MONKEY POX

NURSES' GUIDE TO PREVENTING TRANSMISSION OF MONKEYPOX IN HEALTH CARE SETTINGS »

Cleaning and Disinfection

INTRODUCTION

The monkeypox virus (MPV) is an orthopoxvirus, which is a family of viruses that includes smallpox. The transmission modes of MPV include contact with infectious lesions or contaminated objects and airborne/aerosol transmission nnu.org/monkeypox-scientific-evidence.

Cleaning and disinfection are important elements of a plan to prevent MPV transmission in health care settings, in addition to patient screening and isolation, optimal personal protective equipment (PPE), and exposure surveillance. For more information on comprehensive plans, visit nnu.org/monkeypox-what-nurses-need-to-know.

HOW LONG CAN THE MONKEYPOX VIRUS (MPV) SURVIVE IN THE ENVIRONMENT?

Orthopoxviruses can survive in the environment for long periods of time, from weeks to years.[1] Infectious MPV virus has been recovered from environmental samples up to 15 days after an infected individual was present.[2] Viable virus was detected primarily on porous surfaces, such as bedding and clothing.[3,4]

WHAT IS THE DIFFERENCE BETWEEN CLEANING, SANITIZING, AND DISINFECTING?

The U.S. Environmental Protection Agency (EPA) regulates chemicals used for sanitizing and disinfection. For more information:

Table 1: Cleaning vs Sanitizing vs Disinfecting — What's the Difference?

Action	What does it do?	Does EPA regulate the product?
Cleaning	Cleaning removes dirt and organic matter from surfaces using soap or detergents.	EPA regulates cleaning products only if they sanitize or disinfect. **Learn more about EPA's role.**
Sanitizing*	Sanitizing kills bacteria on surfaces using chemicals. It is not intended to kill viruses.	Yes, EPA registers products that sanitize.
Disinfecting*	Disinfecting kills viruses and bacteria on surfaces using chemicals.	Yes, EPA registers products that disinfect. To find disinfectants for use against SARS-CoV-2 (COVID-19), see **List N**.

Source: **https://www.epa.gov/coronavirus/whats-difference-between-products-disinfect-sanitize-and-clean-surfaces**

*If soil is present, effective sanitizing and disinfection rely on cleaning the surface first. If not first removed, soil such as bodily fluids can block the action of disinfectants and sanitizers.

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WHAT KIND OF CLEANING IS NEEDED TO REDUCE MONKEYPOX TRANSMISSION IN HEALTH CARE SETTINGS?

Because of the ability of the MPV virus to survive on surfaces, cleaning high-touch surfaces and other surfaces that staff and patients may come into contact with is an important element of a plan to prevent MPV transmission in health care settings. Cleaning should be performed prior to disinfection in order to remove soil (e.g., dirt or bodily fluids) that could reduce the effectiveness of disinfectants.

Dry sweeping and dry dusting are not recommended because they can aerosolize dust containing infectious particles. Using wet methods such as mopping and wet dusting are recommended.

WHAT FACTORS DETERMINE WHETHER A DISINFECTING AGENT IS EFFECTIVE?

There are multiple factors that impact the effectiveness of a disinfectant agent:

» Contact time.

» Concentration of the disinfection agent.

» Particular pathogen of concern.[5]

WHAT KINDS OF CHEMICALS ARE EFFECTIVE FOR DISINFECTION OF THE MPV VIRUS?

There are multiple places you can look for information on the effectiveness of disinfectants.

The EPA publishes a list — List Q: Products with Emerging Viral Pathogens Claims — for which manufacturers have submitted data showing effectiveness of disinfectants against difficult-to-inactivate viruses. You can view the EPA's List Q here: **https://www.epa.gov/pesticide-registration/disinfectants-emerging-viral-pathogens-evps-list-q**.

Scientists have studied the effectiveness of some disinfectants, though this is not a comprehensive source of information. A June 2022 literature review found studies evaluating inactivation of orthopoxviruses (including MPV) by different disinfecting agents and found some to be effective — see Table 2.[6]

Table 2: Results of a June 2022 literature review on the efficacy of some disinfectants against orthopoxviruses (not a comprehensive resource).[7]

Disinfectant studied	Concentration	Contact time
Ethanol	50-95%	1 min
Isopropanol	40-75%	1 min
Glutaraldehyde	0.05-0.5%	5 min
Hydrogen peroxide	14.4%	30 sec
Peracetic acid	0.005-0.2%	1 min
Sodium hypochlorite	0.25-2.5%	1 min
Quaternary ammonium compound	0.1%	30 min
Note: This is NOT a comprehensive list of effective disinfectants for the MPV virus. See the EPA's **List Q** for additional disinfectants.		

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ARE THERE ADDITIONAL HAZARDS ASSOCIATED WITH DISINFECTANTS?

Some disinfectants can pose additional health hazards, so it is important to do the following when selecting a disinfectant:

» Select a disinfectant that is effective on the type of surface to be disinfected.

» Evaluate potential health hazards and the recommended protective measures (e.g., gloves, goggles, and/or a respirator).

» Follow the manufacturer's directions for use including dilution, required contact time (the surface should stay wet for the required amount of time; reapply if necessary), and protective measures.

» Never mix disinfectants with other cleaners, disinfectants, or other chemicals.

HOW DO I KNOW WHAT KIND OF PROTECTIVE MEASURES ARE NEEDED TO USE A DISINFECTANT SAFELY?

Your employer should provide you with information about the chemicals to which you may be exposed at work, including what protective measures are necessary. Manufacturers should include required protective measures on the Safety Data Sheets, or SDSs, for the disinfectants. For more information on workers' right to know about chemical hazards and accessing SDSs, see this resource: **nnu.org/monkeypox-chemical-hazards-and-safety**.

