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Communicable Diseases WATCH

衛生防護中心 Centre for Health Protection 衛生署 Department of Health

FEATURE IN FOCUS

2017/18 Winter Influenza Season Underway in Northern Hemisphere

Reported by Ms Vera CHOW, Scientific Officer, Respiratory Disease Office, Surveillance and Epidemiology Branch, CHP.

Overview

The 2017/18 winter influenza season has already started in most areas in the northern hemisphere and the influenza activity continued to increase or reached a high level. Locally, after the 2017 summer influenza season, the activity of seasonal influenza in Hong Kong had remained at a low level from September to mid-December 2017. It started to increase steadily in late December and exceeded the baseline level in early January, indicating the arrival of the 2017/18 winter influenza season in Hong Kong. The overall seasonal influenza activity has shown a continual increase in the past two weeks with notable increases in laboratory detection of influenza viruses among respiratory specimens, institutional influenza-like illness (ILI) outbreaks and influenza-associated hospitalisation rate in public hospitals. It is anticipated that the local influenza activity may further increase in the coming weeks and remain at an elevated level for some time.

Local seasonal influenza activity

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 has increased steadily from 3.93% in the week ending December 16 to 15.13% in the week ending January 6, which exceeded the baseline threshold (Figure 1). It has then increased to 16.73% in the week ending January 13. In typical winter seasons in the past few years, the positive percentage would reach a peak level around 25% to 40%.

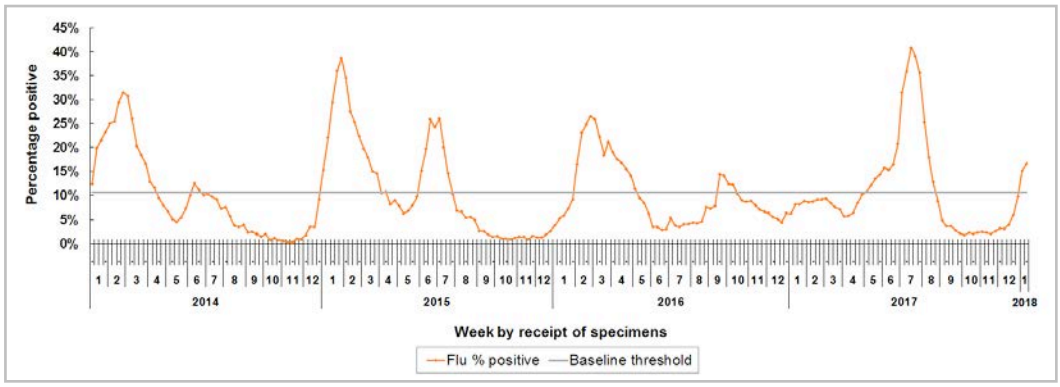

Figure 1 - Percentage of respiratory specimens tested positive for influenza viruses, 2014-2018.
(Note: The baseline threshold is 1.96 standard deviation above the average weekly positive percentage during non-season periods from 2014-2017.)

Unlike the past three influenza seasons (2016 summer season, 2016/17 winter season and 2017 summer season) predominated by influenza A(H3N2) viruses, influenza B became the most commonly detected virus type in this season (Figure 2). Among the influenza viruses detected in the past four weeks (December 17, 2017-January 13, 2018), the majority were influenza B (76.5%), followed by influenza A (H1) (9.7%), influenza A(H3) (8.4%) and influenza C (5.5%). Among the positive influenza B detections from December 17 to January 6, 88.1% belonged to the Yamagata lineage which is included only in the quadrivalent seasonal influenza vaccine (SIV) recommended for the 2017/18 northern hemisphere season but not the trivalent SIV including the Victoria lineage. The last season predominated by influenza B viruses in Hong Kong was the 2015/16 winter season when 43.5% of the positive detections was influenza B.

