

CHAPTER 7

Multifacility & Multijurisdictional Outbreaks

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Multifacility & Multijurisdictional Outbreaks



Preface

Compared with single-facility outbreaks, those involving multiple facilities or multiple jurisdictions are more complex and often more difficult to detect, coordinate, and investigate. This chapter focuses on the unique aspects of multifacility and multijurisdictional healthcare outbreak response. See Chapter 3 for more information on public health jurisdictions and agency roles during outbreak response.

7.0 Introduction

A multifacility outbreak can be defined as any outbreak that affects more than one healthcare facility, including outbreaks that involve multiple types of healthcare settings such as a single outbreak across a hospital and an outpatient clinic. Multifacility outbreaks can involve multiple jurisdictions, and multijurisdictional outbreaks often involve multiple facilities. Multijurisdictional outbreaks can involve more than one county or city within a state, multiple states, or even multiple countries. As the numbers of involved facilities, agencies, and levels of organizations across jurisdictions increase, the need for special efforts to maintain effective communication and coordination also increases.

7.1 Overview

Multiple healthcare facilities (and multiple jurisdictions) may experience outbreaks that share the same

underlying cause.¹⁻³ For example, this can happen when medical products are contaminated at the point of production and then distributed to multiple facilities (See Supplement A for more information on contaminated medical products). Another example is a healthcare provider who does not follow recommended infection control practices and works (and spreads infections) in multiple facilities. Another common scenario in multifacility and multijurisdictional outbreaks involves an emerging pathogen that spreads after a colonized or infected patient is transferred from one facility to another.⁴⁻⁶

As the ability of healthcare facilities and public health agencies to detect and respond to outbreaks involving healthcare-associated infections and antimicrobial resistance (HAI/AR) increases, multifacility and multijurisdictional outbreaks have the potential to be identified more frequently and rapidly. The healthcare and public health communities must be sensitive to potential regional or national implications of any local

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outbreak, especially those that could have far-reaching consequences, such as when transmission stems from a contaminated medical product.

When there are multiple healthcare facilities or jurisdictions involved in an outbreak response, coordination and communication become more complicated. Two main points need to be considered: 1) recognition of an outbreak situation possibly affecting multiple facilities or jurisdictions should be accompanied by rapid communication; and 2) response activities will benefit from integration and coordination at the local, state, and national levels. Examples of categories of multifacility and multijurisdictional outbreaks can be found in Box 7.1; reviewing these examples to categorize an investigation can assist with ensuring that appropriate entities are promptly notified and effectively engaged.

Box 7.1 | Examples of How Healthcare Outbreaks Can Affect Multiple Facilities and/or Multiple Jurisdictions

1. Multiple healthcare facilities or settings within a single local jurisdiction
2. One healthcare facility serving patients across multiple local jurisdictions
3. One healthcare facility serving patients across multiple states or countries
4. Multiple healthcare facilities across multiple local jurisdictions within the same state
5. Multiple healthcare facilities across multiple states
6. Multiple healthcare facilities across multiple countries

7.2 Example Scenarios

7.2.1 Multifacility Outbreak within One Jurisdiction

A multifacility outbreak within a single jurisdiction may be detected via case reports, surveillance data, or other public health activities. It may initially be detected as

a single-facility outbreak that is later determined to be multifacility. These types of outbreaks often result from a combination of infection control breaches and poor communication between transferring and receiving facilities. In New York City, a *Candida auris* outbreak investigation revealed a network of transmission involving hospitals and long-term care facilities in multiple boroughs, spurred on by infection control lapses and environmental contamination.⁴ In Oregon, an outbreak of extremely drug-resistant *Acinetobacter baumannii* across multiple healthcare facilities was facilitated by the transfer of colonized patients without effective communication.⁶

If a medical product is locally distributed, such as with a local compounding pharmacy, a point-source outbreak among multiple local healthcare facilities is also possible. Scenarios that are less common but could result in local multifacility outbreaks include deficient infection control practices (or drug diversion) by a consultant or other healthcare worker who works at multiple facilities within a jurisdiction (see Supplement B), or medical equipment contaminated locally due to inadequate reprocessing practices and shared across multiple facilities (see Supplement A).

