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Adding New Fuel to the Fire: Monkeypox in the Time of COVID-19–Implications for Health Care Personnel

Tara N. Palmore, MD; and David K. Henderson, MD

As the COVID-19 pandemic continues to challenge health care workers around the world, monkeypox virus is reemerging, with 1233 confirmed cases reported on 6 continents as of 8 June 2022 (1). As the monkeypox outbreak grows, health care workers must understand the threat and be prepared to address an infectious disease risk that may herald yet another unprecedented epidemic.

Monkeypox virus is an enveloped double-stranded DNA virus that belongs to the *Orthopoxvirus* genus of the *Poxviridae* family, which includes variola (smallpox virus), vaccinia (the smallpox vaccine virus), and cowpox virus. Monkeypox is endemic in western and central Africa. Outbreaks have been smoldering there for years, with cases occasionally imported to the United States and Europe (2). Although smallpox has significant risk for airborne spread, monkeypox is transmitted via direct contact with body fluids from an infected person, through contact of mucosal surfaces or nonintact skin with open lesions, via respiratory droplets, or through contact with contaminated objects (3). The disease is believed to become infectious at symptom onset.

Past human monkeypox infections detected in the United States have almost invariably been related to travel from endemic areas, exposure to infected animals imported from endemic areas, or exposure to domestic animals infected by imported animals. In contrast, the current outbreak has to date affected primarily young men who have sex with men (MSM). Genome sequencing has shown that the isolates belong to the less virulent of the 2 circulating monkeypox clades, with previous mortality of 1% or less.

Guidelines from the Centers for Disease Control and Prevention can help clinicians to safely manage a suspected case of monkeypox infection in a health care setting (4). Health care workers should wear personal protective equipment (PPE) that is appropriate for airborne precautions, including a fit-tested filtering facepiece respirator (for example, an N95 respirator) or a powered air-purifying respirator. State and local health departments should be informed immediately to assist in testing.

Poxviruses are very stable and may remain contagious over months to years in the environment (5). They are highly resistant to desiccation and heat, and this is accentuated by their inclusion in protected environments (such as dermal crusts), with implications for hospital infection control. Approved disinfectants should be used for cleaning and disinfection of high-touch surfaces, and procedures (such as sweeping, dry dusting, or shaking bed linens) that may aerosolize virus particles should be avoided (4). Linens should be removed carefully and washed at high heat or discarded.

Careful history taking and contact tracing are essential. Patients may have had multiple visits to health care facilities or an extended stay in a facility with multiple personnel contacts before monkeypox infection was suspected and appropriate precautions were implemented. Infection prevention and infectious diseases staff should work closely with public health and occupational health services to facilitate case investigation. Although monkeypox has caused occupational infections among health care workers who were not wearing PPE (6, 7), timely postexposure vaccination and close monitoring help to reduce further spread of infection.

In this epidemic, clinical presentations have frequently been atypical, mimicking some sexually transmitted infections by presenting with genital, groin, perianal, or rectal lesions and, in some cases, painful inguinal adenopathy. Although genital lesions have also been described in endemic cases (8), reports from this outbreak suggest that the febrile prodrome that characterizes classic monkeypox disease has been mild or absent in some cases (9, 10). Each exposed health care worker needs to undergo detailed risk assessment to determine exposure and receive counseling on self-monitoring, isolation, and prompt reporting of symptoms based on risk level. For example, a nurse who shakes an infected patient's bed linens is likely at higher risk (from aerosolized virus particles) than a nurse who takes vital signs and administers medications.

Although waves of COVID-19 have at times decimated health care staffing, appropriate caution will prevent monkeypox from adding to staffing shortages. Exposed health care workers need not quarantine but should undergo active surveillance during the 21-day incubation period, including twice-daily temperature checks and daily occupational health symptom screening before reporting to work (11). Educating health care workers and the public may help reduce delays in diagnosis and limit exposures.

Given the characteristics of the current outbreak, patients with monkeypox infection may present to sexually transmitted infection clinics or other outpatient settings that are not well equipped for isolation procedures. Such settings need to be vigilant for potential cases and have appropriate PPE available.