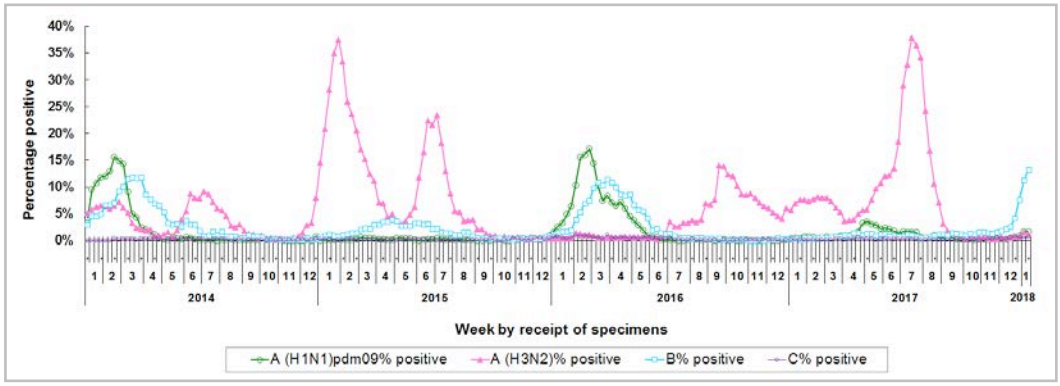

Figure 2 - Percentage of respiratory specimens tested positive for influenza virus subtypes, 2014-2018.

Antigenic characterisation by PHLSB showed that the circulating influenza viruses so far remained similar to the components in the

SIV recommended for the 2017/18 northern hemisphere season and there were no significant antigenic changes. Overseas health authorities also reported that the circulating viruses including influenza A and influenza B viruses remained similar to the vaccine components.

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

The weekly number of institutional ILI outbreaks reported to CHP increased sharply in the past two weeks. Twenty-six outbreaks in schools and institutions were reported in the week ending January 13, as compared to five outbreaks in the previous week (Figure 3). In the first four days of this week, the number of ILI outbreaks further increased to 49. From January 7 to 17, the reported ILI outbreaks occurred in primary schools (50.7%), kindergartens/child care centres (37.3%), residential care homes for the elderly (6.7%), residential care home for people with disabilities (2.7%) and others (2.6%).

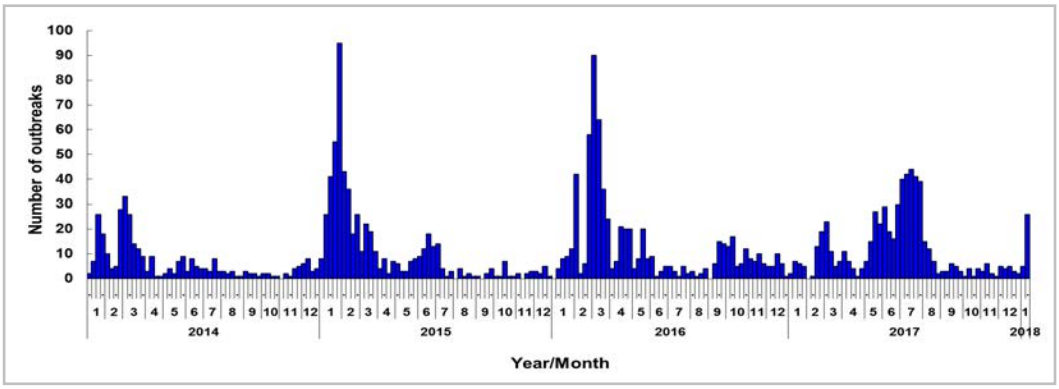

Figure 3 - Weekly number of institutional ILI outbreaks reported to CHP, 2014-2018.

Influenza-associated hospital admissions in public hospitals

The admission rate with principal diagnosis of influenza in public hospitals has increased steadily since mid-December to 0.27 admitted cases (per 10 000 population) in the last week of December, which was above the baseline threshold (Figure 4). It further increased to 0.45 and 0.52 in the following two weeks. Similar to previous seasons, the rate was highest among young children and elderly (Figure 5). Among children aged below five years, the rate has increased to 3.83 in the week ending January 13. The rate among children aged between five and nine years and elderly aged 65 years or above increased to 2.31 and 0.99 respectively in the same week.

