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FEATURE IN FOCUS

2021 Questionnaire Survey on Attitudes to Childhood Vaccination among Parents of Preschool Children in Hong Kong

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Background

Vaccine hesitancy refers to delay in acceptance or refusal of vaccines despite availability of vaccination services[1]. It was listed by the World Health Organisation (WHO) as one of the ten threats to global health in 2019[2]. Vaccine hesitancy is regarded as a complex and context specific issue that varies across time, place and vaccines. Factors such as complacency, convenience and confidence are believed to influence vaccine hesitancy[1].

The Centre for Health Protection of the Department of Health assessed the parental attitudes to childhood vaccines/vaccination among parents/guardians of preschool children as part of the 2018 Immunisation Survey on Preschool Children in Hong Kong[3] and results affirmed a low tendency of vaccine hesitancy among local parents/guardians. Another round of Immunisation Survey on Preschool Children was conducted in 2021 and the part on immunisation coverage of the vaccines under the Hong Kong Childhood Immunisation Programme (HKCIP) was reported in a previous article[4]. We report the results of the part on parental attitudes to childhood vaccines/vaccination in this article.

Methods of the Survey on Parent Attitudes to Childhood Vaccines/Vaccination

The study population was children aged three to five (defined as children born between 2015 and 2017) attending 25 pre-primary institutions (kindergartens and kindergarten-cum-childcare centres) in Hong Kong selected by stratified cluster sampling. A bilingual (Chinese and English) self-administered questionnaire on Parent Attitudes about Childhood Vaccines (PACV) was distributed to the parents/guardians of all the children in the sampled pre-primary institutions.

This questionnaire consisted of three main parts: (1) questions on demographics; (2) questions on the top three channels and sources for acquiring vaccination information; and (3) a total of 15 PACV questions on belief, perceptions and behaviour related to vaccination. The 15 PACV questions, referencing from a published Asian study[5], and the scoring scheme were the same as those used in last round in 2018[3]. Each PACV question was scored from 1 to 5, with 1 being most positive attitude towards vaccination (least hesitant), 5 being most negative attitude (most hesitant) towards vaccines/vaccination and 3 being neutral. For each parent/guardian, the scores for these 15 questions were summed up and then divided by 15 to derive an average PACV score ranging from a minimum of 1 to a maximum of 5. The lower the average PACV score means the more positive attitude the parents were towards childhood vaccines/vaccination.

Results

Among the 5 076 children attending the 25 pre-primary institutions, a total of 2 565 parents/guardians with children in the targetted birth cohort (50.5%) responded to the PACV questionnaire survey. The children of the respondents were mostly local children who were born and resided in Hong Kong before and after entering preschools (Table 1). Most of them had 1 or 2 siblings (65.2%).

Majority of the respondents were mothers (77.7%), aged 25 to 44 years (88.4%) and ethnic Chinese (95.6%) (Table 1). Over 95% (97.0%) of the respondents attained secondary education or above. About half (51.3%) and one tenth (9.6%) were working full-time and part-time respectively. About half (50.2%) of the respondents' monthly household income was less than $30 000, comparable to the general population.

Less than 3% of the respondents reported that they had delayed (51 respondents; 2.0%) or refused (17 respondents; 0.7%) to arrange their children to receive vaccines under HKCIP for reasons other than illness or allergy. For the channels for acquiring vaccination information, "internet/ search engines" (23.4%) and "TV/radio" (16.8%) were the most common channels, followed by "social media" (16.1%) and "health promotion activities and materials" (15.7%) (Table 2). The most common sources of vaccination information were healthcare professionals (34.6%) and family/ friends/ social networks (33.6%), followed by non-healthcare professionals (16.6%) and vaccine manufacturers (11.5%) (Table 2).

