Summary of the 2018/19 winter influenza season in Hong Kong

Reported by Ms Vera CHOW, Scientific Officer, Respiratory Disease Office and Mr Desmond CHAN, Scientific Officer, Vaccine Preventable Disease Office, Surveillance and Epidemiology Branch, CHP.

The 2018/19 winter influenza season in Hong Kong started in the first week of 2019 and ended in early April, which lasted for about 14 weeks. The duration was within the range of 12-17 weeks for major influenza seasons in the past few years.

Laboratory surveillance

The weekly percentage tested positive for seasonal influenza viruses among respiratory specimens received by the Public Health Laboratory Services Branch (PHLSB) of the Centre for Health Protection (CHP) of the Department of Health started to increase steadily since mid-November last year. It then rose rapidly to exceed the baseline threshold in late December and peaked at 30.10% in mid-January (Figure 1). The peak percentage was within the range recorded in the major seasons from 2015-2018 (26.41%-40.86%). The positive percentage had been decreasing since February and returned to a low level in late March.

Influenza A(H1) virus predominated in this season (Figure 2). From December 30, 2018 to April 6, 2019, the majority of influenza viruses detected by PHLSB were influenza A(H1) (75.1%), followed by influenza A(H3) (22.0%). The activity of influenza B had remained at a low level throughout this season. Both influenza A(H1) and A(H3) viruses remained antigenically similar to the strains contained in the seasonal influenza vaccine (SIV) recommended for the 2018-19 Northern Hemisphere season.

Influenza-like illness (ILI) outbreaks in schools and institutions

The weekly number of institutional ILI outbreaks reported to CHP increased sharply in the second week of January and remained at a high level in January. The weekly number of reported ILI outbreaks ranged from 121 to 209 between January 6 and 26 (Figure 3). It reached the very high intensity level in the third and fourth week of January according to the assessment by
the Moving Epidemic Method (MEM)\(^1\) (Figure 4). A total of 863 outbreaks were recorded in this season with 6145 persons affected (as of April 6), which was the highest number recorded during influenza seasons since 2013 (the previous high was 600 outbreaks recorded in the 2017/18 winter season). The most affected type of institutions was kindergarten and child care centre (KG/CCC) which constituted 61.2% of all reported outbreaks during this season (Table 1).

Table 1 - Numbers and percentages of ILI outbreaks in schools and institutions during the 2018/19 winter season.

<table>
<thead>
<tr>
<th>Type of institutions</th>
<th>Cumulative number of ILI outbreaks reported from December 30, 2018 to April 6, 2019 (% of total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KG/CCC</td>
<td>528 (61.2%)</td>
</tr>
<tr>
<td>Primary school</td>
<td>183 (21.2%)</td>
</tr>
<tr>
<td>Secondary school</td>
<td>35 (4.1%)</td>
</tr>
<tr>
<td>Residential care home for the elderly</td>
<td>55 (6.4%)</td>
</tr>
<tr>
<td>Residential care home for persons with disabilities</td>
<td>19 (2.2%)</td>
</tr>
<tr>
<td>Others</td>
<td>43 (5.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>863</td>
</tr>
</tbody>
</table>

Figure 6 - Weekly admission rates with principal diagnosis of influenza in public hospitals, 2018-2019.

Influenza-associated hospital admission rates in public hospitals

The overall admission rate with principal discharge diagnosis of influenza in public hospitals started to increase steadily since mid-November last year. It exceeded the baseline threshold in mid-December and rose to the peak of 1.59 per 10,000 population in the week ending January 19 (Figure 5). The peak weekly rate reached the high intensity level according to the assessment by MEM (Figure 6). It had decreased since early February and returned to a level below the baseline threshold in the week ending April 6.