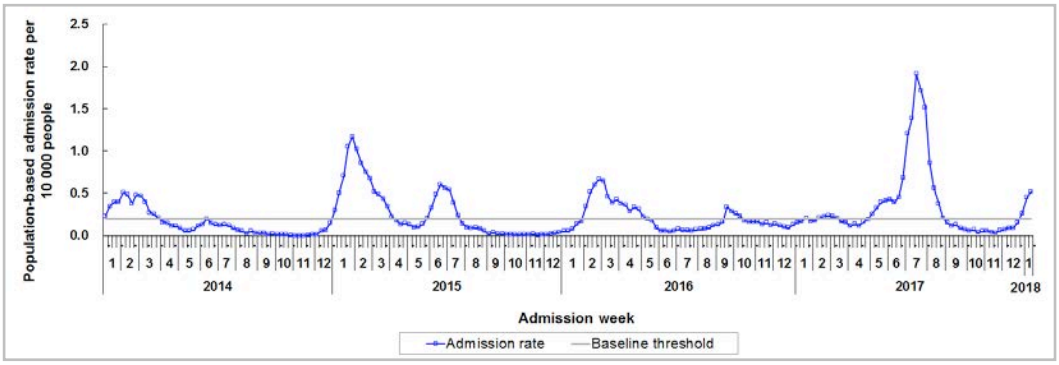

Figure 4 - Weekly admission rates with principal diagnosis of influenza in public hospitals, 2014-2018.
(Note: The baseline threshold is 1.96 standard deviation above the average weekly admission rate during non-season periods from 2014-2017.)

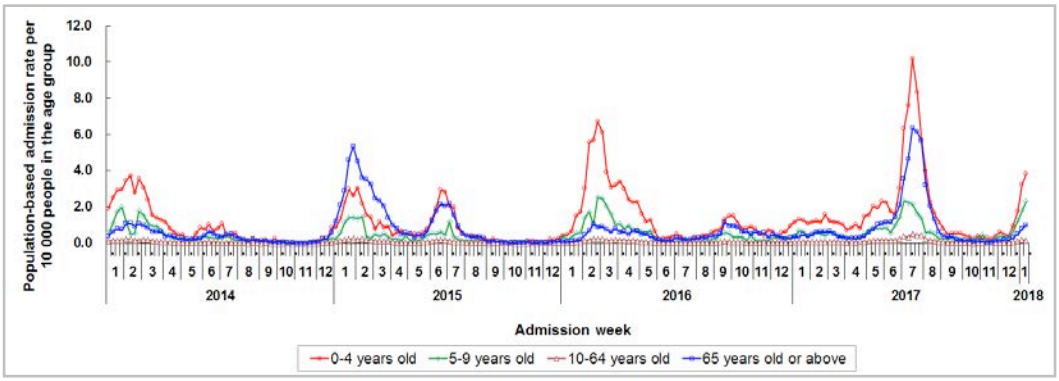

Figure 5 - Weekly admission rates with principal diagnosis of influenza in public hospitals by age groups, 2014-2018.

Severe influenza cases

Since 2018, 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 regularly as a routine surveillance throughout the year. For surveillance purpose, the cases refer to laboratory-confirmed influenza patients who required ICU admission or died within the same admission of influenza infection. Their causes of ICU admission or death may be due to other acute medical conditions (e.g. stroke, acute myocardial infarction, etc.) or underlying diseases (exacerbation of chronic obstructive airway disease, renal failure, malignancy, etc.).

Since the start of the winter influenza season in the week of January 7, a total of 41 adult cases of ICU admissions or deaths with laboratory confirmation of influenza were recorded (including 23 deaths) (as of January 17) (Figure 6). Among them, 34 patients had infection with

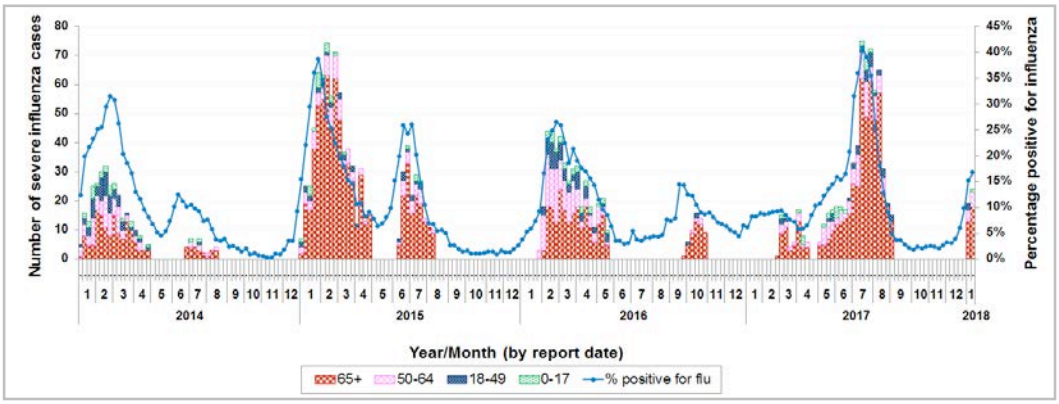

Figure 6 - Weekly number of severe influenza cases by age groups, 2014-2018 (the percentage positive for influenzas viruses is also shown).
(Note: The surveillance system for severe influenza cases among adult patients aged 18 years or above was only activated intermittently during influenza seasons before 2018.)

