LNS
LUXEMBOURG

MICROBIOLOGY

Scientific briefing – Monkeypox outbreak

24 June 2022

Introduction

Monkeypox is a viral disease that typically affects animals but can sometimes be transmitted to humans (zoonosis). Its natural host is mammals (e.g. rodents and primates) from Western and Central Africa, where the disease is endemic and most cases are usually detected. Occasionally, cases are also detected outside these regions, but generally, they share an epidemiological link to endemic areas (travel, importation of animals, etc.).

Starting in May 2022, the United Kingdom and several other countries around the world (but mainly in Europe) began to notify to World Health Organization (WHO) of the detection of monkeypox cases with no known connection to endemic regions. As of 22 June, 3157 confirmed cases and no deaths have been reported worldwide, the main reporting countries being the United Kingdom (793), Spain (518), Germany (469) and Portugal (304) (Figure 1).[1,2] The first case in Luxembourg has been detected recently.

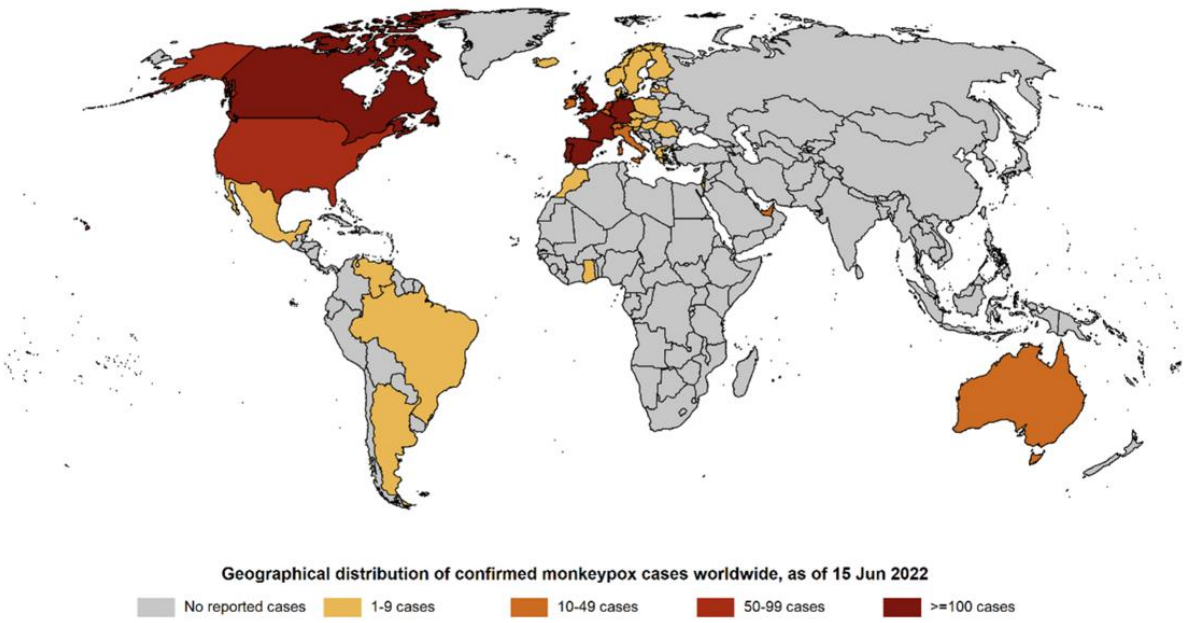

Figure 1. The number of confirmed cases by country. Source: European Centre for Disease Prevention and Control.

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Disease background

Agent

This disease is caused by the monkeypox virus, enveloped double-stranded DNA type, which belongs to the Orthopoxvirus genus. It is related to the variola virus, which was responsible for smallpox before its eradication, but symptoms from monkeypox are generally milder.[3] Two strains (clades) of the monkeypox virus have been described: the Central African clade, generally associated with a more virulent clinical presentation, and the West African clade, usually displaying a lower mortality rate (<1%).[4] The latter is the one responsible for the ongoing outbreak.[5]

Transmission

Transmission from animals to humans typically happens through direct contact with the infected animal or its secretions, as well as bites or consumption of infected meat insufficiently cooked. Transmission between humans is rarer, as the virus does not spread easily between people, and it is usually linked to direct contact with skin lesions or body fluids of an infected individual, as well as indirect contact through clothes, beds, towels or other shared items. Exposure to respiratory droplets during prolonged face-to-face contact might also lead to infection. Sexual transmission was not traditionally considered a route of infection but had already been hypothesised in previous outbreaks. During the current outbreak, sexual contact seems to have played a key role.[3]

