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ENVIRONMENTAL SCAN

# Guidance for Monkeypox Waste Disposal

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## Key Findings

- The United Kingdom (UK), United States (US), Canada, European Centre for Disease Prevention and Control (ECDC), and World Health Organization (WHO) have all published guidance on the disposal of waste (i.e., gauze, contaminated items) from monkeypox cases in health care and/or domestic settings. However, the depth of information varies across the jurisdictions.

- Guidance in all included jurisdictions recognizes (in varying degrees of detail) that items contaminated during the care of a monkeypox patient should be considered as infectious waste and handled accordingly.

- Guidance from a majority of included jurisdictions (Canada, UK, US, and ECDC) states that contaminated items should be discarded according to jurisdictional protocols (i.e., municipal, state/provincial, national). However, monkeypox waste disposal guidance documents that deferred to general local, state or national level clinical waste disposal protocols largely did not provide further detail on waste management protocols for monkeypox.

- In early June 2022, the US Centers for Disease Control and Prevention (CDC) stated that contaminated waste should not be disposed of with waste in landfills or dumps. However, the CDC updated that guidance and now recommend that monkeypox patients who are isolating at home use a dedicated, lined garbage can in the room where they are isolating, and that all waste that has been in direct contact with skin be disposed of in a sealed plastic bag and placed into a dedicated garbage.

- Canada and the US both recognize waste that may contain monkeypox virus as a “Category A” substance, which refers to infectious substances capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans or animals upon exposure to the substance. This recognition requires special guidance on transportation, handling and packaging when disposing of waste. The US has since provided updated guidance depending on the monkeypox virus clade (strain) and Transport Canada has provided guidance specific to patient specimens.

    - The US Department of Transportation (DOT) has established different requirements for waste management practices and classification depending on the monkeypox virus clade. Waste contaminated with the West African clade of monkeypox virus should be managed as UN3291 Regulated Medical Waste (RMW) in the same manner as other potentially infectious medical waste (e.g., soiled dressings, contaminated sharps). Waste contaminated with the Congo Basin clade of monkeypox virus is classified as Category A and managed accordingly.

    - Transport Canada issued a Temporary Certificate pursuant to subsection 31(2.1) of the *Transportation of Dangerous Goods Act, 1992*, which came into effect on June 2, 2022 to allow the transportation of monkeypox patient specimens as "Category B" infectious substances. Household waste is not under the jurisdiction of Transport Canada, thus this re-categorization would not apply to waste.

    - Following an assessment by Public Health Agency of Canada (PHAC), Transport Canada authorized this reclassification of monkeypox patient specimens to be transported as a "Category B" infectious substance in order to assist medical professionals in their timely response to the monkeypox outbreak.

- There was limited available guidance on waste management protocols for monkeypox from Quebec and WHO. These jurisdictions, as well as the others included in this scan, should be monitored for emerging information as the global outbreak continues.

- From a human health infection prevention and control (IPAC) perspective, the transmission risk from domestic waste to an individual is likely low and may be reduced by using strong bags, ensuring bags are securely tied, double bagging waste and reinforcing routine practices for management of waste (i.e., good hand hygiene, gloves if bags are handled).

- There are additional considerations beyond the scope of human health IPAC considerations including, but not limited to, the obligation to abide by the risk Category A classification protocols, and potential zoonotic risk of biohazardous material disposed in landfills without treatment (i.e., establishment of an animal reservoir). There may also be local/municipal differences in waste collection services that need to be taken into account.

# Objectives and Scope

The purpose of this document is to summarize existing guidance for the disposal of contaminated waste, such as gauze, wound dressings and other contaminated items, from monkeypox cases who are under quarantine and care at home or in healthcare settings. The document also discusses implications for public health practice, including concerns surrounding the potential establishment of the monkeypox virus in wildlife (risk of endemic zoonosis) due to use of landfills.

This document can be used by public health organizations and local/regional health units to support the development of monkeypox waste disposal guidance.

Out of scope for this document is a summary of guidance on other IPAC measures (i.e., environmental cleaning and disinfection, ventilation, personal protective equipment) during and after the care of a monkeypox patient, laboratory waste, and the treatment of contaminated waste.

