

# Communicable Diseases

## WATCH



**EDITORIAL BOARD** **Editor-in-Chief** Dr SK Chuang **Members** Dr Yonnie Lam / Dr Albert Au / Dr TY Wong / Dr Gladys Yeung / Dr Benjamin FUNG / KK So / Sheree Chong / Doris Choi / Chloe Poon **Production Assistant** Yoyo Chu. This biweekly publication is produced by the Centre for Health Protection (CHP) of the Department of Health, 147C, Argyle Street, Kowloon, Hong Kong **ISSN** 1818-4111 **All rights reserved** Please send enquiries to [cdsinfo@dh.gov.hk](mailto:cdsinfo@dh.gov.hk).

### FEATURE IN FOCUS

## Review of cryptosporidiosis in Hong Kong

Reported by Miss Doris Choi, Scientific Officer, Enteric and Vector-borne Disease Office and Dr YH LEUNG, Senior Medical and Health Officer, Communicable Disease Division, Surveillance and Epidemiology Branch, CHP.

Cryptosporidiosis is a diarrhoeal disease caused by the parasite *Cryptosporidium*. Among the *Cryptosporidium* species, *C. hominis* and *C. parvum* cause the majority of human infections. Other species, such as *C. canis*, *C. felis*, *C. meleagridis* and *C. muris*, have also been reported to cause human infections<sup>1</sup>.

Cryptosporidiosis is transmitted through ingestion of faecal contaminated food or water, including pool water swallowed while swimming, or from person to person via the faecal-oral route. People infected with *Cryptosporidium* can be asymptomatic. For those who develop symptoms, the symptoms generally begin two to ten days after infection and include watery diarrhoea, abdominal pain, dehydration, nausea, vomiting, fever and weight loss. In immunocompetent people, the symptoms are usually self-limiting and last about one to two weeks. However, symptoms may be more severe and prolonged and can lead to serious or life-threatening illnesses in immunocompromised people such as patients with acquired immunodeficiency syndrome (AIDS) or inherited diseases that affect the immune system, cancer patients and transplant recipients who are taking immunosuppressive drugs<sup>2</sup>.

Cryptosporidiosis can be diagnosed by microscopic examination of stool samples using different techniques. Molecular methods can be used to identify *Cryptosporidium* at the species level<sup>3</sup>. The mainstay of management of cryptosporidiosis is to prevent dehydration by drinking adequate amounts of fluid while anti-diarrhoeal medicine may control diarrhoea. Most immunocompetent patients will recover without treatment<sup>4</sup>.

Due to its low infectious dose, prolonged survival in moist environments and high tolerance to chlorine, *Cryptosporidium* is highly transmissible through drinking or recreational water such as swimming pools<sup>5</sup>. Outbreaks of cryptosporidiosis linked to drinking municipal water or recreational water contaminated with *Cryptosporidium* have been reported in overseas countries.

### Global situation

The first human case of cryptosporidiosis was reported in 1976 in an immunocompetent child. In the 1980s, cryptosporidiosis emerged as an opportunistic infection that complicated AIDS and became widely recognised as a human pathogen causing acute enteric disease<sup>6,7</sup>. In the past two decades, cryptosporidiosis has become one of the most common causes of waterborne diseases and is now endemic worldwide, with the highest incidences in developing countries<sup>5</sup>.

The largest documented outbreak of cryptosporidiosis occurred in Milwaukee, Wisconsin of the United States in 1993. It affected more than 400 000 people and resulted in 54 confirmed deaths associated with cryptosporidiosis, of which, 85% had AIDS listed as the underlying cause of death<sup>8,9</sup>. The outbreak was due to contamination by *Cryptosporidium* of Lake Michigan water which was used as drinking water after treatment. The *Cryptosporidium* oocysts could not be adequately filtered at one of the water treatment plants, allowing the parasites to enter the drinking water supply, hence resulting in the outbreak<sup>8</sup>.

### Local situation

In Hong Kong, medical practitioners are encouraged to report cryptosporidiosis cases to the Centre for Health Protection (CHP) of the Department of Health for epidemiological investigations and implementation of control measures. In the past decade (2009-2018\*), CHP recorded a total of 35 confirmed cryptosporidiosis cases, with the annual number ranged from zero to 15 (median: one case) (Figure 1). The 35 cases involved 21 males and 14 females, with ages ranging from nine to 56 years (median: 32 years). The majority of the patients were Chinese (30, 85.7%), followed by African (1, 2.9%), Belgian (1, 2.9%), British (1, 2.9%), French (1, 2.9%) and one was unknown due to loss of contact. All patients presented with diarrhoea (35, 100%). Other presenting symptoms included abdominal pain (29, 82.9%), fever (14, 40.0%) and nausea (13, 37.1%). Thirty-one patients (88.6%) required hospitalisation while 30 of them had been discharged with a median length of stay of three days (range: less than one day to 24 days). No fatal case due to cryptosporidiosis was recorded.

