Communicable Diseases WATCH

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

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FEATURE IN FOCUS

Review of Legionnaires' Disease (LD) in 2017

Reported by Dr Francis WONG, Medical and Health Officer, Respiratory Disease Office, Surveillance and Epidemiology Branch, CHP.

Legionnaires' Disease (LD) is a type of bacterial pneumonia caused by legionella, most commonly *Legionella pneumophila* serogroup 1 (Lp1). Legionellae are ubiquitous in aqueous environments including fresh water environment as well as man-made water systems such as potable water supplies systems.

Since 2016, the Centre for Health Protection (CHP) of the Department of Health has adopted a revised risk-based strategy for environmental investigation and sampling for LD cases according to recommendations by CHP's Scientific Committee on Emerging and Zoonotic Diseases after reviewing the local epidemiology as well as drawing reference to prevention and control practices overseas. This article reviews the LD cases reported to CHP in 2017.

Epidemiology of LD cases in 2017

CHP recorded a total of 72 LD cases in 2017 with an incidence rate of 0.97 per 100 000 population (Figure 1), as compared with 75 cases (1.02 per 100 000 population) and 66 cases (0.90 per 100 000 population) in 2016 and 2015 respectively. The local incidence rate in 2017 was within the range of about 0.5 to 2.0 cases of LD or legionellosis per 100 000 population observed in recent years in some overseas or neighbouring countries/areas including Australia, Europe, Japan, Taiwan, the United Kingdom and the United States.

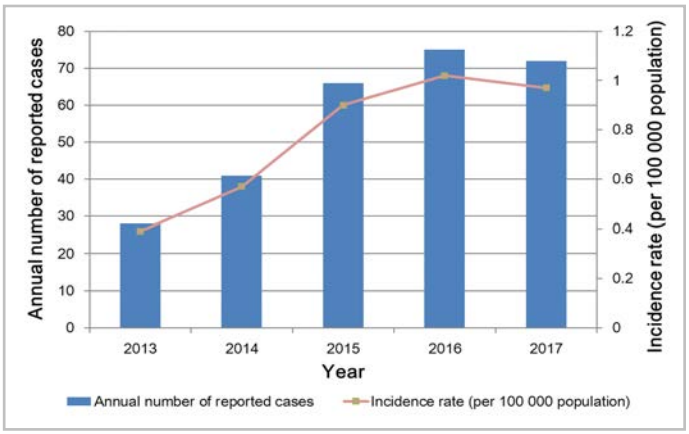

Figure 1 – Annual number and incidence rate of reported LD cases in Hong Kong, 2013-2017.

Among the 72 LD cases recorded in 2017, 70 were Chinese and the remaining two cases involved an Australian and a British. Their ages ranged between 39 and 99 years (median: 68 years). The majority (65, 90.3%) of the cases affected persons aged 50 years or above. Males were predominately affected with a male to female ratio of 5:1.

The main presenting symptoms included fever (86.1%), cough (75.0%), shortness of breath (61.1%) and malaise (25.0%). All patients developed pneumonia requiring hospitalisation. Twenty-nine patients (40.3%) required intensive care. Nine patients died within the same admission for LD (seven due to LD and the other two due to concomitant diseases).

Regarding the positive test leading to the initial diagnosis of LD, 61 (84.7%) and 10 (13.9%) cases were initially diagnosed by urinary antigen test (UAT) and polymerase chain reaction (PCR) of respiratory specimens respectively, while only one case (1.4%) was initially diagnosed by culture of respiratory specimen.

Fifty-one cases (70.8%) and 10 cases (13.9%) were classified as locally acquired and imported infections respectively, while the place of infection of the remaining 11 cases (15.3%) could not be determined because the patients had stayed both inside and outside Hong Kong during their incubation periods (IP).

Figure 2 – Geographic distribution of the residential places of the 51 locally-acquired LD cases during the IP. (Source: Communicable Disease Information System)

Among the imported cases, there were three epidemiologically linked imported cases involving three patients who had stayed in or visited the same hotel in Macau during the IP and their Lp1 isolates were of the same sequence base type (ST2338).

The residential places of the 51 local cases during the IP were distributed in various districts in Hong Kong (Figure 2). Two patients with onset in late November resided in the same residential care home for the elderly (RCHE). The remaining local cases were sporadic cases.