For the scores of the 15 PACV questions, 88% respondents had an average PACV score <3 (i.e. positive attitudes towards vaccination). The mean score for all the respondents was 2.5. The mean scores for individual PACV question were summarised in Figure 1. Among the 15 questions raised in the 2021 survey, only one question *"concern about serious side effects from vaccination"* had a mean PACV score of 4.0 (i.e. hesitant to vaccines/vaccination) while the other questions had mean PACV scores below 4.0. Notably, the mean PACV score was above 3 but below 4 (leaning towards hesitant side) for four questions: *"too many vaccines may not incur extra benefits"* (mean score: 3.4), *"it is better to have fewer vaccines at the same time"* (mean score: 3.3), and *"concern that some HKCIP vaccines are not safe"* (mean score: 3.2), and *"concern that vaccines are not able to prevent diseases"* (mean score: 3.1)

Compared to the previous survey in 2018, the mean score for respondents in both surveys were similar at around 2.4 (in 2018) and 2.5 (in 2021), which indicated the parental attitudes to childhood vaccines/vaccination were positive as a whole. As regard to individual question, the findings on mean PACV score were also similar for all except for two questions (Figure 1). *"Concern about serious side effects from vaccination"* had higher mean PACV score in the current survey (4.0 in 2021 vs 3.7 in 2018) while the reverse was noted for the item *"Better to develop immunity after getting sick than getting vaccination"* (3.0 in 2021 vs 3.1 in 2018).

Similar to the previous round, the same set of limitations applied in this study. First, the respondents might not be the major decision-maker in the family for their children's vaccination. Second, respondents of the sampled group might not be representative of preschool parents in general. Third, some PACV questions in the survey might indicate commonplace

Table 1 – Demographics of children and parents/guardian (the respondents) (n = 2 565)

Characteristics of Children		%
Birth year	2015	31.2
	2016	36.9
	2017	32.0
Sex (female)		46.6
Local status*	Local	89.6
	Non-local	10.4
No. of siblings	0	31.1
	1	54.2
	2	11.0
	3	1.4
	≥4	0.7
	Unknown	1.6
Characteristics of Parents/Guardian (the respondents)		**%**
Relationship with child	Father	20.3
	Mother	77.7
	Grandparent	0.7
	Guardian	1.3
Age group	Under 25	0.6
	25-44	88.4
	45-64	8.9
	65 or above	0.4
	Unknown	1.6
Ethnicity	Chinese	95.6
	Filipino	0.9
	Indian	0.8
	Pakistani	0.6
	Nepalese	0.3
	White	0.2
	Other	0.4
	Unknown	1.1
Education level	Pre-primary/ Primary	1.6
	Secondary	53.5
	Post-secondary	43.5
	Unknown	1.4
Employment status	Full-time	51.3
	Part-time	9.6
	Unemployed	37.2
	Unknown	1.9
Average monthly household income	<$10000	6.4
	$10000-$19999	21.5
	$20000-$29999	22.3
	$30000-$39999	14.3
	>=$40000	31.2
	Unknown	4.2

*Local children were defined as those who were born in Hong Kong, resided in Hong Kong before two years of age and lived in Hong Kong at the time of the survey. Children who did not fulfil all the above three criteria were defined as non-local children.
Note: percentage may not add up to 100% due to round off to 1 decimal place.

parental concerns rather than real concern for being hesitant to vaccines/vaccination, such as serious side effects of vaccines and administration of multiple vaccines in the same visit.

Conclusion

In summary, the 2021 immunisation survey on preschool children supported a continual positive attitude towards vaccine/vaccination among local parents/guardians, similar to the findings of 2018. This was echoed by the high uptake of HKCIP vaccines shown by this survey. However, vaccine safety, vaccine effectiveness and too many vaccines given to young children remain as the major concerns for some parents. Healthcare professionals may consider to take every chance to explain the importance and safety to parents/guardians by highlighting the items with mean PACV score above 3.0 to ensure their children could undergo up-to-date vaccination in a timely manner.

