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FEATURE IN FOCUS

Resurgence of measles after the COVID-19 pandemic: A global and local update

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(Last updated March 26, 2024)

Measles is an acute viral infection characterised by a prodrome of fever, cough, coryza, conjunctivitis, white spots inside the mouth (Koplik spots), followed by a generalised maculopapular rash. The disease is highly contagious, usually spread through airborne droplets or by direct contact with nasal or throat excretions of infected persons. Measles can be severe in pregnant women and leads to an increased risk of miscarriage, stillbirth or preterm delivery, whereas infected neonates are at an increased risk of complications such as subacute sclerosing panencephalitis (a very rare but fatal disease of the central nervous system) in later life.

Global situation

Measles activity reduced dramatically from a worldwide resurgence in 2019 to low level during the first two years of COVID-19 pandemic due to the implementation of wide ranging travel and social restrictions. However, the incidence has increased globally since 2022, with outbreaks reported not only in endemic regions but also in countries that already achieved elimination including the United Kingdom (UK) and the United States (US).[1,2,3] Such resurgence was a consequence of low levels of measles vaccination uptake associated with disruptions in routine immunisation during the pandemic. According to the provisional data from the World Health Organization (WHO), as of March 12, 2024, the number of measles cases had risen worldwide with 171 countries reporting over 315 000 cases in 2023, roughly 85% increase from 2022.[4] In the Western Pacific region, a similar upward trend was observed in 2023 (over 5 000 cases compared to about 1 400 cases in 2022) with majority of cases reporting from the Philippines and Malaysia where measles remains endemic.[5]

Local situation

Hong Kong was certified by the WHO as having achieved measles elimination status in 2016. The annual totals have remained low since then despite a surge of cases in 2019 including an outbreak of 33 cases at the Hong Kong International Airport (HKIA). The outbreak was quickly interrupted and the number of cases decreased substantially following a territory-wide measles mop-up vaccination campaign for non-immune adults that lasted till September 2020.

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[1] World Health Organization (WHO). Global measles threat continues to grow as another year passes with millions of children unvaccinated. November 16, 2023. https://www.who.int/news/item/16-11-2023-global-measles-threat-continues-to-grow-as-another-year-passes-with-millions-of-children-unvaccinated (Accessed on March 11, 2024).

[2] UK Health Security Agency (HAS). Confirmed cases of measles in England by month, age and region: 2023. March 7, 2024. https://www.gov.uk/government/publications/measles-epidemiology-2023/confirmed-cases-of-measles-in-england-by-month-age-and-region-2023 (Accessed on March 13, 2024).

[3] US Centers for Disease Control and Prevention (CDC). Stay alert for measles cases. January 25, 2024. https://emergency.cdc.gov/newsletters/coca/2024/012524.html (Accessed on March 13, 2024).

[4] WHO. Provisional monthly measles and rubella data. March 12. 2024. https://www.who.int/teams/immunization-vaccines-and-biologicals/immunization-analysis-and-insights/surveillance/monitoring/provisional-monthly-measles-and-rubella-data (Accessed on March 11, 2024).

[5] WHO Western Pacific Region. Western Pacific countries at risk of measles outbreaks due to immunization and surveillance gaps. March 1, 2024. https://www.who.int/westernpacific/news/item/01-03-2024-western-pacific-countries-at-risk-of-measles-outbreaks-due-to-immunization-and-surveillance-gaps (Accessed on March 11, 2024).

During the years of COVID-19 pandemic from 2020 to 2023, measles remained at low activity level, with one to three cases reported annually (0.1 – 0.4 cases per million population) (Figure 1). As of March 16, 2024, three measles cases have been recorded this year.

