

# Nurses' Guide to Preventing Transmission of Monkeypox in Health Care Settings

## SAFE DONNING AND DOFFING OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

Health care employers are responsible for ensuring that nurses and other health care workers are protected from exposure to the monkeypox virus (MPV) to ensure safe patient care. Health care worker and patient protection requires multiple layers to prevent exposure, including isolating suspected and confirmed cases, providing optimal personal protective equipment (PPE) and training on its proper use, and exposure notification and follow-up. Safe donning and doffing of PPE is an essential element of preventing health care worker exposure to MPV.

To see more about comprehensive MPV prevention plans, visit: [www.nationalnursesunited.org/monkeypox-resources](http://www.nationalnursesunited.org/monkeypox-resources)

### HOW IS THE MONKEYPOX VIRUS (MPV) TRANSMITTED?

#### ▶ **Monkeypox virus (MPV) can be transmitted through multiple modes:**

- Contact with lesions of an infected patient and/or with contaminated surfaces or objects.
- People who are infected with MPV can have lesions in their throats and mouths and shed infectious virus in aerosolized particles during breathing, speaking, coughing, or sneezing.
- Infectious monkeypox virus that is present on objects, such as bedding and clothing, can become aerosolized when the object is moved, especially if it is shaken.

### WHAT PPE PRECAUTIONS ARE NEEDED FOR MPV IN HEALTH CARE SETTINGS?

#### ▶ **MPV requires both airborne and contact precautions, including:**

- Optimal level of PPE for MPV: powered air-purifying respirator (PAPR), coveralls impermeable to viral penetration that incorporate head and shoe covering, and gloves.
- Minimum level of PPE for MPV: fit-tested, single-use N95 respirator, isolation gown, goggles, and gloves.

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## CAN I BE EXPOSED TO MPV WHEN DOFFING (TAKING OFF) PPE AFTER CARING FOR A PATIENT WITH MPV?

► **Exposure during PPE doffing (taking off) can occur to health care workers after caring for patients with MPV. If proper doffing protocols are not followed, transmission can occur via both airborne and contact transmission:**

- Airborne exposure during PPE doffing: One study found positive contamination in the breathing zone of a worker while doffing PPE, including a PAPR, isolation gown, inner and outer gloves, and boot covers.<sup>1</sup>
- Contact exposure during PPE doffing: This study also found contamination on the skin, hands and wrists of health care workers following PPE doffing. Contamination was observed on every subject to a certain extent.<sup>2</sup>
- Extensive viral contamination has also been detected on various surfaces in hospital isolation rooms of positive patients, including air vents, fabrics used by the patients, gloved hands of investigators and all hand-contact points in the anteroom.<sup>3</sup> PPE worn by health care workers can become contaminated during use and should be doffed carefully according to proper procedures.

## HOW LONG CAN MPV SURVIVE IN THE ENVIRONMENT?

Orthopoxviruses, the family of viruses including MPV, have an exceptional ability to remain infectious in the environment for long periods of time. Infectious MPV virus has been recovered from environmental samples up to 15 days after an infected individual was present.<sup>4</sup>

## WHAT PRECAUTIONS SHOULD HEALTH CARE EMPLOYERS IMPLEMENT TO PROTECT STAFF AND PATIENTS FROM MPV?

Based on the precautionary principle and the scientific evidence about how MPV is transmitted, health care employers must implement both optimal workplace protections for MPV and safe practices for donning and doffing of PPE to limit the spread of and contamination by MPV.

**Precautions for preventing MPV transmission in health care settings should include the following:**

- Immediate isolation of suspected and confirmed MPV cases in airborne infection isolation rooms (also known as negative pressure rooms)
- Optimal personal protective equipment (PPE)
  - **Optimal level of PPE for monkeypox:** powered air-purifying respirator, coveralls impermeable to viral penetration that incorporate head and shoe covering, and gloves.
  - **Minimum level of PPE for monkeypox:** fit-tested, single-use N95 respirator, isolation gown, goggles, and gloves.
- Strict procedures for donning (putting on) and doffing (taking off) of PPE upon entry and exit from the patient's isolation room
  - Cleaning protocols after each doffing for PPE designed to be reused (e.g., PAPRs).
- Tight control of patient transport and health care worker movement through the facility must also be implemented to prevent transmission or contamination of monkeypox.
- Safe nurse and health care worker staffing levels.

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## WHAT ARE THE RECOMMENDATIONS FOR DONNING, USING, AND DOFFING PPE SAFELY?

