Outbreak Investigation

June 2017

1. GENERAL CONSIDERATIONS

1.1 Definitions

This document summarizes guidelines for conducting communicable disease outbreak investigations in Oregon. “ACDP” refers to the Acute and Communicable Disease Prevention Section in the Public Health Division of the Oregon Health Authority (OHA). “Counties” refers to local public health jurisdictions. “Outbreak” refers, in general, to an unexpected number of similarly ill persons clustered by place and time. "OSPHL" refers to the Oregon State Public Health Laboratory.

1.2 Laboratory and Physician Reporting Requirements

Investigative Guidelines for reportable communicable diseases and for outbreaks waterborne disease, respiratory illness, gastroenteritis in long-term care facilities, and varicella in schools are available on the ACDP web site. Resources are also available for foodborne and health care acquired infections. The *Investigative Guidelines* include definitions of these different types of outbreaks and descriptions of how they can be investigated.

1.3 Local Health Department Responsibilities

County officials (i.e., county health officers, public health administrators, or communicable disease supervisors) will direct outbreak investigations that occur solely in their jurisdictions; counties are legally responsible for investigating and controlling such outbreaks (see OAR 333-019-0000). They will collect enough information to characterize the outbreak (Section 4).

1.4 ACDP Responsibilities

ACDP may direct investigations when an outbreak overwhelms local investigative capacity and a county requests such assistance. ACDP may also direct multi-jurisdictional investigations (i.e., multi-state outbreaks, multi-county outbreaks, and outbreaks involving contaminated commercial products).

ACDP will, in general, not be able to take on investigation of gastroenteritis outbreaks in which a common source is not suspected, and in which the initial symptom profile suggests that norovirus is the likely cause.

2. COUNTY INVESTIGATIVE ACTIVITIES

2.1 Outbreaks in Jurisdictions

Investigate outbreaks in their jurisdictions and support multi-jurisdictional investigations that involve their county.

Start investigating confirmed outbreaks and contact ACDP for an outbreak number within 24 hours of receiving the initial report.*

Collect clinical specimens until the etiologic agent is laboratory-confirmed with ≥2 positive specimens or until ≥4 specimens are negative.

Because it takes at least two positives to confirm the microbial cause of a gastroenteritis outbreak, OSPHL will not test single fecal specimens.

2.2 Control Measures

Implement appropriate control measures as soon as possible (e.g., addressing time/temperature violations, excluding infected food handlers, closing a school, and so on). Document control measures on standardized reports, if available, and enter data from these reports in the appropriate ACDP database. Describe control measures in the final outbreak report if a standardized report is not available.†

2.3 Active Case Finding

Conduct active case finding and use a standardized questionnaire for data collection when investigating common-source outbreaks. Templates are available from ACDP that facilitate rapid questionnaire design, data entry, and analysis.‡

2.4 Enter Data

Use a *Gastroenteritis* or *Respiratory Case Log* when appropriate. Enter data in the ACDP "Outbreaks Database," and use tools included in this database to get basic descriptive epidemiology, including an epidemic curve (i.e., cases by onset time and date).

Enter preliminary data from gastroenteritis outbreak investigations into the ACDP "Outbreaks Database" within 5 working days of receiving the initial report. Preliminary data are the date of first illness (at the time of the initial report), suspected primary mode of transmission, the exposure site, and the total number of cases (at the time of the initial report).

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* On evenings and weekends call 971-673-1111 and ask the answering service to page the on-call epidemiologist.

† See Final Outbreak Reports, below, for a complete description of what is required.

‡ Templates and ACDP databases are available via Citrix through the "Directory of Useful Databases for Epidemiologists" (DUDE).

2.5 Final Outbreak Reports

Enter final outbreak reports in the ACDP "Outbreaks Database" within 30 working days of the onset date of the last case (exceptions: 2 incubation periods for varicella, mumps, and pertussis outbreaks), unless arrangements have been made for an ACDP staff member to do this.