Most cases (23, 65.7%) were locally acquired infections, while four (11.4%) were imported cases who acquired the infection from Kenya (1), Malaysia (1) and multiple countries (2) respectively. The place of infection could not be determined for six cases (17.1%) as the patients had stayed both in and outside Hong Kong during the incubation period. The importation status of the remaining two cases (5.7%) was unknown. No epidemiological linkage was identified among the cases.

About 46% (16) of the patients enjoyed good past health, while 12 (34.3%) were infected with human immunodeficiency virus, one (2.9%) was a renal transplant recipient, one had acute leukaemia (2.9%) while four (11.4%) had other underlying medical illnesses and the past health of one patient (2.9%) was unknown. Regarding the risk factors, two patients reported swimming and drinking unboiled water outside Hong Kong, respectively. Three and one patients had consumed raw vegetables and raw oyster, respectively.

Notably, CHP has observed an upsurge of *C. hominis* infection since October 2018. From October 23 to December 20, CHP investigated a total of eight cases of *C. hominis* infection. The cases involved three males and five females with ages ranging from 15 to 51 years (median: 35 years). The patients were all immunocompetent with symptoms onset from October 6 to December 9 (Figure 2). The presenting symptoms were diarrhoea (8), abdominal pain (6) and fever (5). All patients had been hospitalised and seven out of eight were hospitalised at different wards of the same private hospital while the remaining one was hospitalised at another private hospital. All patients had stable condition and were discharged. Their stool specimens were tested positive for *Cryptosporidium* nucleic acid by the private hospital concerned and subsequently confirmed to be positive for *C. hominis* by the Public Health Laboratory Services Branch of CHP.

CHP conducted extensive investigations attempting to identify the reason accounting for the upsurge. All cases had no known exposure history to recreational water or unboiled water. So far, no epidemiological linkage and common exposure among the cases could be identified. Review of patients' practice of stool specimen collection and the procedures of laboratory diagnosis by the private hospital where seven of the patients had stayed were unremarkable. CHP is closely monitoring the situation.

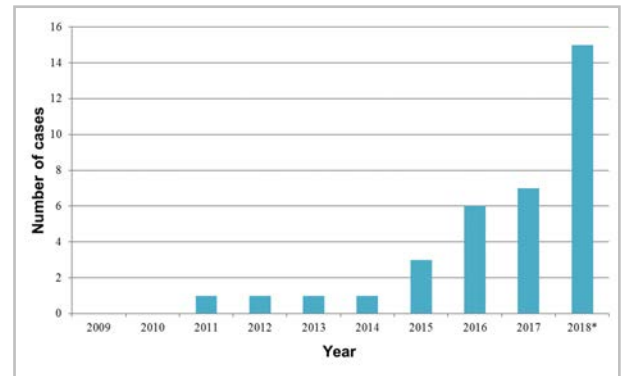


Figure 1 - Annual number of confirmed cryptosporidiosis cases recorded by CHP from 2009 to 2018 (\*Preliminary as of December 31, 2018).

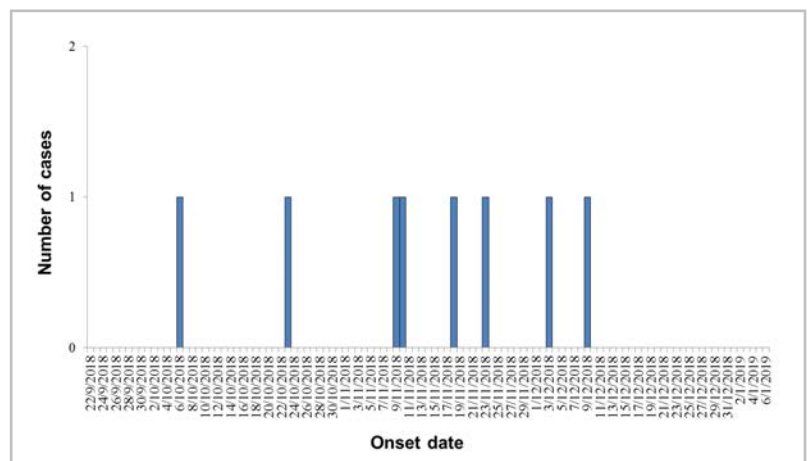


Figure 2 - Epidemic curve of the eight cases of *C. hominis* infection (preliminary as of December 31, 2018).

