

## **Acknowledgments**

Many people and organizations joined forces to produce these products. The **CPHP Collaboration Group on New Modules for Forensic Epidemiology** would like to thank in particular Molly M. Eggleston, University of Pittsburgh Graduate School of Public Health, for her valuable leadership as chair. The contributions of each one of the group members was also critical to the completion of this document. In turn, the group would like to thank the reviewers and the ASPH coordinator for their contributions, guidance, and support.

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## **CPHP Collaboration Group on New Modules for Forensic Epidemiology**

The Centers for Public Health Preparedness (CPHP) constitute a national network developed by the Centers for Disease Control and Prevention (CDC) and the Association of Schools of Public Health (ASPH) to train the public health and healthcare workforce to respond to threats to our nation's health, such as bioterrorism, infectious disease outbreaks, and other public health emergencies. To foster sharing and information exchange, CDC and ASPH established "collaboration groups" on topics of preparedness to develop products to aid the public health workforce.

Among its purposes, this CPHP collaboration group is to enhance the Forensic Epidemiology course originally developed to respond to needs identified by state and local health agencies. As mandated, this group is to collaborate with CDC, compile and review existing modules, and, as needed, propose and develop new ones (e.g., on food safety).

The group used the following definition of forensic epidemiology:

Forensic epidemiology refers to the use of epidemiologic methods in the investigation of public health problems that may have been caused by or associated with intentional and/or criminal acts.

See, e.g., Richard A. Goodman, et al. "Forensic Epidemiology: Law at the Intersection of Public Health and Criminal Investigations." 31 J. L. MED. & ETHICS 684, 685. (2003).

The group produced a number of products, including:

- Two case studies to update the originals in the course entitled, "Forensic Epidemiology: Joint Training for Law Enforcement and Public Health Officials on Investigative Responses to Bioterrorism"; each case study is a stand-alone, "lunch and learn," or otherwise brief refresher (less than three hours in duration) for implementation at the state and local levels, primarily by public health professionals;
- Revised roles for participants, facilitators, and observers in using the case studies; and a
- Sampling of educational resources available to train in forensic epidemiology.

Few people will forget the disorganized response to the October 2001 anthrax attacks in the United States, when law enforcement and public health officials competed with one another for control of the scene and for control of public information dissemination. Efforts have since been made to foster cooperation between these two crucial components of our emergency response system. The collaboration group is committed to learning from history and to reducing inefficiencies in the future.

With that commitment in mind, the CPHP collaboration group developed three case studies to help local agencies keep their emergency response relationships current, to provide practice for the interdisciplinary nature of forensic epidemiology, and to raise the threshold for notification. As noted above, the case studies are meant to stand alone as brief refreshers for implementation at the state and local levels, primarily by public health professionals. They may also replace the case studies in the original course for those who have not yet taken it. They should be used with the facilitator and participant roles as outlined in the original forensic epidemiology curriculum. The intended audience for these case studies remains the same as for the original course: public health and law enforcement personnel. Each scenario should address all of the same 13 learning objectives, which are as follows.

- Provide examples of anomalies in other discipline systems
- Describe the methodology of disease reporting systems
- Define the detection methods of each agency
- Discuss intra-agency capabilities, responsibilities, and authorities for unusual events
- List each agency's capabilities, responsibilities, and authorities during unusual events
- Discuss ways to evaluate credibility of threat information
- Describe the need to reassess credibility of threat information on an ongoing basis
- Describe intra-agency communication thresholds for unusual events
- Describe inter-agency communication thresholds for unusual events
- Describe inter-agency communication and coordination
- Determine which agency is responsible for and has authority to identify and disseminate threat information
- Discuss mechanisms for sharing threat information
- Identify barriers and assess gaps of inter-agency cooperation

For further information about CPHP Collaboration Group on New Modules for Forensic Epidemiology and the development of this and other products, please visit the ASPH Resource Center at <http://www.asph.org/acphp/phprc.cfm>.

