

Communicable Diseases WATCH

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FEATURE IN FOCUS

Update on Zika virus infection

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

Facts on Zika virus infection

Zika virus infection (ZVI) is a mosquito-borne disease caused by Zika virus. Zika virus is primarily transmitted to humans through the bites of infected *Aedes* mosquitoes. While *A. aegypti* is a competent vector for transmission of ZVI, *A. albopictus*, which is commonly found in Hong Kong, may also transmit the disease potentially. Besides, ZVI can be transmitted by sexual contact and from mother to fetus during pregnancy¹. Other possible routes of transmission include transfusion of blood and blood products². The incubation period of ZVI ranges from three to 14 days.

Most people with ZVI are asymptomatic. For those who develop symptoms, they commonly present with skin rash, fever, conjunctivitis, muscle pain, joint pain, general malaise and headache. The disease is usually mild and lasts for a few days and most patients with ZVI recover without complications. However, ZVI during pregnancy is a cause of congenital brain abnormalities, including microcephaly, in the newborn. ZVI is also a trigger of Guillain-Barré syndrome (GBS) which is a potentially life-threatening complication in which the patient's immune system attacks the peripheral nerves, causing muscle weakness and sometimes paralysis^{3,4}. There is no specific treatment for ZVI and the mainstay of management is symptomatic relief.

Global situation

Zika virus was first identified in human in the 1950s in Africa. From the 1960s to 1980s, sporadic cases of ZVI were reported in Africa and Asia. In 2007, the first documented outbreak of ZVI was reported from the Island of Yap (Federated States of Micronesia). This was followed by outbreaks in other countries and areas in the Pacific, including French Polynesia¹.

In 2015, Brazil reported a large outbreak of ZVI which was subsequently found to be associated with GBS and microcephaly. On February 1, 2016, the World Health Organization (WHO) announced that the cluster of microcephaly cases and other neurological disorders reported in Brazil, following a similar cluster in French Polynesia in 2014, constituted a Public Health Emergency of International Concern (PHEIC)⁵. Outbreaks and evidence of transmission of ZVI were soon reported throughout Africa, the Americas, Asia and the Pacific. The incidence of ZVI in the Americas peaked during the first half of 2016 and declined subsequently⁶. On November 18, 2016, WHO announced that Zika virus and its associated consequences no longer represented a PHEIC but remained a significant and enduring public health challenge requiring intense actions⁷. Since 2018, Zika virus transmission has persisted at low levels globally⁸.

On July 2, 2019, WHO published a new classification scheme with two categories for classification of countries and areas with risk of ZVI, namely, those with current or previous Zika virus transmission, and those with established *A. aegypti* mosquito vectors but no known case of Zika virus transmission. One hundred and forty-eight countries and areas were included under the new scheme. As of July 2, a total of 87 countries and areas across four of the six WHO regions (namely, African Region, Region of the Americas, South-East Asia Region and Western Pacific Region) had documented evidence of autochthonous mosquito-borne transmission of Zika virus (i.e. an infection acquired in-country), whereas a total of 61 other countries or areas across all six WHO regions had evidence of the presence of *A. aegypti* but had not yet documented any Zika virus transmission (Figure 1)^{6,9}. However, there is a potential risk for ZVI to spread to these countries or areas previously not affected by ZVI⁶.

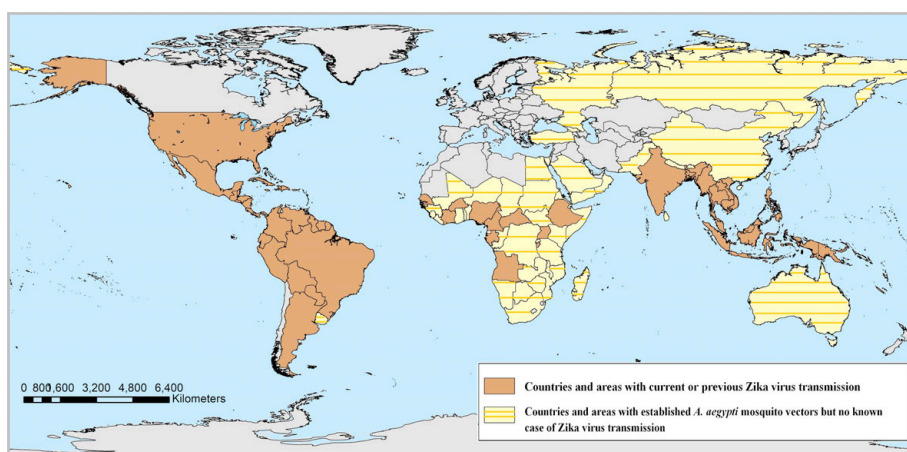


Figure 1 - Countries and areas with current or previous Zika virus transmission; and those with established *A. aegypti* mosquito vectors but no known case of Zika virus transmission (Source of information: WHO).