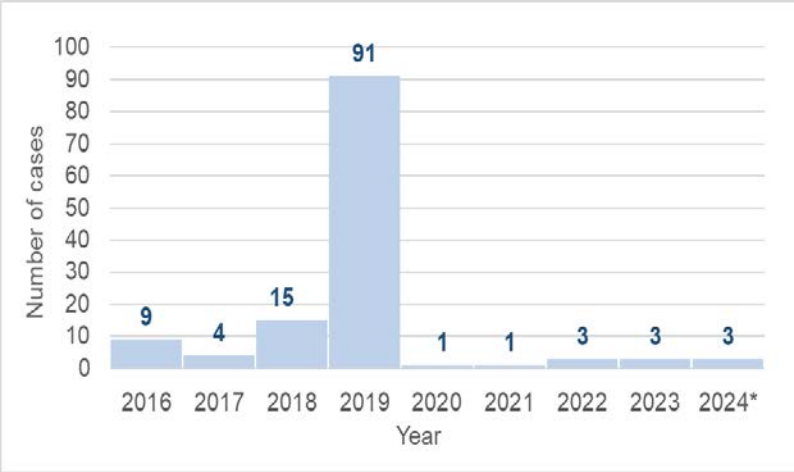

Figure 1 – Measles cases in Hong Kong after elimination, 2016 – 2024 (data as of March 16, 2024).*

Of the 11 measles cases reported between 2020 and 2024 so far, all were sporadic infections involving local residents. The 11 cases had ages ranged from 11 months to 55 years (median age = 36 years), majority being adults (8 cases, 73%) while the remaining three cases were children aged three years or below including an infant under one year. Clinically, eight out of 11 cases (73%) presented with typical symptoms such as rash, fever, cough, coryza and conjunctivitis while the remaining three cases developed modified measles with milder symptoms. None of them reported complications. Seven cases were classified as local infections, and four were imported cases (one each from Japan, Indonesia, India, and Malaysia).

For the eight adult cases aged between 20 and 55, five of them were born in Hong Kong. Only one local-born adult had documented receipt of two doses of combined measles, mumps and rubella (MMR) vaccine. For the remaining cases, one was unvaccinated and the other six had uncertain vaccination status (including all the three foreign-born adults).

For the three paediatric cases aged between 11 months and 3 years, all were local born children. Regarding measles vaccination history prior to exposure, one 3-year-old child was fully vaccinated while another 1-year-old child received one dose only. The remaining unvaccinated case was an 11-month-old infant not yet due for measles vaccination under the Hong Kong Childhood Immunisation Programme(HKCIP).

Closing immunity gaps to sustain elimination

For years, measles has been successfully controlled in Hong Kong through a sustained high level of two-dose vaccination coverage of at least 95% under the HKCIP, robust surveillance systems and rapid response to outbreaks. During the COVID-19 pandemic over the past three years, parents, schools and healthcare workers in Hong Kong continued to support childhood immunisations, striving to maintain the MMR immunisation coverage rates at a high level of at least 95%. In addition, seroprevalence rates of measles virus antibodies in the local population have been maintained at a very high level (at least 95%) among all age groups in recent years, indicating that the majority of the local population already had immunity against measles, either through past infection or vaccination. As such, the risk of a large-scale measles outbreak in Hong Kong is considered to be low.

Measles importations remain an ongoing risk to places that have achieved elimination, especially from neighbouring countries and popular travel destinations where outbreaks are occurring or vaccination coverage is suboptimal. Despite the high local population immunity and low risk of sustained outbreaks, Hong Kong must remain vigilant as there might be small pockets of susceptible individuals accumulated over time, especially among non-local born persons who might not have been fully vaccinated in the past. The measles outbreak occurred at the HKIA in 2019 had underscored this continued threat from international travel posing the risk of local transmission following importations.

In response to the recent measles resurgence globally, the Department of Health has stepped up efforts to raise public awareness through multiple channels including press releases, webinar and social media messages. The Port Health Division of the Centre for Health Protection (CHP) delivered messages to alert the airport community and cruise ship agents to the latest measles situation and remind them to stay vigilant. The CHP issued letters to remind all medical practitioners to remain vigilant and report suspected measles cases timely, and provide vaccination to non-immune individuals if necessary. In addition, the CHP also issued letters to all employment agencies for foreign domestic helpers (FDH) to encourage non-immune FDH to receive measles vaccination. Relevant information was uploaded to the dedicated webpage of measles on the CHP website, the Immigration Department's website and the Labour Department's information portal for FDH. Likewise, letters were sent to local universities to encourage MMR vaccination to non-immune university staff and students from overseas.