### Prevention of cryptosporidiosis

There is no vaccine for cryptosporidiosis. To avoid contracting the disease, members of the public should maintain good personal, food and environmental hygiene, including the following:

- ◆ Adopt the Five Keys to Food Safety in handling food, i.e. Choose (Choose safe raw materials); Clean (Keep hands and utensils clean); Separate (Separate raw and cooked food); Cook (Cook thoroughly); and Safe Temperature (Keep food at safe temperature) to prevent foodborne diseases;
- ◆ Wash hands thoroughly with liquid soap and water before handling food or eating, and after using toilet or handling faecal matter;
- ◆ Drink only boiled water from the mains or bottled drinks from reliable sources;
- ◆ Avoid drinks with ice of unknown origin;
- ◆ Purchase fresh food from hygienic and reliable sources. Do not patronise illegal hawkers;
- ◆ Eat only thoroughly cooked food;
- ◆ Wash and peel fruit by yourself and avoid eating raw vegetables;
- ◆ Exclude infected persons and asymptomatic carriers from handling food and from providing care to children, elderly and immunocompromised people; and
- ◆ Refrain from work or school, and seek medical advice if suffering from gastrointestinal symptoms such as diarrhoea.

Further information on food safety can be found from the website of the Centre for Food Safety of the Food and Environmental Hygiene Department.

## References

- Centers for Disease Control and Prevention. Cryptosporidium: Pathogen & Environment. Available at: <https://www.cdc.gov/parasites/crypto/pathogen.html>, accessed on December 23, 2018.
- Centers for Disease Control and Prevention. Cryptosporidiosis: Illness & Symptoms. Available at: <https://www.cdc.gov/parasites/crypto/illness.html>, accessed on December 23, 2018.
- Centers for Disease Control and Prevention. Cryptosporidiosis: Diagnosis & Detection. Available at: <https://www.cdc.gov/parasites/crypto/diagnosis.html>, accessed on December 23, 2018.
- Centers for Disease Control and Prevention. Cryptosporidiosis: Treatment. Available at: <https://www.cdc.gov/parasites/crypto/treatment.html>, accessed on December 23, 2018.
- Centers for Disease Control and Prevention. Infectious Diseases Related to Travel. Available at: <https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/cryptosporidiosis>, accessed on December 23, 2018.
- Centers for Disease Control and Prevention. Epidemiologic Notes and Reports Cryptosporidiosis: Assessment of Chemotherapy of Males with Acquired Immune Deficiency Syndrome (AIDS). Morbidity and Mortality Weekly Report (MMWR) [Internet]. 1982; 31(44): 589-92.
- O'Connor R M, Shaffie R, Kang G, Ward HD. Cryptosporidiosis in patients with HIV/AIDS. AIDS. 2011;25(5):549-60.
- Hoxie NJ, Davis JP, Vergeront JM, Nashold RD, Blair KA. Cryptosporidiosis-associated mortality following a massive waterborne outbreak in Milwaukee, Wisconsin. Am J Public Health. 1997;87(12):2032-5.
- Mac Kenzie WR, Hoxie NJ, Proctor ME, Gradus MS, Blair KA, Peterson DE, et al. A massive outbreak in Milwaukee of cryptosporidium infection transmitted through the public water supply. N Engl J Med. 1994;331(3):161-7.

## Update on the situation of listeriosis in Hong Kong

Reported by Dr Hyeon LEUNG, Medical and Health Officer, Enteric and Vector-borne Disease Office, Surveillance and Epidemiology Branch, CHP.

### Facts on listeriosis

Listeriosis is a primarily foodborne infection caused by the bacterium *Listeria monocytogenes*. *L. monocytogenes* is ubiquitous in nature and can be found in soil, water, sewage and vegetation<sup>1</sup>. It can contaminate a variety of foods and is able to tolerate adverse environmental conditions with low temperatures, high acidity and high salt concentrations<sup>2</sup>. As such, ready-to-eat products that have a long refrigerated shelf-life and are consumed without further listericidal treatment, such as cheese, unpasteurised milk, processed meat, smoked seafood, raw vegetables and salad, are considered high-risk<sup>1,3</sup>.

