A PRACTICAL APPROACH TO OUTBREAK INVESTIGATION IN CONGREGATE SETTINGS

James ("Jay") Miller – WA DOH
Ethan Bornstein – NPAIHB
Katherine Shulock – WA DOH
Ryan Sealy – NPAIHB
Antoinette Ruiz – NPAIHB
Thomas Weiser – NPAIHB
Section 1

OUTBREAK INVESTIGATION STEPS
Steps to investigate an outbreak in a congregate setting

1. What is the (suspected) pathogen? How is it transmitted?
2. Who is your team? Want to phone a friend?
3. How will you collect information?
4. What is the built environment like? How are people arranged in this environment?
5. Cases: How will you define and identify cases?
6. Contacts: Do you need to identify contacts? If so, how?
7. Who is being affected? Who is at higher risk?
8. What is your outbreak hypothesis?
9. What control measures could you use?
10. Communication

1. What is the (suspected) pathogen? How is it transmitted?
2. Who is your team? Want to phone a friend?
3. How will you collect information?
4. What is the built environment like? How do people move through it?

Graphic of an apartment building (WA DOH stock image).

Washington State Department of Health | 7
5. Cases: How will you define and identify cases?
6. Contacts: Do you need to identify contacts? If so, how will you identify them?

Graphic of people boarding an airplane (WA DOH stock image).
7. Who is being affected? Who is at higher risk?

KUOW, Bunk beds and farm workers: Washington’s new housing rules, May 15, 2020 (image of headline and photo of room with bunkbeds).
8. What is your outbreak hypothesis? (How/why is transmission occurring?)

9. What control measures could you use?

**Biomedical tools**
- Testing
- Post-exposure prophylaxis
- Vaccines
- Treatment

**Public health tools**
- Contact tracing
- Isolation
- Quarantine (post-exposure)
- Other restrictions/closures
- Individual protective items (soap, masks, condoms)
- Behavior change
- Cleaning and disinfection
- Alter built environment

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10. Communication

Who are your different audiences?

What do you want to tell them?

What is the best way to reach them?
Section 2

OUTBREAK SCENARIO
You are sitting in your office when you receive a call from the hotel manager at the casino. Three customers staying at the hotel have complained of experiencing profuse diarrhea. One of these patrons was recently taken by ambulance to the local hospital.

The manager asks, “What do we do now?”
You interview the 3 individuals with diarrhea. They describe having many episodes of diarrhea per day, with accompanying nausea and fever. One individual reports vomiting as well. One individual reports having blood in their stool.

All 3 individuals report eating at the same restaurant at the casino within the last few days. However, based on your interviews, they did not order the same items.
Steps to investigate an outbreak in a congregate setting

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Foodborne Illness Complaint Forms

<table>
<thead>
<tr>
<th>72-hr Food History</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date:</strong></td>
</tr>
</tbody>
</table>

This section is to be used to collect information about what the consumer ate and drank in the 72-hour period prior to the complaint.

**Day of Illness Onset:**

<table>
<thead>
<tr>
<th>Breakfast:</th>
<th>Location:</th>
<th>Time: _____ AM / PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>_______________________________</td>
<td>____________________</td>
</tr>
<tr>
<td></td>
<td>Suspect Meal? □ Yes □ No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contacts:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lunch:</th>
<th>Location:</th>
<th>Time: _____ AM / PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>_______________________________</td>
<td>____________________</td>
</tr>
<tr>
<td></td>
<td>Suspect Meal? □ Yes □ No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contacts:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dinner:</th>
<th>Location:</th>
<th>Time: _____ AM / PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>_______________________________</td>
<td>____________________</td>
</tr>
<tr>
<td></td>
<td>Suspect Meal? □ Yes □ No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contacts:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Foods/Water*:</th>
<th>Location:</th>
<th>Time: _____ AM / PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>_______________________________</td>
<td>____________________</td>
</tr>
<tr>
<td></td>
<td>Suspect Meal? □ Yes □ No</td>
<td></td>
</tr>
</tbody>
</table>

CDC Foodborne Illness Complaint Form: [https://www.cdc.gov/nceh/ehs/ehsnet/docs/ehs-net_foodborne_illness_complaint_form.pdf](https://www.cdc.gov/nceh/ehs/ehsnet/docs/ehs-net_foodborne_illness_complaint_form.pdf)
Investigation (2)

You call the local hospital. The clinician caring for the individual admitted to the hospital reports that the stool culture is positive for *Shigella sonnei*.
What is Shigella?

- Etiology and symptoms: Bacterial illness causing diarrhea and sometimes vomiting. Can cause severe illness.
- Incubation period: usually 1-3 days.
- Transmission: fecal-oral route, small inoculating dose (10-100 organisms). Can see sexual transmission. People can shed the bacteria in their stool for weeks after infection.
- Treatment: can be treated with antibiotics (might not be needed for milder cases). Often see antibiotic resistance so culture with susceptibilities is useful. Antibiotic treatment can shorten the duration of shedding.
- Important settings for public health: food services, healthcare, childcare, congregate residential settings.
Steps to investigate an outbreak in a congregate setting

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Investigation (3)

After learning about the shared exposure to the restaurant, you visit the restaurant, observe food preparation, and speak with employees and the manager.

