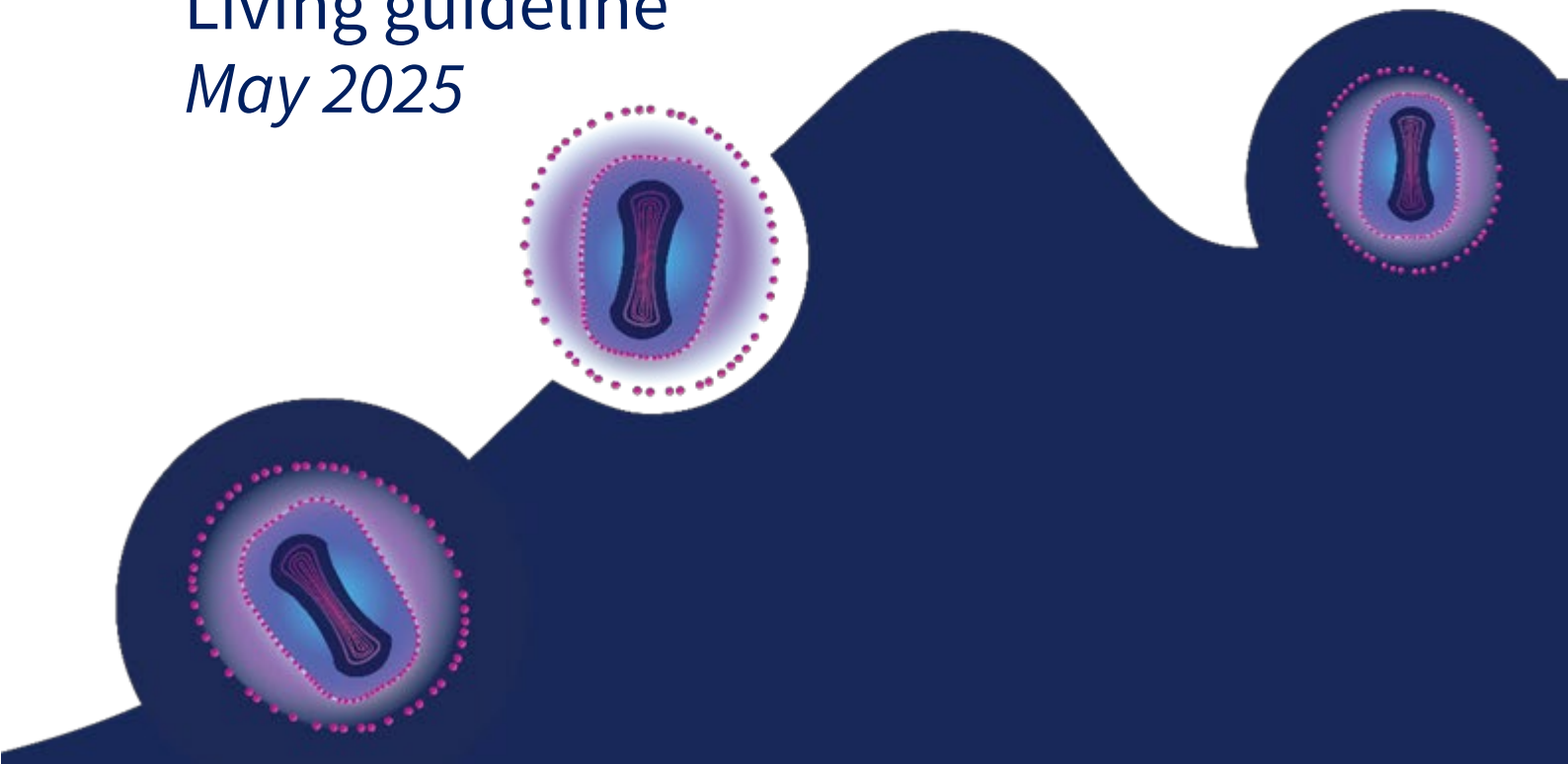
Clinical management and infection prevention and control for mpox

Living guideline

May 2025



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Abbreviations

ABCD	airway, breathing, circulation, disability
ACH	air changes per hour
AGP	aerosol-generating procedure
AIIR	airborne infection isolation room
ALT	alanine transaminase
ARDS	acute respiratory distress syndrome
ART	antiretroviral therapy
AST	aspartate aminotransferase
AVPU	alert, voice, pain, unresponsive (scale)
BMI	body mass index
BUN	blood urea nitrogen
CA-MRSA	community-acquired methicillin-resistant Staphylococcus aureus
CBT	cognitive behavioural therapy
CDC	Centers for Disease Control and Prevention (United States of America)
CFR	case fatality ratio
CSF	cerebrospinal fluid
DGI	disseminated gonococcal infection
DOI	declaration of interest
EMA	European Medicines Agency
FFR	filtering facepiece respirator
GDG	Guideline Development Group
GRADE	Grading of Recommendations Assessment, Development and Evaluation
HAI	heath care-associated infection
HR	hazard ratio
HSV	herpes simplex virus
IDP	internally displaced person
IFRC	International Federation of Red Cross and Red Crescent Societies
IITT	Interagency Integrated Triage Tool (WHO/IFRC)
IO	intraosseous
IPC	infection prevention and control
IRIS	Immune reconstitution inflammatory system
IRP	infectious respiratory particles
IV	intravenous
LGV	lymphogranuloma venereum

MDR	multidrug-resistant
MEURI	Monitored Emergency Use of Unregistered and Investigational Interventions
mpox	mpox is the preferred term as a synonym for monkeypox
MPXV	monkeypox virus
MSSA	methicillin-sensitive Staphylococcus aureus
MUAC	mid-upper arm circumference (in children)
NIOSH	National Institute for Occupational Safety and Health (United States of America)
OR	odds ratio
PAHO	Pan American Health Organization
PCR	polymerase chain reaction
PEP	post-exposure prophylaxis
PPE	personal protective equipment
PTSD	post-traumatic stress disorder
RR	relative risk
RT-PCR	real-time polymerase chain reaction
STI	sexually transmitted infections
US FDA	United States Food and Drug Administration
VIG	vaccinia immune globulin
VZV	varicella zoster virus
WBC	white blood count
WHO	World Health Organization

Definitions

Aerosol-generating procedures: Medical procedures that are reported to be aerosol generating are consistently associated with an increased risk of pathogen transmission. The current list of procedures recognized by WHO as aerosol generating includes aspiration or open suctioning of respiratory tract specimens, bronchoscopy, intubation, cardiopulmonary resuscitation, manual ventilation before intubation, sputum induction by using nebulized hypertonic saline, dentistry and autopsy procedures *[2,3]*.

Airborne infection isolation room (AIIR): A room with a high ventilation rate and controlled direction of airflow that can be used to contain airborne infections and acute respiratory infections caused by a novel agent with the potential to pose a public health risk. Such rooms can be naturally or mechanically ventilated *[2]*.

- Naturally ventilated airborne precaution room: the airflow should be directed to areas free of transit, or should permit the rapid dilution of contaminated air into the surrounding areas and the open air; the average ventilation rate should be 160 L / s per patient.
- Mechanically ventilated airborne precaution room: negative pressure is created to control the direction of airflow; the ventilation rate should be at least 12 air changes per hour (ACH). Such a room is equivalent to the "airborne infection isolation room" described by the United States Centers for Disease Control and Prevention (CDC).