# Background

Monkeypox is a zoonotic infection with symptoms similar to, but less severe than, those seen in smallpox patients and has a typical incubation period of 6 to 13 days (range = 5 to 21 days).[1] Spread of monkeypox may occur when a person comes into close contact with an infected animal, human, or materials used by an infected person (e.g., bedding, towels, clothing), or from mother to fetus. Person-to-person transmission of monkeypox occurs via close contact with lesions, body fluids, and respiratory droplets of an infected person.[2]

Sporadic travel-related monkeypox infections in humans have been reported from 2018 to 2021 in the UK, the US, Singapore, Israel and Benin in individuals returning from Nigeria,[3] and in a health care worker in the UK believed to have acquired the infection from contact with contaminated bed linen.[4]The WHO's May 21, 2022 risk assessment indicated a high likelihood of identification of further cases with unidentified chains of transmission, including in other population groups.[1] The majority of the general population is susceptible to monkeypox infection given absence of routine immunization programs for smallpox.

As of July 11, 2022, there have been cumulative total of 9,624 cumulative monkeypox cases reported globally since May 6, 2022. On July 11, 2022, the seven-day rolling average of monkeypox cases globally reached a high of 414.1 daily cases (seven-day average).[5]

Challenges currently exist regarding disposal of contaminated domestic waste, such as gauze, wound dressings and other contaminated items, from monkeypox cases who are under quarantine and care at home. An infectious substance is classified as "Category A" if it is in a form (i.e., untreated) capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans or animals upon exposure to the substance.[6] The waste stream processes for management of Category A waste, while clear in health care settings, is complicated in other settings that are not familiar with or equipped to handle Category A waste, and may not present the same level of contamination as from a patient in an inpatient acute care setting.

As of June 2, 2022, Transport Canada has lowered the risk category to "Category B" for the transportation of patient specimens that may contain monkeypox virus for the purposes of specimen collection and transport. Household waste is not under the jurisdiction of Transport Canada and this re-categorization would not apply.

Limited information was found about survivability of pox viruses on surfaces:

- WHO indicates that the persistence of surrogate pox virus in the environment and on different types of surfaces has been found to last between 1–56 days depending upon the temperature and room humidity.[7] There are currently limited data on surface contamination and fomite transmission, aside from contaminated linens.[7] Pox viruses are generally more resistant to environmental conditions and show high environmental stability.[7-10]

- A study by Essbauer et al. (2007) inoculated various items (e.g., bread, salad, sausages, and gauze bandages) with vaccinia virus (an orthopoxvirus and smallpox surrogate) and stored these at 4.5C to assess virus viability on the surface of these items. At this temperature samples were found to be infectious for up to 166 days following inoculation.[11] A similar study examining viability of vaccinia virus on different surface types found that the virus may persist from weeks to months, depending on the material and environmental conditions.[12]

# Methods

This scan reports on publically available guidance from select jurisdictions: Canada, Quebec, UK, US, ECDC, and WHO. Information is available up to July 12, 2022.

This scan was informed by scanning key government websites, non-government health and public health organizations' websites, as well as general Google searches for items related to influenza outbreak protocols, testing protocols and treatment guidance. A formal bibliographic database search was not conducted due to time constraints; thus, some relevant articles may not be included. This search was limited to English-only publications.

# Results

## Canada

In 2018, Transport Canada's Transportation of Dangerous Goods (TDG) Bulletin on the shipping of infectious substances categorized monkeypox as a "Category A" substance.[13] However, as of June 3, 2022, following an assessment, PHAC requested that patient specimens which may contain monkeypox virus be authorized to be reclassified as "Category B" infectious substances.[14]

The Transport Minister temporarily authorized the handling, offering for transport, or transporting of dangerous goods that are patient specimens which may contain monkeypox virus by issuing a temporary certificate under subsection 31(2.1) of the *TDG Act*. This certificate takes into account existing safety requirements of the *TDG Regulations* and recommendations from PHAC.[9]

This temporary decision was made to assist medical professionals in their response to the monkeypox outbreak. The handling and transport of "Category A" substances from patients is associated with rigorous requirements which are difficult to adhere to in a timely manner in the current context as patient specimens are being collected at facilities not accustomed to "Category A" infectious substances. For example, it is challenging to ensure that patient specimens are transported in a timely manner in P620 packaging required of "Category A" substances, since many facilities may not have a sufficient supply of P620 packaging.[9]

Transport Canada's 2018 TDG Bulletin on the shipping of infectious substances recognized monkeypox as a "Category A" substance, which required that waste generated from the care of a monkey pox patient must be shipped in a specific type of packaging (i.e., type P620 or standardized and non-standardized packaging permitted in Part III of the CAN-CGSB-43.125 standard).[8]

According to Transport Canada, type P620 packaging (required for the disposal of "Category A" substances, which includes monkeypox) should consist of:

- Inner packaging comprising: 1) Leak-proof primary receptacle(s); and 2) Leak-proof secondary packaging(s); and
- A rigid outer packaging of adequate strength for its capacity, mass and intended use of which the smallest external dimension is at least 100 mm. The outer packaging must be selected from a standardized list.

