Essay Mantra

Work Sample

The following sample was featured on a leading diagnostic laboratory's website/blog.

The article is targeted at healthcare professionals, particularly physicians, and is thus technical in nature.

Monkeypox Testing, Facts, & Essentials: Understanding the Novel Medical Challenge

Monkeypox is a zoonotic disease that was originally detected in laboratory monkeys in Africa in 1958. The resurgence of the illness in 2022 has caused a global outbreak that has spread to nearly 109 countries. Originally restricted to 7 central and western African countries, the illness has now become a global health challenge that poses threats to public health, just as the world limps back to normalcy following the COVID-19 pandemic. At the time of writing this article, about 78,229 cases have been reported globally and the illness has claimed at least 41 lives so far. Apart from the characteristic symptoms of a poxvirus illness such as bumps and blisters, the disease also results in other symptoms that include prodromal signs.

Like most infectious diseases, testing for monkeypox is integral to combat it effectively. Our laboratory is perfectly placed to help physicians and the healthcare machinery in deterring this viral disease. Read on to know more about this new threat to public health and why our monkeypox tests are ideal to address the illness.

The Monkeypox Virus

- The monkeypox virus comes from the orthopoxvirus genus of DNA viruses. Being from the same genus as smallpox, variola, vaccinia, and cowpox, it also displays comparable symptoms as these viruses.
- While the virus was first discovered in laboratory monkeys used for research in 1958, several other animals have been cited as the original host. Non-human primates, rope & tree squirrels, Gambian pouched rats, and dormice are some of the suspected animals.
- The first case of human infection was reported when the virus was detected in a 9-month-old boy from the Democratic Republic of Congo in 1970. Ever since, the virus has caused limited outbreaks in the nation and its surrounding Central and West African countries.

- The virus is now prevalent in two strains, with the Central African strain causing more severe illness, having a higher fatality rate of nearly 10%. Conversely, the West African variant results in milder disease with a fatality rate of just about 1%.
- Monkeypox, along with other poxviruses, is highly resilient and capable of withstanding higher-than-normal temperatures and even extremely dry conditions. Apart from its tolerance of large pH differences in the external environment, it can also be detected on surfaces even 15 days after initial contamination.
- The virus is much larger in size than SARS-nCoV (COVID-19 virus) and HIV; the DNA of the virus is about 200 kilobases.
- As a zoonotic virus, monkeypox can be transmitted from animals to humans, and vice versa.

The Transmission of Monkeypox

Understanding the transmission of the disease is integral before carrying out monkeypox tests.

- Human-to-human transmission occurs through a variety of routes that include:
  - Droplet infection: This transmission route requires considerable periods of close contact. This route is of special importance when assessing the risk to close family and healthcare workers.
  - **Contact with bodily fluids:** Bodily fluids such as respiratory secretions and fluid from lesions caused by the illness can result in an infection if someone comes in contact with them. The risk of infection from bodily fluids also extends to recently contaminated surfaces.
  - **Sexual contact:** Monkeypox is known to spread through oral, anal, and vaginal sex. Despite the requirement for further clarity on the exact mechanism, intimate contact with these regions of an infected individual is known to result in a higher risk of transmission.
  - **Placental Transmission:** The virus is also transmitted from an infected mother to the fetus across the placental barrier.
- The human-to-animal transmission also occurs through a variety of different routes:

- **Contact with bodily fluids:** Touching or interacting with the blood, secretions, and open wounds on infected animals can cause an infection. Several animals are known to carry and transmit monkeypox. While the reservoir is still unknown, it is believed to be rodents.
- **Consumption of infected meat:** People that consume infected meat are at greater risk of developing the illness. This is also an important risk factor posed to people that live in greater proximity to wild animals prone to monkeypox infections.

