Outbreak of Respiratory Illness Associated with a Long-Term Care Facility — Crawford County, December 2011

Background

On December 22, 2011, the Crawford County Health Department (CCHD) was notified of a possible outbreak of respiratory illness among residents and staff of a 120-bed long-term care facility (LTCF) in Crawford County. The facility indicated that approximately 52 illnesses had occurred over the past four days among residents, and two residents had been hospitalized. Additionally, 23 staff members were ill with similar symptoms. Symptoms included cough, muscle pain, fatigue, and fever. Among ill residents, two individuals also reported symptoms of diarrhea. Laboratory tests had been performed by the facility but no causative agent was identified. In response to this report, an outbreak investigation was initiated on December 22nd by the Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response section (KDHE) and CCHD. The purpose of the investigation was to quantify and characterize the illness, determine the cause of illness, and to prevent additional cases.

Methods

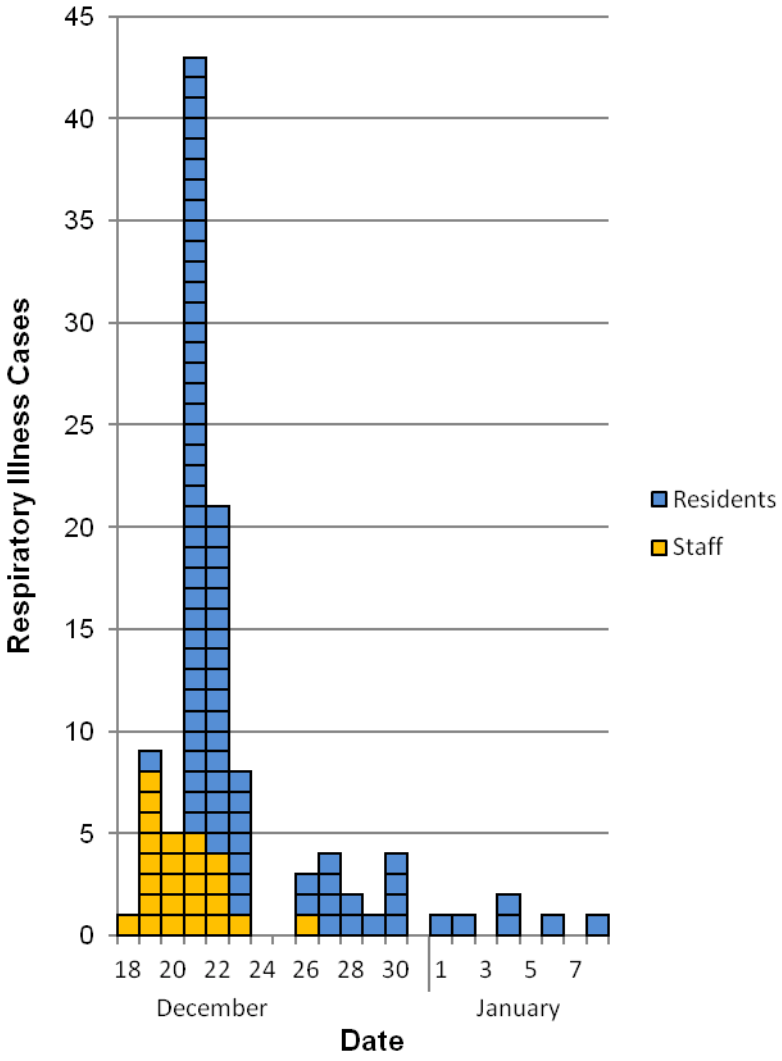
CCHD worked with the long-term care facility to obtain additional clinical and laboratory information. CCHD contacted the Director of Nursing to obtain a line-list of all residents and staff that had symptoms of respiratory illness (e.g. fever, sore throat, cough, shortness of breath, pneumonia, muscle pain, exhaustion, and meningitis) since the outbreak began. Because there were also two residents reporting symptoms of gastrointestinal illness, additional symptom information (e.g. nausea, vomiting, and diarrhea) was collected. Other information collected included illness onset date, laboratory test results, room number or job duty, influenza vaccination status, pneumococcal vaccination status, and illness recovery date. A case was defined as an individual who resided or worked at the LTCF and became ill with an acute cough between December 18th, 2011 and January 8th, 2012.

The long-term care facility had initially performed rapid influenza diagnostic testing using nasal swabs acquired from six symptomatic residents. Nasopharyngeal swabs were collected and sent to the Kansas Health and Environmental Laboratories (KHEL), where molecular testing was performed using a respiratory viral panel (RVP), capable of detecting up to twelve potential respiratory viral agents by qualitative detection of nucleic acids. Additionally the long-term care facility collected a sputum culture from one resident for culture testing and two stool specimens for enteric bacteria testing.

Results

The first case became ill on December 18th, 2011. The last case became ill on January 8th, 2012. At the conclusion of the outbreak the line list included 107 individuals. Eighty-two of 104 residents (79%) and 25 of 138 staff (18%), a total of 107 individuals, met the case definition (See Figure 1).