Transport Canada also notes that for liquid infectious "Category A" substances, an absorbent material must be placed between the primary receptacle(s) and the secondary inner packaging and in sufficient quantity to absorb the entire content of the primary receptacle(s).[8]

The Government of Canada published interim guidance on infection prevention and control for suspect, probable or confirmed monkeypox within health care settings, which states the following:[15]

- Biomedical waste should be contained in impervious waste-holding bags or double bagged according to municipal/regional regulations.
- Contaminated disposable items should be discarded according to jurisdictional protocols.

## Quebec

The Institut National de Santé Publique du Québec (INSPQ) has very limited information on waste disposal guidance for monkeypox. INSPQ recommends that health care settings (e.g., medical clinics, family medicine groups, sexually transmitted infection (STI) clinics, and acute care hospitals in Quebec including outpatient clinics) handle and dispose of waste safely and avoid contamination with infectious materials.[16]

## United Kingdom

The UK Health Security Agency (UKHSA) has published guidance for people infected with monkeypox who are isolating at home.[17] Personal waste (such as used tissues) and disposable cleaning cloths can be stored securely within disposable garbage bags. Vacuum cleaner waste, including disposable filters if your vacuum cleaner has one, should be carefully emptied into a disposable garbage bag.

As an additional precaution, the UKSA guidance states that all disposable garbage bags should be placed into a second disposable bag, tied securely, before being disposed of as usual with your domestic waste. An individual should not put any waste into recycling bins until an individual has ended their self-isolation. Waste should all be double bagged and disposed of as described above.[17]

The Government of the UK has also published a consensus statement from the four nations on principles for monkeypox control in the UK, which contained the following guidance:[18]

- Waste management and decontamination practice in the health care setting should follow best practice and be based on all the available evidence on safe handling of all waste in accordance with country specific legislation and regulations.
- In domestic and non-domestic settings where health care is being provided, waste generated is classified as health care waste and should be managed appropriately.

## United States

The US Department of Transportation (DOT) published guidance for waste management that differs depending on the monkeypox virus clade (strain) and classification:[19]

- Waste contaminated with the West African clade of monkeypox virus should be managed as UN3291 Regulated Medical Waste (RMW) in the same manner as other potentially infectious medical waste (e.g. soiled dressings, contaminated sharps).
- Waste contaminated with the Congo Basin clade of monkeypox virus is classified as Category A and managed accordingly.

The CDC initially recommended (according to information available as of June 9, 2022) containment and disposal of contaminated waste (such as dressings and bandages) after consultation with state or local health officials for infection control specific to monkeypox patients being cared for at home.[20] . The CDC

also previously stated (according to information available as of June 9, 2022) that contaminated waste should not be disposed of with waste in landfills or dumps.[20]

However, the CDC has since updated their guidance for household disinfection of monkeypox virus, which now states the following: individuals with monkeypox isolating at home should use a dedicated, lined garbage can in the room where they are isolating. All waste that has been in direct contact with skin should be disposed of in a sealed plastic bag, then placed into the dedicated garbage.[21]

The National Emerging Special Pathogens Training and Education Center (NETEC) published guidance for health care/clinical facilities on *Waste Management from Patients Being Treated for Monkeypox Virus*.[22] The NETEC states that the waste associated with the monkeypox virus is considered a Category A waste, as it is identified as such by United Nations Regulation 2814. However, waste from patients infected with the West African Clade of monkeypox may be determined exempt from Category A Infectious Substance Regulations, however, local public health authorities must be contacted for further guidance.

The NETEC's guidance also notes that as facilities begin to prepare or implement their waste disposal and handling strategies, they should first check with their local and state health officials who oversee solid and liquid waste as well as the requirements from various federal government agencies. If facilities use a vendor for waste transportation that has a US DOT special permit for Category A waste handling, the facility and the vendor should confirm with the DOT whether an update to the special permit is required to cover monkeypox.[22]

The Pipeline and Hazardous Materials Safety Administration (PHMSA) published guidance on the disposal and management of Category A substances.[7] The PHMSA states that Category A waste management plans should detail how waste management tasks will be accomplished, and should provide jurisdiction- or facility-specific procedures. Leadership within health care facilities, laboratories, governments, and other entities that need to manage Category A waste should ensure their organizations have plans to address the entire waste lifecycle, including the generation, transportation and treatment of waste.