Table 2 – Channels and Sources of receiving vaccine information of the respondents (n=2 565)

Channel	Percent (%)
Internet / search engines	23.4
TV/Radio	16.8
Social media (e.g. Facebook, online forum, Youtube, Instagram, Twitter, Weibo, etc.)	16.1
Health promotion activities and materials (e.g. forum, pamphlet, poster, etc.)	15.7
Personal communication software/app(e.g. WhatsApp, LINE, Facebook messenger, Skype, Telegram, WeChat, etc.)	10.8
Face to face	8.5
Print media (e.g. newspapers, magazines, books, etc.)	5.1
Others	3.7
Source	**Percent (%)**
Healthcare professionals	34.6
Family / friends /social network	33.6
Non-healthcare professionals (celebrities/ bloggers/ writers/ columnists)	16.6
Vaccine manufacturers	11.5
School	1.0
Others	2.7

Remarks: Parents were asked to list the top three channels they acquired vaccination information from. The percentage shown in the above table was the percentage of parents who picked that item as one of their top 3 channels.

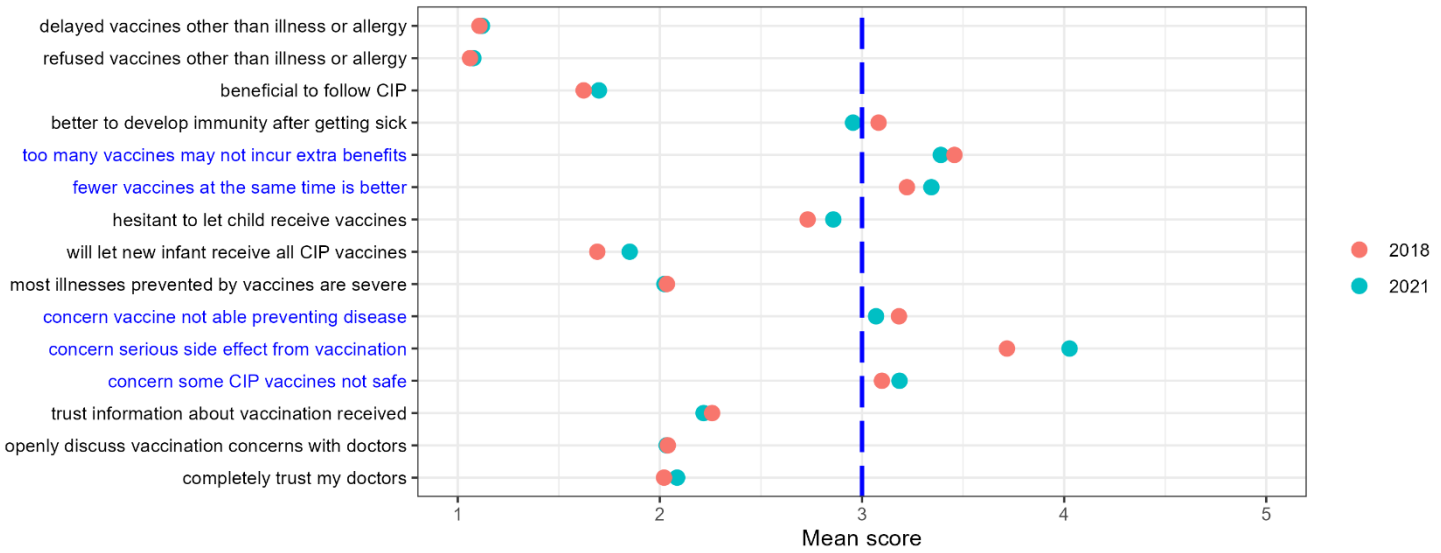

Figure 1 – Mean score of each PACV question in 2018 and 2021 questionnaire survey

Remarks:
Responses of 15 PACV questions were scored from 1 to 5, with 1 being least hesitant (most confident) and 5 being most hesitant (least confident) to vaccines/ vaccination

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Updated situation of invasive pneumococcal disease in Hong Kong and Recommendations on the use of pneumococcal conjugate vaccines

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Background

Pneumococcal infections is caused by the bacteria *Streptococcus pneumoniae* (pneumococcus), which may be manifested as a range of non-invasive and invasive diseases. Non-invasive diseases are more common, examples include acute otitis media, sinusitis and pneumonia while invasive pneumococcal diseases (IPD) include meningitis, pneumonia with bacteraemia, empyema, septic arthritis, osteomyelitis, endocarditis and sepsis. The disease is transmitted by direct contact with respiratory droplets. Nasopharyngeal carriage of *Streptococcus pneumoniae*, especially in young children, is related to its spread. Children younger than 5 years old and adults 65 years or older are at increased risk of suffering from IPD. Other risk factors of IPD include previous history of IPD, having cochlear implant, suffering from cerebrospinal fluid leakage, weakened immunity due to asplenia, malignancy, human immunodeficiency virus infection, immunosuppressant, chronic illnesses such as diabetes mellitus, chronic lung disease and chronic kidney disease, etc.

