

Measles outbreak at an international airport: a Hong Kong perspective

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Measles (rubeola) is a highly contagious childhood vaccine-preventable disease caused by the measles virus.^{1,2} Complications occur in 10% to 40% of affected patients, and treatment is mainly symptomatic.^{1,3-6} In developed countries, routine immunisation with measles-containing vaccine is recommended with the first dose at age 12 to 15 months and the second dose at age 4 to 6 years.^{7,8} In regions with high rates of measles transmission, the World Health Organization (WHO) recommends that the first dose of measles-containing vaccine be given at age 9 months and the second dose at age 15 to 18 months.⁹ Studies have shown that one dose of measles vaccine given at or after 1 year of age is 93% to 95% effective in protecting against measles whereas two doses given at appropriate intervals is close to 100% effective.⁸ Measles vaccination given to susceptible contacts within 72 hours of exposure is effective in preventing illness or modifying the severity of the illness.^{9,10}

Recently, outbreaks of measles have been reported globally, especially in Asia.^{1,11,12} An outbreak in early 2019 at the Hong Kong International Airport also created a public health concern, with wide national media coverage.¹³ Between March and mid-May 2019, 73 individuals were identified to have been infected with measles, including 29 airport workers.¹⁴

In general, patients with measles after vaccine failure were less ill than unvaccinated patients. Nevertheless, these patients required the same amount of effort from public health workers in tracing contacts.¹⁵ Of the 50 individuals infected with measles, six had two doses of measles vaccination.

It is expected that the immune system of a small percentage of individuals would not respond to the vaccine, resulting in primary vaccine failure.¹⁵ For those who were vaccinated but do not have sufficient antibodies, receiving a third dose might help boost their immunity; however, there is little scientific evidence to show how effective this third dose might be.¹⁵ Those who are worried might consider taking a

blood test for measles antibodies to decide whether another dose of measles vaccine is necessary. Several issues have arisen with this airport outbreak.

Issue 1: Protecting airport staff

It is likely that airport staff contract measles by exposure to infected arriving tourists or aircrew.^{16,17} Individuals working at the airport typically had mild disease and did not spread the disease to their co-workers or family members, indicating that they are likely partly protected owing to prior vaccination.¹⁶ Infectivity is likely low, and these individuals need only be quarantined. Re-vaccinate their family members and close contacts may be unnecessary. It might be difficult, if not impossible, to identify visiting tourists with measles if they are asymptomatic. It might be unethical to quarantine asymptomatic arrivals even if they are from epidemic cities, and it would be impractical to demand these visitors provide evidence of measles vaccination. Aircrew members under age 52 years should be the first priority to receive booster measles vaccinations. Measles-containing vaccine should be given to those individuals who cannot readily provide evidence of immunity to measles as post-exposure prophylaxis. Aircrew who are exposed to a known case of measles but have no antibodies to measles should not be allowed to work, even after receiving post-exposure prophylaxis with measles vaccine. The Centers for Disease Control and Prevention recommends that medical staff who have no antibodies to measles should not be allowed to work for 5 to 14 days after exposure to measles, even after receiving post-exposure prophylaxis with measles vaccine.¹⁸

Issue 2: Prioritising vaccination

In Hong Kong, most people born between 1967 and 1978 and many born between 1979 and 1984 received only one dose of measles vaccination. Those born before 1967 and after 1985 are supposed to be protected, although full immunisation does not

guarantee full protection.¹⁶ In the event of inadequate immediate supply of vaccine for revaccination, it is reasonable to prioritise measles immunisation to the at-risk group, namely, those born between 1967 and 1978 and those working at the airport or in hospitals. Drivers of public transport, taxis, and other transport become the next category of individuals for consideration of vaccination if the supply of vaccines remains inadequate. Other priority groups include those who were born in high-risk regions, such as the Philippines, Malaysia, and other places with inadequate vaccination policies, and those who have not received two doses of measles vaccinations and have not been infected with measles before.

Issue 3: Blood testing

Blood tests for measles antibodies take approximately 1 week before the results are available to determine the need to vaccinate.¹ Initially, there were insufficient stocks of measles vaccines to administer to all vulnerable airport staff. The Department of Health provided the measles serology test service to airport staff and a cumulative total of 777 blood samples were collected.¹⁴

Issue 4: Severe paediatric complications

The risks of severe measles complications are very low. Paediatric complications such as encephalitis occur once in a million cases.^{1,6,19} However, amid the rise in measles infections, the Hong Kong Department of Health announced a change to existing measles vaccine policy so that children get their second dose of measles vaccine at an earlier age.²⁰ It is now recommended that children will receive the second dose of measles vaccine at age 18 months instead of at age 6 years.

Issue 5: Infection control

Several infectious diseases have been a cause for concern at Hong Kong International Airport, including SARS (severe acute respiratory syndrome),²¹ MERS (Middle East respiratory syndrome),²² Avian Influenza, and seasonal influenza.²³ Ordinary surgical masks are not designed for airborne infection and it is uncertain if aircrew and other staff wearing such masks plays any role in the prevention of spread of measles and other airborne diseases.²⁴ For infectious diseases including measles, although infection control is an important gesture, universal immunisation is the definitive management strategy.^{1,3,6,8,9} The rise of anti-vaccination material on social media has been connected to the dramatic increase in cases of measles and various vaccine-preventable communicable diseases.²⁵ Healthcare workers should join efforts to promote immunisation as an

effective healthcare policy in infection control.²⁶

Summary

Epidemics of infectious diseases raise many dilemmas, such as the effectiveness of vaccination programmes, which groups are most at risk, and how to prioritise further treatment or vaccination. In Hong Kong, the measles outbreak at the airport has resulted in an inadequate supply and stock of measles vaccines to meet local demand; sufficient vaccine supply should be secured as soon as possible. It is recommended to vaccinate first those aircrew who routinely fly to outbreak regions, followed by all other airport staff, including the shop assistants and janitors. Taxi drivers and drivers of public transport, and staff at local hotels may be included in the second wave. Fortunately, there have been no serious cases so far.

Author contributions

All authors contributed to the concept of study, acquisition and analysis of data, drafting of the article, and critical revision for important intellectual content. All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

As an editor of the journal, KL Hon was not involved in the peer review process. Other authors have no conflicts of interest to disclose.

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