You identify one employee who recently experienced a diarrheal illness (but is now asymptomatic).
Steps to investigate an outbreak in a congregate setting

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10. Communication

# Foodborne Illness Investigation Checklist

<table>
<thead>
<tr>
<th>Suspect Agent or Pathogen of Concern and Corresponding Field Focus</th>
<th>Risk Factors &amp; Interventions</th>
<th>Remediation &amp; Control Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VIRUSES</strong></td>
<td><strong>FIELD FOCUS</strong></td>
<td><strong>III Food Workers (III FW)</strong></td>
</tr>
<tr>
<td>Norovirus</td>
<td>BHC, HW, III FW</td>
<td>Exclude III FW</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td></td>
<td>Check work schedules</td>
</tr>
<tr>
<td><strong>BACTERIAL TOXINS</strong></td>
<td><strong>FIELD FOCUS</strong></td>
<td>Determine employee health status</td>
</tr>
<tr>
<td>Clostridium botulinum</td>
<td>Cooling, HH, RH, RTS, ROP</td>
<td>Determine roles of food workers for suspected meals or ingredients</td>
</tr>
<tr>
<td>Clostridium perfringens</td>
<td></td>
<td>Bare Hand Contact (BHC)</td>
</tr>
<tr>
<td>Bacillus cereus</td>
<td></td>
<td>Gloves/utensils available and signs of usage</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td></td>
<td>History of BHC prevention in establishment</td>
</tr>
<tr>
<td><strong>BACTERIAL INFECTIONS</strong></td>
<td><strong>FIELD FOCUS</strong></td>
<td>Discussion of food preparation steps</td>
</tr>
<tr>
<td>Escherichia coli</td>
<td>Cook, CH, HW, III FW, Egg, Meat, or Produce Source, Produce Wash, XC, CA</td>
<td></td>
</tr>
<tr>
<td>Enterohemorrhagic or Shiga toxin-producing Shigella spp</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hand hygiene (HH)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Handwash sinks available and have soap and towels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observe proper HH</td>
</tr>
<tr>
<td>Campylobacter jejuni</td>
<td></td>
<td>Cold Holding (CH), Hot Holding (HH), Cooling, Reheating (RH), Room Temperature Storage (RTS), Reduced Oxygen Packaging (ROP)</td>
</tr>
<tr>
<td>Salmonella spp</td>
<td></td>
<td>Proper CH and HH</td>
</tr>
<tr>
<td>typhi, paratyphi, typhimurium, enteritidis</td>
<td></td>
<td>Proper Cooling and RH practices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>History of Cooling or RH practices in establishment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>History of proper temperature control practices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Presence of RTS or advanced preparation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ROP products used in suspect menu</td>
</tr>
<tr>
<td>Listeria monocytogenes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yersinia enterocolitica</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PARASITES</strong></td>
<td><strong>FIELD FOCUS</strong></td>
<td>Cross Contamination (XC), Cook, Consumer Advisory (CA)</td>
</tr>
<tr>
<td>Cryptosporidium parvum</td>
<td>BHC, HW, III FW, Produce Washing, Source, Water</td>
<td>Proper storage of raw meats</td>
</tr>
<tr>
<td>Giardia lamblia</td>
<td></td>
<td>Separation of utensils used for raw product</td>
</tr>
<tr>
<td>Trichinella spiralis</td>
<td></td>
<td>Cleaning and sanitizing of equipment and utensils</td>
</tr>
<tr>
<td>Cyclospora cayetanensis</td>
<td></td>
<td>Menu with proper CA</td>
</tr>
<tr>
<td>Toxoplasma gondii</td>
<td></td>
<td>Calibrated digital thermometer readily available</td>
</tr>
<tr>
<td><strong>SEAFOOD TOXINS &amp; INFECTIONS</strong></td>
<td><strong>FIELD FOCUS</strong></td>
<td>Cooking methods validated and logs checked</td>
</tr>
<tr>
<td>Scombroid fish poisoning</td>
<td>Shellfish Tags, Source, Receiving, CH, Cook, CA</td>
<td>Receiving/Source</td>
</tr>
<tr>
<td>Shellfish poisoning</td>
<td></td>
<td>Copy of receipts</td>
</tr>
<tr>
<td>PSP, DSP, NSP, ASP</td>
<td></td>
<td>Shellfish Tags</td>
</tr>
<tr>
<td>Vibrio spp</td>
<td></td>
<td>Produce Washing</td>
</tr>
<tr>
<td>vulnificus, para-haemolyticus, cholera</td>
<td></td>
<td>Clean, sanitized sink available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proper process observed or discussed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Suspect products sources identified</td>
</tr>
</tbody>
</table>

Washington Department of Health Foodborne Illness Investigation Field Checklist: [https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs/333-204.pdf](https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs/333-204.pdf)
Investigation (4)

The hotel manager informs you that 2 more individuals have called to complain that they are experiencing profuse diarrhea.

Additionally, there are rumors among hotel guests and casino staff about an outbreak. The hotel manager asks you what to do.
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Outbreak scenario wrap-up

Number of sick people in outbreak linked to Seattle restaurant nearly doubles

By Coral Beach on February 14, 2023

Shigellosis outbreak reported in travelers returning from Cabo Verde

News brief | February 17, 2023
Chris Dall, MA
Topics: Antimicrobial Stewardship, Shigellosis

The European Centre for Disease Prevention and Control (ECDC) said today that more than 250 shigellosis cases among travelers returning from Cabo Verde have been reported in an outbreak that began in November 2022.

In a rapid risk assessment, the ECDC said there have been 221 confirmed Shigella sonnei infections and 37 possible cases from the European Union/European Economic Area (EU/EEA), United Kingdom, and United States with links to Cabo Verde, an archipelago and island country off the western coast of Africa. Many of the case-patients are reported to have stayed in all-inclusive hotels located in the region of Santa Maria on the island of Sal. The most recent cases were reported in Sweden on Jan 19.
Questions?
Acknowledgements

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Tia Dostal


CDC Foodborne Illness Complaint Form:  

Washington Department of Health Foodborne Illness Investigation Field Checklist:  
[https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs//333-204.pdf](https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs//333-204.pdf)
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