Airborne transmission/inhalation (formerly airborne transmission): Occurs when infectious respiratory particles (IRPs) are expelled into the air and enter, through inhalation, the respiratory tract of another person. This form of transmission can occur when the IRPs have travelled either short or long distances from the infectious person. The portal of entry of an IRP into respiratory tract tissue during airborne transmission can theoretically occur at any point along the human respiratory tract, but preferred sites of entry may be pathogen specific. It should be noted that the distance travelled will depend on multiple factors including particle size, mode of expulsion and environmental conditions (such as airflow, humidity, temperature, setting, ventilation, etc.) *[4]*

Care workers: People who provide direct personal care services in the home, in a health care or residential setting, assisting with routine tasks of daily life and performing other tasks of a simple and routine nature. This term comprises *[5,6]*:

- Health care assistants: institution-based, personal care workers who provide direct personal care and assistance with activities of daily living to patients and residents in a variety of health care settings, such as hospitals, clinics and residential nursing care facilities. They generally implement established care plans and practices under the direct supervision of medical, nursing or other health professionals or associate professionals.
- Home-based personal care workers: provide routine personal care and assistance with activities of daily living to persons who are in need of such care due to effects of ageing, illness, injury or other physical or mental conditions, in private homes and other independent residential settings.

Contact transmission: The spread of an infectious agent caused by physical contact of a susceptible host with people or objects *[7]*.

- Direct contact transmission involves both a direct body-surface-to-body-surface contact and physical transfer of micro-organisms between an infected or colonized person and a susceptible host *[2,7]*. In addition, direct contact transmission can occur when an infectious person directly transfers infectious pathogens from their own respiratory tract, not via IRPs, to another person by being in direct contact with that person (e.g., via a handshake), who then directly transfers the IRPs into their own mouth, nose or eyes *[4]*.
- Indirect contact transmission involves contact of a susceptible host with a contaminated intermediate object (e.g., contaminated hands) that carries and transfers the micro-organisms *[2,7]*. Contaminated surfaces are also created when IRPs expelled into the air settle on a surface, or when an infected person transfers infectious respiratory secretions by first touching their own mouth, nose or eyes and then touching a surface or shaking hands. Infectious pathogens on the contaminated surfaces are then transferred to another person who touches that contaminated surface and then their own mouth, nose or eyes *[4]*.

Direct deposition (formerly droplet transmission): Occurs when IRPs are expelled into the air following a short-range semi-ballistic trajectory, then are directly deposited on the exposed facial mucosal surfaces (mouth, nose or eyes) of another person, thus, entering the human respiratory tract via these portals and potentially causing infection *[4]*.

Filtering facepiece respirator (FFR or respirator): Filtering facepiece respirators (FFRs or respirators) offer a balance of filtration, breathability and fit. Whereas

medical masks filter 3-micrometre droplets, N95-rated and FFP2-rated FFRs must filter more challenging 0.075-micrometre particles or particulates and must do so across the entire surface of the respirator as a result of the fitted design. European FFP2 FFRs, according to the EN 149 standard, filter at least 94% sodium chloride (NaCl) salt particles and paraffin oil droplets. The United States of America's N95 FFRs, according to the National Institute for Occupational Safety and Health (NIOSH) NIOSH 42 CFR Part 84, filter at least 95% NaCl salt particles *[8,9]*.

Health worker: Health and care workers are all people from the community to hospitals, primarily engaged in actions with the primary intent of enhancing health. This includes health service providers, such as doctors, nursing and midwifery professionals, public health professionals, technicians (laboratory, health, medical and non-medical), personal care workers, and healers and practitioners of traditional medicine. It also includes health management and support workers, such as cleaners, drivers, hospital administrators, district health managers, social workers and other occupational groups in health-related activities [6,10].This document uses the combined term of health and care worker to cover all roles and settings.

Infectious respiratory particles: Pathogens, contained within a particle (known as "infectious particles"), that travel through the air and these infectious particles are carried by expired airflow which enter the human respiratory tract or are deposited on the mucosa of the mouth, nose or eye of another person [4].

Isolation: The separation of infected people with a contagious disease from people who are not infected [11].

Screening: A process through which an individual is evaluated to see whether that person meets a standardized case definition. Screening does not typically require close physical contact or clinical expertise [12,13].

Standard precautions: Aim to protect both health workers and patients by reducing the risk of transmission of micro-organisms from both recognized and unrecognized sources. They are the minimum standard of infection prevention and control (IPC) practices that should be used by all health and care workers, during the care of all patients, at all times, in all settings. When applied consistently, standard precautions can prevent the transmission of microorganisms between patients, health workers and the environment [14].

Transmission-based precautions: Transmission-based precautions are used in addition to standard precautions for patients with known or suspected infection or

colonization with transmissible and/or epidemiologically significant pathogens. The type of transmission-based precautions assigned to a patient depends on the transmission route of the micro-organism: contact, droplet or airborne [7].

Triage: The process of sorting patients into categories based on the need for time-sensitive treatment using validated tools. Triage identifies those who require immediate medical intervention, and those who can safely wait. Triage may occur at a health post, primary health centre, clinic or emergency unit. It typically requires close physical contact (within 1 metre) with the patient during the assessment [12,13].

1. Executive summary

1.1 Clinical question: What are the clinical and IPC interventions to use in caring for patients with mpox?

Target audience: This document is for public health specialists, health emergency responders, clinicians, health facility managers, health and care workers and IPC practitioners including but not limited to those working in primary care clinics, sexual health clinics, emergency departments, dental practices, infectious diseases clinics, genitourinary clinics, maternity services, paediatrics, obstetrics and gynaecology and acute care facilities that provide care for patients with suspected or confirmed mpox.

Context: Since the publication of the WHO interim mpox guideline in 2022 [1] the mpox virus, also known as the monkeypox virus (MPXV), and outbreaks associated with it have continued to evolve. Prior to 2022, cases were primarily reported in Central and West Africa. In 2022, a global outbreak of clade IIb was declared and continues to affect numerous countries. Subsequently, there have been outbreaks associated with clades Ia and Ib, primarily affecting the Democratic Republic of the Congo and neighbouring African countries. Since August 2024, increasing numbers of MPXV cases in Africa and detection of clade Ib beyond the African continent, have led to a second declaration by the WHO Director General of a public health emergency of international concern related to the epidemic risk and widespread transmission of MPXV.

If the person with mpox is an acute infection patient or is at risk of complications, they should be managed in a health facility setting and have more supportive care. Only mild, non-complicated cases of mpox should be managed with home-based care.

1.2 New infection prevention and control recommendations

- Infection prevention and control measures including hand hygiene, dedicated personal items, appropriate handling of linens and laundry, cleaning and disinfection of the environment, and waste management should be followed for persons with mpox in the community until all lesions are healed.* *(Good practice statement)*
- WHO suggests that persons with mild, uncomplicated mpox infection cared for at home are not required to isolate** provided their lesions are covered and they wear a well-fitting medical mask when in close proximity with others until all lesions are healed.* *(Conditional recommendation, low certainty evidence)*

- In patients with suspected or confirmed mpox infection, WHO suggests that health and care workers use contact and droplet precautions.*** *(Conditional recommendation, low certainty evidence)*

** Healed lesions: lesions have crusted, scabs have fallen off and a fresh layer of skin has formed underneath.*

*** Isolation means the separation of infected people with a contagious disease from people who are not infected.*

**** Contact precautions include the following personal protective equipment (PPE): gloves, gown. Droplet precautions include the following PPE: a medical mask and consider eye protection based upon a risk assessment.*

1.3 New clinical management recommendations

- WHO recommends rapid initiation of antiretroviral therapy (ART) in people with mpox infection and HIV who are ART naïve or have had a prolonged interruption of ART. *(Strong recommendation, moderate certainty evidence)*
- WHO suggests that mothers with mpox continue breastfeeding whilst limiting direct contact with their non-infected infant. *(Conditional recommendation, low certainty evidence)*
- WHO suggests that mothers who recover from mpox infection and who had withheld breastfeeding and direct contact, to resume breastfeeding and direct contact with the infant as soon as lesions are healed.* *(Conditional recommendation, very low certainty evidence)*

** Healed lesions: lesions have crusted, scabs have fallen off and a fresh layer of skin has formed underneath.*

What triggered this guideline: The spread of the current global outbreak (since 2022 to present) is sustained by human-to-human transmission occurring during close contact including sexual contact. As of 10 March 2025, a total of 129 172 confirmed cases, including 283 deaths, have been reported to WHO from 130 Member States/territories across all six WHO regions [23].