Table 2 shows the peak weekly admission rates by age groups recorded in the major influenza seasons from 2015 to 2019. The peak rate among all ages in this season was within the range of 0.67 to 1.91 per 10,000 population recorded in the major seasons in the past four years. Similar to previous seasons, the rate was highest in young children aged five years or less (11.06), followed by elderly aged 65 years or above (3.09). The peak rate among children in young children aged 0-5 years had exceeded those recorded in the major seasons during 2015 to 2018. Besides, the peak rates of adult patients aged 50-64 years (1.05) and 18-49 years (0.56) were also the highest when compared with the corresponding rates in previous seasons (0.38 to 0.87 and 0.16 to 0.36 respectively).

Table 2 - Peak weekly admission rates (per 10,000 population) recorded during major influenza seasons, 2015-2019.

<table>
<thead>
<tr>
<th>Season (predominating virus)</th>
<th>Peak weekly admission rate (per 10,000 population)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-5</td>
</tr>
<tr>
<td>2018/19 season (H1)</td>
<td>11.06</td>
</tr>
<tr>
<td>2017/18 winter (B)</td>
<td>8.82</td>
</tr>
<tr>
<td>2017 summer (H3)</td>
<td>9.09</td>
</tr>
<tr>
<td>2015/16 winter (H1&amp;H3)</td>
<td>6.15</td>
</tr>
<tr>
<td>2014/15 winter (H3)</td>
<td>2.78</td>
</tr>
</tbody>
</table>

Note: The peak rate of various age groups might be recorded in different weeks of the same season.

Severe influenza cases

CHP has collaborated with the Hospital Authority and private hospitals to monitor intensive care unit (ICU) admissions and deaths with laboratory confirmation of influenza among adult patients. For surveillance purpose, the cases refer to laboratory-confirmed influenza patients who require ICU admission or die within the same admission of influenza infection. It should be noted that their causes of ICU admission or death may be due to other acute medical conditions or underlying diseases.

During this season, a total of 601 cases (including 356 deaths) of ICU admission or death with laboratory confirmation of influenza were recorded among adult patients aged 18 years or above, which was within the range of 409-647 cases (211-501 deaths) recorded during the major influenza seasons from 2015-2018. Their ages ranged from 18 to 109 years (median: 71 years). About 26% affected persons aged 50-64 years, which was higher than 15% in the 2017 summer season predominated by influenza A(H3) and 20% in the 2017/18 winter season predominated by influenza B. Nonetheless, most of the deaths (87%) still affected elderly aged 65 years or above. The cumulative incidences of severe cases among persons aged 18-49 years and 50-64 years were 18.48 and 85.62 per million population respectively, which were higher than the corresponding rates recorded during the major influenza seasons from 2015-2018 (6.15 to 17.08 and 37.37 to 75.51 respectively). About 78% of the cases had pre-existing chronic medical diseases.

For paediatric cases of influenza-associated severe complications and deaths, a total of 24 cases (including one death) were recorded in this season, which was within the range of 18-27 (1-3 deaths) recorded during the major influenza seasons from 2015 to 2018. The cases involved 16 boys and eight girls. Their ages ranged from one month to 15 years with a median of four years.

In summary, the 2018/19 winter season was predominated by influenza A(H1) which constituted 75% of all influenza detections in this season. The last season with significant circulation of influenza A(H1) was the 2015/16 winter influenza season where 49% of the influenza detections were influenza A(H1). Young children were most affected in this season as reflected by the large number of ILL outbreaks in KG/CCC and the high influenza-associated hospitalisation rate among young children. The cumulative population incidence of severe cases among young patients aged 50-64 years was also the highest when compared to previous seasons.

Effectiveness of seasonal influenza vaccine in the 2018/19 winter influenza season

Since the 2017/18 season, CHP has been collaborating with private medical practitioners participating in the sentinel surveillance system to estimate the vaccine effectiveness (VE) of the seasonal influenza vaccine (SIV) at the local primary care setting using the test-negative case-control method. In the 2018/19 season, our sentinel private medical practitioners submitted 1,037 specimens from December 2018 to March 2019, with 55% tested positive for influenza viruses and 70% of the positive specimens tested for influenza found that the interim VE was 90% overall, and 92% against influenza A(H1).