- PHMSA Guidance for Waste Generators:[7] Managing Category A waste at the point of generation requires a multi-pronged approach that includes waste minimization, proper classification of waste, and appropriate storage (i.e., a secure location, segregation from other wastes).
    - Hospital protocols should consider and address limiting the amount of waste generated by keeping infectious and non-infectious wastes separate and bringing only essential items directly needed for care into a patient room. This limits the volume of items in the contaminated area, thereby limiting the volume of items that will ultimately require inactivation and disposal (e.g., hospital staff can remove all outer wraps on pre-packaged kits or remove any internal packaging).
    - Special attention should also be directed at protecting large items (e.g., mattresses) from gross contamination through the use of protective coverings. When care of the patient is complete, protective coverings should be disposed of using the Category A waste protocol.
- PHMSA Guidance for Waste Transporters:[7] When a Category A waste cannot be inactivated on-site, waste generators (i.e., hospitals, laboratories, other types of facilities, environmental/biohazard remediation companies, and federal and government agencies) that are not transporting the waste themselves will need to work with a qualified transporter to ship the waste off-site for treatment (i.e., inactivation) and disposal.

- PHMSA Guidance for Waste Treatment: [7] All facilities and jurisdictions planning for managing Category A waste should consider how any waste they generate and/or offer for transport will be treated (i.e., inactivated). A variety of options exist for waste inactivation, including autoclaving, incineration, and, in certain circumstances, chemical alternatives. Depending on facility or jurisdiction capabilities, the volume of waste needing treatment, and other factors, these options may be deployed on-site (i.e., where the waste is generated) or off-site (e.g., at specialized waste management contractors' facilities).

## European Centre for Disease Prevention and Control (ECDC)

The ECDC's rapid risk assessment of the monkeypox outbreak states that gauzes or other material soaked with lesion fluid or containing scabs from the monkeypox case should be handled in a health care facility as infectious waste, or according to instructions from the local public health authority.[23]

## World Health Organization (WHO)

WHO guidance provides that waste that is generated from caring for a patient with MPX, such as bandages and PPE, should be placed in strong bags and securely tied before disposal and eventual collection by municipal waste services.[7] If such services are not available, as an interim measure and according to local policies, safely burying or controlled burning may be done until more sustainable and environmentally friendly measures can be put in place.[7]

Patients in quarantine or receiving care at home should ensure appropriate management of all waste (such as bandages) and potentially contaminated materials to prevent the disease from being transmitted from infected humans to susceptible animals at home (including pets), or to peri-domestic animals, especially rodents.[24]

# Discussion and Implications for Public Health Practice

This environmental scan highlights the existence of limited specific guidance regarding the management of waste generated during care of monkeypox cases in domestic settings. In most jurisdictions, waste (such as bandages) is classified as health care waste and general guidance provided is that it should be managed "appropriately" and discarded "according to jurisdictional protocols". Across jurisdictions that do provide guidance for disposal, there is no consensus approach.

Risks from domestic waste to humans within the household arising from directly handling contaminated waste, such as gauze and wound dressings, generated within the home setting can be reduced through practices such as performing regular hand hygiene, wearing gloves, discarding contaminated items directly, not touching the outside of the waste container or other surfaces with contaminated gloves.

Risks from domestic waste to humans collecting the garbage can be reduced by using strong bags, ensuring bags are securely tied, double bagging waste and reinforcing routine practices for management of waste (i.e., good hand hygiene, gloves if bags are handled).

There are additional considerations beyond the scope of human IPAC considerations including potential zoonotic risk of infectious material disposed in landfills without deactivation of the virus (i.e., establishment of an animal reservoir). Establishment of an animal reservoir may pose additional challenges with the current outbreak control and future outbreak risk. A national approach to domestic waste management for monkeypox is an important consideration, given the potential for animals to move between jurisdictions.

Should domestic waste be disposed of according to regular protocols for domestic waste (i.e. landfill disposal), measures that may reduce the risk of animal access include making access to the garbage more challenging (e.g., double bagging, using strong bags, ensuring bags are securely tied) and promoting good landfill practices to prevent rodent and animal access to landfills.

Measures to prevent transmission from domestic waste to susceptible animals at home (including pets), or to peri-domestic animals (especially rodents) include double bagging waste, using strong bags, ensuring bags are securely tied and storing the garbage in a secure bin prior to collection.

Containment and disposal of contaminated waste generated in health care settings (e.g., soaked dressings) should be managed in accordance with facility-specific/public health guidelines for infectious waste.[25]

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