



EDITORIAL BOARD **Editor-in-Chief** Dr SK Chuang **Members** Dr Yonnie LAM / Dr Albert AU / Dr TY Wong / Dr Gladys Yeung / Dr Philip Wong / Simon Wong / Sheree Chong / Dr Shirley Tsang / Doris Choi **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

FEATURE IN FOCUS

Review of Monkeypox and Smallpox

Reported by Dr Eric LAM, Medical and Health Officer, Communicable Disease Surveillance and Intelligence Office, Surveillance and Epidemiology Branch, CHP.

Smallpox is a serious, acute infectious disease caused by variola virus which is under the genus of orthopoxvirus. It is transmitted through respiratory droplets from infected persons. The incubation period is usually 10 to 14 days, with a range from seven to 19 days¹. Early symptoms include high fever and headache, followed by maculopapular rash two to four days later which spreads from the face to all parts of the body. The skin sores sequentially become vesicular and pustular, before they turn into crusts and scab over. Smallpox has a case fatality of up to 30%². There is no cure for smallpox, but vaccination can effectively prevent infection if given within four days after exposure to the virus².

Smallpox was once one of the most feared infectious diseases in human history. It was declared eradicated on May 8, 1980 by the 33rd World Health Assembly following a global immunisation campaign led by the World Health Organization (WHO). The last natural case of smallpox occurred in Somalia in 1977. Since then, one smallpox outbreak involving two cases and one fatality has been reported in Birmingham, England, in 1978, which was due to accidental exposure to variola virus in a research laboratory. In the wake of this accident, it was agreed by the international community to gradually reduce the number of laboratories holding stocks of variola virus. Today all the stocks of variola virus are stored in two secure WHO reference laboratories, one in the United States and the other in the Russian Federation^{1,2}.

Eradication eventually led to the global cessation of vaccination with the smallpox vaccine. Currently the majority of the global population <40 years has been neither vaccinated against, nor exposed to, smallpox and therefore remains vulnerable to the virus today. In the past 15 years, attention has shifted from the risk of a laboratory accident to the possibility of a deliberate release of the virus as an act of bioterrorism³.

Smallpox is a notifiable infectious disease in Hong Kong. It has been once made non-notifiable in 1994 but made notifiable in 2008 again. The last Smallpox case in Hong Kong was reported in 1952.

Monkeypox is a rare zoonosis caused by monkeypox virus which, like the variola virus causing smallpox, also belongs to the genus of orthopoxvirus. The virus was first discovered in 1958 in monkeys kept for research, hence the disease was named 'monkeypox'.

Infection could occur when a person comes into contact with the virus from animals, humans or contaminated materials. Humans could get infected from various wild animals, such as some species of primates, rodents and squirrels, etc., through bite or scratch, or direct contact with their body fluids. Human-to-human transmission is also possible through respiratory droplets during prolonged face-to-face contact or direct contact with body fluids.

The incubation period is usually from six to 16 days, with a range from five to 21 days⁴. The symptoms are similar to those of smallpox, but in milder forms. The first few days after infection with monkeypox are characterised by fever, intense headache, myalgia and lymphadenopathy. Rash appears about one to three days after onset of fever, and spreads from the face to other parts of the body. The case fatality in previous monkeypox outbreaks has been between 1% and 10%⁴.

Some patients with monkeypox develop severe swollen lymph nodes before the appearance of the rash, which is a distinctive feature of monkeypox compared to other similar diseases such as chickenpox. In addition, monkeypox can only be diagnosed definitively in the laboratory through virus isolation, antigen and nucleic acid detection, etc⁴.

Since first reported in humans in 1970 in the Democratic Republic of Congo (then known as Zaire), most of the reported monkeypox outbreaks have occurred in Central and West Africa. While smallpox has been eradicated for more than three decades, today monkeypox still occurs in some remote parts of Central and West Africa⁴. In 2003, a shipment of animals from Ghana introduced monkeypox virus into the United States which caused an outbreak affecting 47 persons. It was the first time human monkeypox case reported outside Africa^{4,5,6}.

More recently in October 2017, a major monkeypox outbreak was reported in Nigeria. The investigation established that the initial cluster of cases had regularly played with a captured monkey in their neighbourhood, which was killed and eaten by them about one month prior to onset of their illness. The initial confirmation of this outbreak had been challenged by long delays in the collection, referral and testing of samples⁷. However with the support of the international community led by WHO, the Nigerian State Ministry of Health rapidly scaled up its outbreak response and contained further spread of the disease, through strengthened surveillance, case management, contact tracing and public education. As of December 9, 2017, there were a total of 172 cases reported from 22 states and the Federal Capital Territory across Nigeria, among them 61 were laboratory confirmed, with one fatality recorded in a case with immunocompromised condition⁸ (Figure 1).

