



FOCUS on Field Epidemiology

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Forensic Epidemiology Investigations

There has been an incident: a deadly chemical has been detected in your community's water supply. As the person responsible for investigating outbreaks in your county, you gather a team and head to the site of contamination. Your team includes environmental health specialists to sample the area for chemicals and interviewers to talk to potential victims. You have even alerted area hospitals of the situation.

As you arrive on the scene, the police are beginning an investigation of their own, roping off areas that you need to sample from and preventing you access to witnesses. What is going on here? Isn't this a health-related event? Who has authority over the investigation: law enforcement or public health? How can you prevent widespread illness or death in this situation?

The investigation of health-related criminal cases, such as deliberate poisonings or bioterrorist events, marks a new era in public health, and more specifically, in epidemiology. Forensic epidemiology uses public health methods in the setting of a potential criminal investigation (1).

Most public health workers will encounter forensic epidemiology as health-related criminal investigations unfold, and they may find themselves working side by side with law enforcement officials. Because an ordinary public health investigation differs from a law enforcement investigation, however, people in both public health

and law enforcement need to learn about the ways in which their counterparts conduct investigations (see Table 1). Recognizing the differences will help these disciplines work together effectively to protect the public's health and identify and prosecute individuals responsible for health-related criminal acts.

Criminal Intent

In epidemiology, outbreaks are usually considered naturally occurring. Therefore, epidemiologists look for mistakes in food preparation, changes in the environment, and other unintentional incidents as the cause of an unusual disease occurrence. However, recognizing early on that criminal intent is involved in a health-related incident will help greatly in preserving evidence and solving the crime. There are different ways in which criminal activity may occur: an attack may be overtly or covertly carried out.

Covert Attack

In a covert attack, no group or individual takes responsibility and the incident may not be initially recognized as an attack. The large *Salmonella typhimurium* outbreak that occurred in 1984 in Oregon is an example of a covert attack. Several months after the outbreak, authorities discovered that members of a religious commune had deliberately contaminated restaurant salad bars to cause the outbreak. When a covert attack occurs, public health



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officials will recognize any unusual signs, symptoms, or disease clusters first through their surveillance systems. Thus, a hospital emergency room, laboratory staff, or health care providers who are seeing an unusual number of patients with a specific disease may become the first responders.

Even though ill persons or groups of ill persons in the community have been identified, it may be difficult to immediately confirm that a bioterrorist incident has occurred. Therefore, the local health department should immediately notify the state health department when they detect large numbers of cases of unexplained disease or death and conduct a joint preliminary epidemiologic investigation using a rapid-response epidemiologic and laboratory team (2).

Once a bioterrorist incident is thought to be a possibility, local and state health officials should notify the FBI and other predetermined response partners (e.g., CDC, local and state law enforcement). This notification must be done immediately.

Overt Attack

An attack is considered overt when the perpetrator announces responsibility for the act; an example is the intentional release of sarin nerve agent in a Tokyo subway in 1995. The threat or the incident may be reported to a public health official first, but it is more likely to be announced on a public web site or through the media. In this case, law enforcement officials will likely detect the event first, and law enforcement and emergency management teams will be the first responders. Although many overt incidents have actually been hoaxes (e.g., white powder in envelopes), especially in 2001 and 2002, any overt event is a crime and the site is considered a crime scene.

If officials in a local or state health department are notified of an apparent incident or threat of bioterrorism, they are required to contact the FBI and state and local law enforcement partners immediately. The overall response to the threat is coordinated by the FBI (2). After ensuring that federal law enforcement officials are notified, local health officials should immediately notify the state health department (2).

Table 1: Differences between public health and law enforcement investigations

Difference	Explanation
Criminal intent	Public health investigations usually look for a naturally occurring organism or environmental hazard rather than a responsible person or persons.
Interviews with subjects of an investigation	Public health officials interview patients to gather information for health purposes rather than criminal purposes.
Laws governing investigations	Public health authority influences public health investigations and actions; the criminal justice code is the authority behind criminal investigations.
Collecting evidence/samples	Public health officials are not required to collect samples (which could be needed as evidence) in a way that makes them admissible in court.
Confidentiality	Public health officials are concerned about confidentiality for the person possibly involved in an outbreak; law enforcement officials are concerned about confidentiality for an informant or witness.
Media interaction	Public health has a relatively open relationship with the media; law enforcement tends not to be open with the media during an ongoing investigation.
Using classified or sensitive information	Public health officials or offices may not be equipped to handle or process secret or secure information.

Deaths

Any death due to a deliberate attack is a homicide, and must be reported promptly to the medical examiner or coroner. Statutes allow medical examiners/coroners to take jurisdiction over deaths suspected (not just proven) to be caused by poisoning, bioterrorist agents, or any other hazard not due to natural causes. The medical examiner/coroner will assume jurisdiction, carry out a medicolegal death investigation, perform a medicolegal autopsy, and collect fluid and tissue samples needed for testing, culture, and any other analyses that will be needed as evidence in court. This must be done promptly before the body is embalmed, moved, or otherwise altered. An autopsy should be performed before the epidemiological or FBI investigation is complete (3).

Laws Governing an Investigation

Historically, very different laws have governed investigations by public health officials and law enforcement officials. In North Carolina, statutes give health directors permission to review medical records that pertain to the diagnosis, treatment, or prevention of a communicable disease or condition for a person infected, exposed, or reasonably suspected of being infected or exposed; implement control measures to manage the communicable disease and prevent the spread of the disease, which may include submission to examinations and tests; impose quarantine and isolation to limit the freedom of a person for the period of communicability (4); and enter upon the premises of any place where entry is necessary to enforce the provisions of these public health laws. Under these statutes, public health officials have the ability to respond quickly to health-related threats.

