



Elsevier has created a [Monkeypox Information Center](#) in response to the declared public health emergency of international concern, with free information in English on the monkeypox virus. The Monkeypox Information Center is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its monkeypox related research that is available on the Monkeypox Information Center - including this research content - immediately available in publicly funded repositories, with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the Monkeypox Information Center remains active.



Correspondence

Healthcare workers and monkeypox: The case for risk mitigation

ARTICLE INFO

Keywords

Monkeypox
Health personnel
Disease outbreak
Occupational exposure
Prevention and control
Delivery of health care
Virus diseases

ABSTRACT

Potentially more at risk of contracting the monkeypox virus are healthcare workers. Most healthcare workers come into direct contact with the disease's infected people, which can spread directly and indirectly. Healthcare professionals must contact patients with the disease and any infected objects or fluids to effectively manage the disease, which further increases the risk of transmission. It is crucial to put safety measures in place and protect healthcare workers. To stop the spread of the monkeypox virus, countries must develop the necessary safeguards and countermeasures. In this emergency, healthcare systems must be strengthened. All healthcare systems should offer staff sufficient personal protective equipment (PPE) and facilitate risk assessment among those with a high risk of exposure. Any suspected case of monkeypox requires caution on the part of healthcare professionals. They must abide by infection control safety rules and protective measures.

Healthcare workers are the core of health systems worldwide. Healthcare workers, including doctors, dentists, pharmacists, nurses, midwives, paramedics, administrators, support workers, laboratory technicians and community health workers, play a substantial role in responding to global health emergencies, such as the current monkeypox outbreak [1].

Monkeypox is a zoonotic disease caused by a virus that belongs to the Poxviridae family. Taking its name from an initial detection among monkeys in a Danish laboratory in 1958 [2], monkeypox was first diagnosed in humans in 1970 in the Democratic Republic of the Congo (DRC). Since then, the virus has been endemic in Western and Central Africa, but few cases were detected outside Africa in 2003 when the first monkeypox case was detected in the US. This ongoing multi-country monkeypox outbreak, which was first documented in the United Kingdom in May 2022, has quickly spread across the globe [3]. This resulted in gaining global attention and, subsequently, the WHO declaring it a Public Health Emergency of International Concern (PHEIC) [4]. As of 18 November 2022, more than 80,328 cumulative cases of monkeypox have been documented worldwide, alongside 53 deaths [5].

Healthcare workers are inextricably involved in the diagnosis, treatment, and direct management of patients with suspected or confirmed monkeypox infection. However, a significant number of healthcare workers reported a lack of confidence regarding the disease diagnosis and management [6]. This is compounded by eruptions or rashes of the suspected individual, which are often similar in appearance to measles, chickenpox and sexually transmitted diseases [7]. Monkeypox is currently diagnosed through analysis of fluid swabbed from those eruptions or rash sites. However, the capacity to diagnose the disease requires advanced laboratory infrastructure and specialised equipment such as polymerase chain reaction (PCR) assays, nucleic acid amplification tests, and GeneXpert assays [8], which may be difficult to carry out in limited-resource settings, thereby hindering the disease diagnosis, and potentially exposing healthcare workers. Furthermore,

despite the vaccination recommendation of HCWs, who are considered at high risk of exposure/infection, many countries still need vaccination, thus being an additional risk factor for healthcare workers to contract the virus [4].

Many other factors render healthcare workers vulnerable to virus transmission. Monkeypox management takes a toll on healthcare workers that primarily serve populations at risk, such as men who have sex with men (MSM), the immunocompromised, and their household and workplace contacts, without necessary workplace precautions due to stigma and diminishing trust in healthcare workers [9]. In addition, protective measures such as contact tracing and adequate follow-up of suspected cases are not implemented in many countries. At the same time, medicines and vaccinations are not available across all dimensions of healthcare [4], from receptionists to doctors, medical laboratory technicians, nurses, support workers or healthcare assistants, and all those involved in patient care from admission to discharge. Studies have documented cases of monkeypox among healthcare workers. For instance, a healthcare worker contracted the monkeypox virus in September 2018 in the United Kingdom due to contact with a contaminated patient's bedding despite having personal protective equipment (PPE) [10]. Moreover, transmissions among health workers have been reported in the Central African Republic [11,12]. Interestingly, new data has reported the Monkeypox virus widespread in hospitalisation environment, furthering the disease exposure to healthcare workers [13,14]. This is a concern because the study showed the virus contamination not only in rooms but also on the PPE of healthcare workers [14].