Figure 1: Number of cases of respiratory illness by onset date (n=107).



The most frequently reported symptoms were acute cough (n=107), exhaustion (n=97), myalgia (n=96), fever (n=40), and shortness of breath (n=7). Additionally, four cases reported complications of pneumonia and one reported meningitis (See Table 1). The median duration of illness was 7 days.

Table 1: Symptoms reported among cases (n=107).

Symptom	# of Cases	% of Cases
Cough	107	100
Prostration	97	91
Myalgia	96	90
Fever	40	37
Shortness of Breath	7	7
Pneumonia	4	4
Vomiting	3	3
Meningitis	1	1
Diarrhea	1	1

Six residents were hospitalized; one of these six cases died, and three additional, non-hospitalized cases died during the outbreak. Among death certificates filed for the four deceased individuals, two listed causes of death from pneumonia and respiratory failure. Laboratory tests conducted at the LTCF and a local hospital were unable to identify a cause of illness. Six residents tested negative for influenza by rapid assay. One sputum culture from one resident revealed heavy growth of beta-lactamase producing *Moraxella catarrealis*. Three residents had nasopharyngeal specimens collected and tested by the Kansas Health and Environmental Laboratories (KHEL) using a respiratory viral panel. Two cases tested positive for human metapneumovirus (hMPV). One case tested negative for all of the targets tested by the respiratory viral panel.

Four individuals experienced one of the three symptoms of a gastrointestinal illness (nausea, vomiting, or diarrhea). Upon investigation, non-infectious causes were identified for each case's gastrointestinal symptoms. As a result, the two stool specimens that were collected for enteric bacteriology were not tested.

Discussion

The cause of the LTCF's respiratory outbreak was likely hMPV. Two cases tested positive for hMPV by a respiratory viral panel. Although one case tested positive for *Moraxella catarrealis* by culture, the symptoms reported for the individual were consistent with all other cases of respiratory illness within the facility and did not include inflammation of the middle ear, or other symptoms commonly associated with *Moraxella catarrealis*. Additionally, the attack rate and transmission pattern observed in this outbreak did not support *Moraxella catarrealis* as the causative agent.

The first reported illness in this outbreak was a staff member. Transmission was likely spread person-to-person and began as symptomatic staff members were present in the facility. While the symptoms

experienced by staff members were consistent with those experienced by residents, staff members also experienced symptoms of sore throat (n=25) and fever (n=21).

Among the four deaths that occurred at the facility during the outbreak, two listed causes of death that were consistent with complications that could have been attributable to hMPV.

Conclusion

This respiratory illness outbreak was caused by human metapneumo virus (hMPV) and was likely transmitted person-to-person, beginning in staff that were present in the facility while symptomatic.

While only recently identified in 2001, data suggests that hMPV has most likely been causing respiratory illness for at least 50 years worldwide.[1, 2] It is a member of the same virus family as respiratory syncytial virus and parainfluenza virus. hMPV can cause upper and lower respiratory tract infections in persons of all ages but most often occur in young children and older adults.[3] Spread of the virus is most likely to occur by direct or close contact with the respiratory secretions of infected persons or by contact with objects and surfaces contaminated by their secretions. For persons who acquire hMPV, illness is believed to develop after three to five days.

Most persons with hMPV infection have mild symptoms including cough, runny nose or nasal congestion, sore throat and fever. More severe illness, with wheezing, difficulty breathing, hoarseness, cough, pneumonia, and in adults, aggravation of asthma, also has been reported. In children younger than 1 year of age, the elderly and persons who have weak immune systems, hMPV can cause more serious respiratory illness. It is believed most children become infected early in life and adult infections represent person becoming infected with hMPV again. Limited data suggest that reinfection with hMPV can occur. Repeated infection appears to result in milder illness, although serious disease is a risk for patients who are immunocompromised.

hMPV is most common in late winter and early spring in the Unites States; however, at least one outbreak in residents and staff of long-term care facilities has been reported during summer months. Supportive treatment for patients varies with the severity of the illness but generally treatment consists of fever reducers, antihistamines, breathing treatments and other means of providing comfort to the patient until the illness resolves.

Control measures used for other respiratory illness should be emphasized: coughing or sneezing into the upper sleeve rather than the hands, prompt disposal of used tissues, and proper hand washing. Health care workers should stay home when any symptoms of hMPV occur (cough, runny nose or nasal congestion, sore throat, and fever).

References:

1) van den Hoogen BG, et al. A newly discovered human pneumovirus isolated from young children with respiratory tract disease. Nat Med. 2001 Jun;7(6):719-24.
2) Kahn. Epidemiology of Human Metapneumovirus. Clin. Microbiol. Rev. July 2009 / 19(Rev.3);546-557.
3) Illinois Department of Public Health. Human Metapneumovirus. Healthbeat. Accessed online at: http://www.idph.state.il.us/public/hb/hb_hMPV.htm. Accessed on August 30, 2013.

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