Multifacility outbreaks, even if the facilities are located within one jurisdiction, will usually involve patients from multiple jurisdictions (by address of residence) and may involve patients across state and national boundaries. Patient interviews may be performed by the jurisdiction where the facility is located or the jurisdiction where the patient resides, depending on the preferences of affected public health agencies.

7.2.2 Outbreaks that Span Multiple Jurisdictions

A multifacility outbreak may involve multiple jurisdictions. This type of outbreak can be detected via case reports, surveillance data, or other public health activities. It may originally be detected as a single-facility outbreak that is later determined to involve multiple facilities across jurisdictions. The outbreak mechanisms can resemble those presented in the previous section, with facility involvement that crosses jurisdictional boundaries.

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When multiple jurisdictions are involved, effective outbreak response is supported by ongoing and regular coordination across jurisdictions. Coordination will usually be led by the public health agency that covers the multiple jurisdictions, such as the state public health agency, if multiple counties are involved, or the Centers for Disease Control and Prevention (CDC), if multiple states are involved. An example of the latter was the investigation of *Mycobacterium chimaera* contamination of heater-cooler devices used in cardiac surgeries.⁷ In some cases, the state public health agency may have sufficient capacity, resources, and expertise to lead a multistate investigation. See section 7.3.3 for more details.

7.2.3 Outbreaks Involving Medical Tourism

Outbreaks related to medical care obtained outside the U.S. are another important example of multijurisdictional outbreaks, as patients receiving care at a single facility abroad may be returning home to various states across the U.S. Identification of outbreaks associated with medical tourism typically depends on astute clinicians who recognize that patients presenting with infectious complications following overseas healthcare procedures may represent a larger problem. Reporting single cases of infections related to medical tourism is critical to the identification of this type of outbreak; typically, CDC coordinates these investigations in close collaboration with state and local public health. Clinicians are advised to notify state and local public health as soon as medical tourism-associated infections are identified.⁸ In coordination with state and local public health, cases may also be reported to CDC's Division of Global Migration and Health (DGMH) by emailing medicaltourism@cdc.gov.

7.2.4 Contaminated Products

Medical products can become contaminated during production or distribution. The possibility of intrinsic contamination should be considered when an unusual organism causes infection following a procedure, when there is widespread distribution of cases across multiple facilities and jurisdictions, and when it is biologically plausible that the pathogen identified could have caused this type of product contamination. When an outbreak related to an intrinsically contaminated medical product

is detected, unless the product is contaminated locally within a specific facility (for example, during drug compounding or improper storage), the investigation and response is almost always multijurisdictional and multifacility. Since these investigations can be complex and involve multiple federal agencies, the coordinating agency is usually CDC, FDA, a state public health agency, or a large local public health agency with extensive capacity. For additional information on medical product investigations, see Supplement A.

7.3 Coordination of Multifacility and Multijurisdictional Outbreaks

7.3.1 Initial Detection of a Multifacility or Multijurisdictional Outbreak

A multifacility or multijurisdictional outbreak may be detected by an astute clinician or by examination of surveillance data that reveal a suspected outbreak across facilities. As described in Chapter 4, public health agencies fill a key role in the detection of multifacility outbreaks, since they receive case reports and surveillance data that can be reviewed for potential linkages. Sharing information across the public health and healthcare communities through open and regular communications—both formal and informal—can help detect multifacility outbreaks. For example, forums, local conferences, and listservs can provide opportunities to share information on current outbreaks that may lead to multifacility/multijurisdictional outbreak detection.