While the principal mode of transmission is through consumption of contaminated food, listeriosis may also be transmitted from pregnant women to their foetuses<sup>1</sup>. In otherwise healthy people, listeriosis usually manifests as febrile listerial gastroenteritis with self-limiting symptoms including diarrhoea, fever and headache. In the elderly and immunocompromised people, listeriosis may manifest as invasive listeriosis with fever, myalgia, sepsis and meningitis. In invasive listeriosis, symptoms are severe and the mortality rate is as high as 20 to 30%<sup>1</sup>. Pregnant women, the elderly and immunocompromised people are particularly at risk of contracting listeriosis<sup>4</sup>. Listeriosis in pregnant women can result in miscarriage, stillbirth, premature delivery and life-threatening infection of the newborn<sup>4</sup>. Severe cases such as meningitis should be treated with antibiotics<sup>1</sup>.

In Hong Kong, listeriosis is a notifiable disease under the Prevention and Control of Disease Ordinance (Cap 599). From 2009 to 2018, the Centre for Health Protection (CHP) of the Department of Health (DH) recorded a total of 179 cases of listeriosis. From 2009 to 2018, the annual number of cases ranged from six to 26 and the annual incidence ranged from 0.09 to 0.36 cases per 100 000 population (Figure 1). Cases were recorded all year round and there was no seasonal trend observed.

Among the 179 cases, 62 (34.6%) were male and 117 (65.4%) were female. Their ages ranged from less than one day to 95 years (median: 60 years). The incidences in infants and adults aged 65 years or above were higher than that of other age groups (Figure 2).

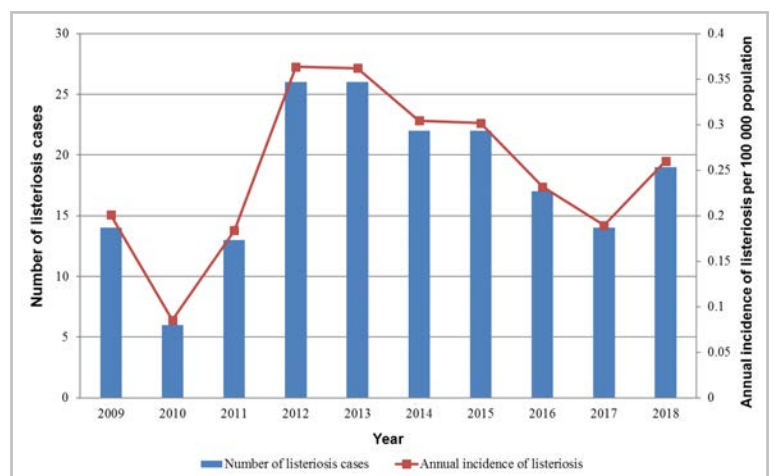


Figure 1 - Annual number of cases and incidence of listeriosis in Hong Kong, 2009-2018.

The commonest presenting symptom was fever (156, 87.2%), followed by abdominal pain (30, 16.8%), chills/rigors (30, 16.8%), diarrhoea (30, 16.8%) and headache (28, 15.6%). Almost all patients (178, 99.4%) required hospitalisation. Seventeen patients died due to listeriosis, giving a case fatality rate of 9.5%. Among the 179 cases, 38 (21.2%) were pregnancy-related (i.e. affecting pregnant women or neonates) while the remaining 141 cases (78.8%) were non-pregnancy-related (Figure 3).

Among the 141 non-pregnancy-related cases, the majority (131, 92.9%) had at least one chronic medical condition. The commonest medical condition was malignancies (64, 45.4%). Other immunocompromising conditions such as autoimmune diseases (27, 19.1%), renal diseases (27, 19.1%) and diabetes mellitus (25, 17.7%) were also documented. Seventy-nine patients (56.0%) in this group were aged 65 or above. There were 14 deaths due to listeriosis in this group, giving a case fatality rate of 9.9%.

Among the 38 pregnancy-related cases, 30 (78.9%) were pregnant women and eight (21.1%) were neonates. Among the 30 pregnant patients, six (20%) had foetal loss. Among the remaining 24 pregnant patients, five (20.8%) delivered live births with documented neonatal listeriosis, of which four were born preterm and three of these preterm neonates died due to listeriosis. Another two pregnant patients underwent preterm labour with their neonates born prematurely whom did not have neonatal infection. No fatal case was recorded among the pregnant patients. Among the eight cases of neonatal infection, five (62.5%) were born to mothers with listeriosis and the remaining three (37.5%) were born to mothers not diagnosed with listeriosis. As mentioned above, three of the infected neonates died due to listeriosis, giving a case fatality rate of 37.5%.