The need for evidence-based clinical guidance has become apparent as cases of mpox have arisen in the context of limited direct experience of patient management compared with prior outbreaks. The WHO mpox Steering Committee with the Guideline Development Group (GDG) previously made initial recommendations as interim guidance [1].

About this guideline: This living guideline from WHO incorporates new evidence to dynamically update recommendations for clinical management and IPC for mpox infection. The GDG typically evaluates an intervention when WHO judges sufficient evidence is available to make a recommendation. While the GDG takes an individual patient

perspective in making recommendations, it also considers resource implications, acceptability, feasibility, equity and human rights. Some IPC interventions are listed as good practice statements and have been formulated according to the principles outlined in the GRADE (Grading of Recommendations Assessment, Development and Evaluation) framework and further described in the Methods section of the document. This updated version of the guideline was developed according to standards and methods for trustworthy guidelines.

Statements in the 2022 interim guidance about clinical care and IPC measures for patients with mpox infection were prioritized for review with the GDG chairs, the methodologist and subsequently reviewed with the Steering Committee and panel. The GRADE framework to generate evidence-based recommendations has been applied to the recommendations in the tables in this version and some prior recommendations have been imported. The remaining prior recommendations and any future recommendations will be reviewed according to the prioritization and as more evidence becomes available for future updates to this guideline.

More information around the methodology followed to bring the recommendation in these updated guidelines can be found in Methods: how this guideline was created.

2. Introduction

2.1 Mpox clades

Mpox virus (MPXV) belongs to the Orthopoxvirus genus of the Poxviridae family. The human disease was first identified in 1970 in a 9-month-old boy in the Democratic Republic of the Congo. Until 2022, most cases have been reported from Central and West Africa [15,16].

There are two distinct clades of MPXV [17]

- clade I (a, b), previously known as the Central African (Congo basin) clade;
- clade II (a, b), previously known as the West African clade;
    - subclade IIb is the group of variants circulating as part of the 2022 global outbreak.

Historically, clade I was considered to be more virulent, with a case fatality ratio (CFR) ranging from 1% to 10% [16,18,19], while clade IIa is associated with an overall lower mortality rate of < 3% [19,20]. However, the emergence of clade IIb and global expansion in 2022, as well as the historic increase in Clade I mpox cases in 2023 and 2024, have made these virulence differences less clear.

The details of the virulence of different clades have been described [21,22]. As of December 2024, a total of 124 753 confirmed cases, including 272 deaths, have been reported to WHO from 128 Member States/territories across all six WHO regions [23].

2.1.1 Update of mpox outbreaks by virus clade using of evidence available by January 2025

This section provides an overview of the major mpox outbreaks by MPXV subclade.

2.1.2 Clade Ia MPXV

Clade Ia MPXV is found primarily in the Democratic Republic of the Congo, where it affects endemic provinces and has increasingly been found in previously unaffected provinces in recent years, including the capital, Kinshasa. Sporadic cases continue to be reported in neighbouring Central African Republic and in the Republic of Congo. The Democratic Republic of the Congo and the Central African Republic report a

higher proportion of children among cases, while in the Republic of Congo, most cases are among adults.

Previously, genomic sequencing analysis had indicated that clade Ia MPXV typically emerged in human populations through zoonotic exposure, leading to limited human-to-human transmission. Current epidemiological data and phylogenetic analysis still suggest that many outbreaks of mpox due to clade Ia MPXV are the result of zoonotic spillover with secondary human-to-human transmission.

2.1.3 Clade Ib MPXV

Clade Ib MPXV is predominantly spreading in the Democratic Republic of the Congo, and neighbouring countries to the east, with community transmission reported in Burundi and Uganda, clusters of cases reported in Kenya and Rwanda, and mostly travel-related cases in other countries where it has been detected. No human case has been substantively linked to a suspected animal exposure for this clade yet, and current genomic sequencing data suggest that it is transmitted only through human-to-human contact [24,25]. In the Democratic Republic of the Congo, it has been found in eight provinces: South Kivu, North Kivu, Kinshasa, Kasai, Tshopo, Tanganyika, Haut-Katanga and Mai-Ndombe, and it is the fastest expanding MPXV strain. The other most affected countries in Africa are Burundi and Uganda, where transmission has been ongoing since the end of 2024 and early 2025; while smaller clusters have been reported in Kenya and Rwanda, the extent of undetected transmission is unknown. Zambia and Zimbabwe have reported travel- related cases and very limited secondary transmission. Outside of Africa, imported travel-related cases have also been detected (in order of reporting) in Sweden, Thailand, India, Germany, the United Kingdom, the United States of America, Canada, Pakistan, Belgium, China and France. Secondary transmission from these cases has been reported in the United Kingdom, Germany, Belgium, China and France.

Imported mpox cases have been among adults who travelled during their incubation periods or with early symptoms and were diagnosed once they arrived in the country. Often, they reported prior sexual contact with a person with known mpox infection or someone with signs and symptoms suggestive of mpox. Where initial clusters of mpox due to clade Ib MPXV expand and as the outbreak progresses, transmission patterns appear to evolve, with more spread within households, leading to a progressive shift in age and sex distribution, with a rising proportion of cases among children. The multi-country outbreak of mpox driven by clade IIb MPXV that

began in 2022 showed that sexual contact can sustain community transmission of MPXV. Likewise, subclades Ia and Ib are also spreading through sexual contact, much remains to be understood about the transmissibility and sustainability of transmission through nonsexual direct physical contact for all clades. In settings where transmission persists, it is likely driven by a combination of sexual, household and community contact.

2.1.4 Clade IIa MPXV

In 2024, Côte d'Ivoire, Guinea and Liberia reported mpox linked to clade IIa MPXV. Both countries have shown evidence of sustained community transmission of this strain, with cases dispersed over wide geographical areas. Outbreaks of clade IIa MPXV are a concerning new phenomenon as human-to-human transmission of this clade had not been reported before 2024 [21]. Furthermore, co-circulation of clade IIa and clade IIb MPXV has been reported for the first time, in both Côte d'Ivoire and Liberia. Mpox linked to clade IIa MPXV has been reported in adults and children, with many lacking a known epidemiological link, suggesting ongoing, largely undetected community transmission. Limited epidemiological investigations have constrained our understanding of the modes of transmission in these outbreaks and clade IIa MPXV remains the least described MPXV strain in the scientific literature. While there is no documented evidence of sexual contact transmission for this strain, all forms of close contact likely contribute to its spread, documented for the first time in 2024.

2.1.5 Clade IIb MPXV

Most mpox outbreaks in other parts of West, North and Southern Africa and other parts of the world are due to clade IIb MPXV, a continuation of the multi-country outbreak that began in 2022. Most regions report circulation of clade IIb lineage B.1, while lineage A.1 continues to circulate in Nigeria and some countries in the WHO Eastern Mediterranean Region. The most affected population outside of Africa continues to be men who have sex with men, primarily exposed through sexual contact [26,27]. In instances where others have been affected, such as women and children, it has not led to sustained transmission, unlike that being observed for clade I MPXV in the African context. Australia has seen an unprecedented rising trend in cases in recent months while most other reporting countries have reported ongoing low-level transmission mainly in the same population at risk.