Transmission from humans to animals is a potential risk in Europe, although there is no report of infection of pets or wildlife yet.[6]

Symptoms and severity

After infection, the disease usually takes 5 to 21 days to develop. It typically starts with unspecific viral syndrome symptoms (fever, headache, muscle and back pain, intense lack of energy) and swollen lymph nodes (lymphadenopathy). This is generally followed some days afterwards by a rash. It usually arises in the face and limbs, but not exclusively, and it can be itchy. This rash starts with small spots (macules) that become bumps (papules), then blisters (vesicles), then pustules and finally scabs that shed and disappear. During the current outbreak, the atypical distribution of skin lesions in the peri-genital area supports the hypothesis of sexual transmission.[3,5]

Severity depends on the quantity of virus inoculated and host susceptibility, which is higher in children and immunocompromised persons (not well understood yet in pregnant women, although adverse outcomes could be expected for the foetus).[3,4] According to experience from cases in endemic areas, some complications could be secondary infections of skin lesions, bronchopneumonia or infection of the cornea.

Treatment and prevention

Monkeypox is generally a self-limited disease that resolves in several weeks, but sometimes symptomatic and supportive treatment might be administered. A specific antiviral treatment also exists, Tecovirimat, and it was approved by the European Medicines Agency.

Vaccination against smallpox has been shown to protect against monkeypox, but these vaccines stopped being regularly administered to children in the late 20th century. Currently, there is one vaccine against smallpox that has already been approved for monkeypox prevention in Canada and the United States: Imvanex (Modified Vaccinia virus Ankara). However, given the low risk of infection for the general population and the scarce availability of these products, vaccination is generally restricted to individuals having had contact with a positive case (post-exposure prophylaxis) or at a higher risk of infection (e.g. designated health workers).[7]

Laboratory diagnosis

The Microbiology Department at LNS has developed a specific in-house molecular diagnostic test for monkeypox that allows reporting results within 24h of sample reception. Laboratory confirmation of monkeypox infection is based on nucleic acid amplification testing (NAAT), using real-time polymerase chain reaction (RT-PCR), for the detection of unique sequences of viral DNA. RT-PCR can be used alone or in combination with sequencing, which can provide more insight into how the virus spreads.

Indications for testing

Given the wide range of rash illnesses (mainly varicella-herpes zoster, but also other herpes, molluscum contagiosum, syphilis, etc.), it could be challenging to conclude a clinical diagnosis without laboratory confirmation. Any individual meeting the clinical and epidemiological criteria for probable cases[5] is eligible for testing, and a further assessment of the likelihood of infection will be performed by the LNS (see test request form in Annex 1).

Specimen collection, storage and shipment

Specimens from probable cases should be collected by health workers while observing standard precautions and handled with caution. Skin lesion materials (exudates, crusts or swabs of the surface of the lesion) are the recommended specimen type. It is also recommended to take several specimens from a single patient, but types of skin lesions should not be mixed in the same tube.

Due to limited evidence on the stability of specimens, WHO recommends that specimens be stored refrigerated within an hour of collection and transported to the LNS-Microbiology laboratory as soon as possible. Dark, cool environments may be considered if refrigerated storage is not possible.[8] For shipment, triple packaging with appropriate labelling and documentation is needed.

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Finally, cleaning after working with potential monkeypox specimens can be done with common disinfectants, like household bleach (dilution 1:50) or quaternary ammonium compounds.

Recommendations

The risk of infection during the current outbreak of monkeypox for the general European population is considered low, but moderate for people having multiple sexual partners.[6] The following precautions should be observed:

- Frequent hand and respiratory hygiene are always recommended, as they can help prevent many infectious diseases.
- Regarding sexual activities, the use of condoms helps prevent many sexually transmitted infections and is always encouraged, but it is not fully protective against monkeypox. Assessing the risk of specific situations is recommended to prevent the further spread of the virus.
- In case of experiencing related symptoms or having had a risk contact, health authorities should be contacted for further advice. Specific instructions for Luxembourg can be found on the following site: *Variole du singe - Recommendations sanitaires* (french)[9].

References

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