influenza B, five patients with influenza A(H1N1)pdm09, one patient with influenza A(H3N2) and one patient with influenza A pending subtype. 65.9% were aged 65 years or above. Majority of them (94.3%) had underlying medical diseases. Only seven out of the 41 adult cases (17.1%) were known to have received the 2017/18 SIV.

Separately, three paediatric cases of influenza-associated severe complication/death among patients aged below 18 years were reported to CHP in 2018. All of them had influenza B infection. The first case affected a three-year-old girl with good past health. She was complicated with encephalopathy, and had passed away. The second case affected a three-year-old boy with history of congenital brain malformation and epilepsy. He was complicated with pneumonia and septic shock. Both children did not receive the 2017/18 SIV. The third case affected a 15-year-old girl with history of right middle fossa arachnoid cyst. She was complicated with encephalopathy. She had received SIV for this season.

Seasonal influenza activity in Northern Hemisphere

According to the latest update by the World Health Organization, influenza activity continued to increase in the temperate zone of the northern hemisphere. Worldwide, influenza A(H3N2) and B viruses accounted for the majority of influenza detections although influenza A(H1N1)pdm09 viruses were predominant in some countries.

North America

In the United States, the proportion of out-patient visits for ILI reached 2.3% in the week ending November 25, which exceeded the national baseline of 2.2%. It increased to 5.8% in the two weeks from December 30 to January 6. In this season, 87.2% of the positive influenza detections by public health laboratories were influenza A, with the majority (89.9%) being influenza A(H3N2). In Canada, the 2017/18 winter season started in early November last year, which was earlier than previous seasons. So far, 71% of positive influenza detections have been influenza A with H3N2 representing 94% of subtyped influenza A detections.

Europe

In Europe, influenza activity was increasing in countries in northern, southern and western Europe. The percentage of respiratory specimens collected at sentinel primary healthcare sites tested positive for influenza viruses has increased from 7% in the week ending November 26 to 44% and 41.8% in weeks ending December 31 and January 7 respectively. Both influenza A and B viruses were co-circulating and mixed patterns were observed across the Region. From October 2 to January 7, 65% of influenza virus detections in sentinel-source specimens were influenza B (mostly Yamagata) while 35% were influenza A (60% H1 and 40% H3).

In the United Kingdom, influenza activity continued to increase in January for all surveillance indicators with notable increases for respiratory outbreaks and influenza confirmed hospitalisations. The overall weekly ILI consultation rates have increased and were above their respective baseline thresholds for England, Wales, Scotland and Northern Ireland. In the first week of January, 28.6% of respiratory specimens were tested positive for influenza viruses. Influenza A and B are co-circulating in this season (47% and 53% in the week ending January 7 respectively). Of note, the weekly ICU influenza admission rate and the weekly influenza hospitalisation rate have greatly exceeded the respective peak levels recorded in the 2016/17 season.

Neighbouring areas

In Mainland China, the winter influenza season arrived earlier this year. In early January, the influenza activity in both Southern and Northern China was still on an increasing trend. The proportion of ILI cases in emergency and outpatient departments reported by sentinel hospitals was higher than that reported in the corresponding period in 2014-2016 in both Southern and Northern China. The most common influenza virus detected currently was influenza B (70.1% in Southern China and 47.5% in Northern China). In Guangdong, the influenza activity has been increasing since December. The ILI consultation rate has exceeded the baseline level of about 4% in mid-December and continued to increase to 6.36% and 5.79% in the first two weeks of January. The laboratory positive percentage of influenza viruses was 41.73% in the week ending January 14 with 96% being influenza B viruses. In Taiwan, the influenza season has arrived in late December 2017 with increasing influenza activity. The proportions of ILI cases in emergency department were 13.87% and 13.18% in the first two weeks of January, which was above the threshold of 11.4%. The predominating virus was influenza B which constituted about 70% of the influenza detections.