As vaccination schedule varies across countries, non-local born individuals residing in Hong Kong for residence, work or study

including new immigrants, foreign workers and students should review their immune status and receive measles vaccination if they are non-immune (Box). Two doses of the measles-containing vaccine provide effective protection for individuals and the wider community. As remarkably high herd immunity levels (≥95%) are needed to prevent measles virus transmission, elimination can only be sustained going forward by maintaining high two-dose MMR vaccine coverage in children and accelerating efforts to catch up older children and adults who had missed out on vaccinations in the past. For more information on measles and MMR vaccination, please visit the CHP's designated webpage: https://www.chp.gov.hk/en/features/100419.html

Evidence of Measles Immunity

People born in Hong Kong before 1967 when measles was endemic are considered to have acquired immunity to measles through natural infection.

In general, persons who are born on or after 1967 are considered as non-immune to measles if they –

- Have never been vaccinated with two doses of measles-containing vaccine or have unknown vaccination status; AND
- Did not have laboratory confirmed measles infection in the past; AND
- Did not have laboratory evidence of immunity (i.e. no laboratory test ever done or tested negative/indeterminate for measles immunoglobulin G

Non-immune individuals are advised to receive two doses at least four weeks apart. Only one dose is required for those who had already received one dose of measles vaccination in the past.

Review of hand, foot and mouth disease activities in Hong Kong

Reported by Dr KONG Wai-chi, Scientific Officer, Dr Taron LOH, Senior Medical and Health Officer, Enteric and Vector-borne Disease Section, Surveillance Division, Communicable Disease Branch, CHP

Hand, foot and mouth disease (HFMD) is commonly seen in children that is caused by enteroviruses. In Hong Kong, HFMD occurs throughout the year, with the usual peak season occurring from May to July and a smaller upsurge from October to December. HFMD activity decreased drastically and maintained at a very low level during the COVID-19 pandemic. After resumption of normalcy in early 2023, HFMD activity re-surged, with a high level observed in October and November before returning to baseline in January 2024. This article summarises the HFMD activities from 2014 to 2023 in Hong Kong.

Seasonal Trend as observed from sentinel surveillance data

Before the COVID-19 pandemic, seasonal pattern of HFMD activity was observed from surveillance data collected through the sentinel surveillance system based at CCC/KG, private medical practitioner (PMP), and Accident and Emergency Departments (AED) communicable diseases syndromic surveillance system (Figure 1 to 3). HFMD activity usually increased from May to July and October to December although there were variations from year to year. Throughout the COVID-19 pandemic, the HFMD activity decreased drastically and maintained at unusually low levels as a result of all the prevention and control measures (e.g. stringent personal, hand and environmental hygiene) and school suspension. In 2023, data from sentinel surveillance systems showed an increase in HFMD activity since June and peaked around October/ November of the year.

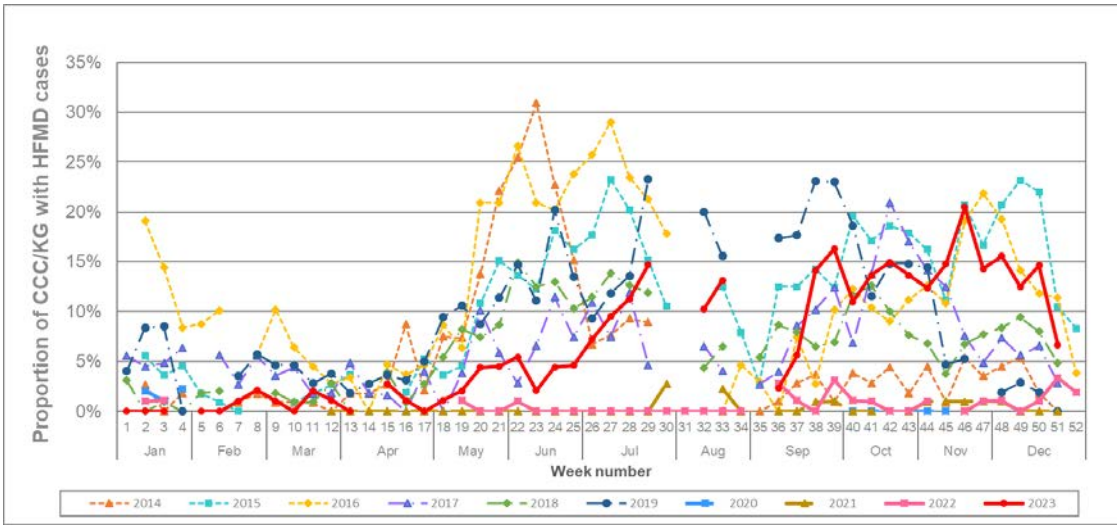

Figure 1 – Occurrence of HFMD in sentinel child care centres/kindergartens (CCC/KG) under sentinel surveillance of infectious diseases, 2014 to 2023.