Donning and doffing safely is an important component of infection prevention in health care settings to prevent risk of contamination. **The following are general recommended steps.**

### *Donning (putting on) PPE*

- PPE should be donned prior to entering the patient isolation room and all personal items and jewelry must be removed.
- As required by the OSHA Respiratory Protection Standard [29 CFR § 1910.134], health care employers must “provide each respirator user with a respirator that is clean, sanitary, and in good working order.”
  - **If wearing a PAPR**, health care workers must ensure that the blower, battery, and air supply hose are in good condition.
  - **If wearing a tight-fitting respirator** (e.g., elastomeric or N95), health care workers must be fit tested for the type, model, and size of respirator they will be wearing. A user seal check should be performed each time a user dons a respirator to ensure an adequate seal is achieved. Here is a video from OSHA about respirator fit testing and user seal check. <https://www.youtube.com/watch?v=Tzpz5fko-fg>
- Here is a link to the Centers for Disease Control and Prevention (CDC) sequence for PPE donning. <https://www.cdc.gov/hai/pdfs/ppe/ppe-sequence.pdf>
- Once all PPE has been donned, thoroughly inspect PPE for any tears, cuts, or contamination in a full-length mirror.
  - A trained buddy or observer could also visually confirm that the PPE was donned in the correct sequence, allowing for a full range of motion while making sure that no exposed skin or clothing is visible. If used, the buddy should also be donned at the same level of PPE as the health care worker providing patient care. Here is a link to a video on how to serve as the trained observer during PPE donning. - <https://www.youtube.com/watch?v=Is75vrNrtwl&t=1s>

### *During patient care*

- Health care workers should avoid touching their faces or adjusting PPE with contaminated gloves.
- If any breach in PPE occurs (e.g., tears in gloves, needlestick), during patient care, the health care worker should immediately move to the doffing area to assess the exposure and don clean PPE before continuing care.
- Employers must ensure staffing levels so that health care workers are adequately hydrated and can take frequent breaks. Wearing PPE for long periods of time can cause thermal stress, increased heart and respiratory rates, and other physiologic impacts that can be remedied with a rest break.

### *Doffing (taking off) PPE*

- One of the highest risks of exposure exists while removing PPE. Because of this, PPE must be removed slowly and deliberately in the correct sequence to prevent or minimize contamination.
  - **Careful doffing of PPE also requires sufficient time and attention.** Staffing levels should take into account patient acuity, including the need for time to don and doff PPE safely.
- A designated area or anteroom where health care workers can doff, and discard PPE can help prevent cross-contamination to other staff, patients, and areas of the facility.
- Before removing any PPE, thoroughly inspect for any tears, cuts, or contamination.

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- The correct sequence for doffing PPE should start with removing the most contaminated equipment first, working towards the least contaminated:
  - Remove and dispose isolation gown and gloves in the anteroom.
  - Perform hand hygiene.
  - Remove goggles or face shield outside the patient room.
  - Wash hands with soap and water.
  - Remove the respirator by grasping the bottom, then the top ties or elastic bands without touching the front. Respiratory protection should be removed last and outside the patient room.
  - Proper hand hygiene must be performed immediately after the final doffing of PPE using soap and water or, if soap and water are not available, alcohol-based hand sanitizer.
- Safely dispose of all single-use PPE in biohazard waste containers.
- Working with a trained buddy or observer can be an additional protection to visually confirm and ensure that each doffing step is safely and correctly followed. Here is a link to a video on how to serve as the trained observer during PPE removal or doffing.
  - <https://www.youtube.com/watch?v=YG6NQZf17MM&t=1s>
- For reusable respirators like PAPRs and elastomerics, OSHA’s Respiratory Protection Standard requires employers to ensure that reusable respirators are cleaned and disinfected using procedures in Appendix B-2 or use the procedures recommended by the manufacturer (if at least as effective).<sup>5</sup>

### ADDITIONAL RESOURCES:

- Sequence for Putting on Personal Protective Equipment <https://www.cdc.gov/hai/pdfs/ppe/ppe-sequence.pdf>
- Types of Respiratory Protection [https://www.cdc.gov/niosh/npptl/topics/respirators/disp\\_part/respsourceTypes.html](https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsourceTypes.html)
- NIOSH user seal check factsheet <https://www.cdc.gov/niosh/docs/2018-130/>
- How to Serve as the Trained Observer: Putting on PPE
- How to Serve as the Trained Observer: Taking off PPE

### Endnotes

- 1 • Therkorn, J., D. Drewery, et al., “Development and Comparison of Complementary Methods to Study Potential Skin and Inhalational Exposure to Pathogens During Personal Protective Equipment Doffing,” *Clinical Infectious Diseases*, September 2019, <https://doi.org/10.1093/cid/ciz616>
- 2 • Ibid.
- 3 • Gould, S., B. Atkinson, et al., “Air and surface sampling for monkeypox virus in UK hospitals,” *medRxiv*, July 2022, <https://doi.org/10.1101/2022.07.21.22277864>
- 4 • Morgan, C.N., F. Whitehill, et al., “Environmental Persistence of Monkeypox Virus on Surfaces in Household of Person with Travel-Associated Infection, Dallas, Texas, USA, 2021, *Emerging Infectious Diseases*, August 2022, <https://doi.org/10.3201/eid2810.221047>
- 5 • 29 CFR 1910.134 App B-2 <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134AppB2>