

# Outbreaks and Unusual Infection Occurrences

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Infection Preventionist Training for Skilled Nursing Facilities  
Healthcare-Associated Infections Program  
Center for Health Care Quality  
California Department of Public Health



# Objectives

- Define outbreaks and unusual disease occurrences
- Describe reporting requirements to public health
- Provide examples of outbreaks in SNF
- Review the steps in an outbreak investigation

# Definitions

- Outbreak
  - Occurrence of cases **above the expected** or baseline level
  - **Number of cases** indicating an outbreak will **vary**
  - “Outbreak” designation is **relative to the usual frequency of the disease**
  - **A single case** of a communicable disease long absent from a population or the first invasion by a disease not previously recognized requires **immediate reporting** and epidemiologic investigation

\*California regulatory definitions, Titles 17 and 22

[CDPH All Facilities Letter \(AFL\) 19.18](#) (PDF)

([www.cdph.ca.gov/Programs/CHCQ/LCP/CDPH%20Document%20Library/AFL-19-18.pdf](http://www.cdph.ca.gov/Programs/CHCQ/LCP/CDPH%20Document%20Library/AFL-19-18.pdf))

# Definitions (continued)

- Unusual Disease
  - A **rare disease** or a newly apparent or **emerging disease**
  - **Syndrome of uncertain etiology** which a health care provider has reason to believe could possibly be caused by a transmissible infectious agent or microbial toxin.
- Unusual Occurrences
  - Occurrences such as epidemic outbreaks, poisonings, fires, major accidents, death from unnatural causes or other catastrophes
  - Unusual occurrences which **threaten the welfare, safety or health** of patients, personnel or visitors

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# Reporting Outbreaks and Unusual Occurrences

Health facilities licensed by CDPH Licensing and Certification (L&C) are required to report outbreaks and unusual infectious disease occurrences to

- Local public health (LPH) officer
- CDPH Licensing & Certification (L&C) district office

## Examples of Reportable Incidents in SNF

CDPH provided examples of outbreaks or unusual infectious disease occurrences that should be reported

- Single case of colonization or infection with a **novel MDRO** that was never previously or only rarely encountered such as
  - *Candida auris*
  - mcr-1-producing bacteria
  - Vancomycin-resistant *Staphylococcus aureus* (VRSA)
  - pan-resistant MDRO
- Single case of healthcare-associated **legionellosis**
- Single case of healthcare-associated invasive **group A beta hemolytic Streptococcus**

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[CDPH AFL 19-18](#) (PDF)

([www.cdph.ca.gov/Programs/CHCQ/LCP/CDPH%20Document%20Library/AFL-19-18.pdf](http://www.cdph.ca.gov/Programs/CHCQ/LCP/CDPH%20Document%20Library/AFL-19-18.pdf))

## Examples of Reportable Incidents (continued)

- Cluster or suspected transmission of **any MDRO**
- Outbreak or increased incidence of disease due **to any infectious agent** occurring in residents or persons working in the facility
- **Intra-facility outbreak** of influenza, gastroenteritis, pneumonia, or respiratory syncytial virus
- Infections associated with transfusions, contaminated medications, replacement fluids, or commercial **products**
- **Foodborne** infectious disease outbreak
- Clusters of positive tuberculosis (**TB**) **test conversions**
- Single case of **active TB** (pulmonary or laryngeal) in a SNF resident or employee

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[CDPH AFL 19-18 \(PDF\)](#)