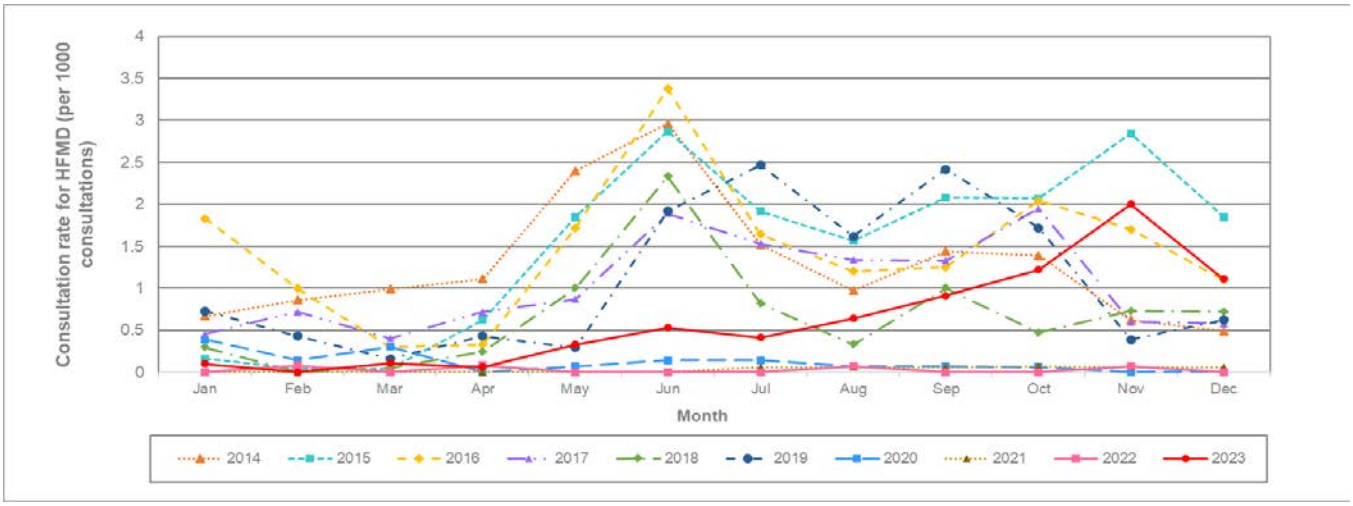

Figure 2 – Occurrence of HFMD in sentinel Private Medical Practitioner (PMP) under sentinel surveillance of infectious diseases, 2014 to 2023.

