A measles outbreak in the Whitsundays, Queensland: the shape of things to come?

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Abstract

This report describes a small outbreak of measles that occurred in the Whitsunday region, north Queensland, in July to August 2002. With one exception, all the cases were deliberately unvaccinated because their parents were conscientious objectors to vaccination. It is suggested that this pattern of measles outbreaks, with most cases being not preventable because of conscientious objection, will become increasingly recognised in the future. *Commun Dis Intell* 2002;26:589–591.

Keywords: measles, disease outbreak, surveillance,vaccination

Introduction

Epidemiological and virological studies provide compelling evidence that measles is no longer endemic in Australia, and that indigenous transmission ceased several years ago.[1,2] As a consequence recent outbreaks of measles in Australia have several common characteristics: they are usually initiated by an imported case, they mainly involve young adults, and they can be of moderate size.[3,4]

A recent outbreak of measles in north Queensland, although initiated by an imported case, had otherwise different features which may become more characteristic in measles outbreaks in the future.

Methods

Measles cases were defined according to national guidelines.[5] Responses to cases, especially in health-care and child-care settings, were as described in the national guidelines.[5]

Measles virus RNA was detected in clinical samples by reverse-transcriptase polymerase chain reaction (PCR),[2] and genotyping was undertaken by comparison of the nucleotide sequence to reference strains.[6]

Results

The index case

In late July 2002 the Tropical Public Health Unit was notified by a general practitioner at Airlie Beach in the Whitsunday region, (approximately 140 km by road north of Mackay, north Queensland), of a 4.5-year-old child with a very typical measles presentation. The child, a local resident, was unvaccinated, as her parents were conscientious objectors to immunisation. There were no siblings. Measles RNA was detected by PCR on both a throat swab and urine taken on the first day of the rash.

The child went to a gym class, visited the local shopping complex and attended (full-time) the local preschool for 2 days, all whilst infectious. She had contact with approximately 20 children aged 6–14 years at the gym, and approximately 40 other children at the preschool.

The imported case

During the index case's exposure period a family of four was staying in the child's household. The family was from Europe and had apparently spent a week in Thailand before arriving in north Queensland.

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There was a 16-year-old female in the family; she became unwell 3 days after arriving in the Whitsunday region. She undertook several popular tourist activities locally whilst unwell, and went on several local shopping trips as well. She eventually saw a general practitioner 5 days after her onset, and because she felt worse presented to a hospital emergency department a day later. Although fever, conjunctivitis and a 'generalised dense, florid maculopapular rash' were documented in the hospital notes, measles was not considered in the diagnosis. No diagnostic tests were performed.

The family travelled by bus to Cairns 9 days after the onset of illness in the 16-year-old, then on to New Zealand by air. They were not able to be located for interview.

Other outbreak cases

A total of seven locally acquired cases, in two generations of transmission involving four families, were recognised (Figure). The 16-year-old visitor also apparently infected a 19-year-old female working in the local shopping complex, and a 14-year-old male from New South Wales visiting the Whitsundays where he too went shopping. Measles RNA was detected by PCR on samples taken from the 19-year-old, and serum from the 14-year-old was measles IgM positive. Neither teenager had been vaccinated as their respective parents were also conscientious objectors to vaccination.

The 4.5-year-old child infected an unvaccinated 11-month-old child who went to the same supermarket at the same time as the younger child. Although this case was not able to be laboratory confirmed as the mother declined venipuncture, he was classified as an epidemiologically linked case.[5]

The 19-year-old infected her 17-year-old sibling, despite the latter having received the appropriate volume (10 mL) of immunoglobulin intramuscularly on day six following exposure.[5] This sibling's illness was also confirmed by PCR. The 14-year-old visitor infected his two siblings upon returning to New South Wales; measles RNA was detected in both siblings.