2.6 Outbreak Investigation Tools

Complete and submit an *ACDP Outbreak Investigation Evaluation Tool* (attached), if desired, within 30 working days of receiving the final report from ACDP.

3. ACDP INVESTIGATIVE ACTIVITIES

3.1 Investigation

ACDP will lead investigation of outbreaks in state-run facilities (e.g., correctional facilities, the state psychiatric hospitals, etc.) and multi-state outbreaks.

ACDP may lead investigation of outbreaks involving residents of more than one county in the following situations:

- Outbreaks in which there is felt to be likely state or national public health impact;
- OHA coordination is felt to be important for effective response; or
- Statewide media interest is expected.

In certain circumstances and as resources permit, ACDP may also lead investigations of single-county outbreaks when the local health authority requests that ACDP do so. ACDP will assume the lead for such investigation if, in ACDP's estimation, investigation has the potential to limit illness or death, or there is the potential for useful additions to the public health knowledge base. (Exception: ACDP cannot assume the lead or provide epi support for routine investigations of gastroenteritis consistent with norovirus infection where findings are not consistent with a common-source exposure.) See outbreaks algorithm and Outbreak Investigation Evaluation Tool.

3.2 Communication

ACDP will return calls or e-mail messages regarding outbreaks within four hours and no later than close-of-business the day they are received and will promptly assign an outbreak number and a single point-of-contact ("lead") ACDP epidemiologist for all outbreaks in which ACDP will be involved.

3.3 Guidance and Tools

ACDP will provide guidance for and assistance with collecting clinical or environmental specimens and recommend and help implement appropriate control measures. When an investigation includes food product trace-back, ACDP will coordinate activities with appropriate agencies and inform counties of the trace-back results as information becomes available.

ACDP will provide questionnaire templates to use in a variety of settings or construct questionnaires for event-centered outbreaks (e.g., restaurant meals, catered events) upon request.

3.4 Data Management and Analysis

ACDP will enter and analyze outbreak data when managing an outbreak for a county or when otherwise requested to do so by a county that has used ACDP templates. Data analysis will be completed as soon as possible and no later than 3 working days after data collection is finished.

ACDP will transmit preliminary and final data from gastroenteritis outbreak investigations to the National Outbreak Reporting System (NORS).

ACDP will review outbreak data entered by the counties in the ACDP "Outbreaks Database" and send back a final version of an outbreak summary submitted by a county no more than 30 working days after the county submits it.

ACDP will maintain the ACDP "Outbreaks Database".

4. DESCRIPTIVE EPIDEMIOLOGY

4.1 Characterize the Outbreak

This is done by systematically collecting enough data to answer the following questions:

- Is this really an outbreak?
- How many people were affected?
- How were these people affected?
- What is the infectious agent?
- How was the infectious agent transmitted?
- When did the outbreak start?
- When did it stop?
- How many people were exposed?
- What environmental or other factors contributed to the outbreak?

4.2 Outbreak Confirmation

Confirm the outbreak by verifying medical diagnoses or laboratory reports, talking to ill persons, verifying the exposure or event and collecting other data that lead to an understanding of the outbreak beyond what is first reported. Remember that not all initial reports of outbreaks are really outbreaks. Consultation with the county public health officer and public health administrator prior to proceeding with an investigation is strongly recommended.

4.3 Case Investigation

- **Develop a case definition**. Case definitions typically refer to characteristics of person, place, and time (e.g., resident of Nursing Home A with vomiting or diarrhea starting on or after 12-31-20xx).