7.3.2 Initial Notification Upon Detection

After a potential multifacility/multijurisdictional outbreak has been detected, entities that may be affected and/or need to participate in the investigation should be promptly notified. As discussed in Chapter 3, section 3.1, notification should be considered for the following potentially impacted entities:

- Affected local public health agency
- State public health agency, including epidemiology and laboratory partners
- Surrounding local public health agencies (other counties, cities, or states) when these agencies may be affected (e.g., cases may be detected within their jurisdictions)



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- Affected healthcare facilities (those with cases)
- Healthcare facilities that may receive or transfer patients from or to affected facilities
- Healthcare facilities that may be positioned to detect and report new cases (e.g., if patients go to their local clinic or hospital for care after being exposed at an affected facility)
- Facility or provider licensing entities
- Affected patients or members of the public
- CDC if the outbreak is unusual or involves organisms of national interest, if technical assistance or additional resources may be needed, or if the outbreak may extend across state lines
- Food and Drug Administration (FDA) if intrinsic medical product contamination is suspected
- Local, state, or federal law enforcement if criminal actions are suspected (see Supplement B for information on drug diversion and drug tampering)

Notification processes among local, state, and national public health agencies and healthcare stakeholders may vary depending on jurisdiction and how an outbreak is initially recognized. More information on notification and communication can be found in Chapter 8.

7.3.3 Coordinating Agency

Following notification of affected agencies and healthcare facilities, it is important to promptly identify investigation partners and to recognize or designate a lead or “coordinating” agency, to do the following:

- Organize a multiagency, multidisciplinary team
- Manage information collection and dissemination
- Facilitate communications
- Ensure a complete and rapidly progressing investigation

Depending on the scope and nature of the outbreak, the coordinating agency may be a local public health department, state public health department, or federal agency such as CDC. Identification of the coordinating agency should allow for rapid investigation and mitigation of the outbreak. In some cases, during a multijurisdictional outbreak involving a single facility, the entity coordinating the response may be the healthcare system or academic center. When there is a multifacility outbreak, however, typically the coordinating agency will

be a public health agency rather than a healthcare facility. For the remainder of this chapter, the term “coordinating agency” will be used to imply a coordinating public health agency. Additional considerations for identification of a coordinating public health agency include the following:

- **In some situations, outbreak responses may be coordinated most efficiently by the public health agency nearest the source or index case; in other situations, it may make sense for the coordinating agency to be the one having the broadest jurisdictional authority.** An outbreak response involving multiple local public health agencies may be coordinated best by a local public health agency, if most cases or facilities are in that jurisdiction, or by the state public health agency, if cases or facilities are more widely dispersed throughout the state. A multistate outbreak may be coordinated best by a state public health agency or CDC. Outbreaks of widely geographically dispersed cases may be coordinated best by CDC. It is critical to have conversations early in the investigation regarding the role of each agency.
- **The coordinating agency should have sufficient resources, expertise, and legal authority.** In some situations, a coordinating agency may be a state public health agency or CDC due to resource limitations within local or state public health agencies, respectively. FDA may be the coordinating agency in some situations involving widely distributed contaminated medical products. Federal, state, and local regulations may also dictate which agency or jurisdiction should assume the coordinating role.
- **Designation of the coordinating agency may change over time, depending on the cause, scale and phases of an outbreak.** If an outbreak expands geographically or evolves in a manner that creates resource demands that no longer can be met by the originally designated coordinating agency, consideration should be given to changing the coordinating agency.

7.3.4 Interagency Outbreak Response Team

Investigating a multifacility or multijurisdictional outbreak is a collaborative process and requires team effort. As noted in the previous section, the coordinating agency



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plays a key role in helping assemble and manage a multidisciplinary outbreak response team. The team may comprise local, state, and federal agencies, as well as healthcare facilities and healthcare providers. Consider the following suggested practices for establishing interagency outbreak response teams:

- Clarify the roles and authorities of local and state public health agencies and other entities.
- Consider how, and to what extent, investigation team partners may need to, or be expected to, retain a lead role within their jurisdiction or agency.
- Discuss plans for incorporating (or communicating and coordinating with) regulatory agencies such as state healthcare facility and professional licensing agencies, the Centers for Medicare and Medicaid Services (CMS), and law enforcement agencies (local, state, and/or federal including the Drug Enforcement Administration (DEA); see Chapter 5 for more information.
- Review or designate specific roles for individual team members in each agency.
- Establish points of contact and communication pathways (see section 7.3.5).
- Share organizational charts.
- Refer to Chapters 3 and 5 for additional information relevant to assembling and managing outbreak response teams.

