Human Metapneumovirus Outbreak in a Michigan Adult Care Facility

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Introduction

Human metapneumovirus (hMPV) is a paramyxovirus first described in 2001 as a cause of pediatric respiratory illness (1). Adults can also be infected with hMPV; presentations range from mild influenza-like illness to severe respiratory infections with exacerbations of previous medical conditions (2). Past hMPV outbreaks in adult care settings, including long-term care facilities, psychiatric wards and hospitals, have been described (3-8).

In February 2010, the Michigan Department of Community Health (MDCH) received notification of an influenza-like illness outbreak in an adult nursing care facility within southwest Michigan. We report on the epidemiologic and laboratory investigation of this outbreak, which is the first described facility outbreak of hMPV in Michigan.

Methods

• An on-site facility investigation was conducted 4 days after notification of the outbreak to collect epidemiologic information and evaluate infection control procedures
• Cases were defined as a person who had contact with the identified facility during the week prior to an acute onset of respiratory illness, including symptoms such as cough, sore throat, congestion or pneumonia. Facility staff conducted daily active surveillance for resident cases, while staff cases self-reported to facility management
• A local hospital laboratory conducted rapid antigen testing for influenza and direct fluorescent antibody (DFA) testing for influenza A and B, adenovirus, parainfluenza, and respiratory syncytial virus (RSV) on nasopharyngeal specimens via the Bartels® Viral Respiratory Screening and Identification Kit (Trinity Biotech, Bray, Ireland)
• MDCH performed additional testing for influenza viruses and hMPV on nasopharyngeal and nasal swabs via real-time reverse transcription-PCR with the TaqMan® One-Step RT-PCR Master Mix Reagents kit (Applied Biosystems™, Foster City, CA, USA)
• Specimens were collected from ill residents within 5 days of symptom onset

Results

Facility Information

• 81 residents housed in 3 separate units
• 120 staff provided short- and long-term adult care
• Illness spread sequentially in residents and direct-care staff of the three residential units (Central, North, South)
• Transmission then spread to kitchen and lobby staff in nearby but separate unit

Clinical Information

• 32 residents and 21 staff met the case definition (attack rates of 39.5% and 17.5%)
• Pneumonia or chest infiltrates were diagnosed in 6 residents and 2 staff
• One staff member was hospitalized for 3 days

Infection Control

• Influenza vaccination coverage:
  • 100% seasonal influenza vaccination coverage of residents; staff coverage unknown
  • Vaccination for pandemic 2009 influenza A/H1N1 was not provided at the facility
  • 5 (6.2%) residents and 2 (1.7%) staff had documented 2009 H1N1 vaccination

• Infection control precautions recommended to the facility on February 22, 2010:
  • Droplet precautions for symptomatic residents
  • Isolation of ill residents
  • Removal of ill staff
  • Restriction of staff to specific units

• Droplet precautions were recommended for all residents and staff on February 25, 2010
• Implementation of recommendations was initially sporadic but improved after a site visit by the local health department

Laboratory Results

• 5/8 (62.5%) specimens were hMPV-positive, resulting in 5/7 (71.4%) positive patients
• All nasopharyngeal (NP) swabs were hMPV-positive, while all nasal swabs were negative

Conclusions

• This hMPV outbreak, the first described in Michigan, caused moderate to severe respiratory illness among residents and staff of all ages in an adult care facility
• Lapses in infection control recommendations exacerbated the outbreak’s spread
• Ill residents were not isolated
• Staff continued to work while ill
• Facility management lacked a procedure to verify and assess staff illnesses
• Staff shortages during the outbreak led to staff working in multiple units and may have played a role in transmission between different units
• The role of hMPV in Michigan respiratory outbreaks is not well understood
• hMPV testing is not routinely performed by most laboratories
• Increased surveillance is warranted
• hMPV testing should be considered for all respiratory illness outbreaks, regardless of season, as hMPV outbreaks have been documented in all seasons (5, 9-10)
• The addition of hMPV to routine respiratory viral culture and PCR testing panels would aid in detection and characterization of hMPV infections
• While the sample size was small, it was notable that all NP specimens were hMPV-positive, while all nasal specimens were negative. The role of collection method specific to hMPV identification has not been studied, and future research is warranted
• Communication is crucial in order to identify increases in hMPV circulation
• MDCH pursued hMPV testing for this outbreak in part because a nearby state health department had identified hMPV in recent long-term care facility outbreaks
• A national hMPV surveillance system would increase knowledge of hMPV circulation and its role in facility outbreaks and may encourage additional laboratory testing

References


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Acknowledgements

The authors would like to thank Ed Hartwick and Susan Bohm for their assistance.