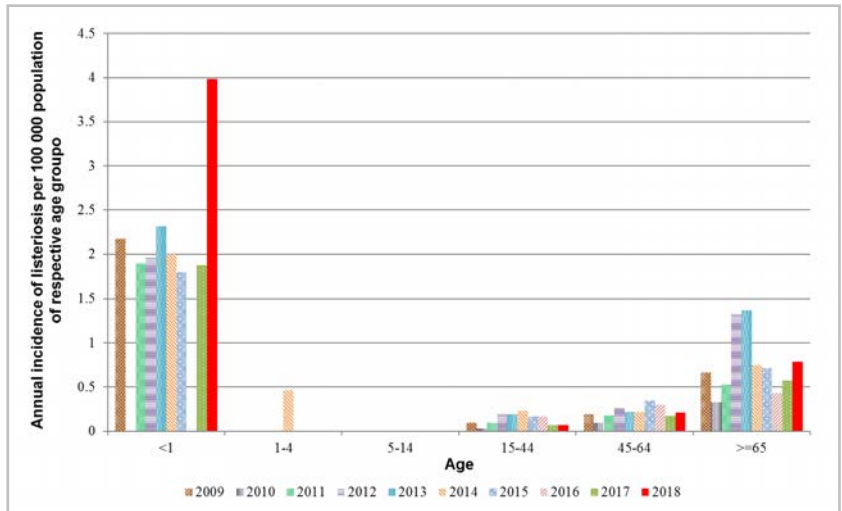


Figure 2 - Age-specific annual incidence of listeriosis in Hong Kong, 2009-2018.

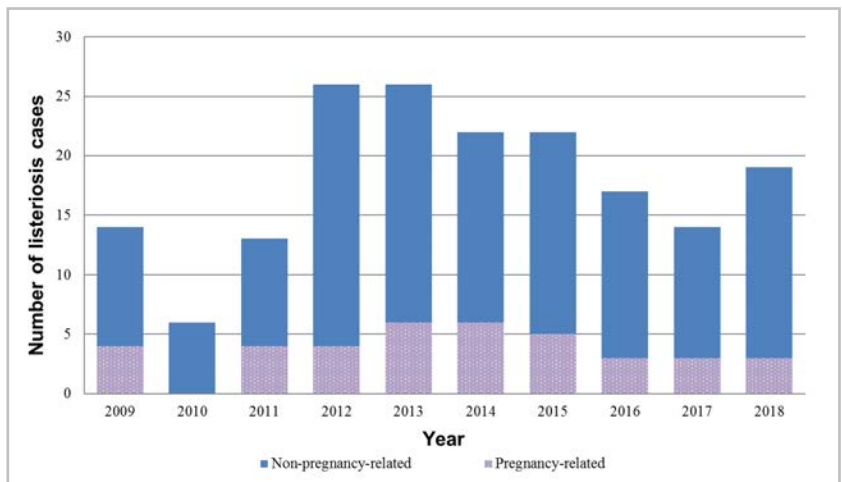


Figure 3 - Annual number of pregnancy-related and non-pregnancy-related listeriosis cases, 2009-2018.

The high-risk food items most commonly consumed by the patients during the incubation period<sup>#</sup> were dairy products (106, 59.2%), followed by salad or sandwiches (39, 21.8%), cheese (29, 16.2%) and raw or smoked seafood (19, 10.6%). Among those who consumed dairy products, 70 (66.0%) had consumed milk, milk powder or soymilk and 26 (24.5%) had consumed ice-cream. One patient consumed cheese made with unpasteurised milk.

To prevent listeriosis, members of the public should maintain good personal, food and environmental hygiene. The risk of contracting listeriosis can be reduced by adopting the Five Keys to Food Safety in handling food, i.e. Choose (Choose safe raw materials); Clean (Keep hands and utensils clean); Separate (Separate raw and cooked food); Cook (Cook thoroughly); and Safe Temperature (Keep food at safe temperature). Individuals at risk, such as pregnant women, women preparing for pregnancy, infants, the elderly and immunocompromised people, should avoid consumption of high-risk foods. For more information on listeriosis, please visit the CHP website at: <https://www.chp.gov.hk/en/healthtopics/content/24/14450.html>. For healthy eating advice for pregnant women and women preparing for pregnancy, please visit the website of the Family Health Service of DH at: [https://www.fhs.gov.hk/english/health\\_info/woman/20036.html](https://www.fhs.gov.hk/english/health_info/woman/20036.html).

