

Exercise 2

Case Management of Suspected Human Infection with Avian Influenza A (H5N1) During a Poultry Outbreak

Part 1: Background information on clinical features of human infection with avian Influenza A (H5N1)

Objectives:

- Identify clinical features of suspected avian influenza A (H5N1) infections in humans
- Assess exposure to avian influenza A (H5N1)
- Give recommendations to health-care providers in the management of suspected avian influenza A (H5N1) patients

Instructions:

For this exercise, you will work with your group to complete a case study investigation. Each segment of case study information will be followed by a series of questions. Your facilitator or one person in your group should read the information aloud to group members. Then, work as a group to generate one answer for each question asked.

Time allotted: 1.5 hours

The Situation

It is May 16, 2006. You are working at a county public-health department. Highly pathogenic avian influenza A (H5N1) has been identified among poultry flocks in the United States, including a farm in a neighboring state, State X. However there have been no reported human illnesses. You learn during a meeting that a local farm, Wilson's Farm, reported a sudden die off among its flock to the State Department of Agriculture (State AG) on May 14. Preliminary PCR results from that state veterinary laboratory came back positive yesterday for avian influenza (H5). Samples have been sent to the National Veterinary Services Laboratory (NVSL) for confirmatory testing.

Question 1 – What action do you, as part of the public-health workforce, take as a result of this situation?

Questions for Discussion – In your state, region or local area are there established channels of communication between the Departments of Public Health and Agriculture? Is there a protocol in place for sharing information and coordinating the workload between agencies in the event that a highly-pathogenic strain of influenza is detected among poultry?

A Patient

Before you get a chance to call your contact at the State AG, you receive a phone call from Dr. Garvill at Community Hospital. He has just come on shift and describes a 39-year-old female named Maya Thomas who was admitted earlier in the day. She visited her primary-care physician yesterday. Her symptoms included fever (38 C/100.4 F), nausea, and cough. Her white blood-cell count was below normal as well as her lymphocyte count. The platelet count was normal. An antibiotic was prescribed.

Question 2 – Based on this information, what illness would you suspect this patient has?

Additional Background

Dr. Garvill continues. Maya went back to her primary-care physician early this morning, as she began to have shortness of breath. Her physician recommended she be admitted to Community Hospital. The admitting physician ordered a chest radiograph. She had patchy infiltration in the lower region of both of her lungs.

Question 3 – Do you think the patient has influenza?

Maya's Current Condition

Shortly before Dr. Garvill contacted you, he checked Maya's stats again. She had a fever of 102.9F / 39.4C and a high respiratory rate of 44 breaths per minute. Her heart rate was also high at 140 beats per minute. Her blood pressure was 110/80 mm Hg. A follow up chest radiograph shows diffuse bilateral infiltrates and her arterial blood oxygen is 48 mm Hg. Dr. Garvill decided to intubate her. Laboratory tests on her blood found a drop in lymphocyte count. Platelet count was normal. The clinical profile indicated she was developing acute respiratory distress syndrome. Dr. Garvill gave her imipenem, azithromycin and doxycycline.

Dr. Garvill has heard on the news about the possibility of HPAI (H5N1) at Wilson's Farm. Because Maya's chart indicated her occupation was "poultry worker", he decided to contact you. He is concerned about the possibility that Maya is infected with avian influenza A (H5N1).

Question 4 – To date, do any symptoms indicate seasonal influenza infection? Which symptoms might indicate infection with avian influenza A (H5N1)?

Question 5 – Dr. Garvill asks you, "Could this be a human case of avian influenza A (H5N1)?" What is your reply? Why or why not? What other information would you like to know?

HPAI (H5N1) Activity

You tell Dr. Garvill you will need more information about Maya's job as a poultry worker. Given her current status, you suggest he speak with Maya's husband. After getting off the phone with Dr. Garvill, you call your State Ag. colleague for an update on the situation. Your colleague faxes you a notice sent to other animal health agencies earlier today.

STATE DEPARTMENT OF AGRICULTURE HIGHLY PATHOGENIC AVIAN INFLUENZA A (H5N1) ALERT

UPDATE AS OF 12:00 p.m., MAY 16

USDA confirmed the first outbreak of Asian lineage highly pathogenic avian influenza A (H5N1) in U.S. poultry flock in State A. On April 26th, laboratory testing confirmed HPAI (H5N1) among poultry in State X. Avian influenza surveillance among poultry in State X:

- May 3: Precautionary HPAI (H5N1) testing begun among poultry farms and wild birds
- May 14: Poultry die-off reported, Wilson Farm. Investigation initiated at Wilson Farm and surrounding poultry houses. Specimens collected for testing.
- May 15: State A Veterinary Laboratory reports PCR results from Wilson's Farm are positive for avian influenza (H5).
- May 16: National Veterinary Services Laboratory confirms positive PCR results for avian influenza (H5N1). Confirmatory testing, including genetic sequencing, is ongoing.