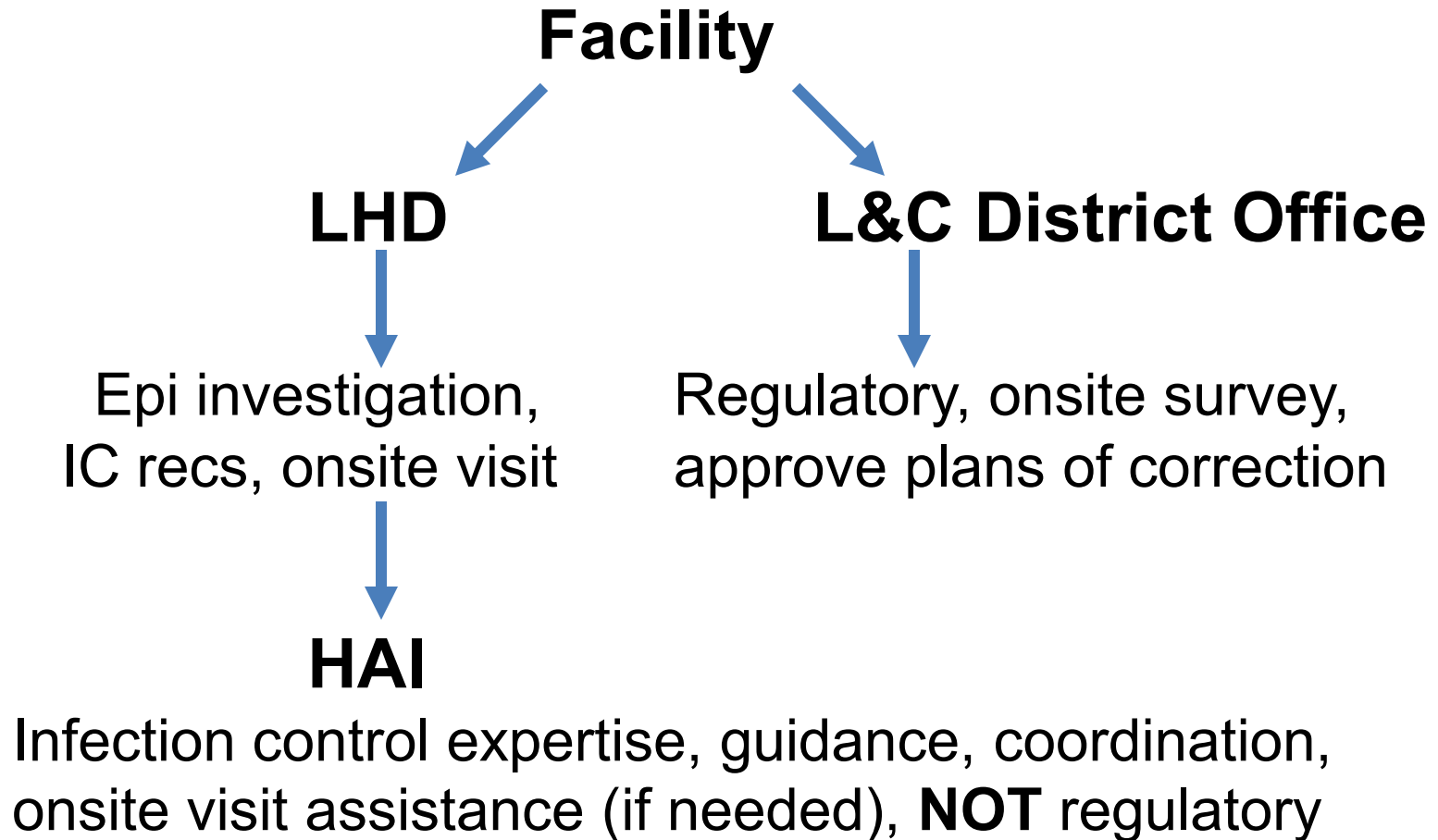
# Actions Taken When an Outbreak or Unusual Disease/Occurrence is Reported

Upon receipt of a report of an outbreak or unusual occurrence

- **Local public health** recommends control actions
- **CDPH L&C district office** determines regulatory follow-up action
- **CDPH Healthcare-Associated Infections (HAI) Program** is available for infection prevention and control expertise