Local situation

In Hong Kong, ZVI was listed as a notifiable disease on February 5, 2016. As of July 3, 2019, the Centre for Health Protection (CHP) of the Department of Health has recorded a total of three laboratory-confirmed imported cases of ZVI (Figure 2). The cases involved one male and two females, with ages ranging from 31 to 56 years (median: 38 years). Their symptoms were mild. Two cases presented with skin rash. Other symptoms included fever, red eyes, joint pain, headache, sore throat, diarrhoea and nausea and vomiting (one case for each symptom). All three patients were in stable condition all along and recovered without any complications. All three patients had travel history to countries and areas with Zika virus transmission during the incubation period, namely, Saint Barthelemy; Antigua and Barbuda, St Maarten and Anguilla; and Ecuador and Peru. So far, no locally acquired case of ZVI has been recorded.

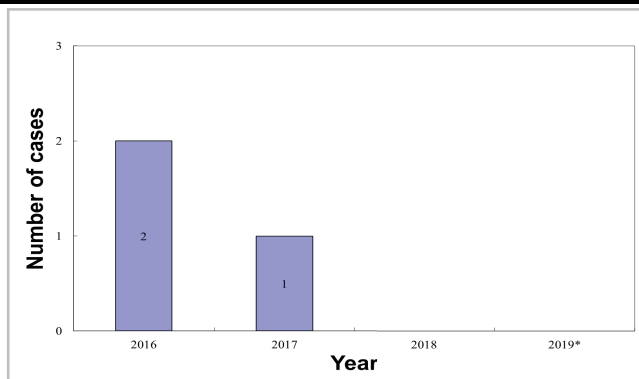


Figure 2 - Annual number of ZVI cases recorded by CHP from 2016 to 2019 (*provisional figure as of July 3).

Due to the high volume of international travellers from affected areas to Hong Kong, there is a constant threat of importation of ZVI cases into Hong Kong. As asymptomatic infections are common and *A. albopictus* is widely present locally, there is also a potential risk of secondary transmission of ZVI in Hong Kong arising from detected or undetected imported cases.

Prevention of ZVI

To prevent ZVI, members of the public should protect themselves from mosquito bites especially during travel to areas affected by ZVI and other mosquito-borne diseases. For details on the use of insect repellents, please refer to "Tips for using insect repellents" at the following link: http://www.chp.gov.hk/en/view_content/38927.html. In particular, travellers who return from affected areas should apply insect repellent for 21 days after arrival in Hong Kong to prevent mosquito bite, because infected persons may transmit the virus to mosquitoes through mosquito bites even if they remain asymptomatic or before their onset of symptoms, leading to further spread of the disease in Hong Kong. If feeling unwell after coming back to Hong Kong, travellers should seek medical advice promptly and provide travel details to the doctor.

Apart from prevention of mosquito bites, members of the general public should also take precautions against sexual transmission of ZVI. Based on the growing body of evidence on sexual transmission of ZVI and the latest recommendations by WHO, CHP has updated its health advice on the prevention of sexual transmission of ZVI. The public should note and take the following precautions to prevent sexual transmission of Zika virus:

- A. Travellers should consider not having sex during travel to affected areas, or else condoms should be used.
- B. Male and female travellers returning from affected areas should abstain from sex for at least three months and at least two months respectively upon return, or else condoms should be used.
- C. All pregnant women should not have sex with her partner who had travelled to affected areas, or else condoms should be used throughout the pregnancy.

Pregnant women should not travel to affected areas. Women preparing for pregnancy should note Points A and B above. If they or their male sex partners plan to travel to affected areas, they should consult their doctors for advice on the risk.