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The overall VE among all ages was 57.9% (95% confidence interval [CI] 42.0 to 69.7%) against all influenza viruses, and 60.2% (95%CI 42.4 to 72.7%) against influenza A(H1). Similar to the 2017/18 season\(^1\), the results showed that the SIV for the 2018/19 season offered a moderate to good protection against laboratory-confirmed influenza at primary care level in Hong Kong. Another local hospital-based test-negative study including data on about 2,000 children admitted to participating public hospitals between September 2018 and January 2019 with febrile acute respiratory illness and tested for influenza found that the interim VE was 90% overall, and 92% against influenza A(H1)\(^2\).

References


Update on the pneumococcal vaccination schedule under the Hong Kong Childhood Immunisation Programme

Reported by Mr Desmond CHAN, Scientific Officer, Vaccine Preventable Disease Office, Surveillance and Epidemiology Branch, CHP.

Background

Streptococcus pneumoniae (also known as pneumococcus) is a common causative agent for infections such as acute otitis media and pneumonia. It also causes various forms of invasive pneumococcal disease (IPD) such as meningitis and sepsis. Pneumococci can colonise nasopharynx of healthy individuals (nasopharyngeal carriage) and is transmitted mainly through respiratory route\(^1\). Although IPD can occur in persons of any age, morbidity and mortality is substantially higher among people at extremes of age (children under two years of age and elders aged 65 years or above). The World Health Organization (WHO) estimated that 294,000 deaths in children aged less than five years were attributed to pneumococcal infections in 2015\(^1\). Persons who have history of clinical IPD, are immunocompromised, have underlying chronic illnesses, or have cochlear implants are at higher risk of IPD.

Pneumococcal vaccination in Hong Kong

There are over 90 serotypes of pneumococci and their distribution varies by a number of factors such as age and geography\(^3\).

Note 1 IPD was listed as a notifiable infectious disease under the Prevention and Control of Disease Ordinance (Cap 599) in 2015.
Pneumococcal Conjugate Vaccines (PCV) consisting of pneumococcal capsular polysaccharides conjugated to carrier proteins can prevent diseases caused by some serotypes of pneumococci. Upon the recommendation of the Scientific Committee on Vaccine Preventable Diseases (SCVPD), 7-valent pneumococcal conjugate vaccine (PCV7) was incorporated into the Hong Kong Childhood Immunisation Programme (HKCIP) in September 2009 for all eligible infants born on or after September 1, 2007. Eligible children receive a primary series of three doses at two, four and six months, followed by a booster dose at 12 months (3p+1 schedule), according to the schedule recommended by the manufacturer. PCV7 covers serotypes 4, 6B, 9V, 14, 18C, 19F and 23F. PCV7 was replaced by PCV10 (covering three additional serotypes 1, 5 and 7F) in October 2010 which was subsequently replaced by PCV13 (covering three more serotypes 3, 6A and 19A) in December 2011.

The overall coverage of PCV under HKCIP among eligible children has been maintained at a very high level. The Department of Health conducted an immunisation coverage survey among preschool children in 2018 and found that 96% of surveyed children aged three to five years had completed four doses of PCV. However, non-local children (those who were either not born in Hong Kong, or did not reside in Hong Kong before two years of age or during preschool) had lower PCV coverage as compared with local children (booster dose coverage: 60% for non-local children compared to 99% for local children).

Epidemiology of IPD in Hong Kong

Since the inclusion of PCV into the HKCIP, IPD incidence among very young children aged below two years has substantially reduced. In addition, the incidence of IPD caused by the seven serotypes covered in PCV7/10/13 has been on a decline for all age groups (Figure 1). However, the incidence of IPD caused by the six serotypes (1, 3, 5, 6A, 7F and 19A) that are covered by PCV13 but not by PCV7 has increased since 2010.