2.2 Natural history

The incubation period of mpox is usually 3 to 17 days following exposure to MPXV [28]. Although most people recover within 1 to 2 weeks, severe complications and sequelae have been reported to be more common among those unvaccinated for smallpox compared with those vaccinated (74% vs 39.5%) [29], although overall the evidence is both inconsistent and uncertain (see Table 2). Clinical evaluation is underway to generate real-world evidence of effect. It is unclear if there is waning immunity to smallpox vaccination over time; however, studies indicate that smallpox vaccination is approximately 85% effective in preventing mpox [30,31]. Evidence of prior vaccination against smallpox can typically be found as a scar on the upper arm. Individuals born after smallpox eradication in 1980 are unlikely to have been vaccinated, although some laboratory personnel or health and care workers may have received the vaccine after this date [15].

To date, most reported deaths have occurred in babies, infants and immunocompromised individuals, such as those with poorly controlled HIV infection [20,29,32]. A study from the Democratic Republic of the Congo reported that in a cohort of 216 patients, there were three deaths in patients < 12 years of age. When compared with survivors, patients with fatal disease had higher amounts of mpox virus DNA in blood, a higher maximum skin lesion count, and raised liver enzymes (aspartate aminotranferase [AST] and alanine tranaminase [ALT]) at initial presentation [33]. Mortality rates decrease when there is access to good supportive of care, and in individuals who have a better background health and nutrition [34].

2.3 Signs and symptoms

Descriptions of outbreaks prior to 2022 described two phases, with an initial 1 to 5 day illness characterized by fever, headache, back pain, muscle aches, lack of energy and lymphadenopathy [33], followed by the appearance of a rash [31,35,36]. The rash typically presented in sequential stages – macules, papules, vesicles, pustules, umbilication before crusting over and desquamating over a period of 2 to 3 weeks.

However, in the 2022 clade IIb outbreak, 52–64% of patients had skin lesions before, or at the time of, systemic symptoms [37,38,39]. Furthermore, lesions did not always present sequentially. For example, the initial lesion might be a pseudopustule or an ulcer without going through the typical progression, or multiple types of lesions may co-exist simultaneously [37].

In prior outbreaks, mpox was noted to spread centrifugally, starting on the face and then extending out towards the palms and the soles [16,29,40]. In the 2022 clade IIb outbreak, as many as 70–78% of participants had lesions (and primarily their first lesion) in the groin, perineum or peri-anal region, and 43% in the oral or peri-oral area [37,38]. These rash distributions may have been influenced by the nature of the transmission events (sexual transmission) and sites of the body that had significant exposure to other lesions of an infected person (potential primary inoculation sites) [41]. Most (92%) of patients had fewer than 20 skin lesions, with a significant minority (39%) of patients having as few as 1 to 5 total lesions, though it is possible to have several hundred up to several thousand in number [15]. A distinct primary presentation was proctitis without perianal lesions [42].

Patients may develop lymphadenopathy – which was described in 98.6% of a cohort of over 200 patients with mpox in the Democratic Republic of the Congo recorded from 2007 to 2011 [16,33]. In more recent series, like the clade IIb outbreak in 2022, lymphadenopathies seem to be less common (around half) [43]. Oral ulcers are common and may affect a patient's ability to eat and drink leading to dehydration and malnutrition [35,44]. Also described in the clade IIb outbreak case series, pharyngeal, conjunctival and genital mucosae also occur [35,45]. A large prospective observational study describing the natural history of 216 patients with mpox in the Democratic Republic of the Congo described the most common clinical symptoms to be rash (96.8%), malaise (85.2%) and sore throat (78.2%). The most common findings on physical examination were the classic mpox rash (99.5%); lymphadenopathy (98.6% – the cervical region was most frequently affected [85.6%], followed by the inguinal region [77.3%]); and mouth/throat lesions (28.7%) [33].

In the 2022 mpox clade IIb outbreak, it was noted that people living with HIV are disproportionately affected with mpox. Presently, 38–50% of individuals diagnosed with mpox are living with HIV [46]. Co-infection with HIV is associated with more frequent perianal lesions, and higher rash burden [47]. Atypical, large and severe skin lesions and wounds have been noted in immunocompromised individuals, especially those living with inadequately controlled HIV [48]. In one global case series, it was noted that individuals with both low CD4 count and high viral load had the greatest disease severity, hospitalization and mortality [46].

2.3.1 Severe disease and complications

Though uncommon, patients with mpox may develop severe and life-threatening complications. For example, confluent skin lesions are at an increased risk of bacterial skin and soft tissue infections such as cellulitis, abscesses, necrotizing soft tissue infections requiring meticulous local wound care; subcutaneous accumulation of fluid in the crusting phase leading to intravascular depletion and shock; and exfoliation resulting in areas of skin that may require surgical debridement and grafting [35,36,44]. Other rarer complications include severe pneumonia and respiratory distress, infection of the cornea and other parts of the eye which may lead to vision loss, loss of appetite, vomiting and diarrhoea which may lead to severe dehydration, electrolyte abnormalities and shock, cervical lymphadenopathy and oropharynx involvement which may lead to retropharyngeal abscess or respiratory compromise, sepsis, septic shock, and encephalitis, proctitis, rectal perforation, myocarditis and death [20,29,32,33,35,36,45,49].

Most recently, two systematic reviews were conducted up to September 2024 (data mostly from the 2022 global outbreak) to understand prognosis, complications and risk factors. The search strategy returned 3606 results; after the screening, 130 studies (19 for risk factors) were included, including 89 722 patients with a male percentage ranging from 42.9–100% and a median age range of 6.9 to 43 years [49]. Limited data were available on children and pregnant women to inform this systematic review. With current ongoing outbreak in the African Region, this systematic review will need to be updated and comparisons between clades and mode of transmission considered.

2.4 Laboratory findings

Small studies looking at laboratory abnormalities in patients with mpox indicate that leucocytosis, elevated liver transaminases, low or high blood urea nitrogen and hypoalbuminemia were common features during illness, and that lymphocytosis and thrombocytopenia were seen in more than one-third of patients evaluated [16,33,44].

2.5 Differential diagnosis

The rash which develops in mpox may resemble the rashes caused by other infectious diseases or other conditions, including primary varicella zoster virus infectious (VZV, chickenpox), herpes simplex virus infection (HSV), primary or secondary syphilis, disseminated gonococcal infection (DGI), foot and mouth disease,

chancroid, lymphogranuloma venereum (LGV), granuloma inguinale, molluscum contagiosum, measles, scabies, rickettsia pox, chikungunya, Zika virus, dengue fever, vasculitis and other bacterial skin and soft tissue infections [50,51,52].

Disseminated cryptococcosis skin lesions may resemble mpox under some circumstances. Guidelines for diagnosing, preventing and managing cryptococcal disease among adults, adolescents and children living with HIV from WHO can be found here: https://www.who.int/publications/i/item/9789240052178 [53]

Often, the rash caused by VZV can be confused with mpox but may be distinguished as the VZV rash generally progresses more rapidly, is more centrally located than the centrifugal distribution of mpox, and patients usually do not classically have lesions on their palms and soles [16,29]. Additionally, patients with VZV typically do not have lymphadenopathy, which is a hallmark of mpox [29]. In the recent publication on cases from South Kivu, Democratic Republic of the Congo (Brosius et al., 2025), lymphadenopathy differed significantly between age groups, while common in adults (82%) and children between 5–14 years old (69%), it was less frequent in children less than 5 years old (16%). In adults, inguinal lymphadenopathies were primarily affected, whereas in children, the submandibular nodes were more commonly involved [54].

Despite the clinical differences between these two diseases, a study from the Democratic Republic of the Congo reported polymerase chain reaction (PCR)-confirmed co-infection with mpox and VZV, with an incidence of 10–13% [55,56]. Patients with co-infection reported fatigue, chills, headache and myalgias. These individuals were less likely to report signs/symptoms of oral sores, axillary lymphadenopathy, cough or sore throat. Patients with co-infection had a higher lesion burden than seen with VZV alone but a lower rash burden than seen with mpox alone raising the suggestion that co-infection with these two viruses could modulate severity of the overall infection – an area for further investigation [55,56]. Other co-infections can occur, such as mpox and syphilis or gonorrhoea, mainly when sexual transmission.