### Case Study 3: Illness in a Poultry Worker Facilitator's Guide

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| <b>Background</b>           | <p>It is early fall on an Indiana egg farm. The farmer is a contractor for a major national food company and employs three full-time workers to tend chickens; he contracts with a transport company to ship the eggs out. The three farm employees—a married couple and another male— have been employed at the farm for about 15 years. The farm is located in a rural area of the state, mostly populated by poultry farms and related industries, but other forms of agriculture are present as well.</p>  |
| <b>Day 1</b>                | <p>Outbreaks of the highly pathogenic H5N1 strain of avian influenza have spread across Europe, and evidence of avian influenza has been found among migrating birds in Alaska and Canada. Consequently, North American countries have become vigilant in their search for signs of avian influenza among poultry and wild birds, as well as signs of any potential human cases. Worldwide, all human cases have been traced to known or suspected direct contact with infected poultry, but scientists have noted slight changes in the strain and worry that further mutations may lead to human-to-human transmission of this strain of influenza. Avian influenza outbreaks (not of the H5N1 strain) have occurred in the U.S. poultry industry as recently as 2004, and the industry has responded by implementing biosecurity measures to protect poultry and heightened surveillance among poultry and poultry workers.</p> <p>On Wednesday, the male farm worker arrives with a mild cough, ragged breathing, headache, and occasional dizziness. He attended his young daughter's birthday party the previous weekend and thinks he probably contracted a cold from one of the children who was present at the party. By the end of the day, he is feeling better and returns home without reporting his illness to his employer.</p> |
| <b>Day 2</b>                | <p>The farm worker's headache and dizziness are worse. Biosecurity rules at the farm require him to report his symptoms to his employer. The farmer believes that the worker has flu-like symptoms, and calls the local health department to report a possible case of influenza in a poultry worker, as local regulations require.</p> <p>At this point, a diagnosis has not been made and a health care provider has not been seen.</p>  |
| <b>Discussion Questions</b> | <p><b>What steps are taken by the local health department? Who is notified internally? Discuss general influenza response protocol.</b></p> <p><i>In the United States, influenza typically occurs annually from December to April. Thus, it is early in the season for a case of seasonal influenza. However, the CDC deems poultry farmers and their workers at high risk for avian influenza. Unlike seasonal flu, avian influenza can be extremely lethal, even for the young and the healthy. Any suspected cases should be taken to a clinic for diagnosis as soon as possible so that antiviral</i></p>   |

*medication can be administered, if necessary. In this case, the local health department should contact the ill poultry worker to gather complete symptom and demographic information and recommend the worker go to a clinic for diagnosis. The local health department should also contact the state health department for follow-up. Each state's plan for pandemic influenza will include protocol for reporting suspected cases of avian influenza, as well as the chain of command for follow-up. State-by-state guidelines are available at <http://www.pandemicflu.gov/plan/tab2.html#stateinfo>.*

**Discuss the health department structure in participant's jurisdictions:**

- What are the different roles of the epidemiology/surveillance staff and the communicable disease staff?
- What is the chain of command for disease reporting? Are your local and state health departments independent? How is disease reporting information shared between these entities?
- Does your public health lab do testing for H5N1 influenza? Is this testing warranted at this point in time?

*Testing may be warranted at this time, given that this person is a poultry worker. Testing should definitely be performed, if the farm has had any chickens become sick or die unexpectedly. Testing of chickens from the farm may also be warranted.*

**Who is notified externally?**

*The state health department should contact the state department of agriculture and the state veterinarian, or whoever else are the proper animal health authorities.*

*Note to facilitator: prompt participants to discuss the relationship between the health department and the agriculture department in their state.*

**How is information communicated between these agencies?**

*This answer will vary depending on the state. The facilitator can initiate student discussion of communication strategies in their states.*

*Note: In the setting of an outbreak investigation, a "case definition" incorporates specific criteria to identify persons likely to have been affected in the outbreak and to set them apart from persons who were uninvolved in the outbreak. By contrast, the use of "case" in the context of law enforcement represents a formal, active criminal investigation.*