Further details on ZVI can be found at the following websites:

- ◆ CHP's designated webpage on ZVI (<https://www.chp.gov.hk/en/healthtopics/content/24/43088.html>);
- ◆ WHO's list of countries and areas with current or previous Zika virus transmission (<https://www.who.int/emergencies/diseases/zika/countries-with-zika-and-vectors-table.pdf?ua=1>); and
- ◆ WHO's latest information on ZVI (<https://www.who.int/emergencies/diseases/zika/en/>).

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Infection Prevention in Residential Care Homes for the Elderly 2016-2018

Reported by Dr CHEN Hong, Associate Consultant; Dr Joyce LEE, Medical and Health Officer; Ms Christina CHAN, Research Officer and Dr TY WONG, Consultant and Head, Infection Control Branch, CHP.

Hong Kong is facing the problem of ageing population. As the population continues to age, more people require temporary or permanent placement in Residential Care Homes for the Elderly (RCHEs). RCHEs are a heterogeneous group of institutions that provide varying levels of care for aged people, who, for personal, social, health or other reasons, can no longer live alone or with their families.

There were 740 RCHEs providing 73 000 places in 2016 which could accommodate 6.5% of the elderly population aged 65 or above in Hong Kong. With the policy of early discharge from hospitals to the community, RCHEs have become an extended facility to take care of elderly with various medical conditions requiring extensive care. Many of these residents are frail with co-morbidities and poor functional status requiring the use of medical devices. These factors predispose them to increased risk of infections which in turn leads to increased hospital admissions, increased morbidity and mortality, and increased burden to the healthcare system. As such, good infection control practice is important to prevent spread of infections among residents in the RCHEs.

The Infection Control Branch (ICB) of the Centre for Health Protection (CHP) of the Department of Health has rolled out the program named infection prevention in RCHEs 2016-2018. The program aimed to (1) understand the infection control practice in RCHEs; (2) observe the infection control compliance in taking care of residents who are Multidrug Resistant Organism (MDRO) carriers; (3) update the infection control knowledge of RCHE staff; and (4) empower the RCHEs to enhance their infection control practice.

The program team consisted of doctors and nurses from ICB. We recruited 60 RCHEs by stratified random sampling. The program was conducted in each participated RCHE for 12 months. The team visited the RCHEs to assess their infection control practice at both the beginning and end of the 12 months. The assessment covered the essential infection control elements: hand hygiene, environmental hygiene, care of residents with nasogastric tube or urinary catheter, and care of residents who are MDRO carriers.

We gave immediate feedback after the first assessment. For the 24 RCHEs with suboptimal infection control assessment, we gave tailor-made infection control advices on subsequent visits before the final assessment at 12 months. A hotline was set up to enable RCHEs to contact us for infection control related issues.

Practice of Hand Hygiene in RCHEs

Hand hygiene was assessed by the availability of facilities (hand washing basin and alcohol-based handrub) and practice of hand hygiene (training, auditing, proper performance of seven steps by one staff selected randomly).

After the program, we noticed that (1) staff carrying pocket size alcohol-based hand rub increased from 8.3% to 41.7%, and (2) hand washing facilities with the availability of liquid soap, paper towel or hand dryer, and lidded rubbish bin increased from 36.7% to 66.7%.



Hand Hygiene Facilities in RCHE.

At our first assessment, staff from 36.4% of private homes could perform hand hygiene properly. This increased to 70.5% on the final assessment. Staff in non-private homes performed better at baseline (81.3%) which increased to 87.5% on final assessment. The commonly missed steps were between fingers and back of fingers (Figure 1).

Environmental Hygiene in RCHEs

Environmental hygiene was assessed by ventilation of the home, general impression of cleanliness, hygienic condition of the toilet, shower room, kitchen, the cleansing schedule of the home and staff's knowledge on diluting household bleach. All homes performed well in this aspect.

Care of Residents with Nasogastric Tube

We took note of the number of residents with nasogastric tube in the home and randomly selected one resident with nasogastric tube and monitor the followings for feeding utensil: designated utensils for each resident, disinfect, cleanse and store the utensil of each resident separately, the utensils were clean, and feeding tube was discarded on daily basis.