# Public Health Roles in Outbreaks



# Sources for Identifying Potential Outbreaks in SNF

- SNF or hospital: Observes new symptoms or test results common to multiple residents or employees
- Microbiology lab: Reviews lab results for trends and unusual pathogens
- Public health: Detects an increase of an illness in the community

# Facility Recordkeeping for Outbreaks

- Start a file folder **immediately**
- Keep a **timeline**
- Make notes of
  - **Who** you notified
  - Daily activities and meetings
  - **Dates and times**
- Keep everything!
  - Your documentation will be needed



# Steps in a Healthcare Facility Outbreak Investigation

Step 1: Verify the diagnosis

Step 2: Confirm presence of an HAI outbreak

Step 3: Alert key partners

Step 4: Establish a case definition

Step 5: Identify and count cases

Step 6: Organize data according to person, place, time, and size

Step 7: Conduct targeted observations, review key concerns with HCP, and develop abstraction forms

Step 8: Formulate and test hypotheses

Step 9: Perform infection control assessment and implement control measures

Step 10: Follow-up, communicate findings, and notify patients



[CDC Investigations in Healthcare Facilities](#)

([www.cdc.gov/eis/field-epi-manual/chapters/Healthcare-Settings.html#fig18-1](http://www.cdc.gov/eis/field-epi-manual/chapters/Healthcare-Settings.html#fig18-1))



## Step 1 – Verify the diagnosis

Early in the investigation, identify as accurately as possible the specific nature of the disease

- Ensure that the **diagnosis** is correct
- Evaluate for possible **laboratory error** as the basis for increased diagnoses
- Evaluate possible **changes in surveillance** and case definitions
- **Review** clinical findings and lab testing results

## Step 2 – Confirm presence of an HAI outbreak

Verify that a suspected outbreak is real

- Reporting might be **increased because of changes** in reporting procedures, case definitions, or diagnostic procedures or increased local or national awareness
- Increase in infections recognized in healthcare settings may be part of a **broader community outbreak**
- **Pseudo-outbreaks** are those caused by lab processing errors or contamination of clinical diagnostic equipment, such as bronchoscopes, without clinical illness

## Step 3 – Alert key partners about the outbreak

After confirming an HAI outbreak

- Inform **facility staff**, including administrator, infection preventionist, medical director
- Ask the clinical laboratory to **save all isolates** that might be related to the outbreak
- Notify local and state **public health officials** (*required*)
- Alert **hospitals and other facilities** with whom your facility shares patients

*A cluster or outbreak should be reported even when laboratory testing to evaluate relatedness of isolates is pending or shows isolates are not closely related.*

## Step 4 – Establish a case definition

- A case definition is used to identify persons who are (or might be) infected
- A case definition usually includes
  - **Clinical information** about the disease (lab test results, signs and symptoms)
  - **Demographics** of affected patients (age, race/ethnicity, sex)
  - **Location** of possible exposure or time of onset (ward and bed number)
  - **Defined time** during which exposure or onset occurred
- The initial case definition should be **broad** enough to include most if not all cases; can be refined as more is known



## Step 4 – Establish case definition (continued)

- Case definition also should be based on the causative agent, if known, and can include infected and colonized patients
- A stratified case definition can be applied to account for the uncertainty of certain diagnoses
  - **Confirmed:** Must have laboratory verification
  - **Probable:** Has typical clinical features and an epidemiologic link to confirmed cases but lacks lab confirmation
  - **Possible:** Has fewer of the typical clinical features or weaker epidemiologic links to confirmed cases

## Examples of Initial Case Definitions

- Resident or staff member on the ventilator subacute unit with methicillin-resistant *Staphylococcus aureus* (MRSA) infection from January 1–December 31
- Resident admitted to the hospital with pneumonia or respiratory symptoms during last three months