In Japan, the average number of reported ILI cases per sentinel site increased to 1.47 in the week ending November 26, which was above the baseline of 1.00. It then continued to increase to 17.88 and 16.31 in the weeks ending December 31 and January 7 respectively.

Preventive measures

It is anticipated that the local seasonal influenza activity will stay at an elevated level for some time. CHP will continue to closely monitor the influenza situation in Hong Kong and overseas countries. All persons aged six months or above except those with known contraindications are recommended to receive SIV for personal protection as soon as possible. During the influenza season, the public, particularly children, the elderly and chronic disease patients, should observe strict personal, hand and environmental hygiene. They should promptly seek medical advice if influenza-like symptoms develop so that appropriate treatment can be initiated as early as possible to prevent potential complications. Parents and carers are reminded to render assistance in prevention, care and control for vulnerable people.

Review of Pneumococcal Vaccination and Invasive Pneumococcal Disease in Hong Kong

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

Pneumococcal diseases

The bacterium *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. IPD can occur in persons of any age but the mortality is substantially higher among people at extremes of age (children under two years of age and elders aged 65 years or above). Persons who have history of clinical IPD, are immunocompromised, have underlying chronic illnesses, or have cochlear implants are at higher risk of IPD.

Pneumococcal vaccines

There are two types of pneumococcal vaccines available on the market, namely the 23-valent pneumococcal polysaccharide vaccine (23vPPV) and pneumococcal conjugate vaccines (PCV) (Figure 1). There are more than 90 serotypes of pneumococci and not all serotypes are covered by the vaccines. 23vPPV consists of pneumococcal capsular polysaccharides for 23 serotypes. PCV consists of pneumococcal capsular polysaccharides conjugated to carrier proteins. There are three types of PCV consisting of antigens against seven, ten and 13 serotypes (PCV7, PCV10 and PCV13 respectively). With the increasing use of PCV10 and PCV13, PCV7 has been gradually phased out from the market.

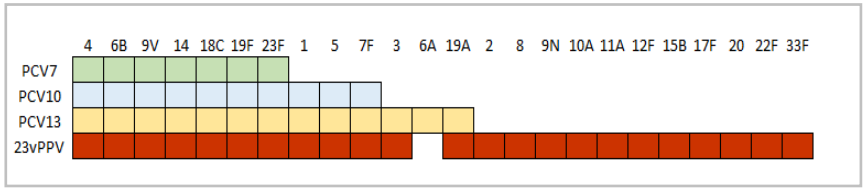

Figure 1 - Serotypes covered by different pneumococcal vaccines.

Pneumococcal vaccination in Hong Kong

Following the recommendation of the Scientific Committee on Vaccine Preventable Diseases (SCVPD) under the Centre for Health Protection (CHP) of the Department of Health (DH), PCV7 was incorporated into the Hong Kong Childhood Immunisation Programme (HKCIP) in September 2009. The standard regimen of PCV in the HKCIP includes a three-dose primary series given at the age of two months, four months and six months, and a booster dose given at 12 to 15 months of age. PCV7 used initially was later replaced by PCV10 and PCV13 in October 2010 and December 2011 respectively. According to the 2015 immunisation survey on preschool children conducted by DH, high PCV coverage was achieved for local-born children eligible for the standard PCV programme[1].

SCVPD also recommended elders aged 65 years or above to receive 23vPPV in 2009. The Government has provided 23vPPV to elders aged 65 years or above through the Elderly Vaccination Subsidy Scheme (EVSS) and the Government Vaccination Programme (GVP) since 2009. In December 2015, SCVPD updated its recommendation of pneumococcal vaccination for elders and high-risk individuals. The updated recommendation includes either a single dose of PCV13 or a single dose of 23vPPV for elders aged 65 years or above without high risk conditions. High-risk individuals aged two years or above should receive a single dose of PCV13, followed by a single dose of 23vPPV one year later. Eligible elders can receive free or subsidised PCV13 under GVP and EVSS respectively starting in October 2017.