After the program, we noticed compliance to the recommendation of care improved from 44.6% to 57.1%. Commonly observed irregularities included: (1) not cleansing the utensils separately; (2) utensils not stored in clean lidded container; (3) feeding utensils were not clean; (4) not disinfect the feeding funnel daily and (5) feeding tubes were not discarded daily.

Care of Residents with Urinary Catheter

We took note of the number of residents with urinary catheter in the home and randomly selected one resident with urinary catheter and monitor if the followings occurred: the level of the urine bag was higher than the bladder, kinking of the drainage tube, outlet of the bag touching the floor, the bag was over 3/4 full or no designated container to empty the urinary bag.

After the program, we noticed compliance to the recommendation of care improved from 62% to 88%. Commonly observed irregularities included: (1) not using clean and designated collecting container; (2) urine bag placed above the level of the bladder; and (3) urine bag outlet touching the floor.

Care of Residents who are MDRO Carriers

We took note of the number of residents who were MDRO carriers (Table 1). We selected one MDRO carriers in the order of CPE, VRE, MDRA or MRSA and monitored their compliance to recommendations with regards to placement, practice of transmission precaution, environmental hygiene, designated medical equipment, toilet and bathing facilities, donning and doffing of personal protective equipment (PPE).

We noticed that compliance to recommendation on caring for CPE, VRE and MDRA carriers were satisfactory while compliance for MRSA carriers was suboptimal. Modified contact precaution was not well adopted for care of MDRO carriers. Compliance was 12% during the first assessment and improved to 28% during the final assessment. All the non-compliant observations were from MRSA carriers. Overall, only around half (48%) of MDRO carriers observed were properly isolated, this slightly improved to 52% on the final assessment but significant improvement was limited by lack of single-bed rooms (Table 2). Environmental cleansing and disinfection improved from 28% to 48%. Proper disinfection of cleansing tools increased from 56% to 84%. Use of dedicated medical items, or proper disinfection after use if shared with other residents, increased from 68% to 92%. Staff from both private homes and non-private homes performed well for donning and doffing of PPE.

Discussion and Recommendations

This programme enabled us to understand the infection control practice in RCHEs. The programme showed improvement in areas such as practice of hand hygiene, care of residents with nasogastric tube, and care of residents with urinary catheter.

We also found blind spots in the current RCHE infrastructure not readily amenable by education and training programme. Care for MDRO carriers seemed to be constrained by resources more than staff training could amend. Government covers the extra cost incurred by adopting contact precautions for care of carriers with emerging MDROs like CPE and VRE, but not endemic MDROs like MRSA. This policy improved compliance to contact precaution for care of emerging MDRO carriers. However, space and availability of single-rooms remained the largest hurdle. When newer MDROs are emerging, policy makers should be alerted to the limitations in the RCHE environment to adopt all the necessary precaution measures and provide the necessary resources.



Figure 1 - Hand Hygiene Steps (Step 3 and 4 are commonly missed steps).

Table 1 - Number of MDRO carriers recorded and observed.

Number of MDRO carriers	First visit	Final visit
Number of MDRO carriers in the 60 RCHEs	174	236
Methicillin-Resistant <i>Staphylococcus aureus</i> (MRSA)	144	200
Extended Spectrum β -Lactamase (ESBL) producing organisms	23	25
MRSA + ESBL	3	4
Multi-drug Resistant <i>Acinetobacter</i> (MDRA)	2	2
Vancomycin-Resistant <i>Enterococcus</i> (VRE)	2	2
Carbapenemase-Producing <i>Enterobacteriaceae</i> (CPE)	0	3
Number of MDRO carriers observed (one selected per RCHE)	29	35
MRSA	26	28
MRSA+ESBL	0	1
MDRA	2	2
VRE	1	2
CPE	0	2

Table 2 - Availability of single-bed room in RCHEs.

Single-bed room	Private Homes	Non-private Homes	Total
	n (%)	n (%)	N (%)
Total number of RCHE	47 (100)	17 (100)	64 (100)*
Single-bed room			
90% or above	14 (29.8)	1 (5.9)	15 (23.4)
50% to less than 90%	21 (44.7)	1 (5.9)	22 (34.4)
Less than 50%	12 (25.5)	15 (88.2)	27 (42.2)

* 64 RCHEs were recruited for baseline assessment with four dropouts at later stage.



Donning and Doffing Area with Poster.