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| <p><b>Day 2 (cont.)</b></p>        | <p>The call from the farmer comes into the local health department at approximately 1 PM. The local health department recommends that the farm worker see a doctor immediately and have a specimen sent to the public health laboratory for influenza testing and subtyping (as test results indicate). The local health department contacts the state to lead the follow-up on the situation. The state health department notifies the state department of agriculture of a potential case of influenza in a poultry worker and contacts the state veterinarian, stating that it is unclear if any poultry appear to be infected. The local health department arranges to interview the ill farm worker later in the day.</p>   |
| <p><b>Discussion Questions</b></p> | <p><b>What information is needed from the farm worker?</b><br/> <i>Public health officials should collect the following information from the farm worker during the interview: description of symptoms, date of onset of symptoms, demographic information, close contacts, and activity history for the last seven days. The health department should also ask additional questions to gain information needed by other agencies and authorities to prevent having to re-interview the patient, (e.g., his occupational history, was he in close contact with sick or dead chickens, was he in contact with any other sick animals, what kind of personal protective equipment does he regularly use?).</i></p> <p><b>What other steps does the health department need to take?</b><br/> <i>The health department needs to first conduct a rapid test for the influenza A virus. If the results come back positive, a specimen must be collected for subtyping. The health department will also need to begin contact tracing. With whom was the patient in close contact during the last seven days? Are any of these contacts displaying symptoms?</i></p> <p><b>What would be the next steps for the department of agriculture/state veterinarian?</b><br/> <i>The state department of agriculture and the state veterinarian should begin an investigation into the health of the poultry on the farm. They should also notify local cooperative extension and emergency management officials, as well as other poultry producers in the area</i></p> |
| <p><b>Day 3</b></p>                | <p>The local health department has collected the following information from the ill farm worker:</p> <ul style="list-style-type: none"> <li>• His symptoms include shortness of breath, watery eyes, headache, nausea, confusion, hallucinations, and fatigue from insomnia, though the symptoms are not debilitating.</li> <li>• Onset of symptoms occurred Tuesday night, but they were not bothersome until Wednesday morning.</li> <li>• He is 36 years of age, divorced, with a 7-year-old daughter and a 5-year-old son.</li> <li>• He lives alone and has custody of the children every other</li> </ul>  |

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| <p><b>Discussion Questions</b></p> | <p>weekend, including the coming weekend.</p> <ul style="list-style-type: none"> <li>• Aside from the weekend birthday party and a trip to a local hardware store for supplies for renovating his home, he has had no contact with anyone outside the farm in the last 7 days.</li> </ul> <p>During the interview that occurred on Day 2, the worker reported not having contact information for the birthday party attendees but did provide contact information for the mother of his children. A rapid test indicated positive results for influenza A, and a specimen was taken for subtyping by Polymerase Chain Reaction (PCR).</p> <p>The local health department followed up with the mother and learned that neither she nor the children were ill. She provided contact information for the parents of the children who attended the party.</p> <p><b>What does a positive influenza A test result indicate?</b><br/> <i>Many subtypes exist of the type A influenza virus, ranging from a mild seasonal influenza to the more lethal avian influenza. These subtypes differ because of changes in certain proteins on the surface of the influenza A virus (hem agglutinin [HA] and neuraminidase [NA] proteins). Each combination represents a different subtype. Therefore, a positive influenza A test result only accounts for the patient having the flu. More testing on the subtype of the influenza A virus that has infected this patient is needed to determine if the patient has subtype H5N1, which is the avian influenza known to cause severe illness in humans.</i></p> <p><b>What should be done immediately, if anything?</b><br/> <i>The health department should implement precautionary measures, such as voluntary quarantine of the farm, until the diagnosis can be confirmed. The state department of agriculture should also begin testing chickens and examining biosecurity measures at the farm. The other farm workers should use personal protective equipment such as a filtering face piece, eye protection, and protective clothing while at work. The local health department should heighten surveillance of the other farm workers for flu-like symptoms.</i></p> <p><b>Day 3 (cont.)</b></p> <p>Representatives of the state veterinary office interview the farmer regarding the health status of poultry on the farm and biosecurity measures that are in place. The veterinarian takes a tour of farm facilities and notes that biosecurity appears to be adequate and that the flock appears to be healthy. A few samples are taken for testing. Upon receiving a phone call about the preliminary test results in the poultry worker, the veterinarian becomes very concerned. He urges the farmer to introduce voluntary quarantine measures until the final test results on</p> |
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| <b>Conclusion<br/>Day 6</b> | <p>The laboratory results indicate that the farm worker has contracted influenza A, subtype H3N2, which is the circulating strain commonly indicated in seasonal influenza. The worker and his children are treated for their symptoms, and the illness resolves. Initial test results for the poultry are negative.</p> <p>Law enforcement personnel, meanwhile, have compared recent crime reports against the address of the home that the ill farm worker recently bought to renovate. The comparison reveals that the address has housed a suspected methamphetamine lab. The officer notifies the health department of his findings.</p> |
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