Considering the above, implementing safeguarding measures and ensuring healthcare workers' protection is essential. It is strongly advocated that countries devise and enforce necessary precautions and measures to protect healthcare workers as part of a wider strategic response to curb the monkeypox outbreak and strengthen the capacity of health systems to address this concern while not forsaking other pressing public health concerns. Areas with a high risk of monkeypox transmission are highly encouraged to sustain the provision of adequate PPE,

<https://doi.org/10.1016/j.ijso.2022.100584>

Received 20 November 2022; Accepted 24 November 2022

Available online 13 December 2022

2405-8572/© 2022 The Author(s). Published by Elsevier Ltd on behalf of Surgical Associates Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

including gowns, gloves, fluid-repellent surgical facemasks (FRSM), eye protection, and FFP3 respirators for personnel [14,15]. This is in line with the global strategy of strengthening human resources for health towards Universal Health Coverage (UHC) and the Sustainable Development Goals (SDGs) [16], which, more broadly, aims to uphold the rights of all health workers and ensure healthcare workers, and to ensure their safety in providing care through decent working conditions [14, 16]. Additionally, in case of any suspected case of monkeypox among healthcare professionals, there is a need to promote preventive action, such as through adherence to protective measures and infection control safety measures, which would greatly prevent infections among more vulnerable groups, such as staff undergoing pregnancy or are of senior age, as well as the immunocompromised.

Most importantly, protecting the high-risk population, including MSM, is critical. Every healthcare worker exposed to the virus should undergo a thorough risk assessment to ascertain their exposure. Depending on the risk level, they should also receive counselling on self-monitoring, isolation, and the timely reporting of manifestations. Healthcare professionals should be trained to be aware of the potential threat of the monkeypox outbreak and be ready to deal with any potential outbreaks of infectious diseases.

Ethics approval statement

Not applicable.

Funding statement

The authors received no funding for this letter.

Author contribution

- Emery Manirambona: Conceptualisation, project administration, design, supervision.
- Emery Manirambona, Jaifred Christian Felicilda Lopez, Colyse Nduwimana, Okesanya Olalekan John, Régis Mbonimpaye, Shuaibu Saidu Musa, Usman Abubakar Haruna, Don Eliseo Lucero-Priso III: Data collection and literature review, preparation of the original draft and visualisation, writing, reviewing, editing and proofreading. All authors have read and confirmed that they meet ICMJE criteria for authorship.

Consent

Not applicable.

Registration of research studies

Not applicable.

Guarantor

Emery Manirambona.

Data availability statement

Not applicable.

Patient consent statement

Not applicable.