2.6 Pregnant people and postpartum period

Mpox can affect pregnant persons and their fetuses [57]. In utero transmission of mpox has been documented, as well as transmission from mother to child via direct contact [58,59,61]. The former is from a longitudinal case series that reported outcomes of four pregnant persons: one delivered a healthy baby, two had early

miscarriages and one a fetal death where the stillborn was covered with diffuse rash with virologic confirmation of mpox. This suggests that mpox infection may lead to adverse outcomes for the fetus, such as death or spontaneous abortion [33,59]. A 2024 systematic review of seven studies identified 32 pregnant people with clade IIb MPXV infection between 6 and 31 weeks of gestation; 3 of the 12 pregnancies with reported gestational outcomes, half of them resulted in intrauterine fetal demise [60]. The association between severity of maternal illness and these outcomes is unclear [59,62].

2.7 Mid-and-long-term effects

More information is needed about the clinical characterization of mid- and long-term effects of mpox. One study has reported > 90% of mpox survivors have no complications, regardless of smallpox vaccination status [35]. Of those who do develop long-term complications, most common sequelae are disfiguring scarring of the skin and blindness [29,35,63]. Pitted scars or pockmarks can develop [29,35]. Data also suggest that patients may be at risk for developing mental health complications [36].

2.8 Transmission and viral shedding

MPXV DNA can be detected in a wide variety of clinical samples, including faeces, saliva, skin and mucosal lesions, as well as semen, urine and blood [64,65,66,67]. Replication-competent virus has been isolated from skin lesion swabs, oropharyngeal swabs, anal swabs, urethral swabs, conjunctival swabs and semen [64]. Studies have shown that skin lesions, anorectal lesions and saliva contain the highest concentration of viral DNA [64,65,66,67].

The data describing mpox transmission and viral shedding show that transmission can occur from animal to human, human to animal, human to human, and from contaminated environments to humans [90]. Previously, most of the available information was derived from the 2022 global mpox outbreak of clade IIb MPXV, which predominantly affected gay, bisexual and other men who have sex with men. In early 2024, a new MPXV strain, subclade Ib was identified in the Democratic Republic of the Congo and neighbouring countries. Since the publication of the 2022 interim guideline two systematic reviews have been commissioned by WHO on transmission routes [68] with the latest review including literature published between September 2022 and September 2024 (review unpublished at the time of writing this guideline but information is available upon request). Both reviews found limited data

on transmission of mpox by clade, specifically clade Ia and clade Ib MPXV with no studies found reporting on clade IIa [68].

MPXV can be transmitted from infected animals to humans via indirect or direct contact [31]. Transmission may occur from bites or scratches, or during activities such as hunting, skinning, trapping, cooking, playing with carcasses or eating animals, such as terrestrial rodents, non-human primates, antelopes and gazelles and tree squirrels [35]. Human-to-animal mpox transmission has been documented through close contact [69]. The extent of viral circulation in animal populations is not entirely known and further studies are underway [29,70]. Current evidence strongly suggests that the 2022 and 2024 multi-country outbreaks have not driven by animal-to-human transmission, rather through sustained human-to-human transmission [71,72].

Human-to-human transmission can occur through direct physical contact with infectious lesions of the skin or mucous membranes, contact with fluids or exudate from those lesions or IRPs [11,16,73,72]. The 2024 review found only one report of a single case of self-reported "droplet exposure" out of the 32 317 cases that reported routes of transmission data (unpublished data). The single case was one of 12 breakthrough infections after post-exposure vaccination against mpox (the study defined droplet transmission as occurring during the presence of the exposed person without masks at less than 2 metres for at least 3 hours with a PCR-confirmed mpox patient) [74]. There were no reported inhalation exposures. A study published in May 2022 on the clinical characterization of 216 patients diagnosed between 2007 and 2011 in the Democratic Republic of the Congo suggested that MPXV DNA in blood and the upper respiratory tract may be detected prior to onset of rash and that peak viral load may occur very early in the disease course [75]. While there have been studies that have shown the detection of MPXV DNA in air samples [76,77], and replicant-competent virus during bedding change in one United Kingdom hospital-based study [77], there has been no epidemiological evidence to date of airborne/inhalation transmission.

In the 2022 multi-country mpox outbreak, transmission was reported as primarily occurring through close physical, sexual contact (oral, vaginal, anal) [47]. Subsequent literature review conducted between September 2022 and September 2024 supported this finding [11]. The 2024 systematic review of non-comparative studies (222 studies describing transmission routes for 32 317 cases of mpox) identified intimate physical contact (sexual contact and suspected sexual contact) as the

primary mode of transmission (95.4%) followed by close (non-sexual) contact (2.9%). Therefore, contact transmission represented 98.3% of the 32317 cases of mpox reviewed.

If infected during pregnancy, MPXV can cross the placenta leading to intrauterine exposure of the fetus and risk of congenital infection of the infant [78].

Environment-to-human transmission can occur through contact with MPXV contaminated objects, fabrics and surfaces (also described as fomite or indirect contact transmission) [79,80,81]. Pox viruses are generally more resistant to environmental conditions and show high environmental stability [48,49,82,83]. Studies conducted in health care facilities or in household settings, show that MPXV DNA can be found on several surfaces in the environment [43,45,84,85,86,87]. Some studies have shown the MPXV can also persist in the environment for several days after the patient with mpox has left the space [46,47]; however, transmission through percutaneous injury with a contaminated object, fomite, transplacental and animal products were uncommon, accounting for approximately 1.8%. In 24 studies reviewed between 2022–2024 describing 3331 household exposures,134 persons were infected (secondary infection rate of 4.02%) and the route of transmission was described as mainly close contact (non-sexual and sexual). Based on global surveillance data, less than 1% of reported cases have been attributed to fomite transmission [88,89]. While the risk of infection through contact with contaminated materials is low, it is not implausible [86,87]. Contaminated clothing or linens can disperse the MPXV if shaken [77,91]. The most recent systematic review conducted in 2024 (see details in Methods section – data not yet published) did not find any health worker infections reported after exposure to contaminated bed linen of patients with mpox.

Mpox transmission through percutaneous injury with contaminated sharp objects has been documented in health and care workers during specimen collection [92] as well as in community settings, in particular tattoo parlours [93]. The review conducted in 2024 found 29 studies that examined exposures among health and care workers. Of the 1738 exposures reported, 14 became infected. Ten of these infections indicated percutaneous injuries as the route of transmission.

2.8.1 Infectious period

Mpox infectious period can vary, but it typically begins with the onset of symptoms and patients are considered infectious until new lesions have stopped appearing,

existing lesions have crusted, scabs have fallen off lesions that formed scabs, and fresh, healthy skin can be seen where lesions used to be. This may generally take from 2 to 4 weeks, but some patients have been found to have persistent lesions for much longer [46,54]. There are studies that have also suggested that some patients might be infectious before symptom onset [75,94,95,96]. The potential for pre-symptomatic transmission remains unclear and more research is needed.

2.8.2 Children

Historically, mpox infection in countries in Central Africa has afflicted primarily children (under 18 years old) and younger age adults, mainly thought to be because older generations had smallpox vaccine-cross protection. The 2022 outbreak, which was dominated by clade IIb MPXV mostly affected gay, bisexual and other men who have sex with men, and children represented approximately only 1.3% of the total reported global cases [97]. Since 2023, the Democratic Republic of the Congo and the Central African Republic report a higher proportion of children among cases of mpox due to clade Ia MPXV [98]. Studies have shown that there is a difference in the exposure characteristics between younger children and older children mpox. Children between the ages of 0–12 years old most often acquired infection after direct skin-to-skin contact with a caregiver or household member with mpox; whereas children between the ages 13–17 years old had similar exposure characteristics to those most commonly reported among adults (i.e., sexual contact) [97,99,100].