## Step 5 – Identify and count cases

- Outbreaks are often first recognized and reported by perceptive HCP or identified during surveillance activities
- Additional cases can be identified through multiple types of data and records, including
  - Microbiology reports
  - Symptom logs
  - Interviews with HCP/physicians
  - Employee health records
  - Medical reports
  - Surveillance records
  - Pharmacy reports
  - Radiology reports
  - Pathology reports

## Step 6 – Organize data according to person, place, time, and size

- **Create a line list**
  - Helps guide the outbreak investigation and permits rapid examination of exposures
- **Construct an epidemic curve**
  - Visually demonstrates the outbreak's magnitude and time course

## Example Data to Obtain for the Line List

- Patient characteristics such as age, sex, comorbidities
- Date of admission
- Date of illness onset
- Date of discharge (if applicable)
- Facility location/unit, including room number, bed, and adjoining room numbers
- Medications
- Procedures
- Attending HCP such as specific nursing staff, respiratory therapists, and physicians

## Creating the Line List

- Collect the information on a standard case-report form, questionnaire, or data abstraction form
- Build a table where each row represents a case and each column represents a variable
- Add new cases as they are identified

This simple format allows the investigator to scan key information on every case and to update it easily

## Example Line List for HAI Investigations

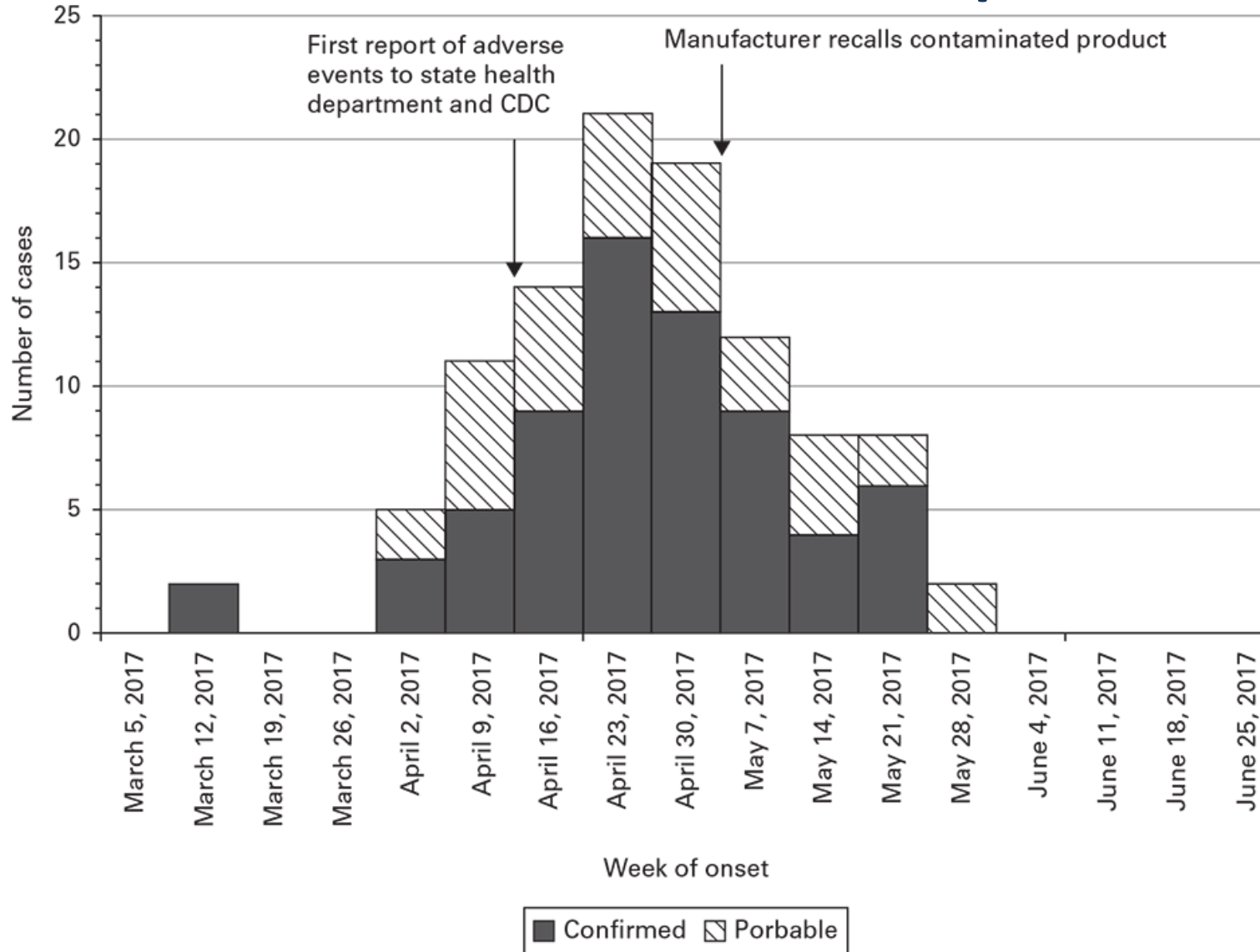
Patient	Age	Sex	Illness onset Date	Patient location	Comorbidities	Current status
1	76	M	6.9.2019	Room 202A	Diabetes, renal disease	In hospital
2	65	F	6.11.2019	Room 203	Cardiovascular disease	Room 105
3	42	M	6.12.2019	Room 202B	HIV infection	In hospital