Permission to reproduce material from other sources

Not applicable.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- [1] Transforming and scaling up health professionals' education and training: World health organization guidelines 2013. Geneva: World Health Organization; 2013. Annex 1, Definition and list of health professionals. Available from, <https://www.ncbi.nlm.nih.gov/books/NBK298950/>.
- [2] von Magnus P, Andersen EA, Petersen KB, Birch-Andersen A. A pox-like disease in cynomolgus monkeys. *Acta Pathol Microbiol Scand* 1959;46:159.
- [3] Manirambona E, Shomuyiwa DO. Monkeypox among refugees: a call for a global protection. *Trav Med Infect Dis* 2022;50:102458. <https://doi.org/10.1016/j.tmaid.2022.102458>.
- [4] Manirambona E, Musa SS, Shomuyiwa DO, et al. The monkeypox virus: a public health challenge threatening Africa. *Public Health Chall* 2022;4(1):e33. <https://doi.org/10.1002/puh.2.33>.
- [5] CDC. 2022 monkeypox outbreak global map. <https://www.cdc.gov/poxvirus/monkeypox/response/2022/world-map.html>; 2022.
- [6] Harapan H, Setiawan AM, Yufika A, Anwar S, Wahyuni S, Asrizal FW, et al. Confidence in managing human monkeypox cases in Asia: a cross-sectional survey among general practitioners in Indonesia. *Acta Trop* 2020;206:105450. <https://doi.org/10.1016/j.actatropica.2020.105450>.
- [7] John Hopkins Medicine. Monkeypox. <https://www.google.com/amp/s/www.hopkinsmedicine.org/health/conditions-and-diseases/monkeypox%3famp=true>; 2022.
- [8] McCarthy MW. Recent advances in the diagnosis monkeypox: implications for public health. *Expert Rev Mol Diagn* 2022;22(7):739–44.
- [9] Manirambona E, Shomuyiwa DO, Musa SS, Lucero-Priso III DE. Monkeypox among men who have sex with men in Africa: the need for testing and vaccination beyond stigma. *J Med Virol* 2022. <https://doi.org/10.1002/jmv.28121>.
- [10] Vaughan A, Aarons E, Astbury J, Brooks T, Chand M, Flegg P, et al. Human-to-Human transmission of monkeypox virus, United Kingdom, October 2018. *Emerg Infect Dis* 2020;26(4):782–5. <https://doi.org/10.3201/eid2604.191164>.
- [11] Nakoune E, Lampaert E, Ndjapou SG, Janssens C, Zuniga I, Van Herp M, et al. A nosocomial outbreak of human monkeypox in the Central African Republic. *Open Forum Infect Dis* 2017;4(4):ofx168. <https://doi.org/10.1093/ofid/ofx168>.
- [12] Besombes C, Gonofio E, Konamna X, Selekon B, Grant R, Gessain A, et al. Intra-family transmission of monkeypox virus, Central African Republic, 2018. *Emerg Infect Dis* 2019;25(8):1602–4. <https://doi.org/10.3201/eid2508.190112>.
- [13] Taylor L. Monkeypox: virus DNA is widespread in treatment rooms, study finds. *BMJ* 2022;379:o2460. <https://doi.org/10.1136/bmj.o2460>.
- [14] Gould S, Atkinson B, Onianwa O, Spencer A, Furneaux J, Grieves J, et al. NHS England Airborne High Consequence Infectious Diseases Network. Air and surface sampling for monkeypox virus in a UK hospital: an observational study. *Lancet Microbe* 2022;(22):S2666–5247. [https://doi.org/10.1016/S2666-5247\(22\)00257-9](https://doi.org/10.1016/S2666-5247(22)00257-9).
- [15] UK Health Security Agency Public health agencies issue monkeypox guidance to control transmission. <https://www.gov.uk/government/news/public-health-agencies-issue-monkeypox-guidance-to-control-transmission>; 2022.
- [16] World Health Organization. Global strategy on human resources for health: workforce 2030. World Health Organization; 2016. <https://apps.who.int/iris/handle/10665/250368>.

Emery Manirambona*

College of Medicine and Health Sciences, University of Rwanda, Kigali, Rwanda

Jaifred Christian Felicilda Lopez

Department of Population Health Sciences, Duke University, Durham, USA

E-mail address: jim.lopez@duke.edu.

Colyse Nduwimana

Gender, Sexual and Reproductive Health Option, University of Global

Health Equity, Kigali, Rwanda

E-mail address: colyseblessed@gmail.com.

Olalekan John Okesanya

Department of Medical Laboratory, Neuropsychiatric Hospital Aro,

Abeokuta, Nigeria

E-mail address: okesanyaolalekanjohn@gmail.com.

Régis Mbonimpaye

Université de Montpellier, Montpellier, France

E-mail address: mbonimpaye88@gmail.com.

Shuaibu Saidu Musa

Department of Nursing Science, Ahmadu Bello University, Zaria, Nigeria

E-mail address: shuaibumusa2@gmail.com.

Abubakar Haruna Usman

Department of Biomedical Science, Nazarbayev University School of

Medicine, Nursultan, Kazakhstan

E-mail address: khaliphate13@gmail.com.

Don Eliseo Lucero-Prisno III

Department of Global Health and Development, London School of Hygiene

and Tropical Medicine, United Kingdom

Faculty of Public Health, Mahidol University, Bangkok, Thailand

E-mail address: don-eliseo.lucero-prisno@lshtm.ac.uk.

* Corresponding author.

E-mail address: manemery1@gmail.com (E. Manirambona).