7.3.5 Communication and Collaboration

The success of a multifacility or multijurisdictional outbreak investigation often hinges on effective communication and collaboration. While Chapters 5 and 8 discuss these aspects in detail, some important considerations for multifacility and multijurisdictional outbreaks are highlighted below.

- The coordinating agency should establish regular communication with involved partners, which may involve regular meetings and email updates for all of the response team members, as well as smaller regularly scheduled group interactions for focused topics.
- The initial communication with all involved partners should include, at a minimum, introductions and roles, a summary of what is known to date, initial investigative steps that will occur (including any that

have already taken place), jurisdictional responsibilities for case investigation (e.g., by facility location vs. resident address), and method and frequency of communication.

- In more complex investigations, use of the incident command system (ICS) can help formalize the roles and lines of communication. See Chapter 3 for a more detailed discussion of the ICS. Agencies involved in the outbreak response should evaluate and decide in advance how to apply ICS, including across agencies during a multifacility or multijurisdictional outbreak response.
- Healthcare facilities and providers should be engaged early in the investigation and should receive timely and regular communications; these entities may benefit from having clearly designated points of contact within the response team, especially when issues arise outside of regularly scheduled interactions.
- Consider the need to notify the wider public health and healthcare communities, including when calling for additional cases; CDC's Epidemic Information Exchange (Epi-X), listservs such as the Emerging Infections Network through the Infectious Diseases Society of America (IDSA), and other networks can be useful for this, depending on the nature of the outbreak.
- Regular updates should include reviews of the investigation's progress across all facilities and jurisdictions. Involved entities will all want to know the big picture, including case numbers, hypotheses, new findings, aggregate data summaries, and investigation progression.
- Consider and regularly reassess internal communication within each agency and partner, including the need to communicate with leadership, communication experts, legal counsel, emergency response personnel, epidemiology experts, and laboratory experts.
- Multifacility outbreak investigations often provide opportunities to improve facility-to-facility communication, which may not be well-established prior to the outbreak response.
- Releasing information to affected patients or members of the press should be discussed with (or coordinated through) the lead agency when feasible.



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For media inquiries, having a unified message and communications plan developed ahead of time is advisable. This enables a rapid response that is consistent among the agencies. For additional information, see Chapter 8.

- Early in the investigation, consider the potential for scientific publications or presentations; discussing agency and individual roles, and agreeing on leads, contributors, and other aspects of attribution can help with collecting information and avoiding conflicts later on.

7.3.6 Data Collection and Dissemination

Data collection, organization, and analysis should ideally be managed centrally by the coordinating agency or through its designee (e.g., the coordinating agency may elect to engage a partner with more experience or authority for this activity). Data collection forms should be applied uniformly by all agencies involved in data collection. Data collection on cases may involve medical record reviews and patient interviews; data collection to determine possible sources of infection or infection control breaches may involve infection control observations, staff interviews, and review of other types of facility records. The coordinating agency should ensure that the entities performing data collection have the resources they need to complete the investigation in a timely manner. Consideration should be given to on-site observations for all involved facilities, and not just those facilities with the majority of cases. To maintain confidentiality, the coordinating agency should also ensure that proper approvals for collecting data have been obtained, including human subjects research determinations as needed.

Sharing of data among affected entities is regulated by local, state, and federal authorities. The coordinating agency should consider options to ensure that each jurisdiction and facility has access to their own data. In most cases, it is not appropriate for all involved entities to have access to all data; for example, it may not be appropriate for a healthcare facility to have access to confidential information on patients from another healthcare system. Maintaining patient confidentiality is essential, and any data sharing should be done in a secure and legal manner. Options to consider based

on agency and local and state regulations may include sharing of data collection tools via secure methods or a secure shared database that allows for each entity to access their own data. A memorandum of understanding (MOU) or other formal agreement between agencies may be necessary for such arrangements. See Chapter 3, section 3.4.2.1 for more on information collecting and sharing.

Barriers to data sharing can include patient privacy regulations and internal policies. Awareness of all entities' barriers can help determine the best method for data-sharing practices throughout the investigation. When the response intersects with a criminal investigation or regulatory action, data collection and sharing are subject to additional layers of complexity, and the role of the coordinating agency may be further amplified.