Sadly, monkeypox has been endemic to Africa for years, with insufficient attention from the rest of the world. Now we are facing infections on every inhabited continent at a time when clinical and public health resources have been stretched to the limit by COVID-19. The public is weary of risk mitigation and the need to be cautious. Public health workers and health care workers are exhausted. The prospect of addressing a new communicable pathogen may add to their existing stress and should

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be acknowledged and mitigated whenever possible. Efforts to alleviate the added stress of a new communicable pathogen are essential.

Although monkeypox is unlikely to reach the pandemic spread of COVID-19, physicians and other health care workers must be vigilant, with a high index of suspicion and careful adherence to appropriate infection control precautions as the outbreak unfolds. Importantly, the infection control response must avoid stigmatizing the most affected patient population and should instead ally itself with the MSM community to combat monkeypox.

Infection prevention teams and infectious diseases staff should also take advantage of relationships with public health departments fortified over the course of the COVID-19 pandemic. Leveraging these ties to improve communication, to muster resources, and to work in concert with affected communities will give us the best chance of quelling monkeypox.

From George Washington University School of Medicine, Washington, DC (T.N.P.); and National Institutes of Health Clinical Center, Bethesda, Maryland (D.K.H.).

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Corresponding Author: David K. Henderson, MD, National Institutes of Health Clinical Center, 10 Center Drive, Building 10, Room 9D46A, Bethesda, MD 20892; e-mail, dkh@nih.gov.

Author contributions are available at Annals.org.

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References

1. **BNO News.** Monkeypox Tracker. Accessed at https://bnonews.com/monkeypox on 5 June 2022.
2. **Adler H, Gould S, Hine P, et al; NHS England High Consequence Infectious Diseases (Airborne) Network.** Clinical features and management of human monkeypox: a retrospective observational study in the UK. Lancet Infect Dis. 2022. [PMID: 35623380] doi:10.1016/S1473-3099(22)00228-6
3. **McCollum AM, Damon IK.** Human monkeypox. Clin Infect Dis. 2014;58:260-7. [PMID: 24158414] doi:10.1093/cid/cit703
4. **Centers for Disease Control and Prevention.** Infection Prevention and Control of Monkeypox in Healthcare Settings. 2022. Accessed at www.cdc.gov/poxvirus/monkeypox/clinicians/infection-control-healthcare.html on 8 June 2022.
5. **Ambrose CT .** Osler and the infected letter. Emerg Infect Dis. 2005;11:689-93. [PMID: 15890120]
6. **Nakoune E, Lampaert E, Ndjapou SG, et al.** A nosocomial outbreak of human monkeypox in the Central African Republic. Open Forum Infect Dis. 2017;4:ofx168. [PMID: 29732376] doi:10.1093/ofid/ofx168
7. **Vaughan A, Aarons E, Astbury J, et al.** Human-to-human transmission of monkeypox virus, United Kingdom, October 2018. Emerg Infect Dis. 2020;26:782-5. [PMID: 32023204] doi:10.3201/eid2604.191164
8. **Ogoina D, Iroezindu M, James HI, et al.** Clinical course and outcome of human monkeypox in Nigeria. Clin Infect Dis. 2020;71:e210-e214. [PMID: 32052029] doi:10.1093/cid/ciaa143
9. **Perez Duque M, Ribeiro S, Martins JV, et al.** Ongoing monkeypox virus outbreak, Portugal, 29 April to 23 May 2022. Euro Surveill. 2022;27. [PMID: 35656830] doi:10.2807/1560-7917.ES.2022.27.22.2200424
10. **Antinori A, Mazzotta V, Vita S, et al; INMI Monkeypox Group.** Epidemiological, clinical and virological characteristics of four cases of monkeypox support transmission through sexual contact, Italy, May 2022. Euro Surveill. 2022;27. [PMID: 35656836] doi:10.2807/1560-7917.ES.2022.27.22.2200421
11. **Centers for Disease Control and Prevention.** Monkeypox: Monitoring People Who Have Been Exposed. Accessed at www.cdc.gov/poxvirus/monkeypox/clinicians/monitoring.html on 8 June 2022.

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Drafting of the article: D.K. Henderson, T.N. Palmore.
Critical revision for important intellectual content: D.K. Henderson, T.N. Palmore.
Final approval of the article: D.K. Henderson, T.N. Palmore.
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