# Construct an Epidemic Curve

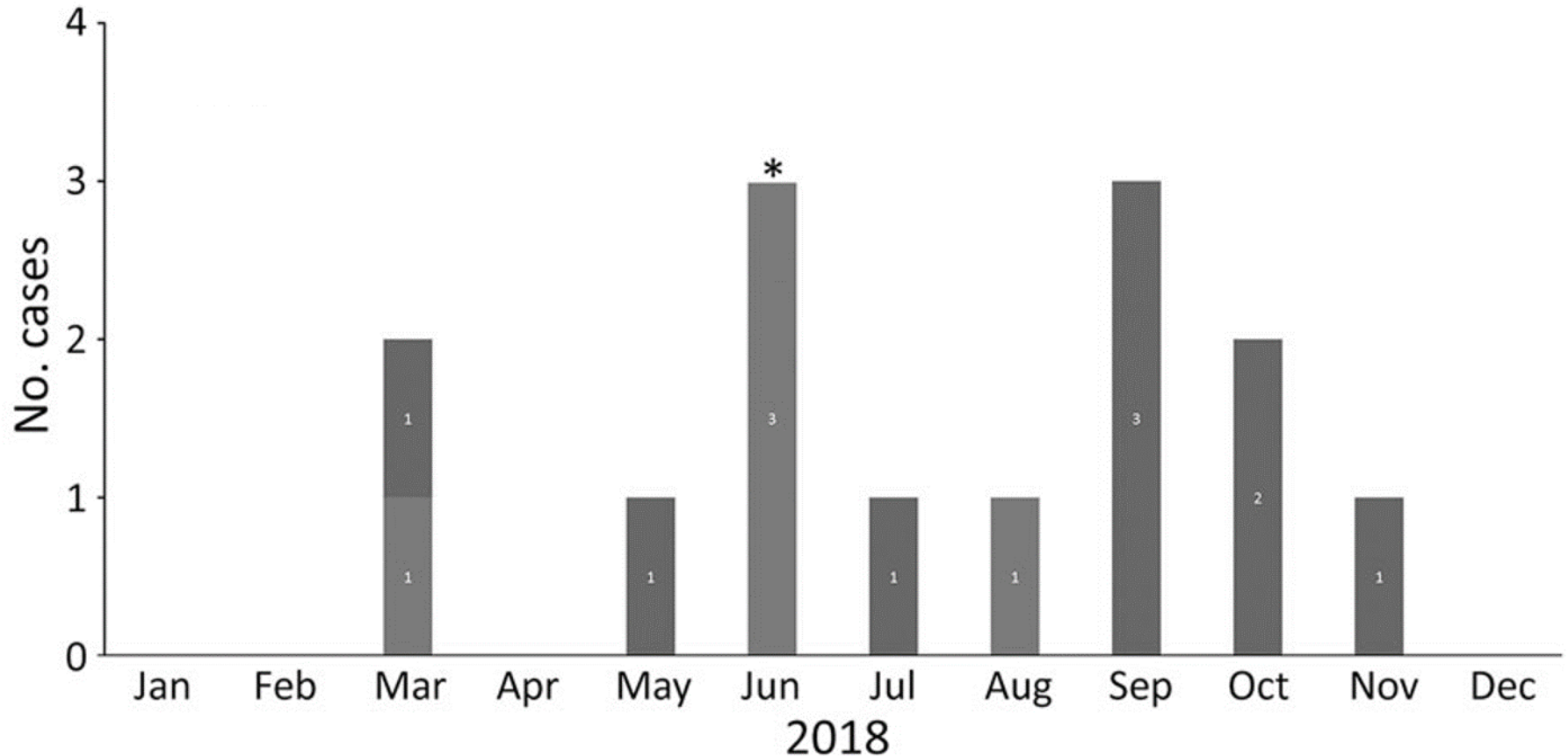
- The epidemic (epi) curve
  - Illustrates the course of the outbreak by day, week, or month
  - Might help estimate a probable exposure period (especially when an incubation period is known)
  - Might provide clues about the epidemic pattern (such as whether common source or person-to-person spread)
- Plot cases by illness onset date or time