For technical questions regarding this alert, call 357-2236 and ask for Arch Green.
For interviews or public information, ask for Lydia Yang.

Question 6 – How is this information helpful for you concerning Maya? What is your index of suspicion for human infection with avian influenza A (H5N1)?

Exposure

Dr. Garvill calls you back with an update on Maya's exposure history. He spoke with Maya's husband, Daniel.

Maya and Daniel live in a rural area of the county. They have two children living at home, ages 2 and 7. No one else in the family is ill. Maya is employed at Wilson's Farm where she is a farm hand manager. Daniel noted that a few days before Maya became ill, she worked overtime because the farm was seeing more deaths than normal in the flock. She assisted in separating sick and dead poultry from apparently healthy poultry.

Question 7 – Do you think Maya is at risk for avian influenza A (H5N1) infection? If yes, what kind of exposures could she have had?

Question 8 – What clinical and epidemiological evidence do you have that Maya may have avian influenza A (H5N1) infection? What are the differential diagnoses?

Question 9 – Would you recommend testing Maya for infection with avian influenza A (H5N1)? Why or why not? If yes, what specimens would you advise Dr. Garvill collect?

Question 10 – Would you recommend treating Maya for avian influenza A (H5N1) infection at this point? Why or why not? If you would not recommend treatment, what information would you want before you recommend treatment?

Community Hospital

Before hanging up with Dr. Garvill, you ask if Maya is in an airborne isolation room. Dr. Garvill tells you that, although Maya is in a room by herself, she is not in an airborne isolation room. Standard precautions (e.g., handwashing) are followed for all patients.

Question 11 – What additional recommendations would you offer Dr. Garvill for infection control measures in Community Hospital?

Case Study 1: Conclusion

Based on clinical features and information about exposure to poultry, you were able to appropriately suspect Maya may be infected with avian influenza A (H5N1).

Part 2: Public-Health Action

Objectives:

- Minimize the risk of spread or further human illness associated with highly pathogenic avian influenza A (H5N1) (HPAI (H5N1)) among poultry

Instructions

This exercise builds upon Case Study 1, focusing on the public-health actions you will need to undertake while following up on your investigation of Maya Thomas. Although many people will need to take action to prevent the spread of HPAI (H5N1) in poultry, this exercise will focus only on what public health practitioners need to do to protect human health.

Please have Part 1 of this exercise and CDC guidelines available for quick reference. Each segment of information will be followed by a series of questions. Your facilitator or one person in your group should read the information aloud to group members. Then, work as a group to generate one answer for each question asked.

Time allotted: 1.5 hours

The Afternoon

You hang up the phone with the state Department of Agriculture (State AG) and head straight to the offices of the county health department director, Dr. Vaughn. You tell her what you know: 1) HPAI (H5N1) is in circulation in poultry at Wilson's Farm, and 2) the farm hand manager for Wilson's Farm, Maya, is in the hospital with symptoms compatible with avian influenza A (H5N1) infection. You and Dr. Vaughn begin to discuss the next steps that need to be taken.

Question 1 – According to the surveillance case definition for human infection with avian influenza A (H5N1), how would you classify Maya?

Question 2 – What public-health actions do you think are “next steps”?

Question 3 – What federal, state or local agencies should be involved in this investigation, and what are their responsibilities?

Visiting Community Hospital

It is now the evening of May 16th, and Dr. Vaughn has asked you to continue to follow up with Maya and also to follow up with her household and close contacts. You call Dr. Garvill and make arrangements to visit Maya at the hospital. Fortunately, Maya's husband, Daniel, is at the hospital so you make arrangements to talk with him as well. Dr. Garvill has been monitoring Daniel, who has no symptoms at present.

You arrive at the hospital and talk with Dr. Garvill as you review Maya's chart. Dr. Garvill has moved Maya to an airborne isolation room, taken tracheal aspirate specimens, and forwarded them to the state public-health laboratory for testing. In addition he began treatment with oseltamivir.

Question 4 – Why do you want to assess Maya's household and close contacts for illness? How long should they be monitored for signs of illness?