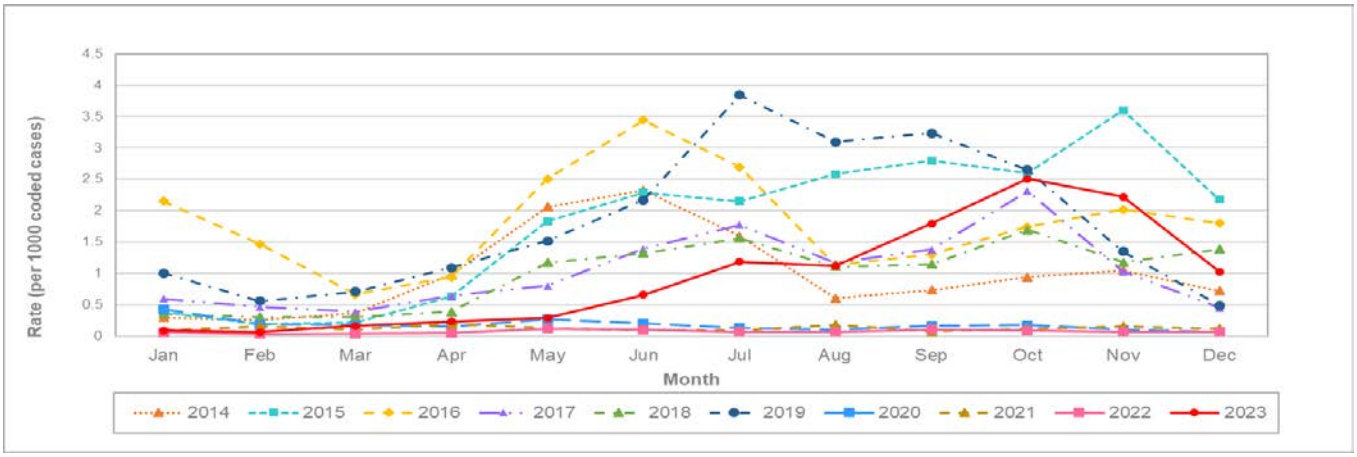

Figure 3 – Consultation rates of HFMD syndrome group at Accident and Emergency Departments in public hospitals under the Hospital Authority, 2014 to 2023.

HFMD Institutional Outbreaks

From 2014 to 2019, the annual number of HFMD outbreaks ranged from 346 to 875 (median=560). During the pandemic period from 2020 to 2022, only seven outbreaks were recorded (three and four in 2020 and 2022 respectively). Subsequent to the resumption of normalcy, HFMD outbreaks re-surged in 2023 with a total of 404 outbreaks recorded affecting 2 125 persons (Figure 4), largely returning to the pre-pandemic level.

In 2023, the number of HFMD outbreaks first showed a small increase in June and July, then an upsurge in September, peaked in late November and returned to baseline in late December (Figure 5). The pattern was similar to the pre-pandemic period. Most of the outbreaks occurred in child care centres/kindergartens (CCC/KG) (223, 55.2%), followed by primary schools (PS) (133, 32.9%), and secondary schools (SS) (35, 8.7%). The remaining 13 outbreaks (3.2%) occurred in other institutions including special schools, hospitals, residential care home for persons with disabilities and a university hall. The size of outbreaks was generally small, with a median of 4 persons (ranged from two to 73 persons). Among them, 49 outbreaks (12.1%) had causative agents confirmed, including coxsackievirus A16 (8, 16.3%), coxsackievirus A6 (7, 14.3%), coxsackievirus A2 (1, 2.0%), and other unspecified enteroviruses (33, 67.4%).

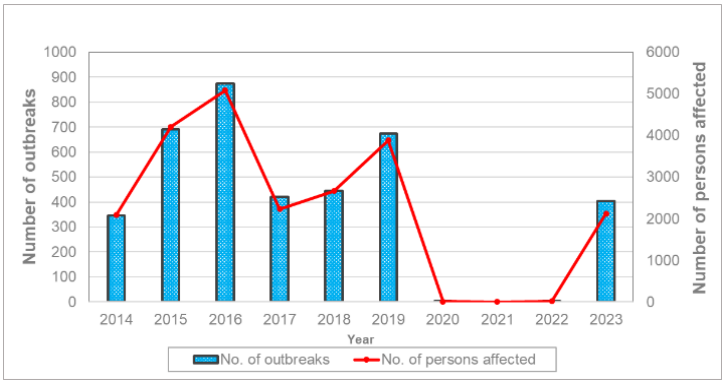

Figure 4 – Number of HFMD institutional outbreaks and persons affected, 2014 to 2023.

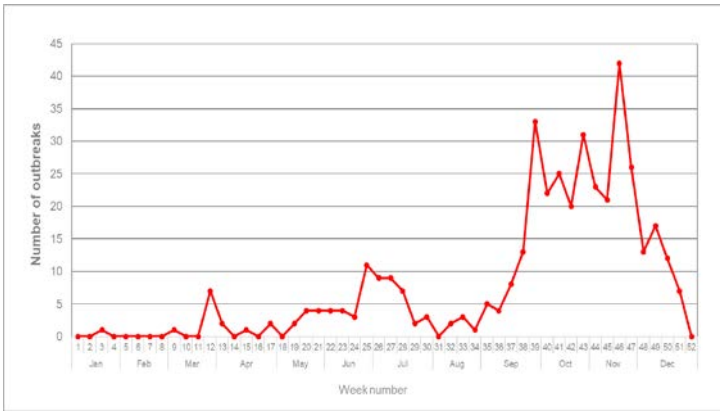

Figure 5 – Number of HFMD institutional outbreaks recorded in 2023.

