this file. For assistance, please send e-mail to: mmwrq@cdc.gov. Type 508 Accommodation and the title of the report in the subject line of e-mail.

Fatal Foodborne *Clostridium perfringens* Illness at a State Psychiatric Hospital — Louisiana, 2010

Weekly

August 17, 2012 / 61(32);605-608

Clostridium perfringens, the third most common cause of foodborne illness in the United States (1), most often causes a self-limited, diarrheal disease lasting 12–24 hours. Fatalities are very rare, occurring in <0.03% of cases (1). Death usually is caused by dehydration and occurs among the very young, the very old, and persons debilitated by illness (2). On May 7, 2010, 42 residents and 12 staff members at a Louisiana state psychiatric hospital experienced vomiting, abdominal cramps, and diarrhea. Within 24 hours, three patients had died. The three fatalities occurred among patients aged 41–61 years who were receiving medications that had anti–intestinal motility side effects. For two of three decedents, the cause of death found on postmortem examination was necrotizing colitis. Investigation by the Louisiana Office

Gastroenteritis Outbreak with Fatalities Caused by Clostridium perfringens and Associated

with a Community-Based Thanksgiving Meal—Contra Costa County, California, 2016

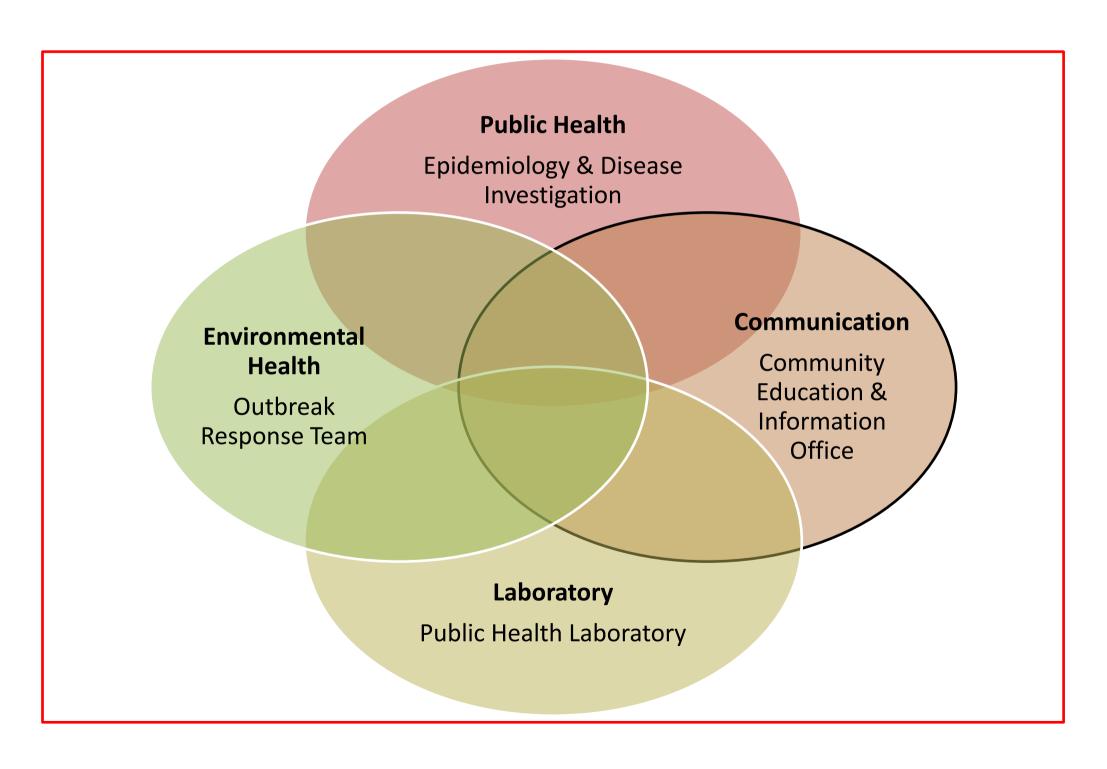
¹Sara E. Sowko, MPH; ¹Louise McNitt, MD; ²Marilyn Underwood, PhD; ¹Sefanit Mekuria, MD; ¹Melody Hung-Fan, MPH; ³Ikechi O. Ogan, MD; ⁴Gerardo A. Gómez; ⁴Carolina Lúquez, PhD; ⁵Joy M. Gary, DVM; ⁵Julu Bhatnagar PhD

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The Health Department In Action!



