

# OUTBREAK OF HUMAN METAPNEUMOVIRUS INFECTION IN A RESIDENTIAL AGED CARE FACILITY

Maggi Osbourn, Kenneth A McPhie, V Mala Ratnamohan, Dominic E Dwyer, David N Durrheim

## Abstract

Summer outbreaks of respiratory illness in residential aged care facilities are uncommonly reported in New South Wales. A respiratory illness outbreak in an aged care facility during January 2008 prompted a response to contain the outbreak by implementing infection control measures, including cohorting of symptomatic residents, cohorting nursing care, closure to new admissions and the use of personal protective equipment by staff. In addition, respiratory tract specimens were collected to determine the causative agent. Human metapneumovirus (hMPV) was detected by polymerase chain reaction assay in 3 specimens with no other respiratory pathogens found. This is the 1st reported outbreak of hMPV in an aged care facility in Australia. hMPV should be considered as the possible cause of outbreaks in aged care facilities when influenza and respiratory syncytial virus have been excluded. *Commun Dis Intell* 2009;33:39–41.

Keywords: human metapneumovirus, outbreak

## Background

Human metapneumovirus (hMPV) was first described as a respiratory pathogen in children in 2001<sup>1</sup> in The Netherlands, and has subsequently been recognised worldwide in children, including Australia.<sup>2</sup> There is a growing recognition of its capacity to cause illness in adults, particularly the elderly. A Canadian study found that 45.9% of hMPV isolates from patients hospitalised with respiratory illnesses were in people aged over 65 years.<sup>3</sup>

Elderly people living in residential aged care facilities (RACFs) are vulnerable to outbreaks of respiratory pathogens, particularly influenza, and hMPV has been implicated in winter outbreaks in RACFs in Japan with hMPV detected by nucleic acid testing in eight of 23 patients<sup>4</sup> and Canada (6 of 13 patients).<sup>5</sup> A summer outbreak has been previously reported in the United States of America (USA).<sup>6</sup>

In the summer months, reports of respiratory virus outbreaks from RACFs and other 'closed' environments in Australia are uncommon,<sup>7</sup> although it should be noted that respiratory outbreaks are only notifiable to New South Wales public health units if influenza virus infection is confirmed.<sup>8</sup> National guidelines for the management of influenza out-

breaks in RACFs have been available since 2005 and are currently being revised.<sup>9</sup> We report on a summer outbreak of hMPV infection in a RACF in New South Wales.

## Methods

In early January 2008, Hunter New England Population Health (HNEPH) received a report from a general practitioner of mild respiratory illness affecting 8 residents in a RACF in the Lake Macquarie area of New South Wales. The initial cases had not responded to cephalexin, and pathology specimens had not been collected.

HNEPH staff undertook an investigation, with respiratory tract swabs collected from the most recently symptomatic residents to ascertain the causative organism, while appropriate infection control measures, including isolation/cohorting of sick residents, cohorting of the care of sick residents and closure of the affected wing of the RACF to admissions and visitors, were instituted. A line-listing of affected residents and their symptoms was initiated.

Within 2 days hMPV was detected by direct immunofluorescence on a throat swab from a resident (influenza A and B, adenovirus, respiratory syncytial virus (RSV) and parainfluenza virus types 1–3 were negative). Throat swabs were submitted from an additional 9 residents who had developed respiratory symptoms during the outbreak, with a further 2 cases of hMPV identified using an in-house polymerase chain reaction (PCR) assay. No isolates were recovered for further typing. No other respiratory virus pathogens were detected by PCR in other samples.

## Results

From 29 December 2007, 16 of 73 residents in the affected RACF experienced respiratory symptoms meeting the case definition (cough, with one or more of: elevated temperature  $\geq 37.5^{\circ}\text{C}$ , sore throat, lethargy, myalgia or shortness of breath) (Table).

Twelve of the 16 affected residents, including the 3 positive hMPV cases, experienced three or more symptoms. These include pyrexia and moist cough (12), sore throat (6), myalgia (5) and lethargy (4). This clinical picture is not dissimilar to influenza in the elderly.

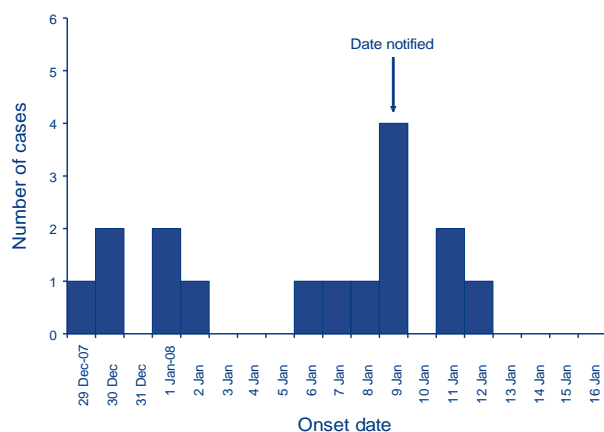
A survey of the 80 staff members to determine respiratory symptoms in the 7 days prior to onset of illness in the 1st resident found no symptomatic staff members.

**Table. Symptoms experienced by cases with human metapneumovirus infection, New South Wales, 29 December 2007 to January 2008**

Symptom	Number of residents with symptoms n=16
Cough	16
Elevated temperature	13
Sore throat	6
Myalgia	5
Lethargy	4
Shortness of breath	1

Affected residents were aged from 64 to 102 years, with a median of 89 years. All had underlying medical conditions. Seven of the affected residents had received influenza vaccination in 2007. Fourteen symptomatic residents did not use the communal dining area or participate in group activities, however two of the symptomatic residents with dementia were mobile, and their wandering within the RACF may have played a role in transmission. The last case was recorded with onset on 12 January 2008 (Figure).

