



衛生防護中心 Centre for Health Protection

Scientific Committee on Vaccine Preventable Diseases

Recommendation on the Schedule of the Second Dose of Measles-containing Vaccine in Hong Kong

Background on measles immunisation in Hong Kong

Measles was a common childhood infection prior to the introduction of measles vaccine. The disease is highly contagious, usually spread through airborne droplets or by direct contact with nasal or throat excretions of infected persons. Infants and immunosuppressed individuals are at a higher risk of complications, severe disease and death following infection.

2. Measles immunisation was first introduced in Hong Kong in 1967 as a single dose of anti-measles vaccine (AMV) given at six months or above. The combined measles, mumps and rubella (MMR) vaccine replaced AMV in 1990 for children at 12 months to offer additional protection against mumps and rubella. In 1996, a second dose of MMR vaccine was provided to children in Primary Six because of the continuing occurrence of measles among older children and outbreaks at schools. During July – November 1997, a territory-wide mass immunisation catch-up programme (Special Measles Vaccination Campaign) was launched and approximately one million doses of MMR vaccine were delivered to persons aged one to 19 years who had not received two doses of AMV or MMR vaccine. After the campaign, the schedule of the second dose has been advanced to Primary One to shorten the gap between the two doses of MMR vaccine so that school children can be protected through their primary school years.



Current schedule of measles immunisation in Hong Kong

3. Currently, under the Hong Kong Childhood Immunisation Programme (HKCIP), children in Hong Kong are given the first dose of MMR vaccine at one year at Maternal and Child Health Centres (MCHCs) of the Department of Health (DH), followed by a second dose at Primary One by the School Immunisation Teams (SIT) of DH through outreach visits to schools. Since 2014, varicella vaccine has been added to HKCIP as a two-dose schedule for children born on or after January 1, 2013. Varicella vaccine and MMR vaccine are given to children at 12 months at MCHCs while the second dose will be given as the combined Measles, Mumps, Rubella & Varicella (MMRV) vaccine when these children reach Primary One. Separate MMR vaccine and varicella vaccine are given as the first doses because several studies found that there was an increased risk of febrile convulsion among young children receiving MMRV vaccine as the first dose than those receiving MMR vaccine and monovalent varicella vaccine as separate injections.

Effectiveness of measles-containing vaccines

4. Both MMR and MMRV vaccines are safe and highly efficacious at preventing measles. According to the United States Centers for Disease Control and Prevention, when given as scheduled, two doses of MMR vaccine are 97% effective while one dose is 93% effective against measles. Studies on revaccination in children who did not respond to their first dose of measles vaccine (primary vaccine failure) demonstrated that approximately 95% would develop protective immunity after the second dose. Evidence also showed that a single dose of correctly administered measles-containing vaccine which results in seroconversion will probably offer lifelong protection for most healthy individuals.

Risk of measles infection in Hong Kong

5. Over the past two decades, measles has been successfully controlled in Hong Kong through sustaining a very high coverage (>97%) of the two-dose MMR vaccination and the well-performing surveillance. In September 2016, the World Health Organization (WHO) confirmed that Hong

Kong has achieved the interruption of endemic measles virus transmission¹ (i.e. measles elimination). The annual number of measles notifications in Hong Kong has remained at a very low level after elimination, with nine, four and ten cases confirmed in 2016, 2017 and 2018 (as of June 30) respectively.

6. Among the 129 measles cases recorded by DH from 2013 to June 2018, 71 (55%) were sporadic cases with unknown source of infection in Hong Kong after thorough epidemiological investigations while the remaining 58 cases were imported or import-related² cases. Among the 71 cases with unknown source, seven (9.9%) were aged between one and five years (i.e. children who were due for the first dose of MMR vaccine under HKCIP but not yet due for the second dose given at Primary One).

Risk of measles infection when travelling to other areas

7. Measles remains an endemic infection in many places around the world. In Southeast Asia, according to data from WHO, the 12-month measles incidence (number of cases per million population) from mid-2017 to mid-2018 was over 70 in Malaysia and the Philippines, and over 20 in Thailand and Indonesia. In Europe, there were marked increases in measles cases in 2017-2018 in some countries, with the 12-month incidence (number of cases per million population) over 100 in Greece and Romania. The measles incidence rates in many countries were far higher than that of Hong Kong, which was 1.4 cases per million population during the period from July 2017 to June 2018. Hence, the risk of acquiring the infection from overseas countries while travelling for persons who are not fully immunised is not negligible.

8. Among the 129 cases reported during 2013 – June 2018, 58 were either imported (55 cases, 42.6%) or import-related (3 cases, 2.3%). Thirteen of the 58 cases affected children aged five years or below. Importations mainly occurred among foreign visitors to Hong Kong and local residents exposed to measles while travelling abroad. In view of the high incidences of measles in some countries including popular travel destinations among local people (e.g.

¹ Endemic measles virus transmission is defined by WHO as existence of continuous transmission of indigenous or imported measles virus that persists for at least 12 months.