Surveillance and epidemiology of IPD in Hong Kong

To monitor the local trend of IPD, serotype replacement and antimicrobial resistance, microbiology laboratories of public and private hospitals in Hong Kong started to send pneumococcal isolates to the Public Health Laboratory Services Branch (PHLSB) of CHP since 2007 via the laboratory surveillance system for IPD. To enhance surveillance, IPD was listed as a notifiable infectious disease under the Prevention and Control of Disease Ordinance (Cap 599) in 2015. Since then, medical practitioners are required to notify DH of any laboratory confirmed cases of IPD (either by detection of DNA by polymerase chain reaction [PCR] or isolation of the bacteria by culture). As such, the surveillance of IPD has extended to include cases diagnosed only by PCR.

From 2007 to 2017, there were 1 734 cases of IPD recorded under the above laboratory surveillance system and statutory notification. The annual IPD incidence ranged from 1.7 to 2.9 per 100 000 population from 2007 to 2017 (Figure 2), which was lower than that recorded in overseas countries that have introduced PCV in their childhood immunisation programmes such as the United States[2], Australia[3] and New Zealand[4] (with a range of eight to 10 per 100 000 population).

IPD incidence was highest among children aged under five years and elderly aged 65 years or above (Figure 3). The incidence among young children aged under two years has decreased gradually from about 10 per 100 000 population in 2007 and 2008 to less than three per 100 000 population in recent years (2015 to 2017) (Figure 3). The reduction is most noticeable for the seven serotypes covered by PCV7/10/13 (PCV7 serotypes) (Figure 4).

On the other hand, the incidence of IPD among children aged two to four years and those aged five to 17 years apparently increased in

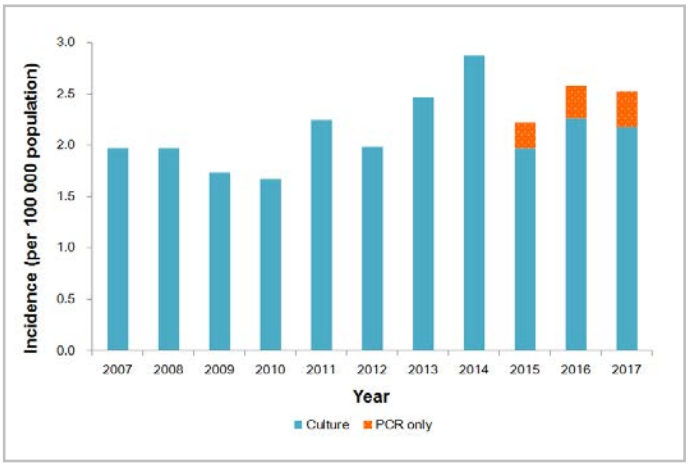

Figure 2 - IPD incidence in Hong Kong, 2007-2017. (Source of data: 2007-2014: PHLSB laboratory surveillance (bacterial culture only); 2015 onwards: IPD notification to CHP (bacterial culture + PCR))

recent years, which may be partly due to an increase in the number of cases detected only by PCR since 2015 (Figure 3). Similar to children aged under two years, IPD incidence caused by PCV7 serotypes has also decreased among children aged two to four years in recent few years. However, for children aged two to four years and those aged five to 17 years, most cases (78%, or 87 of 112) recorded in the recent few years (2015-2017) were caused by serotypes covered by PCV13 but not by PCV7 (PCV13, non-PCV7 serotypes), with the majority (89%, or 77 of 87) being serotype 3 (Figure 4). Incidence caused by these serotypes appeared stable for other age groups.

For adults, IPD incidence increased with age and was the highest among those aged 65 years or above. For elders aged 65 years or above, the overall IPD incidence remained stable in recent years (Figure 3). The incidence caused by PCV7 serotypes had decreased from about three per 100 000 population in 2007 and 2008 to about one per 100 000 population from 2015 to 2017 (Figure 4). This reduction was likely contributed by both the direct effect of 23vPPV in vaccinated elderly and an indirect effect of the PCV vaccination in children.

Serotype 3 pneumococci (one of the PCV13, non-PCV7 serotypes, Figure 4) was the most frequently detected among IPD cases in recent years, accounting for 68% and 40% in children and adults respectively from 2015 to 2017. Although serotype 3 is covered by PCV13 and 23vPPV, the level of immune response against serotype 3 was lower compared to other vaccine serotypes in an immunologic non-inferiority study[5] and the vaccine effectiveness against this serotype was reported to be lower compared to other vaccine serotypes in overseas vaccine effectiveness studies[6,7].