2.8.3 Wastewater surveillance

MPXV can be detected in wastewater and guidance for wastewater and environmental surveillance for MPXV is available from WHO [101]. The virus present in mucosal and skin lesions can be released into grey water during activities including brushing teeth, hand washing, bathing, and from excretions into toilets [72]. There is no known case of mpox infection resulting from contact with contaminated wastewater to date [72] and detection of replication-competent MPXV in wastewater has not yet been reported [102,103].

3. Who do these recommendations apply to?

This guideline applies to patients with mpox infection cared for in the community, at home or in a health facility. Recommendations may differ based on the severity of MPXV defined by the clinical assessment of patients: presence of risk factors for severe disease, danger signs or complications.

WHO classification of severity of mpox disease and different pathways according to it:

- Non-severe mpox: home-based care
- Severe or complicated mpox: admission in health facility for closer monitoring and clinical care

Table 1. Risk factors and clinical findings described as being associated with severe disease and poor outcomes (based on small, uncontrolled observational studies) (Published in 2022)

Patient groups at higher risk of severe disease or complications	Children, pregnant women, persons who are immunosuppressed such as persons living with HIV having poorly controlled disease have historically been at risk groups (low CD4 cell count) *[106,18,45,29,32,46]*. Though data are lacking, patients with chronic skin conditions (e.g. atopic dermatitis), acute skin conditions (i.e. burns) may also be at higher risk for complications, such as bacterial infection. Results of recent systematic review can be found in next chapter.
Clinical signs and symptoms of complications	Nausea and vomiting *[29,40]*, painful cervical lymphadenopathy causing dysphagia, poor oral intake, eye involvement: eye pain, vision abnormalities, hepatomegaly, sepsis, dehydration, respiratory distress/ pneumonia, and/or confusion. Results of recent systematic review can be found in next chapter.
Laboratory abnormalities	Elevated hepatic transaminases (AST and/or ALT), low or high blood urea nitrogen (BUN), low albumin, elevated white blood count (WBC), or low platelet count *[40]*.
Skin lesion severity score	From smallpox experience *[59,107]*: Mild (< 25 skin lesions) Moderate (25–99 skin lesions) Severe (100–250 skin lesions) Very severe (> 250 skin lesions).

3.1 Risk factors for severe disease

Risk factors: Most recently, a systematic review was conducted up to September 2024 [49] (data mostly from the 2022 global outbreak) to understand prognosis,

complications and risk factors. The search strategy returned 3606 results; after the screening, 130 studies (19 for risk factors) were included, including 89 722 patients with a male percentage ranging from 42.9% to 100% and a median age range of 6.9 to 43 years. Limited data were available on children and pregnant women to inform this systematic review. With the current ongoing outbreak in the African Region, this systematic review will need to be updated and comparisons between clades and mode of transmission considered.

Using previously agreed upon thresholds, in discussion with the methodology chair, and subsequently confirmed with the GDG, it was determined that the criteria for determining whether a risk factor was significant for predicting hospitalization in patients with non- severe disease was if in the review of observational data, the risk factor had an odds ratio (OR) of greater than 2.0 and there was at least a moderate certainty of evidence. Additional, but less impactful, risk factors were noted if they had at least a moderate certainty of evidence and an OR of between 1.7 and 2.0. Those with a low or very low certainty of evidence or an OR of less than 1.7 were not considered significant risk factors for severe disease.

Thus, major factors noted to meet the specified criteria as significant risk factors for patients with non-severe mpox infection developing severe disease or hospitalization (see Table 2) are:

- HIV positive
- HIV (CD4 < 350 cells/mm^3)

The next section will show the results of a recent systematic review that has data published up to September 2024 [49].

Table 2. Risk factors associated with severe disease or hospitalization

Risk factors	Study results and measurements	Certainty of the evidence	Summary
Age (per 10 years increase)	Odds ratio: 0.88 (95% CI 0.63 to 1.23) Based on data from 16 939 participants in 6 studies	Low Due to serious inconsistency, Due to serious imprecision	Age may be associated with little or no increase in severe disease.
Sex (males vs females)	Odds ratio: 0.78 (95% CI 0.34 to 1.78) Based on data from 5501 participants in 3 studies	Low Due to serious inconsistency; Due to serious imprecision	Males may be associated with little or no increase in severe disease compared with females.
HIV (positive vs negative)	Odds ratio: 1.79 (95% CI 1.07 to 3.00)	Moderate Due to serious inconsistency	HIV is probably associated with increased odds of severe disease.

	Based on data from 9883 participants in 7 studies		
HIV (CD4 < 350 cells/mm^3 vs HIV negative)	Odds ratio: 2.45 (95% CI 1.19 to 5.02) Based on data from 2321 participants in 2 studies	High	Patients with CD4 < 350 cells/ mm3 are associated with increased odds of severe disease compared with HIV negative patients.
HIV (CD4 ≥ 350 cells/mm^3 vs HIV negative)	Odds ratio: 0.82 (95% CI 0.55 to 1.22) Based on data from 2321 participants in 2 studies	Low Due to serious inconsistency, Due to serious imprecision	Patients with CD4 ≥ 350 cells/mm3 may be associated with little or no increase in severe disease compared with HIV negative patients.
Vaccination (mpox or smallpox)	Odds ratio: 0.88 (95% CI 0.57 to 1.36) Based on data from 7400 participants in 7 studies	Low Due to serious inconsistency; Due to serious imprecision	Mpox or smallpox vaccination may be associated with little or no decrease in severe disease.
Vaccination (childhood or prior smallpox)	Odds ratio: 0.96 (95% CI 0.61 to 1.51) Based on data from 7032 participants in 6 studies	Low Due to serious inconsistency; Due to serious imprecision	Childhood or prior smallpox vaccination may be associated with little or no decrease in severe disease.

Only one major factor noted to meet the specified criteria as significant risk factors for patients with non severe mpox infection for death (see Table 3) are:

- HIV (positive)

Table 3. Risk factors associated with mortality

Risk factors	**Study results and measurements**	**Certainty of the evidence**	**Summary**
HIV (positive vs negative)	Odds ratio: 10.81 (95% CI 9.80 to 11.92) Based on data from 3377 participants in 2 studies	High	HIV is associated with increased odds of all-cause mortality.
Age (per year)	Odds ratio: 0.90 (95% CI 0.82 to 0.97) Based on data from 86 participants in 1 study	Very low Due to extremely serious imprecision	We are uncertain whether age is associated with increased odds of all-cause mortality.
Sex (males vs females)	Odds ratio: 3.59 (95% CI 0.54 to 23.60) Based on data from 86 participants in 1 study	Very low Due to extremely serious imprecision	We are uncertain whether males are associated with increased odds of all-cause mortality compared with females.

3.2 Prognosis

3.2.1 Risk for adverse outcomes

Table 4 shows the baseline risk estimates from the systematic review. In the non-severe cohort the rate of hospitalization is 4% (39 to 42) with very low mortality. Whereas, in patients from the severe cohort, already hospitalized, the rate of death is estimated to be 4.6% (36 to 58).