Streptococcus pneumoniae bacteria has more than a hundred serotypes. The serotypes are determined by the capsular polysaccharides expressed by the bacteria, which is recognised as its major virulence factor and targets for vaccine development.

As at October 15, 2023, four different pneumococcal vaccines are registered in Hong Kong. Besides 13-valent pneumococcal conjugate vaccine (PCV13) and 23-valent pneumococcal polysaccharide vaccine (23vPPV) that have been used in Hong Kong for a few years, two newer vaccines, 15-valent pneumococcal conjugate vaccine (PCV15) and 20-valent pneumococcal conjugate vaccine (PCV20) are registered for use in individuals 6 weeks or above, and in adults aged 18 years or above respectively.

In order to evaluate the impact of IPD and pneumococcal vaccination programme, ongoing surveillance of IPD has been implemented since 2007 and the disease has become a notifiable infectious disease in 2015.

The use of pneumococcal vaccines in Hong Kong under government programme

Pneumococcal vaccine was incorporated into the Hong Kong Childhood Immunisation Programme (HKCIP) in September 2009 and PCV13 has been the recommended vaccine in HKCIP since 2011. The schedule of PCV13 under HKCIP was updated in 2019 to two doses of PCV13 as primary series given at 2 and 4 months, followed by a booster dose of PCV13 at 12 months.

23vPPV was first introduced to high risk individuals 2 years of age and older and elders 65 years of age and older in Hong Kong in 2007[1]. In adults aged 65 years or above, a single dose of either PCV13 or 23vPPV was recommended in 2014[2]. Besides, high-risk individuals aged 2 years or above have been recommended to receive a single dose of PCV13, followed by a single dose of 23vPPV 12 months later since 2016[3].

Local epidemiology of invasive pneumococcal disease

In Hong Kong, the number of IPD cases was relatively stable during pre-COVID period, but dropped significantly during COVID-19 pandemic, and then increased in 2023 to a level lower than pre-COVID era. During 2007 to 2019, 117 to 205 IPD cases per year were recorded (annual incidence from 1.67 to 2.84 per 100,000 population). Due to implementation of COVID-19 containment measures from 2020 to 2022, the number of IPD cases dropped drastically, with a total of 47, 25 and 28 cases in 2020, 2021 and 2022 respectively (annual incidence from 0.34 to 0.63 per 100,000 population). As pandemic control measures were gradually lifted in 2023, the number of IPD cases has been rising but to a level lower than pre-pandemic era. As of end of September 2023, 67 IPD cases (including 15 paediatric cases) were recorded, an

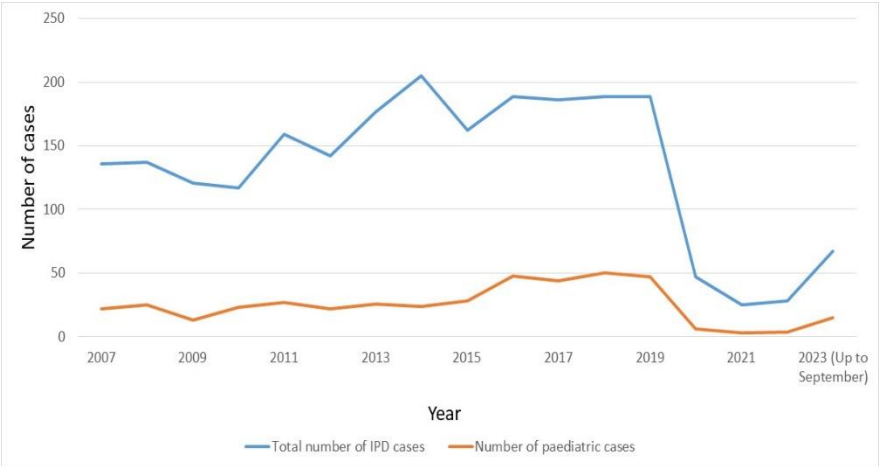

Figure 1 – Number of IPD cases by year

annualised incidence rate of 1.19 per 100,000 population (Figure 1).