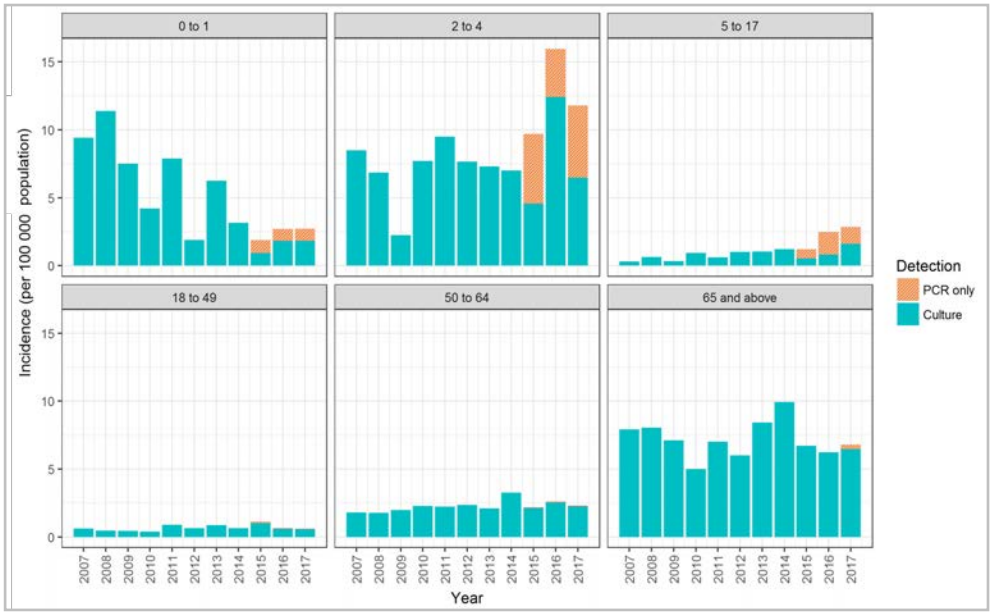

Figure 3 - Age-specific incidence of IPD in Hong Kong, 2007-2017. (Source of data: 2007-2014: PHLSB laboratory surveillance (bacterial culture only); 2015 onwards: IPD notification to CHP (bacterial culture + PCR))

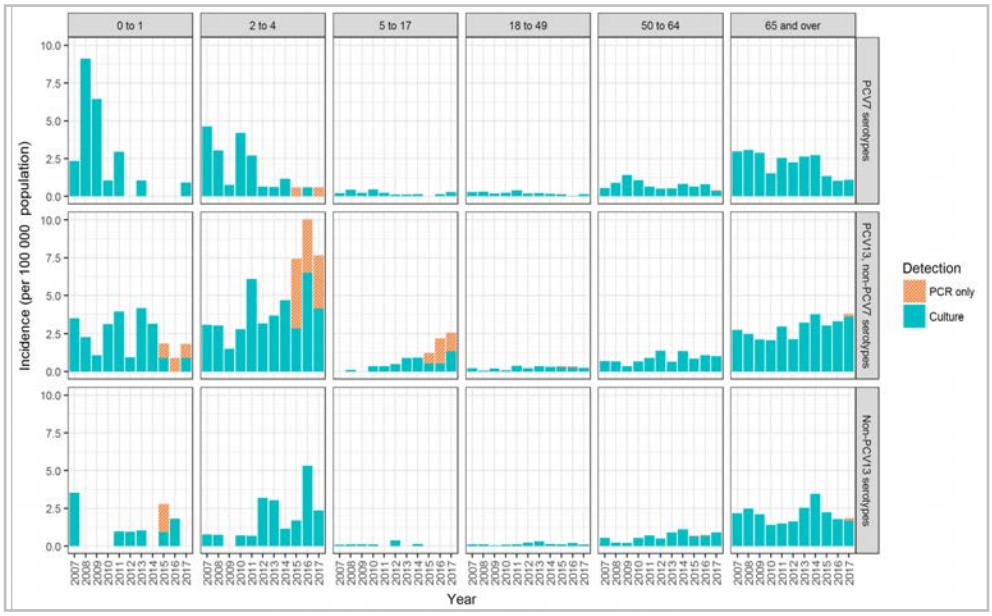

Figure 4 - IPD incidence by vaccine serotypes, 2007-2017. (Source of data: 2007-2014: PHLSB laboratory surveillance (bacterial culture only); 2015 onwards: IPD notification to CHP (bacterial culture + PCR))