**Figure. Cases of human metapneumovirus infection, New South Wales, 29 December 2007 to 16 January 2008**



For 11 residents where data were available, the duration of illness ranged from 3 to 18 days with a median of 6 days. Two residents died, 8 and 22 days

after onset of respiratory symptoms, respectively, with the principal cause of death listed on their death certificates as bronchopneumonia. Although neither fatality had laboratory confirmed hMPV infection, or any other respiratory pathogen detected, the timing and clinical presentation suggests that the deaths were precipitated by hMPV infection.

## Discussion

This report describes the first reported outbreak of hMPV infection in a RACF in Australia.

When a respiratory virus outbreak occurs in a RACF it is important to immediately introduce stringent infection control procedures to minimise transmission. Influenza virus infection specifically needs exclusion as antiviral treatment and prophylaxis may be appropriate.

Every year in the Hunter New England area there are a number of respiratory outbreaks in RACFs where influenza or other respiratory pathogens cannot be isolated from laboratory specimens (4/15 in 2007). Human metapneumovirus may be an important contributor to these outbreaks. It is diagnosed by antigen detection (e.g. immunofluorescence) or detection of hMPV RNA by nucleic acid testing using PCR on respiratory tract samples. Serological testing for hMPV is not widely available.

Outbreaks in RACFs are much less commonly reported during the summer months in New South Wales. This summer outbreak of hPMV was characterised by relatively mild disease in most residents, although 2 non-laboratory confirmed cases succumbed to bronchopneumonia, with a relatively low attack rate of 16.4%. The clinical picture and attack rate is not dissimilar to the reported summer outbreak in the USA, although there were no deaths during the latter.

The attack rate is similar to outbreaks of RSV, reported as between 3%–20%,<sup>10</sup> whereas attack rates during influenza outbreaks have been reported as high as 27%.<sup>11</sup> Introduction of infection control procedures occurred relatively late in the outbreak and thus it is difficult to judge their effectiveness in controlling hPMV outbreaks in RACF settings.

When influenza and RSV have been excluded as the causative organism for a RACF respiratory outbreak, infection with hMPV should be considered.

## Acknowledgements

Management and staff of the residential care facility, and attending medical practitioners are warmly thanked for their collaboration in this outbreak investigation.

## Author details

Ms Maggi Osbourn,<sup>1</sup> Clinical Nurse Consultant  
Mr Kenneth A McPhie,<sup>2</sup> Senior Technical Officer  
Ms V Mala Ratnamohan,<sup>2</sup> Senior Scientific Officer  
Prof Dominic E Dwyer,<sup>2</sup> Medical Virologist  
Dr David N Durrheim, Director Health Protection,<sup>1</sup> Conjoint  
Professor of Public Health<sup>3</sup>

1. Hunter New England Population Health, Hunter New England Area Health, Wallsend, New South Wales
2. Centre for Infectious Diseases and Microbiology Laboratory Services, Institute of Clinical Pathology and Medical Research (ICPMR), Westmead Hospital Westmead, New South Wales
3. University of Newcastle, Callaghan, New South Wales

Corresponding author: Ms Maggi Osbourn, Hunter New England Population Health, Locked Bag 10, WALLSEND NSW 2287. Telephone +61 2 4924 6477. Facsimile: +61 2 4924 6408. Email: maggi.osbourn@hnehealth.nsw.gov.au

## References

1. van den Hoogen BG, de Jong JC, Groen J, Kuiken T, de Groot R, Foucher RA, et al. A newly discovered human pneumovirus isolated from young children with respiratory tract disease. *Nat Med* 2001;7:719–724.
2. Nissen MD, Siebert DJ, Mackay IM, Sloots TP, Withers SJ. Evidence of human metapneumovirus in Australian children. *Med J Aust* 2002;176:188.
3. Boivin G, Abed Y, Pelletier G, Ruel L, Moisan D, Côté S, et al. Virological features and clinical manifestations associated with human metapneumovirus; a new paramyxovirus responsible for acute respiratory-tract infections in all age groups. *J Infect Dis* 2002;186:1330–1334.
4. Honda H, Iwahashi T, Kashiwagi Y, Imanura Y, Hamada N, Anraku T, Ueda S, et al. Outbreak of human metapneumovirus infection in elderly inpatients in Japan. *J Am Geriatr Soc* 2006;54:177–180.
5. Boivin G, De Serres G, Hamelin E, Côté S, Argouin M, Tremblay G, et al. An outbreak of severe respiratory tract infection due to human metapneumovirus in a long-term care facility. *Clin Infect Dis* 2007;44:1152–1158.
6. Louie JK, Schnurr DP, Pan CY, Kiang D, Carter C, Tougaw S, et al. A summer outbreak of human metapneumovirus infection in a long-term-care-facility. *J Infect Dis* 2007;196:705–708.
7. Young LC, Dwyer DE, Harris M, Guse Z, Noel V, Levy MH, on behalf of the Prison Influenza Outbreak Investigation Team. Summer outbreak of respiratory disease in an Australian prison due to an influenza A/Fujian/411/2002(H3N2)-like virus. *Epidemiol Infect* 2005;133:107–112.
8. *Public Health Act 1991 (NSW) S3.*
9. Communicable Diseases Network Australia. *A Practical Guide for the Management of Influenza Outbreaks in Residential Care Facilities in Australia.* July 2008.
10. Falsey AR, Walsh EE. Respiratory syncytial virus infection in adults. *Clin Microbiol Rev* 2000;13:371–384.
11. Ferson MJ, Morgan K, Robertson PW, Hampson AW, Carter I, Rawlinson WD. Concurrent summer influenza and pertussis outbreaks in a nursing home in Sydney, Australia. *Infect Control Hosp Epidemiol* 2004; 25:962–966.