Consistent with other places, IPD was more prevalent in children under five years and elderly aged 65 years or above in Hong Kong. The incidence among young children aged under two years decreased gradually from about 10 per 100,000 population in 2007 and 2008 to less than 3 per 100,000 population in 2015 to 2017, likely due to the inclusion of PCV into the HKCIP in 2009. The incidence among these young children remained low (about 4 per 100 000 population) in 2018 to 2019 (Figure 2). On the other hand, the incidence of IPD among children aged two to four years apparently increased since 2015, which may be partly due to an increase in the number of cases detected by PCR since 2015[4]. The incidence among children aged 2 to 4 years remained the highest (9.73-15.93 per 100 000 population) from 2015 to 2019. The incidence among elders aged 65 years or above fluctuated during 2007 to 2014 (at around 5 to 10 per 100 000 population)[4] and slightly decreased from 6.73 per 100 000 population in 2015 to 5.57 per 100 000 population in 2019 (Figure 2).

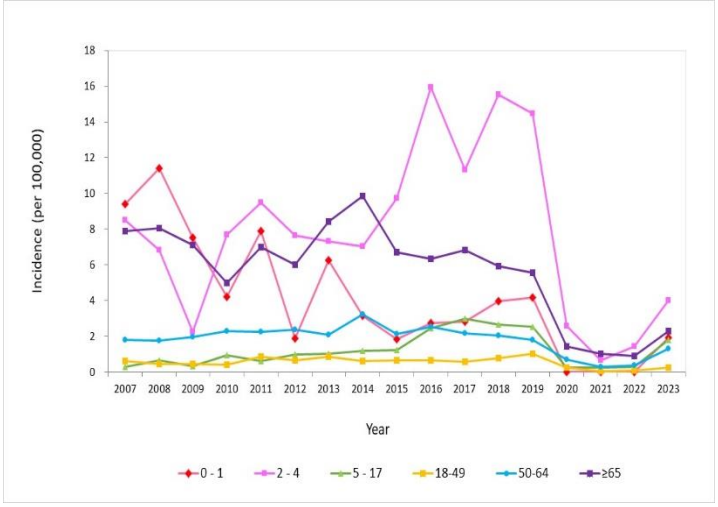

Figure 2 – Age-specific incidence of IPD in Hong Kong, 2007 to September 2023

In terms of mortality, there were a total of nine paediatric death cases reported from 2015 to 2022, with case fatality rate of IPD ranged from 0% to 6.8%. The mean age of paediatric death cases was 3, ranging from 2 to 5. Seven of them received four doses of PCVs, one received 3 doses of PCVs and one with unknown vaccination history. On the other hand, 124 death cases were reported in adults aged 65 years or above from 2015 to 2022, with case fatality rate of IPD ranged from 21.4% to 40.0%. Regarding pneumococcal vaccination among these elderly fatal cases, 34.7% received at least 1 dose of 23vPPV, while 1.6% received at least 1 dose of PCV13.

Serotypes covered by PCV13 accounted for 48% to 75% of IPD cases each year during 2015 to September 2023 (Figure 3). Overall, 69.9% of all reported IPD cases and 79.6% of all paediatric IPD cases turned out to have serotypes covered by PCV13 respectively (Figure 3). Notably, during the COVID-19 pandemic, especially in 2021, the serotype distribution of IPD differed from other years, mainly due to smaller number of cases at that time. Despite being covered in PCV13, serotype 3 remains the most common serotype, accounting for 46.2% of all IPD cases and 64.5% of all paediatric IPD cases recorded from 2015 to end of September in 2023. The second most common serotype reported was 19A (6.8%) of all IPD cases, followed by serotype 14 (5.7%). Both serotypes 19A and 14 are also covered by PCV13.