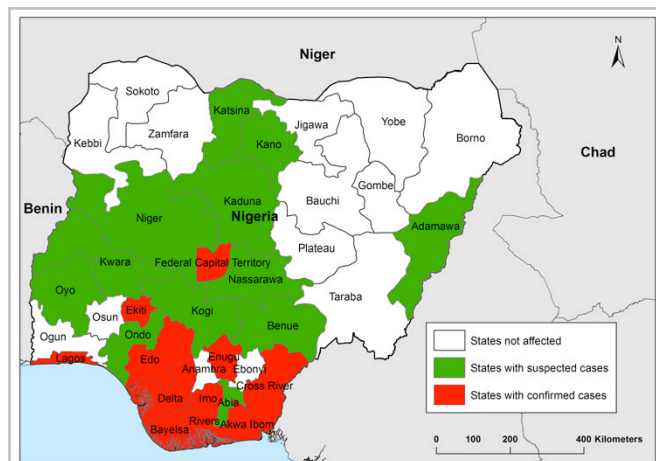


Figure 1 – Distribution of Monkeypox Cases in Nigeria, as of December 9, 2017.

There is currently no treatment or vaccine available for monkeypox, although previously it has been shown that smallpox vaccine may also be effective in preventing monkeypox. To reduce the risk of infection during human monkeypox outbreaks, members of the public should:

- ❖ Avoid close physical contact with sick persons or animals;
- ❖ Wear protective clothing and equipment including gloves and surgical masks when taking care of ill people or handling animals, and carry out regular hand washing after these procedures;
- ❖ Thoroughly cook all animal products before eating; and
- ❖ Seek medical advice promptly for any suspicious symptoms.

References

- ¹Smallpox (July 2017). US Centers for Disease Control and Prevention. Available at: <https://www.cdc.gov/smallpox/>.
- ²Frequently asked questions and answers on smallpox (June 2016). World Health Organization. Available at <http://www.who.int/csr/disease/smallpox/faq/en/>.
- ³Smallpox in the post eradication era. Weekly Epidemiological Record (May 20, 2016). World Health Organization. Available at <http://www.who.int/wer/2016/wer9120.pdf>.
- ⁴Monkeypox fact sheet (November 2016). World Health Organization. Available at <http://www.who.int/mediacentre/factsheets/fs161/en/>.
- ⁵Monkeypox in the United States. US Centers for Disease Control and Prevention. Available at <https://www.cdc.gov/poxvirus/monkeypox/outbreak.html>.
- ⁶Monkeypox (May 2015). US Centers for Disease Control and Prevention. Available at <https://www.cdc.gov/poxvirus/monkeypox/>.
- ⁷Weekly Bulletin on Outbreaks and Other Emergencies (October 14 to 20, 2017). World Health Organization Regional Office for Africa. Available at <http://apps.who.int/iris/bitstream/10665/259352/1/OEW42-1420102017.pdf>.
- ⁸Monkeypox Outbreak in Nigeria Situation Report (No. 11, December 9, 2017). Nigeria Centre for Disease Control. Available at <http://ncdc.gov.ng/themes/common/files/sitreps/6bd3b9afa442c7ccd4f46478d965354b.pdf>.

NEWS IN BRIEF

A domestic cluster of pertussis

In December 2017, the Centre for Health Protection (CHP) recorded a domestic cluster of pertussis affecting a two-month-old girl and her 22-month-old elder sister. The baby girl presented with cough, runny nose with reduced appetite since December 1 and was admitted to a public hospital on December 10. Her pernasal swab was tested positive for *Bordetella pertussis*. She was treated with antibiotic and was discharged on December 17. Contact tracing revealed her 22-month-old elder sister had cough since November 28. She was then referred to the Accident and Emergency Department of a public hospital on December 12. She did not require hospital admission. She was given antibiotics and remained in stable condition. Her pernasal swab was also tested positive for *Bordetella pertussis*.

Epidemiological investigation revealed that both children did not travel outside Hong Kong during the incubation period. The two-month-old girl was not yet due for her first dose of diphtheria, tetanus, acellular pertussis and inactivated poliovirus (DTaP-IPV) vaccine while her elder sister had received four doses of DTaP-IPV vaccine according to the Childhood Immunisation Programme of Hong Kong. Their other household contacts remained asymptomatic. The parents of these two cases were given chemoprophylaxis.