- **Conduct case finding** by talking to reported cases, reviewing medical records, and, when appropriate, contacting others who were potentially exposed (e.g., credit card users at a restaurant).
- **Characterize the cases** and their illnesses through systematic data collection using standardized data collection instruments (e.g., questionnaires or case logs) which include, at a minimum, demographics (e.g., age, sex, classroom, room number), onset date and time, signs and symptoms, illness durations, and measures of severity (e.g., MD visits, hospitalizations, deaths). For gastroenteritis outbreaks without "red flags" for more serious infections (e.g., bloody diarrhea, high fever, hemolytic uremic syndrome, hospitalizations, deaths) and in which the tempo of onset is not consistent with a common-source exposure, a complete line list, including demographics, date and time of onset, symptoms, signs, medical encounters and other indicators of severity need only be collected for ten ill persons. (Clearly, fewer is fine if fewer than ten people become ill.)
- **Assess the mode(s) of transmission** using an epidemic curve (i.e., cases by date, and, as necessary, time of onset) to distinguish point-source foodborne outbreaks from those with microbes spread from person to person. Use the "epi curve" to see when the outbreak started and stopped.
- **Collect enough clinical specimens** to confirm the outbreak with ≥2 positive specimens or until ≥4 specimens are negative. Because it takes at least two positives to confirm the microbial cause of a gastroenteritis outbreak, OSPHL will not test single fecal specimens. Specimens submitted to OSPHL must be accompanied by the appropriate submission forms and the assigned outbreak number. Sending specimens in batches may be requested by OSPHL for certain types of outbreaks. Stool and respiratory specimen collection kits can be ordered from OSPHL (503-693-4100).
- **Evaluate the physical environment** whenever the setting of the outbreak is known. Environmental health specialists often take the lead during this component of the investigation. Evaluate food handlers for illness. Evaluate practices related to storing, cooking, and holding food, as well as environmental cleaning and food worker hygiene. Collect environmental samples if indicated; consult with ACDP epidemiologist about testing.

5. BASIC ANALYTIC EPIDEMIOLOGY

If a common source is suspected, try to identify it. If this is a foodborne outbreak, for example, which foods were contaminated? Identify potential exposures and develop tools (usually questionnaires) to assess their association, if any, with illness. Sampling strategies, questionnaire design, data entry and analytic methods, etc., must be well thought out and coordinated. Consultation with ACDP during this process is strongly recommended. If a county finalizes a questionnaire without consulting with ACDP, the county is responsible for data entry and analysis.

6. CONTROL MEASURES AND FOLLOW-UP 4

Correct deficiencies as they are identified. Remove any identified sources of contagion (e.g., sick food worker, contaminated food, etc.). Review institutional and personal hygiene practices and work to improve them as indicated. Monitor the situation until the incidence returns to baseline, especially in institutional outbreaks.

7. FINAL OUTBREAK REPORTS

Counties are responsible for documenting investigations that occur in their jurisdictions unless other arrangements are made with ACDP. Enter outbreak data in the ACDP “Outbreaks Database”. There are different layouts for enteric and non-enteric outbreaks; when the syndrome is selected, the user will be automatically directed to the proper layout (with corresponding syndrome-specific questions). After data entry, notify ACDP that the record is ready for review by the ACDP epidemiologist assigned to the outbreak by hitting the “Click to Submit Report” button. Attach only de-identified data in the outbreak database since all outbreak database users can access records.

The minimum information needed for an outbreak report is:

1. The outbreak data entered in the ACDP “Outbreaks Database” (or in a non-ACDP database if desired),
2. The epidemic curve, and
3. The supporting documentation. Attach electronic files of the epidemic curve and supporting documentation to the ACDP “Outbreaks Database”. Typical supporting documentation includes:
    - Copy of the questionnaire (for foodborne and other types of outbreaks as needed) when data are entered in an ACDP database
    - Completed questionnaires or computer files when data are entered in a non-ACDP database; completed case logs (for gastroenteritis and respiratory illness outbreaks) when data are entered in a non-ACDP database. These data should not contain any personal health information.
    - OSPHL and private laboratory reports, environmental health inspection reports, outbreak notes
    - Photographs
    - *Control Measures Reports* for long-term care facility outbreaks of viral gastroenteritis (data from which are entered in the ACDP “Control Measures Database”).