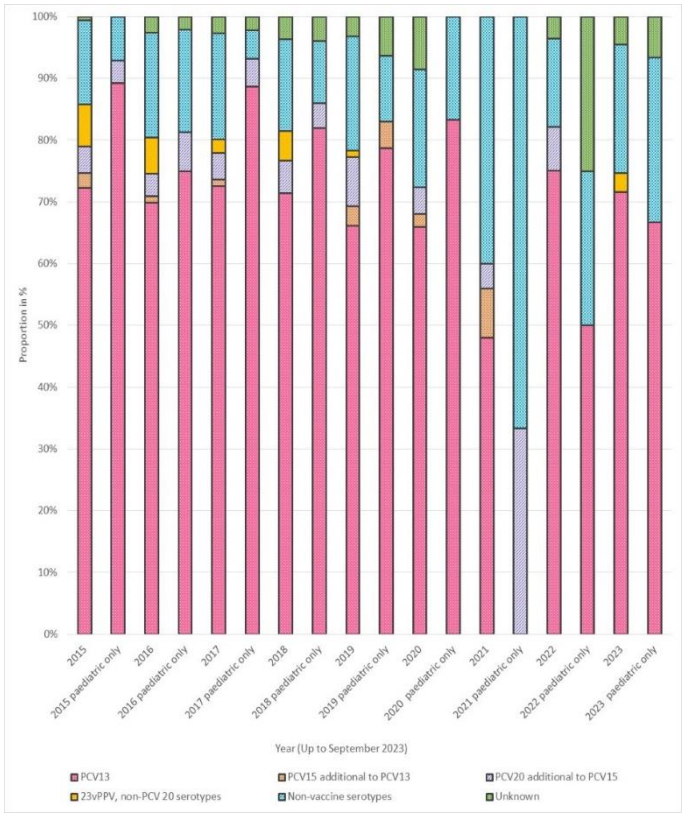

Figure 3 – Proportion of IPD cases by serotypes

Serotypes 22F and 33F are the unique PCV15 serotypes in addition to PCV13. From 2015 to September 2023, 17 (1.6%) IPD cases, including 2 paediatric cases, were attributable to serotype 22F. No IPD case caused by serotype 33F was notified during the reporting period.

Seven serotypes (8, 10A, 11A, 12F, 15B, 22F and 33F) are unique to PCV20 in addition to those in common with PCV13, which attributed to 6.4% IPD cases recorded from 2015 to September 2023 and 4.5% of all paediatric IPD cases.

On the other hand, non-vaccine serotypes accounted for 17.2% of all IPD cases and 12.2% of paediatric IPD cases recorded until September 2023. Among the non-vaccine serotypes, the most prevalent serotype was 23A (25.3%), followed by 15A (22.6%) and 6C (10.8%).

Recommendations on the use of pneumococcal conjugate vaccines

According to the available scientific data, the safety profiles of the three PCVs (PCV13, PCV15 and PCV20) are comparable, and both PCV15 and PCV20 should confer an overall non-inferior protection against IPD serotypes covered by PCV13. Compared to PCV13/PCV20, PCV15 induced higher immunogenicity against serotype 3 which may potentially be more effective in preventing IPD caused by serotype 3, although further evidence on clinical effectiveness and impact is still pending. In view of the persistent disease burden of serotype 3 IPD locally, scientific evidence and international recommendations, in September 2023, the Scientific Committee on Vaccine Preventable Diseases under the Centre for Health Protection of the Department of Health recommended to replace PCV13 with PCV15 under both the HKCIP and the Government Pneumococcal Vaccination Programme[5]. Pneumococcal vaccination schedules in children and high risk groups remain unchanged. PCV13 and PCV15 can be administered interchangeably at any point during the course of immunisation. Individuals may discuss with their own healthcare provider if they wish to receive PCV20 to protect themselves against IPD.

As there are more than 100 serotypes of pneumococci, vaccination may not offer absolute protection against IPD. Members of the public are strongly advised to keep personal and environmental hygiene for prevention of IPD. Regardless of vaccination history, everyone especially those who are immunocompromised are advised to wear masks when there are symptoms of respiratory tract infection and seek medical attention promptly, in addition to maintaining good indoor ventilation.

