5. Outbreak Case Reports

Measles outbreak in Auckland, December 2007

While the incidence of notified measles in New Zealand is currently low[1], suboptimal vaccination coverage[2] means a measles epidemic remains possible. In December 2007, measles was identified in an unvaccinated boy from Auckland who had recently returned from a trip to India with his mother. Investigation revealed that his mother had experienced a similar illness prior to that in her son: this was confirmed to have been measles. An outbreak investigation and response was initiated by Auckland Regional Public Health Service. This report summarises the results of the investigation, which identified two further cases of epidemiologically-linked measles.

The index case (Case 1) was an unvaccinated European woman in her mid-20s who developed fever, cough and coryza on 25 November at the end of a month-long trip to India. She returned to New Zealand on 27 November, developed a rash on 30 November, was hospitalised on 2 December and discharged with a diagnosis of a chest infection with *Haemophilus influenzae*. Following the diagnosis of Case 2, serologic testing was sought on a 5 December specimen, retrospectively confirming the diagnosis of measles on 13 December.

Case 2 was the unvaccinated 7-year-old son of the index case who had accompanied his mother to India. He presented with fever, cough and conjunctivitis on 5 December, developed a rash on 9 December and was hospitalised on the same day. The diagnosis was confirmed by serology.

Case 3 was the index case's brother, a hospital inpatient whose only exposure to the index case occurred when he left hospital for one day to visit the index case's household on 28 November. He developed cough and coryza on 11 December and a rash on 14 December; Koplik's spots were observed on medical examination, and measles was serologically confirmed. He developed measles pneumonitis requiring a tracheostomy and ventilation, and remained in intensive care for 13 days. Vaccination history was unclear; IgG levels were equivocal.

Case 4 was also a brother of the index case, visiting her household multiple times during her and her son's periods of infectivity. He developed cough, coryza and conjunctivitis on approximately 18 December and a rash on 22 December. He was assessed at a hospital emergency department on 24 December, at which time Koplik's spots were noted, but was not admitted. Measles was confirmed by serology.

Case management and contact tracing was conducted according to the Control of Communicable Diseases Manual[3]. Susceptible contacts were defined as those born after 1968 and without a history of measles or measles vaccination. The following groups in the community were assessed and advised: index case's contacts on flight to New Zealand on 27 November (31), index case's household (1 person in addition to Cases 2, 3 and 4); index case's social contacts (3); school contacts of Case 2 (45); staff of community house visited by Case 3 (9); social contacts of Case 4 (1). No contacts were eligible for immunoglobulin; four school contacts were given measles, mumps and rubella (MMR) vaccination. All community contacts who had been last exposed to a confirmed case less than 21 days previously were given measles information and advised to seek medical attention promptly if prodromal symptoms developed. All were kept under active surveillance for 21 days following last exposure, and none developed measles symptoms.

In addition to community contacts, the four cases had nine separate episodes of contact with three different hospitals while infectious, including emergency department assessments and admission episodes. A total of 248 healthcare staff (including ambulance officers) and 47 patients were considered to have been exposed to one or more of the cases and required assessment for susceptibility. Measles serology testing was sought on those identified as susceptible: of these, three staff were non-immune and stood down from duties, and one patient was non-immune and was isolated. No secondary cases of measles developed among healthcare staff or patients.

This measles outbreak was limited to a first generation of transmission, solely to individuals with close household contact with infectious cases. There are several likely reasons why further propagation of the outbreak was restricted. Firstly, the cases had limited social contacts in the community while infectious, with the exception of Case 2's school contacts and Case 3's community house contacts, though in each of these settings measles vaccination coverage or immunity was high. Secondly, while each case had contact with multiple healthcare staff and patients, measles immunity among these groups was also high. Thirdly, a comprehensive public health and clinical infection control response commenced promptly after each case notification.

Despite the limited measles transmission in this incident, this outbreak illustrates the potential risk associated with imported measles. Measles virus is highly infectious, and an estimated 95% of the population must have measles immunity to prevent recurrent outbreaks. Local outbreaks in populations with a measles seroprevalence lower than this threshold may be triggered by non-immune travellers returning from countries with high measles incidence (such as India[4], as in this case).

All cases were seen at hospital during their infectious periods, and all except one were admitted. The potential for a nosocomial outbreak was therefore high, as has eventuated elsewhere[5]. On receiving a measles notification, public health authorities should rapidly assess whether the case visited a hospital during their infectious period, and alert those responsible for hospital infection control on the risk to staff and patients.

In this context, prevention, early detection and rapid response to measles cases acquired internationally are critical. Healthcare providers should strongly encourage prior MMR vaccination in unvaccinated individuals planning travel to high incidence countries; measles should be considered as a possible diagnosis for unvaccinated returning travellers with fever and maculopapular rash; and appropriate infection control practices must be utilised to prevent measles transmission in healthcare settings. Above all, MMR vaccine coverage among children must be improved.

1 Institute of Environmental Science and Research Ltd 2007. Notifiable and other diseases in New Zealand: Annual Report 2006. ESR, Porirua.

2 Ministry of Health 2008. Immunisation coverage [cited 29 Feb 2008]. Available from http://www.moh.govt.nz/moh.nsf/indexmh/immunisation-coverage-data

3 Ministry of Health 1998. Communicable Disease Control Manual. Ministry of Health, Wellington.

4 Desai VK, Kapadia SJ, Kumar P, Nirupam S 2003. Study of measles incidence and vaccination coverage in slums of Surat City. *Indian Journal of Community Medicine* 28: 10-4.

5 Marshall TM, Hlatswayo D, Schoub B 2003. Nosocomial outbreaks: a potential threat to the elimination of measles? *Journal of Infectious Diseases* 187 Supp1: S97-101.

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