EV71 Infection

EV71 is one of the causative agents for HFMD and is a notifiable disease. Before the COVID-19 pandemic (2014 - 2019), the annual number of reported EV71 infection ranged from six to 68 cases (median=52.5) (Figure 6). During the pandemic, the number of cases decreased drastically with only one case recorded in 2021 affecting an 11-year-old girl; no more EV71 case has been recorded thereafter. In the past ten years, a total of 280 cases were recorded. Their ages ranged from 9 days to 50 years (median: 2.6 years). Only one fatal case was recorded in 2014 involving a 2-year-old girl with good past health; she lived with her parents and elder sister in Mainland China and did not attend school or playgroup.

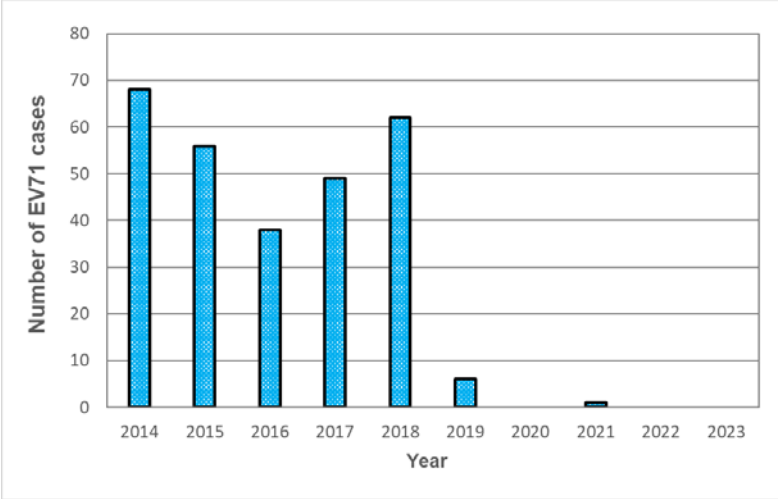

Figure 6 – Annual number of EV71 cases reported to CHP.

Severe Paediatric Enterovirus Infection

For severe paediatric enterovirus infection (other than EV71 and poliovirus) (SE), the annual number of reported cases ranged from six to 21 cases (median = 8) before COVID-19 pandemic. No SE cases were recorded since 2020. In the past ten years, a total of 62 cases were recorded. Their ages ranged from 6 days to 11 years (median: 2.5 months). Majority of the cases developed complications of meningitis (47 cases, 75.8%), followed by encephalitis (4 cases, 6.5%) and other complications e.g. meningoencephalitis and transverse myelitis. No fatal case has been recorded in the past 10 years.

In summary, the HFMD activity had decreased to a historic low level during the three years of COVID-19 pandemic but returned to the pre-pandemic level after relaxation of control measures and resumption of normalcy in 2023. Similar situation also occurred in some neighboring areas (e.g. some provinces in Mainland China and Taiwan) following relaxation of non-pharmaceutical interventions such as school closure. Currently, the HFMD activity in Hong Kong is at a baseline level. Members of the public are reminded to continue to stay vigilant and observe good personal and environmental hygiene to prevent the disease. The latest surveillance data on HFMD and EV71 is published in the weekly "EV Scan" (http://www.chp.gov.hk/en/guideline1_year/29/134/441/502.html). Further information can be found on the CHP website at http://www.chp.gov.hk/en/view_content/16354.html.

Prevention of HFMD

1. Maintain good personal hygiene

- ✦ Perform hand hygiene frequently, especially before and after touching the mouth, nose or eyes; before eating or handling food; after touching blister; and after using the toilet;
- ✦ Wash hands with liquid soap and water, and rub for at least 20 seconds; then rinse with water and dry with either a clean cotton towel or a paper towel. Alcohol-based handrub should not substitute hand hygiene with liquid soap and water, as alcohol does not effectively kill some viruses (e.g. EV71) causing HFMD;
- ✦ Cover your mouth and nose with tissue paper when coughing or sneezing; dispose of the soiled tissue paper into a lidded rubbish bin, then wash hands thoroughly;
- ✦ Use serving chopsticks and spoons at meal time. Do not share food and drinks with others;
- ✦ Do not share towels and personal items with others;
- ✦ Avoid close contact (such as kissing, hugging) with infected persons;
- ✦ Refrain from work or attending class at school, and seek medical advice if feeling unwell; and
- ✦ Exclude infected persons from handling food and from providing care to children, elderly and immunocompromised people.