LD cases with environmental investigations undertaken and environmental samples collected

According to CHP's current investigation strategy, environmental investigations were undertaken and environmental samples were collected for 12 locally acquired cases. Except for a nosocomial case found to be related to tap water in the hospital ward, the sources of infection of the remaining 11 cases could not be confirmed/determined after environmental investigations. The details of the 12 cases are as follows:

Two cases staying in hospital for the whole or majority of the IP

One nosocomial case involved a patient with underlying medical conditions who was hospitalised in a public hospital during the whole IP. In the initial investigation, a total of 12 water samples were collected from the hospital. Five water samples (four collected from water taps and one from a shower) were tested positive for *Legionella* species ranging from 0.1 to 1.4 colony forming units per millilitre (cfu/ml). Chemical disinfection of the relevant water system was performed by the concerned hospital. Post-disinfection water samples were below the action level (i.e. 1 cfu/ml). Sequence-based typing showed that the Lp1 isolates from a water sample collected from the water tap in the toilet of the patient's room and the patient's respiratory specimen belonged to the same sequence type (ST1).

Another case involved a patient with underlying medical conditions who was hospitalised in a private hospital during most of the IP (for nine days before onset). In the initial investigation, a total of 11 water samples were collected from the hospital. Seven water samples (three from a shower, two from a water tap and two from a water dispenser) were tested positive for *Legionella* species ranging from 0.1 to 5.6 cfu/ml. The hospital was advised to carry out disinfection of the water system(s) concerned before resumption of clinical services. No positive respiratory specimens were available from the patient for matching. The source of infection of this case could not be confirmed.

Three cases involving RCHEs

Two patients with underlying medical conditions lived in the same RCHE in Aberdeen. Both had onset of symptoms in late November. A total of 12 water samples and six environmental swabs were collected from the washroom used by both patients. Water samples were also collected from a fresh water cooling towers (FWCT) in a nearby building facing the restaurant patronised by both patients during the IP. All water and environmental samples were tested negative for *legionella*. The source of infection of these two epidemiologically linked cases could not be confirmed.

One patient with underlying medical conditions lived in another RCHE in Yuen Long. In the initial investigation, a total of 12 water samples were collected from the room where the patient had stayed. Four water samples collected from a water dispenser were tested positive for *Legionella* species ranging from 0.2 to 40.5 cfu/ml. The RCHE was advised to stop using the water dispenser. Sequence based typing of the Lp1 isolates from the patient's tracheal aspirate and one positive water sample showed that they were of different sequence types. The source of infection of this case could not be confirmed.

One case with undetermined onset date who had prolonged hospitalisation

The patient had stayed in a private hospital for management of her underlying medical conditions and was later diagnosed to have LD after being discharged from the hospital. However, due to the complicated disease course and her underlying medical conditions, the onset date and the exposure period could not be determined. A respiratory specimen taken 17 days after her admission was tested positive for Lp1 upon testing. One water sample taken from a cold water dispenser on a floor where the patient had stayed before the collection of first available positive respiratory specimen was tested positive for Lp1 at 0.2 cfu/ml. Sequence based typing of the Lp1 isolates from a respiratory specimen of the patient and the positive water sample of the water dispenser showed that they were of the same sequence type (ST1). The hospital had suspended the use of the concerned water dispenser. The source of infection of this case could not be confirmed.

One community-acquired case involving use of spa

The case involved a patient with underlying medical conditions who had visited a spa during the IP. A pair of water samples was taken from the warm water spa pool and were tested negative for *legionella* species. The source of infection of this case could not be determined.

Cases with onset within six months and common exposure to the same potential sources during IP (two clusters involving five cases)

The first cluster involved three patients with common exposure to two sets of FWCTs. Among them, two patients lived in the same housing estate in Kwun Tong but in different blocks and one patient lived in another housing estate. They had onset of illness during the period from June to August. Respiratory specimens collected from one patient in the first estate and another patient in the second estate were tested positive for the same sequence type of Lp1 (ST507) while no respiratory specimen was collected from the remaining patient. Epidemiological investigations revealed that there were two sets of FWCTs, comprising eight FWCTs in total, common to the residences of the three patients. One set of six FWCTs were under the Electrical and Mechanical Services Department's FWCT Scheme and had monthly water samples collected in May to July tested negative for *legionella* species. One water sample collected from a FWCT of the second set was tested positive for *Legionella pneumophila* serogroup 2-14 (Lp2-14) at 200 cfu/ml, which was different from Lp1 detected in the patients. A post-disinfection water sample was below the action level (i.e. less than 10 cfu/ml).

The second cluster involved another two patients living in the same building in Sai Kung. Both cases had onset in August. Two water samples taken from water tanks in the building were tested negative for *legionella* species. Another water sample taken from a decorative waterfall with pond located in the vicinity of the building was tested positive for Lp2-14 at 0.1 cfu/ml (below action level of 10 cfu/ml), which was different from Lp1 detected in the two patients. The source of infection of these two clusters could not be determined.

Discussion

In summary, the number of LD cases recorded in 2017 was similar to that in 2016. The increasing trend observed in the past decade brought about by the increasing use of sensitive diagnostics tests (UAT and PCR) apparently stabilised. The epidemiological features were similar to the cases reported in previous years.