The coordinating agency should ensure sharing of aggregate analyses as the investigation progresses. The coordinating agency should update descriptive analyses, timelines, maps, epidemic curves, and other analyses as needed, and ensure that communication to the entities involved includes dissemination of these data summaries. Aggregate analyses can often be shared more readily across the involved entities because they do not usually contain confidential information. Consideration should also be given to avoid sharing information that may identify an individual based on the detail of information given, even if that information is not typically considered confidential by the public health or healthcare agency.

7.3.7 Regular Assessment of the Scope of the Outbreak and the Resources Needed

The scope of an outbreak response will change over time, especially in the case of multifacility and multijurisdictional outbreaks. Typically, there is a growth period as the overall response process ramps up. Cases may accumulate, and the scope of the investigation may widen to include additional facilities and jurisdictions. Later, after control measures have been implemented, activities may decrease and resource demands may begin to decline. When the scope of an outbreak changes, entities involved in the response, resources needed for the response, and the ability of the coordinating agency to continue in the lead role should be reassessed. Questions that should be periodically considered throughout the investigation follow:



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- Are there additional entities that became involved during the investigation that should be added to communication streams? Are there entities whose involvement may be reduced or initiated?
- Does the coordinating agency continue to have the capacity to lead the response or has the outbreak expanded or shifted in a way that may necessitate transitioning the role of coordinating agency to another agency?
- Are there other experts who may provide additional insight?
- Does it make sense to adjust the frequency of communications? Does the coordinating agency believe that meeting attendance can be narrowed? Are there opportunities to consolidate and decrease the footprint of activities and communications?
- Is it appropriate to consider decreasing the frequency of communications and transitioning to surveillance/maintenance activities?

7.4 Concluding a Multifacility or Multijurisdictional Investigation

Determining when to declare an end to a multifacility or multijurisdictional outbreak investigation can be challenging. As described in section 7.3.7, the scope of the response requires regular reassessment. The coordinating agency is often in the best position to gauge ongoing needs for active contributions from members of the interagency team. Generally, once the likely cause of the outbreak has been determined and appropriate control measures have been put in place, opportunities to narrow the scope of the response can be identified. The investigation may enter a maintenance or “monitoring” phase; this may include a process for confirming that transmission has been interrupted, continuing surveillance for additional cases, completing follow-up activities related to product recalls, case management, finalizing collection and analysis of data, and preparation of reports.

Considerations for a monitoring process can include the needs of the affected agencies (e.g., some organizations may still be detecting cases while others may not),

the jurisdictions involved, and the types of tasks that should occur during the monitoring period. Determining timeframes and endpoints for involved entities during the investigation is very helpful. The duration of the monitoring period often depends on the specifics of the pathogen or the type of infection as well as the likelihood that control measures will be successful. For example, if the outbreak involves a pathogen with a long incubation period, there may be an extended period during which additional cases can be identified as a consequence of exposures that occurred before control measures were implemented (e.g., a product recall). On the other hand, when a multifacility outbreak stems from introduction of a novel multidrug-resistant organism (MDRO), control measures may be more diffuse (e.g., enhanced infection control) and require more vigilance to rule out ongoing transmission. If additional cases representative of ongoing transmission are detected during the monitoring period, it may be necessary to re-activate the response or extend the monitoring period in affected facilities or jurisdictions.

The decision to formally conclude an interagency response depends on many factors, including the gravity and scope of the outbreak, and on the likelihood that the current situation reflects an ongoing public health threat. For additional considerations, see Chapter 5, section 5.1.13. The conclusion of a multifacility/multijurisdictional outbreak represents an opportunity for reflection, assessment, and improvement. It is best practice to conduct an after-action review (i.e., a post-outbreak debriefing meeting) with all involved agencies to identify gaps in the outbreak response and to mitigate these gaps prior to the next outbreak.

In summary, multifacility and multijurisdictional outbreaks can involve multiple healthcare facilities, public health agencies at all levels, regulatory agencies, and other entities. While these investigations can be complex, nonlinear, and involve differences in perspectives and priorities, identification of a coordinating agency, delineation of roles, and establishment of regular and effective communication practices can all increase the likelihood of success.



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