2. Maintain good environmental hygiene

- ✦ Regularly clean and disinfect frequently touched surfaces such as furniture, toys and commonly shared items with 1:99 diluted household bleach (mixing 1 part of 5.25% bleach with 99 parts of water), leave for 15 - 30 minutes, and then rinse with water and keep dry;
- ✦ Use absorbent disposable towels to wipe away obvious contaminants such as respiratory secretions, vomitus or excreta, and then disinfect the surface and neighbouring areas with 1:49 diluted household bleach (mixing 1 part of 5.25% bleach with 49 parts of water), leave for 15 - 30 minutes and then rinse with water and keep dry; and
- ✦ Avoid group activities when HFMD outbreak occurs in the school or institution. Besides, minimise staff movement and arrange the same group of staff to take care of the same group of children as far as possible.

NEWS IN BRIEF

Two local sporadic cases of psittacosis

The CHP of the Department of Health recorded two local sporadic cases of psittacosis on February 25 and 27, 2024 respectively.

This first case affected a 53-year-old male residing in North Point. He presented with fever and chills on February 7. His condition deteriorated later and was admitted to a public hospital on February 14. His chest X-ray revealed pneumonia and he had required support from Intensive Care Unit. His condition improved after treatment. He was extubated and transferred to general medical ward for further management. His endotracheal aspirate collected on February 14 was tested positive for *Chlamydia psittaci* DNA by polymerase chain reaction (PCR). The case had no travel history during the incubation period and he mainly stayed at home and reportedly kept no pets. Despite no known direct contact with poultry or birds during the incubation period, there were pigeons flocked around his flat's window in close proximity to index's desk. Although there was no definite history of handling bird droppings, the patient had cleaned the window without wearing face mask or gloves shortly prior to disease onset. Household contact remained asymptomatic at time of report. CHP mounted a joint visit with Agriculture, Fisheries and Conservation Department and Food and Environmental Hygiene Department to his residence on February 29 and found evidence of haunting of feral pigeons in the residential complex concerned. Environmental samples, including bird droppings directly outside the concerned flat windows, were obtained and were all negative for *Chlamydia psittaci*. As part of anti-pigeon flocking measures, an ad hoc pavement cleansing to regional blackspot where feral pigeons wandered was undertaken on top of usual regular street cleansing. Education on anti-feeding and measures of roosting and nesting were delivered to the property management, patient's family, and the buildings nearby. Anti-littering posters / pamphlets were disseminated to buildings nearby and banner related to feeding of feral pigeons were also erected in the region to warn the public against feeding of wild birds.

The second case involved a 52-year-old female residing in Tuen Mun. She presented with fever, shortness of breath and tiredness on February 4. Her condition deteriorated later and she was admitted to a public hospital on February 10. Clinical diagnosis was acute respiratory distress syndrome and pneumonia. Her nasopharyngeal aspirate collected on February 14 was tested positive for *Chlamydia psittaci* DNA by PCR. Her condition improved and she was discharged on February 20. She was a housewife with no travel history during incubation period. She kept eight parrots at home and they were tested negative for *Chlamydia psittaci*. She had also visited Yuen Po Street Bird Garden and exposed to various birds there during incubation period. Health advice had been given to the staff of concerned bird stalls who remained asymptomatic. Her home contacts remained asymptomatic.

A local sporadic confirmed case of listeriosis

On March 14, 2024, CHP recorded a sporadic case of listeriosis affecting a 39-year-old woman with gestational diabetes mellitus residing in Tai Po. She presented with fever and cough since March 9. She noted decreased fetal movements on March 11 and was admitted to a public hospital on the same day. She gave birth to a pair of full-term twins on March 12 with normal delivery. Her blood specimen collected grew *Listeria monocytogenes* on March 13. Swabs and blood culture collected from both twins were negative for *Listeria monocytogenes*. She was treated with antibiotics while the twins were given prophylactic antibiotics. Their conditions were all stable. She had no travel history during incubation period. She did not recall high-risk exposure including raw or undercooked food. Her household contacts remained asymptomatic.