The National Institute for Occupational Safety and Health (NIOSH) also provides a resource on common cleaning chemicals, associated health hazards, and recommended protective measures: **https://www.cdc.gov/niosh/topics/disinfectant/default.html.**

HOW OFTEN SHOULD SURFACES BE CLEANED AND DISINFECTED IN HEALTH CARE SETTINGS?

Cleaning and disinfecting high-touch surfaces in patient care areas at least once per day is a general minimum. More frequent cleaning and disinfection may be appropriate in certain settings, depending on how many people may be present, how likely they are to be infected with MPV, and whether other control measures are in place.

HOW SHOULD I HANDLE WASTE AND LAUNDRY POTENTIALLY CONTAMINATED WITH MPV?

Waste potentially contaminated with MPV should be treated as biohazardous waste.[8] When handling waste or laundry potentially contaminated with MPV, PPE should be worn — including an N95 or more protective respirator, eye protection, isolation gown, and gloves.

Do not shake or agitate potentially contaminated linens in a way that could aerosolize dust or contamination with the virus. Avoid contact between one's body and clothing and the soiled items being handled. Place the soiled items in a laundry bag or designated bin. Use an impermeable bin to transport laundry, such as a plastic bag.

If caring for MPV-positive patients, consider changing out of scrubs when at the hospital before returning home to reduce the risk of contamination in vehicles, on public transportation, and at home.

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DOES THE LAUNDERING PROCESS INACTIVATE MPV?

The laundering process is expected to remove and inactivate the MPV virus. Several studies have found inactivation of orthopoxvirus by surfactants, which are often the active ingredient in detergents.[9] Studies have also found that hot water (at least 40°C/100°F) with a wash cycle of at least 8-10 minutes followed by adequate drying was effective at removing bacterial and viral contamination.[10] Adding bleach to the wash cycle increased efficacy in inactivating pathogens.[11]

ENDNOTES

1 Essbauer, S., H. Meyer, et al., "Long-lasting stability of vaccinia virus (orthopoxvirus) in food and environmental samples," Zoonoses Public Health, 2007, doi: 10.1111/j.1863-2378.2007.01035.x.

2 Morgan 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://wwwnc.cdc.gov/eid/article/28/10/22-1047_article.**

3 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**.

4 Atkinson, B., C. Burton, et al., "Infection-competent monkeypox virus contamination identified in domestic settings following an imported case of monkeypox into the UK," Environmental Microbiology, July 2022, **https://doi.org/10.1111/1462-2920.16129**.

5 Enveloped viruses contain a lipid envelope that is required for infection, so interfering with the envelope reduces viral infectivity. In contrast, there are also non-enveloped viruses which have a protein coat for infection and disinfection typically requires denaturation of the viral proteins. The monkeypox virus is an enveloped virus.

6 Kampf, G., "Efficacy of biocidal agents and disinfectants against the monkeypox virus and other orthopoxviruses," J Hospital Infection, 2022, 127: 101-110, **https://doi.org/10.1016/j.jhin.2022.06.012**.

7 Kampf, G., "Efficacy of biocidal agents and disinfectants against the monkeypox virus and other orthopoxviruses," J Hospital Infection, 2022, 127: 101-110, **https://doi.org/10.1016/j.jhin.2022.06.012**.

8 CDC, "Infection Prevention and Control of Monkeypox in Healthcare Settings: Waste Management, Environmental Infection Control," Updated Aug 11, 2022, Available at **https://www.cdc.gov/poxvirus/monkeypox/clinicians/infection-control-healthcare.html** (Accessed Aug 24, 2022).

9 Lin, Q., J.Y.C. Lim, et al., "Sanitizing agents for virus inactivation and disinfection," View (Beijing), 2020, 1(2): e6, **https://doi.org/10.1002%2Fviw2.16**.

10 Walter WG, Schillinger JE. Bacterial survival in laundered fabrics. Appl Microbiol 1975;29:368–73. **https://journals.asm.org/doi/full/10.1128/am.29.3.368-373.1975.**

Heinzel, M., A. Kyas, et al., "Evaluation of the virucidal performance of domestic laundry procedures," International Journal of Hygiene and Environmental Health, 2010, 213(4): 334-7. **https://www.sciencedirect.com/science/article/abs/pii/S1438463910000805.**

Jaska, J.M. and D.L. Fredell, "Impact of detergent systems on bacterial survival on laundered fabrics," Applied and Environmental Microbiology, 1980, 39(4), **https://journals.asm.org/doi/abs/10.1128/aem.39.4.743-748.1980.**

11 Christian, R.R., J.T. Manchester, et al. "Bacteriological quality of fabrics washed at lower-than-standard temperatures in a hospital laundry facility," Applied and Environmental Microbiology, 1983, 45(2) **https://journals.asm.org/doi/abs/10.1128/aem.45.2.591-597.1983.**

Smith, J.A., K.R. Neil, et al., "Effect of Water Temperature on Bacterial Killing in Laundry," Infection Control & Hospital Epidemiology, 2015, 8(5) **https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/abs/effect-of-water-temperature-on-bacterial-killing-in-laundry/E7BE45B78E0A2C2110A79140CB602873.**

Honisch, M., R. Stamminger, et al., "Impact of wash cycle time, temperature and detergent formulation on the hygiene effectiveness of domestic laundering," J Applied Microbiology, 2014, 117(6): 1787-97, **https://sfamjournals.onlinelibrary.wiley.com/doi/full/10.1111/jam.12647.**