Among the 189 IPD cases recorded in 2018, 50 were paediatric cases (<18 years) while 139 were adult cases (≥18 years). The incidence in 2018 was highest in children aged two to four years (14.5 per 100,000 population), followed by elderly aged 65 years or above (5.9 per 100,000 population) and children aged one year or less (3.8 per 100,000 population). The most common serotype was serotype 3 (52.9%), followed by serotypes 19A (5.8%) and 14 (4.8%). Although serotype 3 is included in PCV13, overseas studies have shown that PCV13 is less effective against this serotype as compared with other vaccine serotypes.1

WHO recommendation on the use of PCV

WHO recommended a three-dose PCV schedule for infants, either 3p+0 (three primary doses) or 2p+1 (two primary doses plus a booster) in its position paper in 2012.1 In October 2017, WHO Strategic Advisory Group of Experts Working Group on PCVs (SAGE PCV WG) reviewed the evidence to inform PCV vaccination policy and concluded that both 3p+0 and 2p+1 schedules were effective in reducing vaccine-type carriage and diseases.4 It also concluded that a single dose catch-up vaccination can be offered for those initiating PCV at 24 months and older. These WHO recommendations have been reiterated in WHO’s latest position paper recently published in February 2019.1 Of note, it was pointed out that 2p+1 schedule has potential benefits over the 3p+0 schedule, when programmatically feasible, as higher antibody levels are induced in the second year of life, which may be important in maintaining herd immunity.

Regarding the choice of PCV, a systematic review conducted for the SAGE PCV WG showed that both PCV10 and PCV13 had impact on the disease and carriage caused by the 10 common vaccine serotypes.4 There were differences in the impact of PCV10 and PCV13 on the three additional serotypes (i.e. 3, 6A and 19A) included only in PCV13. Overall, impact on serotype 3 was not demonstrated for both PCV10 and PCV13, although PCV13 could elicit a relatively higher immune response. In spite of limited data, the overall impact on serotype 19A was better for PCV13 and the impact on nasopharyngeal carriage of serotype 19A was not demonstrated by PCV10. Both products showed impact on serotype 6A. The SAGE PCV WG noted that there was limited evidence on the superiority in impact between PCV10 and PCV13 against IPD and pneumonia, but PCV13 might have advantage in settings where disease attributable to serotype 19A or 6C is significant. The country level choice will depend on factors such as local or regional programmatic considerations, disease epidemiology, serotype prevalence, cost-effectiveness, or other issues.

Review of PCV schedule in Hong Kong

After reviewing local IPD epidemiology, overseas studies, WHO recommendations and practice of overseas health authorities, the SCVPD and its Working Group on Pneumococcal Vaccination (WGPV) continued to recommend the use of PCV13 in HKCIP. Based on the available evidence and overseas experience, the SCVPD and WGPV regarded that the 2p+1 schedule was non-inferior to the current 3p+1 schedule and should provide comparable protection against IPD to children in Hong Kong.

Note 2 There are more than 90 serotypes of pneumococci and existing pneumococcal vaccines covered different serotypes.
The SCVPD and WGPV recommended a change of PCV13 schedule under HKCIP from 3p+1 to 2p+1 (Table 1). Under the updated 2p+1 schedule, children should receive two primary doses of PCV13 at two and four months, followed by a booster dose of PCV13 at 12 months. This update will simplify the HKCIP with one less dose given at six months of age.

In view of the relatively low PCV13 coverage among non-local preschool children, the SCVPD and WGPV also updated its previous recommendation on catch-up vaccination. Under the updated recommendation, children between the age of one year to <6 years who have not received any PCV13 booster should receive a single dose of PCV13 catch-up vaccination. Details of the updated schedule are shown in Table 1.

As the existing pneumococcal vaccines cannot prevent against all pneumococci, IPD can still occur in vaccinated individuals. In addition to age-appropriate pneumococcal vaccination, there are other measures in preventing pneumococcal infection. Personal and environmental hygiene should be observed, such as maintaining good indoor ventilation and wearing masks when having respiratory symptoms. Those who have fever and respiratory symptoms should seek medical attention early. Moreover, as co-infection with influenza will lead to more severe illness caused by IPD, members of the public aged six months or above except those with known contraindications should receive annual seasonal influenza vaccination as recommended by SCVPD.

