Measles cluster at a tertiary care hospital in Singapore - an outbreak investigation

H. C. Chan[1], R. Sridhar[1], S. M. Chan[2], G. K. Goh[1], G. Ciccone[3], R. T. P. V. Lin[4], S. Salmon[5], I. Venkatachalam[1], P. A. Tambyah[6], D. A. Fisher[6]

[1]National University Health Systems, Epidemiology Unit, Infectious Diseases Division, Department of Medicine, Singapore, National University Health Systems, Paediatrics, Singapore, [5]National University Health Systems, Occupational Health Clinic, Singapore, [4]National University Health Systems, Laboratory Medicine, Singapore, [5]National University Health Systems, Infection Control, [6]National University Health Systems, Infectious Diseases Division, Department of Medicine, Singapore

Introduction

There has been a global resurgence of measles, with 15 000 cases in the Philippines. Although vaccine coverage in Singapore has been above 90% due to the highly successful National Childhood Immunisation Programme, Singapore noted an increase in cases in 2014, with 23 of 72 cases reporting travel to the Philippines. The National University Hospital (NUH) also noted nosocomial measles transmission. Here, we describe 4 cases in February – March 2014.

Methods

NUH is a 1000 bed tertiary hospital with routine laboratory surveillance for infectious diseases of public health significance. The Epidemiology Unit in NUH was notified of the first measles case by the paediatric consultant. Measles diagnoses were confirmed by polymerase-chain reaction and genotyping. Contact tracing was done based on congruence of time, place and activity. Susceptibility to measles infection was assessed through Immunoglobulin G testing (≤250 mIU/mL indicated susceptibility) and vaccination history. Non-immune contacts were offered measles, mumps and rubella (MMR) vaccine or intravenous immunoglobulin if pregnant or immunocompromised. Patient details were obtained from hospital records and interviews. Contacts were risk assessed by the Occupational Health Clinic.

Results

Fig. 1 Measles epicurve

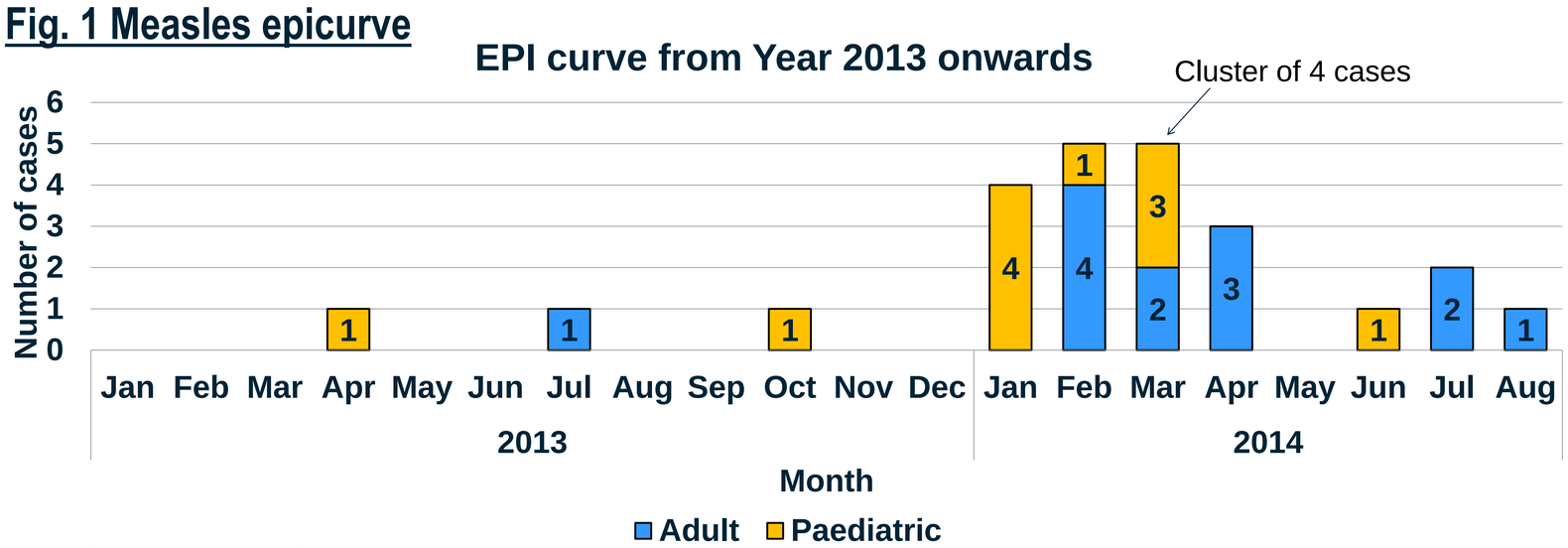
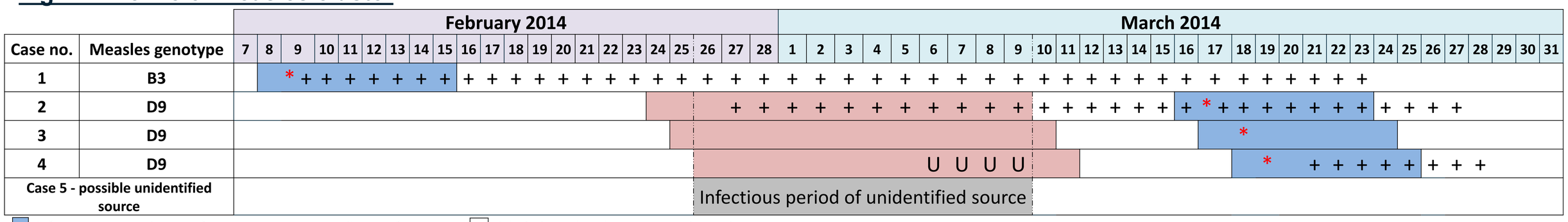