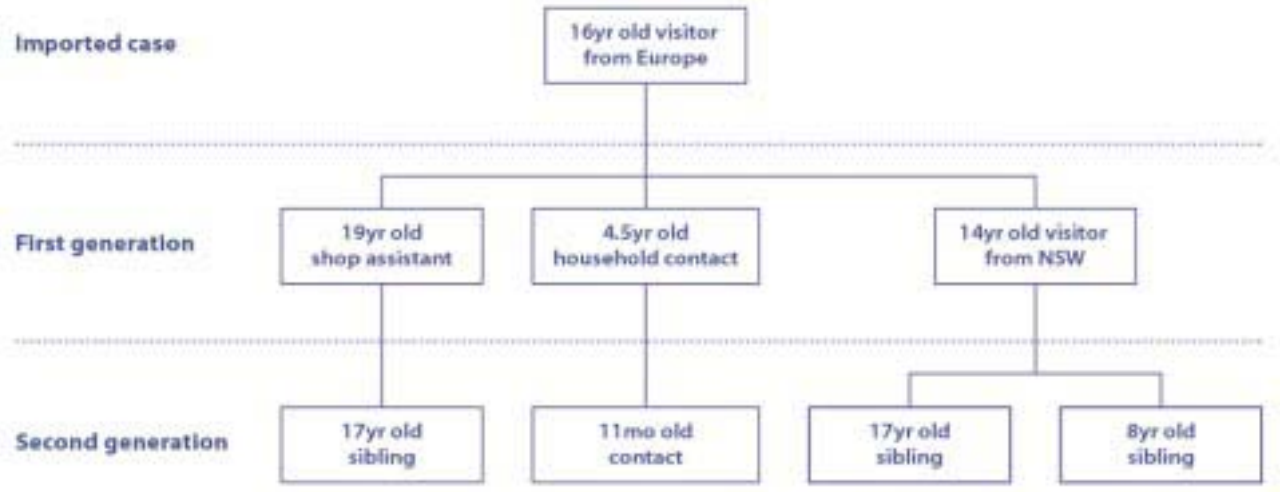
Genotyping

The infecting measles virus was identified as belonging to genotype D5. Sequencing showed that there was 100 per cent sequence homology in the viruses from the five PCR positive cases.

Discussion

Measles is now a rare disease in Australia,[1] indeed, the index was the first confirmed case in north Queensland since October 2000. This rarity has paradoxically created a problem for surveillance, and therefore control, in that many doctors are now not recognising the disease. Not only do younger doctors have little experience with the disease,[7] but also (as happened with the imported case) some older doctors no longer recognise the clinical manifestations of the disease.

Figure. Schema of measles outbreak in the Whitsundays, Queensland, 2002



However, the prompt recognition of the index case enabled the recognition of the putative imported case. Indeed, had the 4.5-year-old child not been reported, the outbreak link to an imported case would probably never have been recognised. Genotyping identified the virus as genotype D5, which has recently been circulating in Thailand.[8] This indicates that the visitor from Europe probably acquired measles during the week in Thailand en route to Australia.

This outbreak was small with only seven locally acquired cases despite the considerable potential for further transmission. This indicates that not only that the level of immunity in the region is high, but also that measles vaccine is very effective in preventing the disease. It also suggests that the prompt implementation of control measures[5] can prevent further cases.

Recent outbreaks elsewhere in Australia have mainly involved young adults many of whom had somehow missed previously receiving two doses of measles vaccine.[2,3] These cases are defined as being 'preventable'.[5] Although all the locally-acquired cases in this outbreak were unvaccinated, with the exception of the 11-month-old infant who was too young to be vaccinated, the remaining 6 cases (from three separate families) were not preventable because their parents had actively rejected vaccination.

As vaccinated and therefore immune cohorts of children grow older, there will be fewer and fewer young adults who are susceptible to measles. In other words, the current pattern of measles outbreaks that mainly include preventable cases in young adults may eventually be superseded by a pattern of outbreaks that mainly include 'not preventable' cases in persons of all ages, whose parents were conscientious objectors to vaccination.

We suggest that this pattern, of outbreaks involving mainly deliberately unvaccinated persons of all ages, will become the predominant pattern in the near future. Indeed, the previous outbreak in north Queensland involved five unvaccinated siblings from the same family of conscientious objectors.[7] These outbreaks are likely to be relatively small in size unless the measles virus finds a way into whole communities of deliberately unvaccinated individuals. Because of their small size, the probability of serious complications will be low thereby reinforcing any misconception that measles is a relatively benign illness.

Conscientious objection 'began with the first vaccinations, has not ceased, and probably never will'.[9] Indeed, the prevalence of conscientious objection to vaccination could increase with time.[10] However, there is no ready 'solution' to this 'problem',[9] and certainly calls for compulsory vaccination would be inappropriate. Nevertheless, it is appropriate to ensure that children of parents who do not conscientiously object to vaccination are able to be vaccinated in as convenient and efficient a manner as possible so as to achieve the highest possible levels of vaccine coverage.[11]

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