### References

1 Pneumococcal conjugate vaccines in infants and children under 5 years of age: WHO position paper – February 2019. Available at: [https://apps.who.int/iris/bitstream/handle/10665/310968/WER9408.pdf?ua=1](https://apps.who.int/iris/bitstream/handle/10665/310968/WER9408.pdf?ua=1).


3 Pneumococcal vaccines. WHO position paper – 2012. Available at: [https://apps.who.int/iris/bitstream/handle/10665/241904/WER8714_129-144.PDF](https://apps.who.int/iris/bitstream/handle/10665/241904/WER8714_129-144.PDF).

4 WHO SAGE meeting of October 2017. Available at: [https://www.who.int/immunization/sage/meetings/2017/october/presentations_background_docs/en/](https://www.who.int/immunization/sage/meetings/2017/october/presentations_background_docs/en/).


### Table 1 - Updated vaccination schedule of PCV13 under the HKCIP.

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Age at presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard regimen*</td>
<td>A standard 2-dose primary series at 2 and 4 months of age with a booster dose at 12 months (2p+1)</td>
</tr>
<tr>
<td>Catch up schedule for missed or delayed doses</td>
<td></td>
</tr>
<tr>
<td>A 2-dose primary series at any time with 4-8 weeks' interval between doses; then a booster dose at 12 months (i.e. 2p+1)</td>
<td>6 months or below*</td>
</tr>
<tr>
<td>A 2-dose primary series with an interval of 4-8 weeks but not later than the age of 1 year; then a booster dose at 12 months or 2 months after the last dose whichever is later (i.e. 2p+1)</td>
<td>7 months to less than 1 year</td>
</tr>
<tr>
<td>One single dose (irrespective of the number of doses received before 1 year of age)</td>
<td>1 year to less than 6 years*</td>
</tr>
</tbody>
</table>

* The primary series is changed from 3 doses to 2 doses

* The upper age limit is changed from less than 2 years to less than 6 years

Please click here for the latest Hong Kong Childhood Immunisation Schedule as recommended by the SCVPD.

### NEWS IN BRIEF

#### Two sporadic cases of listeriosis

CHP recorded two cases of listeriosis in March 2019.

The first case was a 93-year-old man with underlying illnesses. He had presented with fever, vomiting, constipation, poor appetite, headache and myalgia since March 25. He was admitted to a public hospital on March 25 for sepsis. His blood culture collected on March 26 yielded *Listeria monocytogenes*. He was treated with antibiotics and his current condition was stable.

The second case was an 80-year-old male with underlying illnesses. He had presented with diarrhea, fever, headache and confusion since March 26. He was admitted to a public hospital on March 27. His blood culture collected on March 27 yielded *Listeria monocytogenes*. He was treated with antibiotics. His condition was critical and he passed away on March 30.

#### Two sporadic cases of psittacosis

On March 28 and April 4, 2019, CHP recorded two sporadic cases of psittacosis. The first case affected a 60-year-old man with underlying illnesses. He had presented with fever, cough, joint pain, malaise and headache since March 17 and was admitted to a public hospital on March 21. His chest X-ray showed right middle zone consolidation. The clinical diagnosis was pneumonia and he was treated with antibiotics. His condition remained stable and he was discharged on April 3. His sputum collected on March 25 was tested positive for *Chlamydia psittaci* DNA by polymerase chain reaction. He had no recent travel history.
The second case affected a 63-year-old man with good past health. He had presented with fever, cough with sputum since March 23 and was admitted to a public hospital on March 29. His chest X-ray showed right lower zone haziness. The clinical diagnosis was pneumonia and he was treated with antibiotics. His condition remained stable and he was discharged on April 1. His sputum collected on March 29 was tested positive for *Chlamydia psittaci* DNA by polymerase chain reaction. He had travelled with his wife to South Korea during the incubation period.

Investigation did not identify epidemiological linkage between the two cases. Both cases reported no history of contact with birds or their excreta. Both of them did not keep any pets at home and their home contacts and travel collaterals were asymptomatic.