² Cases with a known epidemiological linkage to another confirmed imported case

Europe and some Asian countries such as the Philippines and Malaysia), there is still a risk of measles infection for young children who have not completed the two doses of measles vaccination when travelling to areas with high incidence or outbreaks of measles.

WHO recommendation and overseas practices

9. According to WHO, countries with low rates of measles transmission (i.e. those nearing measles elimination or verified as having eliminated endemic measles virus transmission) and where there is a low risk of measles infection among infants, the first dose of measles-containing vaccine may be administered at age 12 months to take advantage of the higher seroconversion rates achieved at this age. The administration of the second dose at age 15 – 18 months ensures early protection of the individual, slows accumulation of susceptible young children, and may co-administer with other routine immunisations. If the coverage of the first dose is high (>90%) and school enrolment is high (>95%), the second dose given at school entry may be effective in achieving high coverage and preventing outbreaks in schools.

10. The practices in overseas countries/areas are diverse. Some countries/areas (including Australia, some provinces in Canada, Macao SAR, Mainland China and Singapore)³ recommend the second dose of measles-containing vaccine to be given at 18 months, while some countries (including Japan, New Zealand, United Kingdom and United States) recommend the second dose to be given from 3-4 years to 5-7 years (Annex).

Recommendation

11. After reviewing the current measles vaccination strategy for children in Hong Kong, global and local epidemiology of measles, scientific evidence on effectiveness of measles containing vaccines, WHO recommendations and overseas practices, the Scientific Committee on Vaccine Preventable Diseases (SCVPD) has recommended the second dose of measles-containing vaccine (i.e. MMRV vaccine) under HKCIP to be advanced from Primary One to 18 months of age. Under the revised schedule, children are

³ Measles elimination has been achieved in Australia, Canada, Macao SAR of China and Singapore.

recommended to receive the first dose as MMR vaccine at 12 months as before, followed by a second dose as MMRV vaccine at 18 months instead of Primary One. This dose of MMRV vaccine can be co-administered with the booster dose of the Diphtheria, Tetanus, acellular Pertussis & Inactivated Poliovirus Vaccine routinely given at 18 months during the same clinic visit. Besides, the SCVPD has recommended that mop-up MMRV vaccination should be provided for children with incomplete vaccination identified by DH's SIT at Primary One.

12. This proposed change is expected to enhance protection against measles, mumps, rubella and chickenpox among young children at an earlier age (i.e. by 18 months) prior to entry to pre-school institutions (such as kindergartens and child care centres). Besides, giving the second dose in the form of MMRV vaccine at 18 months will offer protection to those who did not respond to the first dose (primary vaccine failure) and potentially reduce the accumulation of susceptible young children before Primary One. In the context of travel related risk of measles infection, completing the two-dose regimen at 18 months may also prevent infection among young children travelling to measles affected areas, especially when measles outbreaks have been reported from time to time in various regions of the world in recent years.

13. In addition, children will be covered by two doses of varicella-containing vaccines by 18 months instead of Primary One. Since the introduction of varicella vaccine in HKCIP in July 2014 for children born on 1 January 2013 or after, varicella incidence among children aged 1 to 5 had decreased from 1248-2158 per 100,000 between 2011 and 2013 to 712-914 between 2015 and 2017. However, chickenpox outbreaks persisted in pre-primary institutions with 212 to 284 outbreaks recorded annually from 2015 to 2017. As the vaccine effectiveness of two doses of varicella vaccine (about 95%) is higher than one dose (about 83%)⁴, the change is expected to bring a secondary advantage of conferring better protection against varicella for young

⁴ According to the WHO position paper on varicella and herpes zoster vaccines (June 2014), a systematic review showed that single-dose vaccine had an approximate median effectiveness of 83% (range 20%–100%) against all grades of disease severity in children aged from 9 months to 12 years while 2 doses provided better protection (median=95%). (http://www.who.int/immunization/policy/position_papers/varicella/en/)

children and hence decreasing the risk of chickenpox outbreaks in pre-primary institutions.

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Annex

| Country/Area | Vaccines used | 1 st Dose | 2 nd Dose |
|----------------|---------------|----------------------|--|
| Australia | MMR / MMRV | 12 months (MMR) | 18 months (MMRV) |
| Canada | MMR / MMRV | 12-15 months | 18 months / 4-6 years (varies across provinces) |
| Japan | MR | 1-2 years | 5-7 years |
| Macao SAR | MMR | 12 months | 18 months |
| Mainland China | MR & MMR | 8 months (MR) | 18 months (MMR) |
| New Zealand | MMR | 15 months | 4 years |
| Singapore | MMR | 12 months | 15-18 months |
| United Kingdom | MMR | 12-13 months | 3-4 years or soon after |
| United States | MMR | 12-15 months | 4-6 years |

MR: Measles & Rubella

MMR: Measles, Mumps & Rubella

MMRV: Measles, Mumps, Rubella & Varicella