Household Contacts

You also get a quick update on Maya's current status and learn that her condition continues to deteriorate. She is already on mechanical ventilation and her kidneys are beginning to fail. Dr. Garvill is not sure she will make it through the evening.

You head over to Maya's room and see Daniel outside the room, waiting for you. The two of you find a quiet seating area and you begin to ask questions about Maya's household and close contacts.

There are only four individuals in the home: Daniel (40), Maya (39), Jacob (7), and Kayla (2). In the 10 days prior to her onset, Maya's only travel was to work or home. Daniel did not know of any other close contact outside of home and work. She had weekend plans to visit friends but cancelled because she was not feeling well. Neither of the children is sick.

Question 5 – What recommendations would you make for post-exposure prophylaxis?

Question 6 – You provide Daniel with literature regarding infection control measures in the home and how to self-monitor for signs and symptoms of avian influenza A (H5N1). Why is it important that you (as a health department employee) provide the information to Daniel?

Question 7 – What other close contacts should you follow up with?

Tuesday Morning, May 17, 2006

You arrive at the office to learn Maya passed away during the evening. You contact Dr. Garvill and he informs you Maya went into multi-organ failure and died around 10:00 p.m. You recommend autopsy specimens be collected for testing, and Maya's husband agrees to the autopsy. You inform the state health department of Maya's death and alert them to the fact that autopsy specimens are being taken and will need to be forwarded to the CDC.

You head into a morning debriefing which involves an inter-agency conference call. You update the group with the news of Maya's death and inform them of your findings from yesterday evening's meeting with Daniel. You also note your follow up of Maya's health-care providers: two physicians and one nurse had close contact with Maya and all are symptom-free.

Question 8 –What specimens should you have recommended Dr. Garvill collect from Maya?

Question 9 – Why is it important to report avian influenza A (H5N1) activity in humans to the state health department?

Wilson's Farm

At the debriefing you learn Wilson's Farm was quarantined yesterday once it was discovered HPAI (H5N1) was circulating in the poultry. Local, state and federal officials were on the scene to help assist in depopulating and disinfecting activities. There are 14 employees at the farm, not including Maya. Interviews were conducted yesterday for 11 of the individuals. All are asymptomatic.

You are asked to help interview Lyle, one of the three pending interviewees. Lyle is one of the farm hands who helped remove the dead birds.

Discussion Questions –

- A. Who has the authority to close down a potentially infected farm?
- B. Do you think closing the farm was the appropriate action to take?
- C. What role, if any, does public health play in the closure of the facility?
- D. What should public health recommend for the 14 employees of the farm?

Lyle

You are finally able to speak with Lyle in the late afternoon. While on the phone you notice he has a cough. You learn he was on holiday visiting his girlfriend's family in another state before returning to work on May 13. That day he stayed at the farm late to help dispose of the dead chicken carcasses. He continued to dispose of the dead poultry for a couple of days wearing a simple face mask and leather gloves. After Mr. Wilson reported the deaths to the State AG on May 14, Lyle began to use appropriate personal protective equipment under the advice of the State AG.

You ask Lyle about his cough. He tells you it started yesterday. He mentioned he had a headache as well, but the symptoms are nothing since he has allergies. The reason he was not at work yesterday was because it was his day off.

Lyle lives with his girlfriend in a house near Wilson's Farm. His girlfriend is still at her parent's home. He has only socialized with his coworkers since returning from his holiday and has had no other close contacts.

Question 10 – According to the case definitions, what would Lyle be classified as? What recommendations would you give Lyle?

Question 11 – Lyle asks you what he should do with his work clothes and boots. Which guidelines should you reference to answer this question?

Wednesday Morning, May 18, 2006

You are in the morning debriefing when you learn Maya's PCR results have come back positive for avian influenza A (H5). Specimens are being forwarded to CDC for confirmation and subtyping.

Question 12 – Does this information have any bearing on Maya's case classification? What about your follow up of her close contacts?

Question 13 – Based on the positive result, are there any additional steps that should be taken in your investigation or control measures?

Case Study Part 2 Conclusion

Of the 15 employees at Wilson's Farm, 12 had direct exposure to sick or dead birds. Five developed symptoms and had specimens collected; three were laboratory confirmed. One case ended in death. Lyle survived. Testing of paired serum specimens for H5 antibody from all 15 persons did not reveal any additional cases.

The outbreak of avian influenza A (H5N1) spread to other jurisdictions before it could be contained. By the end of the outbreak, 12 confirmed cases (laboratory and epidemiologically-linked) of avian influenza A (H5N1) transmitted from poultry to humans were identified.