**Ad hoc Clinical Infection and Public Health Forum: Situation Update of Measles in Hong Kong on March 29, 2019**

An ad hoc clinical infection and public health forum: “Situation Update of Measles in Hong Kong” was conducted on March 29, 2019 in view of the recent surge of measles cases in Hong Kong. The aim of the event was to familiarise healthcare workers with important aspects of measles, including the latest situation in Hong Kong and vaccination recommendation for healthcare workers; laboratory diagnosis; and clinical management in adult and paediatric cases. Dr Wong Miu-ling from the Surveillance and Epidemiology Branch of CHP, as well as Dr Ann Wong from Prince of Wales Hospital, and Dr Jacky Chan and Dr Joshua Wong from the Infectious Disease Centre of Princess Margaret Hospital were invited to give talks on their own specialty areas. The forum was well received by the audience, which consisted of medical and nursing staff from both public and private sectors. Presentation materials and training video have been uploaded at the Hong Kong Training Portal on Infection Control and Infectious Diseases.

**Workshop on Infection Control and Risk Assessment for Construction and Renovation Work in Hospital, April 2019**

The Infection Control Branch of CHP and Chief Infection Control Officer Office of Hospital Authority co-organised an one and a half day “Workshop on Infection Control and Risk Assessment for Construction and Renovation Work in Hospital” on April 2 to 3, 2019.

The workshop aimed to identify risk factors and source of infection related to construction and renovation, increase the awareness and enhance knowledge of healthcare workers and related parties on infection control in relation to construction and renovation work in hospitals.

We invited three renowned overseas speakers, Professor Dale Andrew Fisher (Singapore), Dr Ling Moi Lin (Singapore) and Dr Julie B. Trivedi (USA). They provided valuable insight on risk assessment, surveillance, fungal infection and water-related transmissible disease including legionella disease.

Local speakers Dr Ambrose Wong and Dr David Lung enlightened the audience on local situation of legionella disease and perspectives of a new hospital.

The workshop was well attended by nearly 200 audiences. Among them, around 70 were engineers and senior managers or executives from facility management or hospital management.

The presentation materials would be uploaded onto the Hong Kong Training Portal on Infection Control and Infectious Diseases: [http://icidportal.ha.org.hk/Trainings/View/141](http://icidportal.ha.org.hk/Trainings/View/141).
CA-MRSA cases in March 2019

In March 2019, CHP recorded a total of 110 cases of community-associated methicillin resistant Staphylococcus aureus (CA-MRSA) infection, affecting 67 males and 43 females with ages ranging from 11 days to 89 years (median: 37 years). Among them, there were 85 Chinese, 6 Pakistani, 4 Filipinos, 3 Indian, 2 Caucasian, 1 Indonesian, 1 Nepalese, 1 Thai, and 7 of unknown ethnicity.

One-hundred and eight cases presented with uncomplicated skin and soft tissue infections while the remaining two cases had severe CA-MRSA infections. The first severe case affected a 15-year-old boy with good past health. He presented with fever and pain and swelling of right knee since February 16. He attended a public hospital on February 20 and was admitted for management. His blood specimen collected on February 20 was cultured positive for CA-MRSA. He was treated with antibiotics. He remained in a stable condition and was discharged on March 11.

The second severe case affected an 89-year-old woman with underlying illnesses. She presented with poor appetite and decreased general condition since February 28. She attended a public hospital on March 7 and was admitted for management. Her chest X-ray showed pneumonic changes. Her blood specimen collected on March 8 was cultured positive for CA-MRSA. She was diagnosed with CA-MRSA sepsis. She was treated with antibiotics. Her condition deteriorated and succumbed on March 27.

Six household clusters, with each affecting two persons, were identified. No cases involving healthcare worker were reported during this period.

Scarlet fever update (March 1, 2019 – March 31, 2019)

Scarlet fever activity increased in March. CHP recorded 142 cases of scarlet fever in March as compared with 88 cases in February. The cases recorded in March included 85 males and 57 females aged between five months and 55 years (median: six years). There was one institutional cluster occurring in a kindergarten, affecting two children. No fatal cases were reported in March.