Table 4. Baseline risk for adverse outcomes in patients with mpox

Outcomes	**Event rate (95% CI per 1000)**		
	Non-severe cohort*	**Severe cohort***	**Overall**
Hospitalization	40 per 1000 (39 to 42)	NA	42 per 1000 (40 to 43)
ICU admission	0.3 per 1000 (0.1 to 0.7)	49 per 1000 (33 to 68)	0.4 per 1000 (0.1 to 0.9)
Mechanical ventilation	8 per 1000 (1 to 19)	55 per 1000 (34 to 80)	26 per 1000 (16 to 39)
All-cause mortality	0 per 1000 (0 to <0.001)	46 per 1000 (36 to 58)	0 per 1000 (0 to <0.001)

** The review team used a 50% threshold to categorize studies as severe or non-severe. Studies with fewer than 50% of participants classified as having severe mpox or hospitalized for treatment were categorized as non-severe; studies with 50% or more were categorized as severe.*

3.3 Rate of complications

3.3.1 Rate of complications

Table 5 shows the rate of complications reported in mpox patients. Overall, complications were uncommon (< 10%) but significant variation was observed between the non-severe and severe cohort of patients. In the severe cohort, complications commonly reported (>10%) included: secondary bacterial infection (21%), gastroenteritis (13%), severe pain (27%), cellulitis (15%), proctitis (24%), urethritis (17%) and rectal bleeding (16%). These data are from the systematic review that included studies published up to September 2024. With current ongoing outbreak in the African Region, this systematic review will need to be updated and comparisons between clades and mode of transmission considered.

Table 5. Baseline risk for complications of mpox

Outcomes	**Event rate (95% CI per 1000)**		
	Non-severe cohort*	**Severe cohort***	**Overall**

Acute kidney injury	NA	14 per 1000 (2 to 34)	14 per 1000 (2 to 34)
Secondary bacterial infection	75 per 1000 (69 to 84)	210 per 1000 (188 to 232)	92 per 1000 (86 to 99)
Respiratory failure	NA	37 per 1000 (21 to 56)	37 per 1000 (21 to 56)
Sepsis	0.3 per 1000 (0 to 1.5)	38 per 1000 (23 to 55)	2 per 1000 (0.3 to 3)
Pneumonia	3 per 1000 (1 to 6)	32 per 1000 (8 to 67)	4 per 1000 (1 to 7)
Gastroenteritis	12 per 1000 (0.2 to 35)	125 per 1000 (37 to 248)	23 per 1000 (6 to 48)
Encephalitis	0 per 1000 (0 to 0.2)	3 per 1000 (0 to 9)	0 per 1000 (0 to 0.2)
Severe pain	24 per 1000 (19 to 29)	273 per 1000 (243 to 303)	51 per 1000 (45 to 58)
Cellulitis	42 per 1000 (35 to 51)	153 per 1000 (102 to 211)	46 per 1000 (38 to 55)
Keratitis	63 per 1000 (30 to 106)	32 per 1000 (16 to 52)	39 per 1000 (24 to 58)
Conjunctivitis	38 per 1000 (33 to 43)	20 per 1000 (13 to 30)	34 per 1000 (30 to 39)
Abscess	27 per 1000 (18 to 38)	17 per 1000 (7 to 31)	24 per 1000 (16 to 32)
Myocarditis	0 per 1000 (0 to 0.01)	NA	0 per 1000 (0 to 0.01)
Epiglottitis	1 per 1000 (0 to 7)	NA	1 per 1000 (0 to 7)
Tonsillitis	30 per 1000 (23 to 37)	70 per 1000 (40 to 107)	32 per 1000 (26 to 39)
Pharyngitis	56 per 1000 (33 to 84)	71 per 1000 (21 to 146)	58 per 1000 (37 to 84)
Urinary retention	7 per 1000 (0.2 to 19)	18 per 1000 (0 to 75)	7 per 1000 (0.5 to 19)
Proctitis	67 per 1000 (62 to 72)	235 per 1000 (177 to 298)	69 per 1000 (64 to 74)
Urethritis	11 per 1000 (8 to 14)	167 per 1000 (88 to 263)	12 per 1000 (8 to 15)
Rectal bleeding	26 per 1000 (8 to 51)	160 per 1000 (111 to 215)	74 per 1000 (50 to 101)
Penile edema	45 per 1000 (35 to 56)	NA	45 per 1000 (35 to 56)
Paraphimosis	9 per 1000 (6 to 12)	NA	9 per 1000 (6 to 12)

** The review team used a 50% threshold to categorize studies as severe or non-severe. Studies with fewer than 50% of participants classified as having severe mpox or hospitalized for treatment were categorized as non-severe; studies with 50% or more were categorized as severe.*

4. Recommendations for the mpox care pathway

The following section of the guideline provides recommendations for screening, triage and testing for patients with suspected mpox. See figure 1 (Annex 4) for a visual description of the care pathway.

4.1 Screening and triage

4.1.1 Screening

Interim guidance *(Published 10 June 2022)*

WHO recommends, at the first point of contact with the health system, screening and triage should be performed for all persons who present with a rash and fever and/or lymphadenopathy, according to locally adapted WHO case definition, to identify individuals with suspected or confirmed mpox infection.

- Persons with symptoms that meet the case definition for suspected mpox [108] (see Annex 1: WHO case definitions for mpox outbreak in non-endemic countries) should enter the mpox clinical care pathway and immediately be given a well-fitting medical mask and isolated in a well-ventilated single room. If a well-ventilated single room is not available, then group patients with similar clinical diagnosis and based on epidemiological risk factors, with a spatial separation (at least 1 metre between patients).
- Suspected cases should not be cohorted together with confirmed cases.

4.1.1.1 Practical info

- A simplified questionnaire and screening protocol based on the WHO case definition adapted to local epidemiology can be implemented at the point of entry to health care (or during contact tracing) to screen patients based on the WHO case definition and local epidemiology. For example, during this outbreak, this can be done at primary care clinics, sexual health clinics, emergency departments, infectious diseases clinics, genitourinary clinics, dermatology clinics, maternity and paediatrics clinics and others.

- Depending on national (local) coordination pathways, telemedicine may be considered as a means of screening patients.
- Medical masks and alcohol-based hand sanitizer should be available for patients presenting at screening areas. Signs should be posted for both respiratory hygiene and hand hygiene and instructions to put on a well-fitting medical mask.
- Screening activities should be conducted maintaining a distance of at least 1 m from patients and using a "no touch" approach. Where these measures cannot be implemented or maintained then the facility should conduct a risk assessment to determine the level of PPE required according to the IPC recommendations for health facilities in the context of mpox. Health and care workers performing screening should follow the WHO Your 5 moments for hand hygiene [14,109,110].
- While waiting, crowding should be prevented between patients and a distance of at least 1 m should be maintained between patients [110].
- Consider implementing in-patient surveillance for mpox depending upon local epidemiology.

4.1.2 Triage

Interim guidance *(Published 10 June 2022)*

WHO recommends after screening and isolation, patients with suspected mpox infection should be triaged using a standardized triage tool (e.g. WHO/International Federation of Red Cross and Red Crescent Societies (IFRC) Interagency Integrated Triage Tool), and evaluated to determine risk factors and presence of severe disease.

- Triage refers to the sorting of patients by priority after screening, based on specific criteria (e.g. severity) and can be performed at any point of access to the health care system, including in both pre-health care and facility-based settings [111] and in hospital wards, during monitoring of patients.
- Acuity based triage is the action of sorting and prioritizing patients based on the estimation of their severity. This is used to identify patients who require immediate medical intervention and those who can safely wait or who may need to be transported to a specific destination based on their condition [111].

- The Interagency Integrated Triage Tool (IITT) is a novel triage tool developed to provide an integrated set of protocols for routine triage of adults and children. The tool focuses on a three-tier triage system and can be found in the WHO Clinical care for severe acute respiratory infection toolkit [111].
- Clinical assessment should focus on identifying signs and symptoms of severe or complicated disease and those at higher risk for severe disease (see Table 5).

4.2 Testing for mpox

Interim guidance *(Published 10 June 2022)*

WHO recommends to test for monkeypox virus in patients with suspected mpox

- Testing for mpox virus should be conducted as soon as possible to confirm diagnosis [106].
- Early HIV testing should be conducted when patients present with suspected or confirmed mpox infection [107].
- In areas with other endemic infections that cause rash and fever or lymphadenopathy, or if patient has risk factors for other diseases, as part of screening, febrile patients should be tested and treated per routine protocols (e.g. STIs such as syphilis, HSV and HIV, malaria testing in endemic areas for patients with fever, and other infectious diseases per clinical context and local epidemiology).