Environmental investigations in 2017 highlighted that water dispensers with water supplied directly from mains water might be contaminated with legionella. This will pose a risk to people with weakened immunity, especially those with chronic illnesses (such as cancer, diabetes mellitus, chronic lung or kidney diseases) and those taking corticosteroids or drugs that suppress body immunity. For prevention of LD, immunocompromised persons must not consume water from water dispensers with direct water supply from mains water. They should use sterile or boiled water for drinking, tooth brushing and mouth rinsing. They should also avoid using humidifiers, or other mist- or aerosol-generating devices. Shower may also generate small aerosols. Further information on LD is available from the designated webpage of CHP (http://www.chp.gov.hk/en/view_content/24307.html).

Update on bacillary dysentery in Hong Kong, 2013 to 2018

Reported by Ms Doris CHOI, Scientific Officer, Enteric and Vector-borne Disease Office, Surveillance and Epidemiology Branch, CHP.

Bacillary dysentery, or shigellosis, is an acute enteric infection caused by bacteria of the genus *Shigella*. It is transmitted via the faecal-oral route, either directly from person-to-person contact or sexual contact or indirectly through consumption of contaminated food, water or fomites[1]. The incubation is usually one to three days but could be up to seven days. There are four species of *Shigella*, namely, *Shigella dysenteriae* (*S. dysenteriae*), *S. flexneri*, *S. boydii* and *S. sonnei*. The illness is characterised by sudden onset of fever, diarrhoea with abdominal cramps and nausea or vomiting. The stool may contain blood and mucus. The severity of the illness varies according to the species. *S. sonnei* infections often result in a short clinical course and the case-fatality rate is almost negligible, except in immunocompromised hosts[1]. The serotype *S. dysenteriae* serotype 1 (Sd1) causes epidemic dysentery and is often associated with serious disease and complications such as toxic megacolon, intestinal perforation and haemolytic ureamic syndrome[2].

In Hong Kong, bacillary dysentery is a notifiable infectious disease. From 2013 to 2018, as of January 29, the Centre for Health Protection (CHP) of the Department of Health recorded a total of 238 confirmed cases. A decreasing trend of the disease was observed with the annual number of reported cases decreasing from 66 cases in 2013 to 37 cases in 2017 (Figure 1). Fifty-five percent of the patients were females (Figure 2). All age groups were affected, with the age of the patients ranging from two years to 84 years (median: 30 years). Patients aged between 21 and 40 years accounted for over half (52.9%) of the cases (Figure 2). The patients commonly presented with fever (74.8%), followed by abdominal pain (71.4%), watery diarrhoea (70.2%) and diarrhoea (68.5%). Most of the cases (N=179, 75.2%) required hospitalisation and the length of stay in hospitals ranged from one to 34 days (median: three days). No fatal case was recorded.

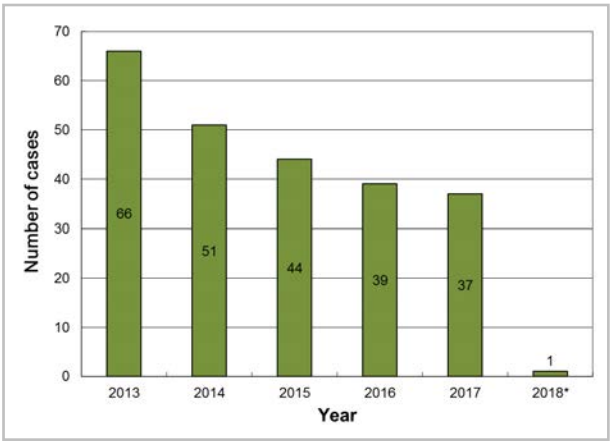

Figure 1 – Annual number of confirmed bacillary dysentery in Hong Kong, 2013 to 2018 (N=238).*
**Provisional figures as of January 29, 2018.*

While bacillary dysentery cases were recorded throughout the year, more cases were recorded between July and December (Figure 3). One hundred and forty-two (59.7%) and 88 (37.0%) cases were classified as locally acquired and imported infections respectively while the places of infection of the remaining eight cases could not be ascertained as the patients had stayed both locally and overseas during incubation period (Figure 3). Among the 88 imported cases, the most common countries/areas of infection were Thailand (15), India (13) and Mainland China (13), followed by Cambodia (8), Pakistan (8), Indonesia (6), the Philippines (6), Vietnam (4), Nepal (3) and others (12). As for clustering, the majority (92.9%) were sporadic cases while eight clusters affecting a total of 17 persons were recorded. The size of the clusters ranged from two to three persons (median: two persons). Seven clusters were related to locally acquired infection and one cluster was acquired the infection from Thailand. Five clusters (62.5%) were foodborne and the suspected incriminated food items included dairy products, oyster, sushi and sandwiches. For the remaining three home clusters, the source of infection could not be identified as the patients could not recall any relevant exposure history.