As no existing pneumococcal vaccines can confer protection against all strains of pneumococci, IPD can still occur in vaccinated individuals. In addition to age-appropriate pneumococcal vaccination, there are other measures in preventing pneumococcal infection. First, personal and environmental hygiene should be observed, such as maintaining good indoor ventilation and wearing masks when having respiratory symptoms. People should seek medical attention early if they have fever and respiratory symptoms. Second, as co-infection with influenza will lead to more severe illness caused by IPD, members of the public except those with known contraindications should receive seasonal influenza vaccine (SIV) as recommended by SCVPD. Dual vaccination of SIV and pneumococcal vaccines may offer further protection particularly among the elderly.

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NEWS IN BRIEF

Two epidemiologically linked cases of invasive pneumococcal infection

The Centre for Health Protection (CHP) recorded two linked cases of invasive pneumococcal infection in December 2017. The first case was a three-year-old girl with good past health. She developed fever, cough and shortness of breath on December 11. She was admitted to a private hospital on December 17 and was transferred to the paediatric intensive care unit of a public hospital for further management on the same day. Her blood culture collected on December 17 was tested positive for *Streptococcus pneumoniae* serotype 3, while her nasopharyngeal swab collected on the same day was tested positive for both enterovirus/ rhinovirus and parainfluenza virus type 1.

The second case was another three-year-old girl with good past health. She studied in the same kindergarten (KG) as the first patient but in a different class. She developed similar symptoms on December 10. She was admitted to a private hospital on December 13 and was transferred to a public hospital for further management on December 15. Her pleural fluid collected on December 16 was tested positive for *Streptococcus pneumoniae* serotype 3, while her nasopharyngeal aspirate collected on December 15 was tested positive for enterovirus/ rhinovirus. Her sister had upper respiratory tract symptoms before and had recovered.

Both patients remained in stable condition. They have been immunised with Pneumococcal Conjugate Vaccine according to the Hong Kong Childhood Immunisation Programme. Other home contacts remained asymptomatic. There was an upper respiratory tract infection outbreak in the KG attended by the two patients. All affected students remained in stable condition. Officers of the CHP have conducted site visit and provided health advice to the school.

CA-MRSA cases in December 2017

In December 2017, CHP recorded a total of 97 cases of community-associated methicillin resistant *Staphylococcus aureus* (CA-MRSA) infection, affecting 47 males and 50 females with ages ranging from 28 days to 80 years (median: 34 years). Among them, there were 69 Chinese, 10 Filipinos, 2 Caucasian, 2 Indian, 2 Korean, 2 Pakistani, 2 Sri Lankan, 1 Indonesian and 7 of unknown ethnicity. All cases presented with uncomplicated skin and soft tissue infections.

The CA-MRSA isolate of one case was found to be resistant to mupirocin. The patient was a 10-year-old girl who presented with perianal abscess in mid-December 2017. She recovered after treatment with antibiotics and surgical drainage. She previously had an uncomplicated episode of CA-MRSA infection in April 2017. Her isolate at the time was also found to be resistant to mupirocin.

Among the 97 cases, two sporadic cases involved healthcare workers. One was a nurse working in a public hospital while the other was a care worker working in an Integrated Home Care Services Centre. Investigation did not reveal any epidemiologically linked cases. Besides, five household clusters, with each affecting two persons, were identified in December.

Scarlet fever update (December 1, 2017 – December 31, 2017)

Scarlet fever activity in December markedly increased as compared with that in November. CHP recorded 414 cases of scarlet fever in December as compared with 263 cases in November. The cases recorded in December included 247 males and 167 females aged between three months and 49 years (median: six years). There were 15 institutional clusters occurring in eight kindergartens/child care centres and seven primary schools, affecting a total of 33 children. No fatal cases were reported in December. Of note, scarlet fever activity in Hong Kong has increased since late October and currently remains at a high level. Parents have to take extra care of their children in maintaining strict personal, hand and environmental hygiene. Scarlet fever can be effectively treated with antibiotics. People presenting with symptoms of scarlet fever (such as fever, sore throat and skin rash) should consult a doctor promptly for early diagnosis and treatment. Besides, children suffering from scarlet fever should refrain from attending school or child care setting until fever has subsided and they have been treated with antibiotics for at least 24 hours.