Clinical Features

- Monkeypox is characterized by the appearance of a maculopapular rash and vesicles that eventually fill up with fluid.
- Apart from these symptoms, the rashes and vesicles are preceded by several prodromal symptoms in several cases. These symptoms often include high fever, headache, myalgia, fatigue, and lymphadenopathy.
- While these prodromal symptoms affect a considerable number of people, they're also completely absent in several others, with just the rashes and vesicles developing on different parts of the body. The prodromal part of the illness often lasts up to 3 days, following which the rashes begin appearing.
- The illness' incubation period ranges from between 5 and 21 days, although in most cases, the symptoms begin appearing between the 6th and 13th day following initial exposure.
- The rashes are characterized by their prevalence on the extremities such as the face, hands, and feet, apart from other parts of the body. Large numbers of patients have also reported experiencing symptoms in their oral cavities, genitalia, anorectal regions, and the conjunctiva & cornea of the eyes. This indicates the virus' affinity for mucous membranes of the human body.
- The classical maculopapular rash seen in the illness develops over time and begins as a macule with a flat lining and base that eventually progresses into a fluid-filled papule raised slightly above the skin.
- The papules subsequently become larger fluid-filled vesicles that have a more defined lining and are raised significantly. The continued infection leads the

vesicle to its final stage, the pustule. Pustules are filled with yellowish fluid, thanks to pus buildup.

- Both vesicles and pustules can break open, often resulting in sores and in some cases, ulcers. A characteristic scab develops over the open sore and the vesicles and pustules that do not break open.
- After drying, the scab sloughs off, leaving behind keloid scars. In patients where the vesicles and pustules tend to coalesce, large portions of the skin are lost due to the sloughing off of scabs. In case this leaves behind large gaping wounds, grafting and cosmetic surgery might be the due course of action.
- Despite the discomfort it causes, monkeypox is self-limiting and often resolves sans medication within 2-4 weeks. Monkeypox treatment is often symptomatic and focused on easing the discomfort brought about by the prodromal and maculopapular symptoms.
- The illness can become especially concerning in individuals with compromised immunity, and in those with a history of debilitating diseases such as prolonged diabetes, renal failure, or cancer. Similarly, young children and the elderly remain at enhanced risk of contracting this illness.

Monkeypox Testing at Our Laboratory

- As of now, the CDC recommends monkeypox tests only when the characteristic rash associated with monkeypox is visible on the patient.
- Monkeypox testing is also recommended for those that suspect close contact with an infected individual. The same applies to those that remain near the infected while caring for them. This includes both close family and medical staff.
- Though visual identification might be possible given the overt symptoms of the illness, confirmation of monkeypox is only possible through the NAAT (nucleic acid amplification test) which can be achieved through PCR (polymerase chain reaction).
- Due to the short duration of the virus' presence in the blood, the preferred samples for monkeypox tests using the PCR method include samples of vesicular fluid, sloughed-off scabs, and skin samples from around the vesicles.
- Our laboratory provides highly sensitive and accurate PCR tests, refined by the millions of tests carried out during the COVID-19 pandemic. Apart from PCR testing, we also use the most reliable and advanced antibody tests. This makes

our laboratory the ideal testing partner when it comes to addressing the latest challenge faced by the medical fraternity.

The remainder of this section has been redacted to ensure the client's anonymity.

Monkeypox Treatment

- Being a self-limiting viral illness, monkeypox has no cure so far. As a result, prevention is the ideal modality.
- Certain inferences point to the spread of the illness due to the reduced smallpox vaccination numbers. It is important to note that the smallpox vaccine is at least 85% effective in protecting against the monkeypox virus.
- Based on current recommendations at the time of writing, the JYNNEOS and the ACAM2000 vaccines that prevent smallpox have been approved by the CDC for the prevention of monkeypox.
- Despite the effectiveness of the vaccines, patients should maintain precautions as there's still a lack of understanding of the long-term effectiveness and protection offered by them.
- While there seems to be no monkeypox cure, symptomatic treatment to ease pain and other symptoms is an essential tool in managing the illness for patients.

Our laboratory is fully prepared and well-equipped to deal with the public health concern of monkeypox on the horizon. Apart from sample collection, testing, and report delivery, we also provide support to physicians through our mobile labs-on-wheels to extend patient education and support along with testing. Get started on your fight against monkeypox by teaming up with us today!