Final outbreak reports (e.g., data entered in the ACDP “Outbreaks Database” and supporting documentation) should be completed as soon as possible. Let’s face it; they only get harder to do and more time consuming if they are delayed. Counties, or ACDP when applicable, shall submit outbreak reports no more than 30 working days after the onset date of the last outbreak-related case (exceptions: 2 incubation periods for varicella, mumps, and pertussis outbreaks). Contact your ACDP epidemiologist if an extension is needed. The proportion of

outbreak reports submitted on time is an evaluation criterion for triennial county reviews.

ACDP shall review and return a final version of the outbreak report to the county no more than 30 working days after receiving the county report. Counties shall have the chance to review outbreak reports a final time and submit corrections as needed.

Keep this axiom in mind: the outbreak report should never take longer than the investigation. If there wasn't much of an investigation, there may not be much of a report. Complex or higher profile investigations might merit an additional, more detailed, formal outbreak report. There is no prescribed format for detailed outbreak reports, but the generic outline of outbreak papers published in medical journals may suffice: background, methods, results (including epi curves, symptom profiles, exposure and risk factor analyses), conclusions and interventions/recommendations/control measures.

UPDATE LOG

June 2017. Clarified submission of final report to be 2 incubation periods for varicella, pertussis and mumps. Updated with procedures for what agency is the lead and specified that identifiable data be excluded from the outbreak database record. Minor edits and corrections of typos and footnotes (June Bancroft)

December 2015. Placed in new template. Minor edits and correction of typos (Leslie Byster, Richard Leman, Melissa Powell)

May 2015. Added to §2.3 ("Starting the Investigation") and §4.3 ("Case Investigation") clarification that OSPHL will not test single fecal specimens. (Paul Cieslak)

January 2014. Updated *County* and *ACDP Investigation Activities* sections; put into standard IG format. (Richard Leman and Melissa Powell)

October 2012. Review and update. (Lore Lee)

April 2004. Created. (Lore Lee)

ACDP Outbreak Investigation Evaluation Tool

Outbreak Number: **2017** - County:

Your role at the county: ☐ CD ☐ Environmental Health ☐ Other

If this was a multi-county outbreak, who was the lead county?

Lead ACDP epidemiologist with whom you worked on this outbreak: <Select One>

Other ACDP epi's with whom you had substantive interactions on this outbreak:

Characterize the assistance you received from the ACDP epidemiologist for each item below (add comments as you see fit).

	Satisfactory (or Yes)	Unsatisfactory (or No)	Not Applicable (or Refused)
1. Transition from the on-call person to lead epi	☐	☐	☐
2. Was the ACDP epi you worked with courteous, kind, and helpful?	☐	☐	☐
3. Calls and/or emails were returned in a timely manner — particularly those flagged as urgent?	☐	☐	☐
4. Did you get the help that you asked for and/or needed?	☐	☐	☐
5. In the case of a food product trace-back investigation, were you kept informed of the progress of the trace back?	☐	☐	☐
6. In the case of multi-county outbreaks involving your county, were you kept informed of pertinent information as it came out?	☐	☐	☐
Additional comments:			

After the completion of the outbreak investigation (add any comments as you see fit):

7. Did you receive a copy of any outbreak summary reports?	☐	☐	☐
8. If yes, on what date did you get that report?			
Additional comments:			

On a scale from 0 (completely dissatisfied) to 10 (completely satisfied) please indicate your overall satisfaction with the assistance provided by the ACDP epi by checking the appropriate number below.

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

	Yes	No
Is it okay to share the information in this questionnaire with the epi you worked with?	☐	☐
Would you like to discuss this evaluation with the CD Medical Director (Paul Cieslak)?	☐	☐
Additional comments:		

Please send to: Dr. Paul R. Cieslak, Medical Director, Acute and Communicable Disease Prevention		
800 NE Oregon St Ste 772 Portland OR 97232	**Fax: 971.673.1100**	**Email: Paul.R.Cieslak@state.or.us**

Outbreak Lead Algorithm