In contrast, law enforcement must first obtain a search warrant to investigate a crime. Under normal circumstances, a law enforcement officer can only conduct a search and make seizures without a search warrant or other authorization if consent to the search is given (4) or if circumstances represent a serious, credible, and 'immediate' threat to the public (known as 'exigent circumstances').

The medical examiner or coroner has jurisdiction over any dead victims, and has access to the scene with law enforcement to recognize and collect any evidence related to the body (3).

Joint Interviewing

When possible and appropriate in a forensic epidemiology investigation, public health and law enforcement personnel should work in teams to jointly conduct inter-

views with victims and witnesses. If a joint interview is not possible, each discipline should be aware of the type of information their counterpart is seeking. Law enforcement investigators want to know personal, travel, incident, safety, and other information pertinent to a criminal investigation. Public health investigators want to know personal, exposure, travel, and medical history information (5).

Evidence

Law enforcement officials gather evidence, while public health officials gather specimens. These are the same under some circumstances, but the purposes for gathering them and the way they are handled differ. Two criteria must be met in order for information from public health investigations to be used in criminal investigations: 1) legitimate public health investigation and 2) chain of custody.

For example, a legitimate public health investigation may involve collecting samples of food from a salad bar when an outbreak is suspected. Because these samples are collected based on a legitimate concern for the public's safety, the samples are admissible as evidence in a criminal investigation if one is conducted.

The second requirement for evidence to be admissible in a criminal investigation is establishment of a chain of custody, using a special form to document the chronological history of a piece of evidence (6). A chain of custody form provides the name or initials of the individual who collected the evidence, each person or entity subsequently having custody of it, the date the item was collected or transferred, the agency and case number, the victim's or suspect's name, and a brief description of the item (6). A chain of custody is required by protocol in a law enforcement investigation, and officials are responsible for creating an incident report, maintaining a chain of custody, and transporting a specimen or other piece of evidence to a laboratory or other facility. Chain of custody is also routine for the medical evidence collected by medical examiners and forensic pathologists (3).

A chain of custody is not established in a typical public health investigation (6). Nevertheless, persons documented as custodians of the item should be able to testify in court that the item was secure, unaltered, and uncontaminated during the time it was in their custody, and should be able to explain the procedures they used to store, examine, test, and otherwise process the item (7).

Confidentiality

Public health officials are primarily concerned with the confidentiality of patients and their medical records. According to the North Carolina statutes, all records containing privileged patient medical information in the possession of the State Health Department or local health departments are confidential and are not matters of public record (4). A person in charge of a health care facility may report to the state or local health director any events that may indicate the existence of a case or outbreak of an illness, condition, or health hazard, but to the extent possible, personally identifiable information should not be disclosed. Therefore, in an "outbreak" setting, public health officials can contact, interview, and offer testing to all cases, case contacts, and even contact contacts who are considered to be suspect cases, but confidentiality must be maintained.

However, as soon as a bioterrorist incident or criminal intent is suspected, a law enforcement official may gain access to confidential or protected health information for the purpose of investigating a terrorist incident involving potential nuclear, biological, or chemical agents. Then confidentiality concerns are not only for the person as a patient, but also as a witness or informant.

Media

Public health officials often rely on the media to get information to consumers for their protection, and they use the media to elicit a response from the public and assist in investigations. Therefore, public health has a more symbiotic relationship with the media than does law enforcement.

While law enforcement may rely on the media to get information to the public about a dangerous person, they tend not to be open with the media about ongoing investigations, in order to preserve the integrity of the case and not hinder investigation of unexplored leads. When a forensic epidemiologic investigation is being conducted, therefore, a protocol

should be in place to avoid accidental disclosure of important information. Public health and law enforcement officials, along with FBI, CDC, and state and local officials, should coordinate messages through a joint information center to hold news conferences and indicate that an ongoing joint investigation is underway.

Classified/Sensitive Information

As members of a joint law enforcement and public health investigation, public health officials may be required to review classified or sensitive information. Public health officials' access to these types of information should be considered. Some public health officials should hold clearances to communicate with law enforcement when necessary, and secure equipment such as phone lines and fax machines should be available for public health officials to communicate with law enforcement.

Challenges of Bioterrorism

Despite the differences in typical law enforcement and public health investigations, they face many of the same challenges when investigating bioterrorist events. There are likely to be high concentrations of agent dispersed; there may be a large primary cohort of people exposed; the agent may have been distributed in a well traveled area; people may present to many different hospitals (making it difficult to recognize clusters); there may be a deliberate second attack that may affect first responders, among others; there may be wide-spread panic; and hospitals may become flooded with both sick and non-sick looking for treatment, vaccines, or reassurance about their health status.

When all participants in an investigation into a bioterrorist event are prepared to respond to the event and can work efficiently and effectively together, they can control panic, ensure a rapid response, treat the sick, identify the source, and successfully identify and prosecute those involved in the attack.

Glossary

Field-based forensic epidemiology: The application of public health methods in a field-based setting to investigate health-related criminal events. Field-based work usually includes both public health and law enforcement officials, among others.

Covert attack: A criminal action that may not be initially recognized as an attack.

Overt attack: A criminal action in which the perpetrator announces responsibility for an attack.

Chain of custody: A form used to document the chronological history of a piece of evidence.

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UPCOMING TOPICS:

- Conducting Traceback Investigations
- Conducting Environmental Health Assessments
- Collection of Appropriate Specimens
- Risk Communication During an Outbreak
- Minority Considerations

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