The key is a coordinated response



Outbreak Scenario: Catered Lunch at Acute Care Facility for Healthcare Leadership

Organism(s): ???

Initial Outbreak Report:

Public Health received a phone call from the administration of local Acute Care Hospital system reporting a suspect outbreak:

- 12 of the 28 attendees were symptomatic
- All were healthcare staff of hospital some with direct patient care and others in key leadership administration roles

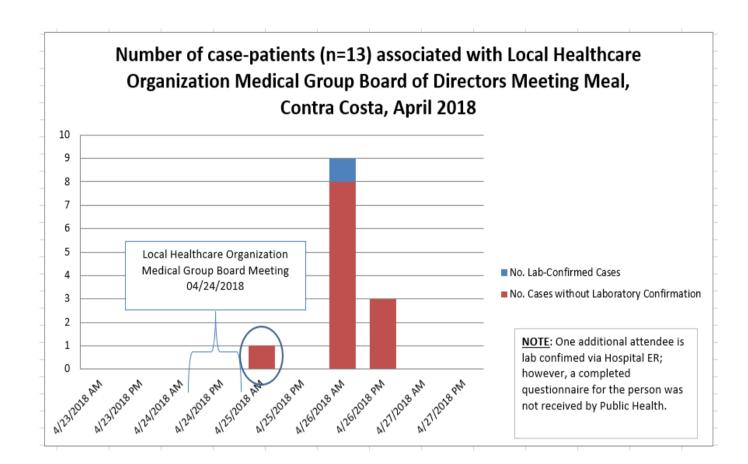


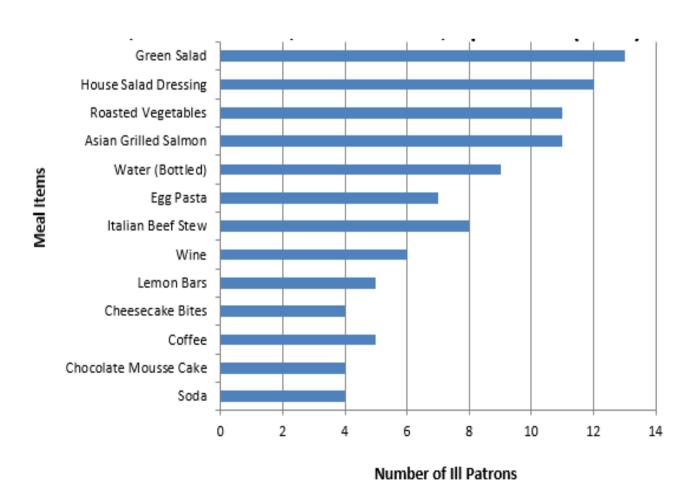
Event Details:

- The major symptoms included: Nausea, Vomiting, and Diarrhea
- Catered Dinner: Menu included both ready-to-eat items (salad) and cooked items (roasted vegetables, grilled salmon, pasta, Italian beef stew, cheesecake bites, lemon bars and chocolate mousse)
- All symptomatic healthcare workers had to be excluded and then cleared from work for a communicable disease

Outbreak Summary

- Case Count: 22 (of 28 attendees)
- Incubation Period: ranged from 33-48 hours
- Attack Rate: 79%







Outbreak Scenario: Catered Lunch at Acute Care Facility for Healthcare Leadership

Organism(s): Norovirus G.I

Outcomes:

 Hearing with County District Attorney's Office resulted in large fines for the caterer for operating without a health permit and refusing to cooperate with Contra Costa Health Department around the outbreak investigation.



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Thank you for all you dofor Public Health!