# Example: Epi curve of patient adverse reactions associated with a contaminated heparin



## Example: Epi curve of a healthcare facility CRE outbreak



[CDC KPC-3-Producing \*Serratia marcescens\* Outbreak between Acute and LTC Facilities](#)

([wwwnc.cdc.gov/eid/article/26/11/20-2203\\_article](http://wwwnc.cdc.gov/eid/article/26/11/20-2203_article))

## Step 7 – Conduct targeted observations, review key concerns with HCP, and develop data abstraction forms

Public health will guide the outbreak investigation. They will

- Focus on whether actual practices deviate from recommended infection control practices and facility policies
  - Such discrepancies are best identified through a combination of direct observation and HCP self-reported practices
- Discuss with facility HCP to help generate hypotheses

## Step 8 – Formulate and test hypotheses

To determine the cause and extent of the outbreak

- Perform sampling and testing
  - A sampling strategy (who, where and what should be tested) must be guided by epidemiologic findings
- Consider testing of HCP
  - Only undertaken after careful consideration of how results will help control the outbreak
- Conduct analytic studies
  - Examine frequency of exposure to a risk factor among case-patients (persons with the HAI) compared with the frequency of exposure among controls (persons without the HAI)

**Analytic studies are not usually necessary to identify the likely source of outbreak and to institute control measures**

## Step 9 – Perform infection control assessment and implement control measures

To control the outbreak

- Perform an infection control assessment
  - Crucial to determine which control measures need to be implemented
  - Use a standardized infection control assessment tool
  - Physical walkthrough should be targeted depending on the hypothesized source of transmission (such as care locations or areas suspected to be involved in the outbreak)
- Recommend and implement control measures
  - Should be implemented as soon as gaps are identified

# Common Control Measures

- Isolation, room placement (cohorting), and Transmission-based precautions
- Closing a unit (or the facility) to new admissions until transmission has ceased
- Environmental control measures
- Adherence monitoring
- Post-exposure prophylaxis, as appropriate
- Visitor restriction, as appropriate
- Ensure affected patient status is communicated when transferred, or flagged internally