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NEWS IN BRIEF

Four sporadic cases of necrotising fasciitis caused by *Vibrio vulnificus* infection

The Centre for Health Protection (CHP) has recorded four sporadic cases of necrotising fasciitis caused by *Vibrio vulnificus* infection on September 24, September 27, October 6 and October 19, 2023 respectively.

The first case affected a 71-year-old female. She had a history of hypertension. She presented with left leg painful swelling and fever on September 21. She was sent to a public hospital on September 22 for decreased general condition and was admitted. The clinical diagnosis was severe septic shock and necrotising fasciitis of left leg. Surgery was performed and her left thigh tissue biopsy showed heavy growth of *Vibrio vulnificus*. According to her family, the patient was suspected to sustain left leg injury during her visit to a market in Mong Kok on September 21. She did not handle or consume any uncooked seafood otherwise.

The second case affected a 76-year-old man with underlying illness. He presented with left lower limb pain and swelling to a public hospital on September 22 and was admitted on the same day. The clinical diagnosis was necrotising fasciitis and surgery was performed soon after hospitalisation. Blood culture and left leg tissue grew *Vibrio vulnificus*. He subsequently passed away on September 24. According to his family, his left shin was punctured by a shrimp on the way home from local wet market in Sham Shui Po district on September 20. There was no report of consumption of uncooked seafood.

The third case affected a 79-year-old-man with underlying illness. He presented with fever and right lower limb cellulitis with bullae to a public hospital on October 1 and was admitted on the same day. The clinical diagnosis was necrotising fasciitis of right lower limb. Surgery was performe and the pus swab grew *Vibrio vulnificus*. His family member recalled that he purchased shrimps at a wet market in Tsuen Wan two days before symptom onset but there was no known history of injury or wounds.

The fourth case involved a 54-year-old female restaurant owner with undiagnosed diabetes mellitus. She presented with chills, rigor and myalgia on October 13 and was admitted to a public hospital on October 17. She was noted to have a cellulitic area with blisteration and crepitus over the abdomen. The clinical diagnosis was necrotising fasciitis of left abdominal wall. Excisional debridement was performed and the wound tissue grew *Vibrio vulnificus*. Her condition improved after treatment and she is now in stable condition. Before symptom onset, she swam alone in seawater at Po Toi O Pier every day while having a pre-existing wound at the same abdominal region since October 9. She did not handle or consume any uncooked seafood. Her family members and co-workers were asymptomatic. There was no history of recent travel.

Two sporadic cases of *Streptococcus suis* infection

On October 6, 2023, CHP recorded two sporadic cases of *Streptococcus suis* infection.

The first case involved an 88-year-old retired man with multiple comorbidities. He presented with fever and chest pain on October 4 and was admitted to a public hospital. His chest x-ray showed right lower zone haziness. His blood culture grew *Streptococcus suis*. His condition was stable. During incubation period, he visited nearby wet market in Sham Shui Po district for grocery shopping. He did not handle any raw pork or related products. He reported a chronic wound at his right knee. There was no recent travel history. He lives with his wife who remained asymptomatic.

The second case was a 74-year-old housewife with hypertension. She presented with fever, chills and rigor on September 30. She attended a public hospital on October 3 and was admitted for constipation and loin pain. Her blood culture grew *Streptococcus suis*. She was put on antibiotics and her condition remained stable. She was discharged on October 5. During incubation period, she has no travel history. She purchased raw pork from local market in Sham Shui Po district and handled the pork at home without gloves. She lives with her husband who was asymptomatic.

A local case of psittacosis

On October 17, 2023, CHP recorded a case of psittacosis affecting a 37-year-old housewife with good past health residing with her family in Sha Tin. She presented with fever, headache and myalgia on September 27 and was admitted to a public hospital on October 4 and her chest X-ray showed pneumonia. Her sputum was tested positive for *Chlamydia psittaci* DNA by polymerase chain reaction. Her condition gradually improved after antibiotic treatment and she was discharged on October 10. She had no travel history during the incubation period. She did not keep any pets at home. She denied any contact with birds, their droppings or carcasses. Her household contacts were asymptomatic.