A probable case of sporadic Creutzfeldt-Jakob disease

CHP recorded a probable case of sporadic Creutzfeldt-Jakob disease (CJD) on December 6, 2017, affecting a 60-year-old female with unremarkable past health who lived in the United States of America. She presented with progressive memory loss and right-sided numbness in late October 2017. She was admitted to a local hospital there and was suspected to have CJD. She came to Hong Kong on November 28 and was admitted to a public hospital on December 6. She was found to have rapidly progressive dementia, cerebellar signs, myoclonus, pyramidal and extrapyramidal signs, and akinetic mutism. Findings of electroencephalography were compatible with CJD. Her condition was stable. Subsequently, she was discharged and was transferred to a hospital in Macau for further management on December 7. No risk factors for either iatrogenic or variant CJD were identified. She was classified as a probable case of sporadic CJD.

Two sporadic cases of listeriosis

CHP recorded two sporadic cases of listeriosis in December 2017. The first patient was a 28-year-old pregnant woman at 35 weeks of gestation with good past health. She presented with spontaneous onset of labour and fever on December 4 and was admitted to a private hospital on the same day. She had an uncomplicated normal vaginal delivery on December 4. Placental swab taken on delivery yielded *Listeria monocytogenes*. The clinical diagnosis was intrauterine infection. She was treated with antibiotics and her condition was stable. She was discharged home on December 6 and her newborn baby girl was transferred to another public hospital for further management on the same day. Blood culture collected from the baby girl showed no bacterial growth. The baby remained in stable condition and was discharged home on December 13. The woman reported no history of high-risk food consumption during the incubation period. Other household contacts remained asymptomatic.

The second case was a 68-year-old woman with underlying medical condition. The patient was admitted to a public hospital on December 8 for management of her underlying medical condition. She developed fever, chills and fatigue on December 11. Blood culture collected on December 11 yielded *Listeria monocytogenes*. She was treated with antibiotics and her condition was stable. She consumed ready-to-eat fermented bean curd occasionally; otherwise, she did not report consumption of other high-risk food items during incubation period. Her household contacts remained asymptomatic.

So far, no epidemiological linkages have been identified among these two cases.

CA-MRSA cases in November 2017

In November 2017, CHP recorded a total of 95 cases of community-associated methicillin resistant *Staphylococcus aureus* (CA-MRSA) infection, affecting 51 males and 44 females with ages ranging from 24 days to 82 years (median: 34 years). Among them, there were 67 Chinese, 6 Filipinos, 4 Pakistani, 3 Caucasian, 3 Indian, 3 Nepalese, 2 Indonesian, 1 African, and 6 of unknown ethnicity.

Ninety-three cases presented with uncomplicated skin and soft tissue infections while the remaining two cases had severe CA-MRSA infections. The first severe case affected an eight-year-old girl with good past health. She presented with right neck swelling and fever since October 19. She attended the Accident and Emergency Department of a public hospital on October 23 and was admitted for management. Her blood specimen collected on October 25 was cultured positive for CA-MRSA. She was diagnosed to have right neck abscess and sepsis. She was treated with antibiotics. Her condition was stable and she was discharged on November 13.

The second severe case affected a male neonate with underlying medical condition. He was born in a private hospital on October 10. He had decreased consciousness since birth and was transferred to the Neonatal Intensive Care Unit (NICU) of a public hospital on October 11 for further management. Chest X-ray taken on October 27 showed signs of pneumonia. His endotracheal aspirate and blood specimen collected on the same day were cultured positive for CA-MRSA. He was diagnosed to have pneumonia and sepsis. He was treated with antibiotics and his condition was stable. This case was epidemiologically linked with two CA-MRSA cases presented with uncomplicated skin and soft tissue infection identified in the same public hospital's unit in September.

Apart from the above hospital cluster, two household clusters, with each affecting two persons, were identified in November. No cases involving healthcare worker were reported in November.

Scarlet fever update (November 1, 2017 – November 30, 2017)

Scarlet fever activity in November markedly increased as compared with that in October. CHP recorded 264 cases of scarlet fever in November as compared with 153 cases in October. The cases recorded in November included 179 males and 85 females aged between 18 months and 40 years (median: five years). There were eight institutional clusters occurring in five kindergartens/child care centres and three primary schools, affecting a total of 22 children. No fatal cases were reported in November. Of note, scarlet fever activity sharply increased since late October and remained high in November. Based on the past epidemiological pattern, the activity of scarlet fever is expected to remain at a high level in the coming few months. Parents have to take extra care of their children in maintaining strict personal, hand and environmental hygiene. People suspected to have scarlet fever should consult a doctor promptly.