## Step 10 – Follow-up, communicate findings, and notify patients

- Complete follow-up stages of the outbreak investigation
  - Refine the case definition, continue case finding and surveillance, and review control measures
- Communication of findings
  - Investigation report should include
    1. Outbreak characteristics
    2. Infection control problems that most likely contributed to outbreak
    3. Any interventions instituted and their effects
    4. Recommendations for preventing future outbreaks
- Notification of patients

## Patient Notification

- Establishes transparency between HCP and residents/patients
  - Can help identify potentially exposed or infected patients who will derive a health benefit through follow-up testing or clinical evaluation
  - May limit the spread of multidrug-resistant organisms or other pathogens of public health concern by identifying exposed patients and their contacts who should be managed under recommended precautions
  - Improves case finding by informing patients and providers about the outbreak, associated exposures, and clinical signs and symptoms
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# Legal Considerations

- HAI outbreaks can result in litigation and have broad financial and public relations implications for affected facilities
- Pressure might be applied to investigate rapidly and implement necessary control strategies quickly
- Public health records of outbreak responses are frequently subject of Public Records Act requests
  - Keep records of all steps taken
  - Exercise care and discretion in how emails and other communications are used
  - Assume investigation records might become publicly available or used as part of litigation proceedings

# CDPH HAI Program Outbreak Resources

Outbreak guidance for	Resource type
<i>Candida auris</i>	Quicksheet (PDF)
Carbapenem resistant Enterobacteriaceae (CRE)	Quicksheet (PDF), Slides (PDF), Webinar Recording*
<i>Clostridioides difficile</i> infection (CDI)	Quicksheet (PDF), Slides (PDF), Webinar Recording*
Healthcare-associated Acute Viral Hepatitis	Quicksheet (PDF), Slides (PDF), Webinar Recording*
Healthcare-associated Legionnaires' Disease	Quicksheet (PDF), Slides, Webinar Recording*
Influenza and Other Respiratory Illness Outbreak	Quicksheet (PDF) Skilled Nursing Facilities annual guidance (PDF)
All outbreak types	Outbreak Line List (EXCEL)

\*Must have Media Player to view webinars

[CDPH HAI Detecting and Controlling Outbreaks in SNF](http://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/SNF_DetectAndControlOutbreaks.aspx)

([www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/SNF\\_DetectAndControlOutbreaks.aspx](http://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/SNF_DetectAndControlOutbreaks.aspx))

[CDPH HAI Resources for LPH \(See Outbreaks\)](http://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/LHD_Resources_and_Trainings.aspx)

([www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/LHD\\_Resources\\_and\\_Trainings.aspx](http://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/LHD_Resources_and_Trainings.aspx))

## Summary

- SNF outbreaks and unusual diseases/occurrences must be reported to the local health department and CDPH L&C district office
- HAI outbreak investigations involve a step-by-step process
- The cause of the outbreak may not be identified and the SNF may not know which control measure was most effective
- HAI Program medical epidemiologists and IPs are available to assist with outbreak or unusual occurrence investigations

# Additional Resources and References

- CDC [HAI Outbreak Investigation Toolkit](http://www.cdc.gov/hai/outbreaks/outbreaktoolkit.html)  
(www.cdc.gov/hai/outbreaks/outbreaktoolkit.html)
- CDC [Outbreak Investigations in Healthcare Settings](http://www.cdc.gov/hai/outbreaks/index.html)  
(www.cdc.gov/hai/outbreaks/index.html)
- [Worldwide Database for Nosocomial Outbreaks](http://www.outbreak-database.com)  
(www.outbreak-database.com)

## Questions?

For more information,  
please contact

[HAIProgram@cdph.ca.gov](mailto:HAIProgram@cdph.ca.gov)

Include “SNF IP Training Class”  
in the subject line

## Post Test

Now that you have completed  
this module,

Click on the “Post Test” link  
when it pops up

To Return to  
Learning Stream  
and take the post test

*If the Post Test link does not pop up, you will  
be sent a link via e-mail*