In summary, the results of the programme have provided a good overview of infection control in RCHes and contribute to the understanding of areas which require improvement. The findings are also valuable in highlighting priority areas for monitoring and intervention. The programme increases awareness of infection prevention of RCHE staff in all levels involved and helps to promote a safe and quality environment.

NEWS IN BRIEF

Two sporadic cases of psittacosis

In early July 2019, the Centre for Health Protection (CHP) of the Department of Health recorded two sporadic cases of psittacosis. The first case affected a 55-year-old man with underlying illnesses. He had presented with fever and cough since June 23 and was admitted to a public hospital on June 27. His chest X-ray showed left side haziness. The clinical diagnosis was pneumonia and he was treated with antibiotics. He remained stable and was discharged on June 30. His sputum collected on June 29 was tested positive for *Chlamydia psittaci* DNA by polymerase chain reaction (PCR). During the incubation period, he had travelled to Shenzhen once every week.

The second case affected a 70-year-old man with underlying illness. He had presented with fever, cough, myalgia and shortness of breath since June 24 and was admitted to a public hospital on June 25. His chest x-ray showed right pleural effusion. The clinical diagnosis was pneumonia and he was treated with antibiotics. His condition remained stable and he was discharged on July 10. His sputum collected on June 29 was tested positive for *Chlamydia psittaci* DNA by PCR. During the incubation period, he had travelled to Xiamen from June 15 to 22.

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

Two local sporadic cases of listeriosis

CHP recorded two sporadic cases of listeriosis in July 2019.

The first case was a 55-year-old woman with underlying illnesses. She had presented with fever and diarrhoea since June 20 and was admitted to a public hospital on June 24. Her blood specimen collected on June 25 grew *Listeria monocytogenes*. She was treated with antibiotics and her condition was stable.

The second case was a 28-year-old pregnant woman with good past health. She was at 25 weeks of gestation. She had presented with fever, headache and abdominal pain since July 6 and was admitted to a public hospital on July 10. Her blood specimen collected on July 10 grew *Listeria monocytogenes*. She was treated with antibiotics and her condition was stable.

Investigation revealed that during the incubation periods, both patients could not recall history of consumption of any high risk food. They had no recent travel history. Their household contacts remained asymptomatic.

Three sporadic cases of necrotising fasciitis due to *Vibrio vulnificus* infection

From July 6 to 11, 2019, CHP recorded three sporadic cases of necrotising fasciitis due to *Vibrio vulnificus* infection. The first patient was a 47-year-old man with pre-existing medical conditions. He had presented with fever and leg cramp since July 3. He was admitted to a public hospital on July 4. The diagnosis was right leg necrotising fasciitis. He was treated with antibiotics and surgical debridement. His pus swab collected from right calf on July 4 grew *Vibrio vulnificus*. His current condition was stable. He had history of visiting wet market but did not report any history of injury by marine products.

The second patient was a 75-year-old man with pre-existing medical conditions. He had presented with right leg pain, swelling and wound with discharge since July 4. He attended a general out-patient clinic on July 6. He was referred to Accident and Emergency Department of a public hospital and was admitted on the same day. After admission, he was also noted to have swollen left leg. The diagnosis was necrotising fasciitis. He was treated with antibiotics, surgical debridement and bilateral above knee amputation. His right leg tissue collected on July 7 grew *Vibrio vulnificus*. He required intensive care and his current condition was stable. According to his son, the patient visited Mui Wo Beach for clam picking on July 4 and he did not know further details.

The third patient was a 76-year-old man with pre-existing medical conditions. He had presented with fever and left leg pain and swelling since July 7. He was admitted to a public hospital on July 9 and was transferred to intensive care unit on the same day. The diagnosis was necrotising fasciitis. He was treated with antibiotics and surgical debridement. His wound swab collected on July 9 grew *Vibrio vulnificus*. His condition deteriorated and he passed away on July 12. According to his wife, he went swimming at Butterfly Beach in Tuen Mun on July 2 and 3 and she was not aware if the patient had sustained any injury.

All three patients had no recent travel history and their home contacts were asymptomatic.