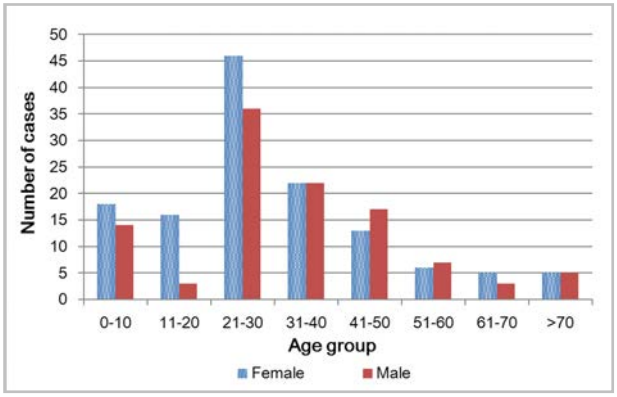

Figure 2 - Number of confirmed bacillary dysentery reported to CHP by age group and gender, 2013 to 2018 (N=238).*
**Provisional figures as of January 29, 2018.*

Similar to the pattern of circulating species in developed countries such as England and the United States[3,4], *S. sonnei* was predominant in Hong Kong and caused 67.7% of the cases recorded during this period, followed by *S. flexneri* (29.4%). Cases caused by *S. boydii* (1.3%) and *S. dysenteriae* (1.3%) were uncommon. Based on the available antibiotic sensitivity tests, 46.8% of *S. sonnei* isolates were resistant to ampicillin, and 26.6% were resistant to ciprofloxacin. The majority (85.7%) of *S. flexneri* isolates were resistant to ampicillin but 61.2% were susceptible to ceftriaxone, which was considered as a second line treatment.

Maintenance of good personal hygiene, especially hand hygiene, and adherence to food and water safety are the mainstay of prevention of the disease. People are advised to wash hands properly, especially after going to toilet, and before preparing and eating food. Travellers are advised to observe food hygiene and drink water only from safe sources, especially when going to places with poor sanitation.

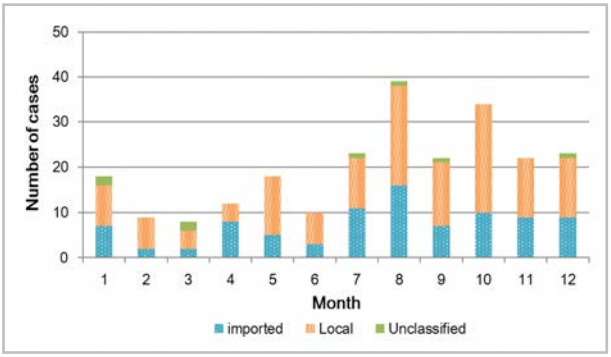

Figure 3 - Monthly number of bacillary dysentery cases by importation status, 2013 to 2018 (N=238).*
**Provisional figures as of January 29, 2018.*

Protect yourself against bacillary dysentery

1. Maintain good personal, food and environmental hygiene. 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.
2. Wash hands properly with liquid soap and water before eating or handling food, and after going to toilet or handling faecal matter.
3. Drink only boiled water from the mains or bottled drinks from reliable sources.
4. Avoid drinks with ice of unknown origin.
5. Purchase fresh food from hygienic and reliable sources. Do not patronise illegal hawkers.
6. Eat only thoroughly cooked food.
7. Wash and peel fruit by yourself and avoid eating raw vegetables.
8. Exclude infected persons and asymptomatic carriers from handling food and from providing care to children, elderly and immunocompromised people.
9. Refrain from work or school, and seek medical advice if suffering from gastrointestinal symptoms such as diarrhoea.

Please visit the website of the Centre for Food Safety (http://www.cfs.gov.hk) for more information on food safety.

References

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NEWS IN BRIEF

Two sporadic cases of psittacosis

On January 19 and 25, 2018, the Centre for Health Protection recorded two cases of psittacosis. The first case affected a 49-year-old woman with unremarkable past health. She presented with fever, headache, myalgia, cough and shortness of breath on January 7 and was admitted to a public hospital on January 14. Her sputum and nasopharyngeal swab were tested positive for *Chlamydophila psittaci* DNA. She was treated with antibiotics and was discharged on January 17. She had travelled with her family members to Huizhou during the incubation period.

The second case affected a 77-year-old man with underlying illnesses. He presented with fever, headache, myalgia, anorexia, cough with blood-stained sputum and shortness of breath on January 10 and was admitted to another public hospital on January 15. His sputum collected on January 20 was tested positive for *Chlamydophila psittaci* DNA. He was treated with antibiotics and was discharged on January 23. He had travelled with his wife to Macau 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. Their home contacts and travel collaterals were asymptomatic.