Table 1: Summary of contacts identified

Healthcare workers	**189**	**53.5%**
- Doctors	89	47.1%
- Nurses	78	41.3%
- Others	22	11.6%
Patients	**162**	**45.9%**
Visitors	**2**	**0.6%**
Grand Total	**353**	**100.0%**

Fig. 2 Timeline of measles cluster



- 4 cases were identified in the pediatric department from 25-February to 21-March 2014; 3 were inpatients and 1, a healthcare worker (HCW).
- Case 1, a 17 year old boy with leukaemia, was transferred from the Philippines. Measles was confirmed on D18 of admission. He died of severe necrotizing pneumonia.
- Case 2, a 5 month old boy with biliary atresia, was symptomatic on D19 of admission.
- Case 3, a 39 year old paediatrician, was a contact of cases 1 and 2.
- Case 4, an 8 month old boy, was admitted from 06-March to 09-March for acute bronchiolitis. He presented with measles 10 days post-discharge, and was subsequently admitted to NUH for measles.
- Of 150 HCW tested, 9 had inadequate immunity by enzyme immunoassay (EIA) but found to be immune by plaque reduction neutralization test (PRNT). 6 received booster MMR, 2 declined, and 1 deferred due to pregnancy.

Conclusion

- Case 3 very strongly suggests a nosocomial transmission. The chronological onset of symptoms for Cases 2 through 4 with D9 genotype suggests an unidentified missing link that may be the source of this paediatric cluster. Further investigation done did not identify any common source (Fig. 2).
- This incident has also exposed healthcare workers' lack of documentation of measles immunity, and highlighted the surge of Epidemiolgy and Occupational Health manpower requirements in an outbreak situation. The contact tracing process can also be expedited with timely communication within and between departments.
- The genotypic and epidemiological data suggests an unidentified index as the source of this measles outbreak. Secondary transmission was averted due to high herd immunity, enhanced infection control, and administration of intravenous immunoglobulin to high risk, non-immune persons. Ongoing surveillance and vigilance is essential with the evolving global measles epidemic.

References

- Constance Low, Koh Cheng Thoon, et. al. Possible nosocomial transmission of measles in unvaccinated children in a Singapore public hospital. *WPSAR* Vol 3, No 4, 2012, doi: 10.5365/wpsar.2012.3.4.008
- Centers for Disease Control and Prevention (CDC) Hospital associated measles outbreak – Pennsylvania, March–April 2009. *MMWR, Morbidity and Mortality Weekly Report*, 2012, 61: 30–32. pmid:22258416