<sup>#</sup>More than one item were consumed in some cases.

## References

- World Health Organization. Listeriosis. [Fact sheet]. 2018. Available at: <http://www.who.int/mediacentre/factsheets/fs104/en/>, accessed on November 13, 2018.
- Codex. Guidelines on the Application of General Principles of Food Hygiene on the Control of *Listeria monocytogenes* in Foods CAC/GL 61. Geneva, Switzerland: Codex Alimentarius Commission; 2007.
- U.S. Food and Drug Administration. Quantitative Assessment of Relative Risk to Public Health from Foodborne *Listeria monocytogenes* Among Selected Categories of Ready-to-Eat Foods. 2003.
- Centers for Disease Control and Prevention. Listeria (Listeriosis). 2017. Available at: <https://www.cdc.gov/listeria/symptoms.html>, accessed on November 13, 2018.

## NEWS IN BRIEF

**A possible case of sporadic Creutzfeldt-Jakob disease**

On December 18, 2018, the Centre for Health Protection (CHP) recorded a possible case of sporadic Creutzfeldt-Jakob disease (CJD) affecting a 67-year-old woman with underlying illnesses. She had presented with unsteady gait and blurred vision since February 2017. She was found to have progressive dementia, gait disturbance, dysarthria, extrapyramidal dysfunction and cerebellar disturbance. The magnetic resonance imaging (MRI) of the brain showed extensive cortical abnormality suspicious of CJD. Subsequently she had multiple admissions to public hospitals for her medical conditions. She was last admitted to a public hospital on September 4, 2018 due to pneumonia. Her condition deteriorated and succumbed on October 9, 2018. The causes of death were pneumonia and CJD. She had no known family history of CJD and no reported risk factors for iatrogenic CJD. She was classified as a possible case of sporadic CJD.

**A sporadic case of *Streptococcus suis* infection**

On December 24, 2018, CHP recorded a sporadic case of *Streptococcus suis* infection affecting a 56-year-old man with good past health. He had presented with fever, headache and left calf pain since December 21. He attended the Accident and Emergency Department (AED) of a public hospital on December 21 and was admitted on the same day. The clinical diagnosis was left calf cellulitis. His blood specimen was tested positive for *Streptococcus suis*. He was treated with a course of antibiotics and his condition remained stable. The patient was a butcher. He had history of handling raw pork and right middle finger abrasion injury at work during the incubation period. He had no travel history during the incubation period. His home contacts and colleagues remained asymptomatic.

**A sporadic case of necrotising fasciitis due to *Vibrio vulnificus* infection**

On December 26, 2018, CHP recorded a sporadic case of necrotising fasciitis due to *Vibrio vulnificus* infection affecting a 60-year-old male with underlying illness. He had presented with fever, right foot pain and swelling since December 24. He attended the AED of a public hospital on December 25 and was admitted on the same day. The clinical diagnosis was necrotising fasciitis. He was treated with antibiotics and surgical debridement of right foot. Blood and right foot tissue fluid collected on December 25 were both tested positive for *Vibrio vulnificus*. His condition was stable. He recalled that his right foot was pricked by the fin of a sea bass (鱸魚) while visiting a wet market on December 24. He had no recent travel history.

**A domestic cluster of pertussis**

CHP recorded a domestic cluster of pertussis in mid-December 2018, affecting a one-month-old boy and his 63-year-old grandmother. The boy presented with productive cough on December 9 and attended a private doctor on December 12. His nasopharyngeal swab collected on December 12 was tested positive for *Bordetella pertussis* and he was then treated with azithromycin. The patient was subsequently hospitalised at a public hospital for cyanotic spells and post-tussive vomiting from December 17 to 19. His condition was all along stable.

Contact tracing revealed that his grandmother had on and off cough since November 30 and she was referred by CHP to a public hospital for management on December 14. Her pernasal swab collected on December 14 was tested positive for *Bordetella pertussis*. She was treated with azithromycin and did not require hospitalisation. Her condition was stable. Pernasal swab collected from the boy's asymptomatic father was also tested positive for *Bordetella pertussis* while those collected from the other home contacts were negative. Chemoprophylaxis was given to all asymptomatic home contacts.

The two patients had no travel history during the incubation period. The boy was yet to receive the first dose of diphtheria, tetanus, acellular pertussis and inactivated poliovirus vaccine while the grandmother's vaccination status against pertussis was unknown.