A probable case of sporadic Creutzfeldt-Jakob disease

CHP recorded a probable case of sporadic Creutzfeldt-Jakob disease (CJD) on July 7, 2019 affecting a 51-year-old woman with underlying illnesses. She had presented with confusion since May 2019 and was admitted to a public hospital on May 14, 2019. She was found to have progressive dementia and cerebellar signs after admission. The electroencephalography (EEG) showed features compatible with CJD. The cerebrospinal fluid (CSF) was tested positive for 14-3-3 protein. Her condition subsequently deteriorated requiring intensive care and she is currently in serious condition. She had no known family history of CJD and no reported risk factors for iatrogenic CJD. She was classified as a probable case of sporadic CJD.

A sporadic case of *Streptococcus suis* infection

On July 8, 2019, CHP recorded a sporadic case of *Streptococcus suis* infection affecting a 63-year-old man with good past health. He had presented with fever, malaise, headache, nausea and right arm pain since July 4. He was admitted to a public hospital on July 6. His blood collected on July 6 grew *Streptococcus suis*. He was treated with antibiotics and his condition remained stable. He had no high risk exposure or recent wound. His home contacts were asymptomatic.

Scarlet fever update (June 1, 2019 – June 30, 2019)

Scarlet fever activity has slightly increased in June. CHP recorded 159 cases of scarlet fever in June as compared with 137 cases in May. The cases recorded in June included 92 males and 67 females aged between 11 months and 33 years (median: six years). There were four institutional clusters occurring in three kindergartens/child care centres and a primary school, each affecting two children. One fatal case was reported in June. This case affected a nine-year-old boy with good past health. He presented with fever, sore throat and vesicular rash since June 17. He developed shortness of breath and chest pain on June 21. On June 23, he presented to Accident and Emergency Department of a public hospital with respiratory failure and cardiac arrest, with restoration of spontaneous circulation upon resuscitation. He was admitted to the paediatric intensive care unit for further management. He had pneumonia and pleural effusion, and his pleural aspirate collected on June 23 was cultured positive for *Streptococcus pyogenes*. He was diagnosed to have chickenpox and scarlet fever complicated with Group A *Streptococcal* pneumonia, septic shock and toxic shock syndrome. His condition deteriorated rapidly and he passed away on June 23.

CA-MRSA cases in June 2019

In June 2019, CHP recorded a total of 91 cases of community-associated methicillin resistant *Staphylococcus aureus* (CA-MRSA) infection, affecting 55 males and 36 females with ages ranging from five months to 95 years (median: 38 years). Among them, there were 67 Chinese, 6 Filipinos, 3 Caucasian, 3 Nepalese, 3 Pakistani, 1 Indonesian, 1 Thai, and 7 of unknown ethnicity.

Eighty-eight cases presented with uncomplicated skin and soft tissue infections while the remaining three cases had severe CA-MRSA infections. The first severe case was a 95-year-old man with underlying disease. He presented with pain and swelling of right buttock on May 20. He was admitted to a private hospital on June 1 for management. His blood specimen collected on June 1 was cultured positive for CA-MRSA. He was diagnosed with CA-MRSA associated right buttock abscess and sepsis. Incision and drainage of his right buttock abscess was performed on June 3. He was also treated with antibiotics. He remained in a stable condition.

The second severe case was a 56-year-old man with good past health. He presented with fever, and redness, pain and swelling of left shoulder on June 3. He was admitted to a public hospital on June 8 for management. His blood specimen collected on June 8 was cultured positive for CA-MRSA. He was diagnosed with CA-MRSA associated left shoulder abscess and sepsis. Incision and drainage was performed on June 11 and wound debridement was performed on June 15. He was also treated with antibiotics. He remained in a stable condition and was discharged on June 25.

The third severe case was a 65-year-old man with underlying diseases. He presented with swelling of buttock on June 7. He was found unconscious on June 14 and was admitted to the intensive care unit of a public hospital for management. Computed tomography of his abdomen and pelvis showed a large buttock abscess. His blood specimen collected on June 14 was cultured positive for CA-MRSA. He was diagnosed with CA-MRSA associated buttock abscess and sepsis. Incision and drainage of his buttock abscess was performed on June 14. He was also treated with antibiotics. He remained in a stable condition.

Among the 91 cases, one case involving a healthcare worker in a public hospital was reported. Investigation did not reveal any epidemiologically linked cases. Besides, five household clusters, with each affecting two to three persons, were identified.