5. Recommendations for patients with mild or uncomplicated mpox (home-based care)

There is one updated IPC recommendation and one new best practice recommendation in this section.

5.1 Infection prevention and control (IPC) considerations in home-based care

Public health emergencies often begin and end in communities; therefore, an effective emergency response always includes communities and their interests. This requires a multifaceted approach that includes, but is not limited to, risk communication and community engagement strategies, public health and social measures, vaccination strategies, environmental services such as adequate water and sanitation infrastructure, and the application of IPC measures [114,115,116,117].

Health ministries and intersectoral partners at national and subnational levels should engage with communities and other actors to identify and provide the resources needed, implement risk communication strategies [118,119] to provide support, and look to other contexts for possible solutions to ensure that IPC measures can be met to provide safe care in settings where patients will be cared for [120].

In the context of emergency response, it is crucial that community IPC and WASH measures are implemented to mitigate and control transmission in high-risk settings, such as households with suspected cases, congregate settings, which includes internally displaced persons (IDP) and refugee camps and to ensure continuity of services such as schools. Infection prevention and control measures such as hand hygiene, dedicated personal items, handling of linen and laundry, environmental cleaning and disinfection and waste management, should be applied and adapted applied to community settings to mitigate and control transmission of mpox.

Previous guidance (2022) advised persons with mpox recovering at home to isolate themselves. Given the evolving evidence and perceived values and preferences of persons with mpox to avoid home isolation, the updated recommendation by the GDG reflects a shift away from isolation during home-based care, provided IPC measures can be implemented and maintained. Further research needs for IPC during

home-based care are listed in the section Uncertainties, emerging evidence and future research.

5.1.1 Infection prevention and control measures

Good practice statement (Published May 2025)
Infection prevention and control measures including hand hygiene, dedicated personal items, appropriate handling of linens and laundry, cleaning and disinfection of the environment, and waste management should be followed for persons with mpox in the community until all lesions are healed.*

** Healed lesions: lesions have crusted, scabs have fallen off and a fresh layer of skin has formed underneath.*

5.1.1.1 Practical info

5.1.1.1.1 Implementation considerations

- The person with mpox infection should wear a well-fitting medical mask and cover lesions when in close proximity to others until their existing lesions have crusted, scabs have fallen off lesions that formed scabs, and fresh, healthy skin can be seen where lesions used to be.
- The person with mpox infection recovering at home should be able to manage their self-care or identify a designated caregiver, preferably someone who is in good health, that has no underlying health conditions and has had previous smallpox or mpox vaccination or MPXV infection (see the conditional recommendation for home care for details for caregivers). The activities undertaken by caregivers may include preparing meals, going to the grocery store, getting medications, etc.
- The person with mpox infection recovering at home should refrain from contact with wild or domestic animals to avoid infecting the animal. This includes keeping possibly infectious and contaminated material, such as linens, towels and clothing away from pets and other animals. Another person should take care of domestic animals throughout the illness.
- If a health and care worker is required to provide care to patients with mpox in the home, they should wear appropriate PPE (gloves, gown, eye protection and medical mask), perform hand hygiene (according to the WHO 5 moments and

before putting on and after removing PPE) and clean and disinfect any patient care equipment used.

5.1.1.1.2 Hand hygiene

- Persons with mpox infection, and their caregivers or contacts should practice frequent hand hygiene [121]. This includes: 1) before preparing food; 2) before eating or feeding/breastfeeding; 3) after using the toilet or handling human and/or animal faeces; 4) after coughing, sneezing and/or disposing of a tissue; 5) each time they come in contact with their lesions; and 5) when hands are visibly dirty.
- Alcohol-based hand rub or soap and water should be used for hand hygiene.
- The person with mpox should have their own soap that they do not share with other household members.

5.1.1.1.3 Personal belongings

- The person with mpox and their family and household members should implement the following measures:
  - Avoid sharing personal items such as eating utensils, linens, towels, electronic devices.
  - Avoid sharing a bed or sleeping area with other people or animals.
  - Avoid direct contact with upholstered furniture, such as couches or chairs. Consider covering furniture with a clean sheet that can be laundered.

5.1.1.1.4 Handling linen, laundry

- Only the person with mpox or their dedicated caregiver should handle and launder their bedding, clothing etc.
  - Linens and bedding should be carefully lifted and rolled to prevent dispersion of infectious particles from lesions and body fluids. They should not be shaken.
  - Linens, towels, and clothing from the patient with MPXV should be laundered separately from other household laundry and can be reused after washing (manually or by machine) with detergent and preferably hot water (> 70°C) or in chlorine (a minimum of 0.05%) if hot water is not available [122].

5.1.1.1.5 Environmental cleaning

- Only the person with mpox or their dedicated caregiver should clean and disinfect the environment and objects/surfaces.

- Dishes and utensils and household surfaces, such as furniture, beds, toilets or floors, or any location where the patient has had contact should be cleaned with water and soap and disinfected regularly.
- Common household disinfectants or sodium hypochlorite (household bleach) products may be used [123,[124,125,126]. Disinfectants should be prepared and applied to surfaces according to manufacturers' instructions.
    - One study found that the use of a minimum of 0.05% sodium hypochlorite solutions or 70% ethanol is efficacious against MPXV when wiped on common non-porous surfaces in low-resource settings with a 1-minute contact time [123].
- Use damp mopping, avoid dry sweeping to prevent dispersion of particles.
- Carpeting and household furnishing should be steam cleaned where possible. Avoid vacuuming.

5.1.1.1.6 WASH and waste management

- Authorities should ensure access to safe water, sanitation, hygienic supplies (soap and water) and waste collection and disposal for persons with mpox infection and their family members during home-based care.
- Waste that is generated from caring for a patient with MPXV, such as bandages and PPE, should be placed in strong bags and securely tied before disposal and eventual collection by municipal waste services[127].
    - If municipal waste services are not available, as an interim measure and according to local policies, safely burying or controlled burning of waste may be performed until more sustainable and environmentally friendly measures can made available in local contexts.

5.1.1.2 Justification

The GDG emphasized the critical role of applying IPC principles at the community level to reduce community MPXV transmission. Members of the GDG highlighted the importance of implementing these IPC measures as a cohesive package of interventions, ensuring a multi-pronged approach to minimizing the spread of the virus. The GDG acknowledged the primary route of transmission is contact (sexual or non-sexual) with the skin lesions, with fluids or exudate from those lesions of individuals infected with the MPXV. Given possible contamination of surfaces and objects as well as the potential for infectious respiratory particles, the risk of indirect contact transmission or direct deposition cannot be excluded. Standard and transmission-based precautions describe measures to reduce routes of transmission

and are widely used in health care. The use of standard and transmission-based precautions are the cornerstone of IPC measures and the GDG noted these should be applied wherever there is human-to-human transmission [7,,103]. GDG members also noted the important role that ministry of health and implementing partners at national and subnational levels play in engaging with communities to identify and provide the resources needed, implement risk communication strategies and provide solutions to ensure that IPC measures can be met.

5.1.2 Isolation of patients with mpox

Conditional recommendation for, low certainty evidence (published May 2025)

WHO suggests that persons with mild, uncomplicated mpox lesions cared for at home are not required to isolate* provided their lesions are covered and they wear a well-fitting medical mask when in close proximity with others until all lesions are healed.**

- Persons with mpox who are unable to comply with covering their lesions or wearing a medical mask should be isolated at home.
- IPC measures to reduce environmental contamination in the home should be implemented.

** Isolation: the separation of infected people with a contagious disease from people who are not infected.*

*** Healed lesions: lesions have crusted, scabs have fallen off and a fresh layer of skin has formed underneath.*

5.1.2.1 Practical info

5.1.2.1.1 Implementation considerations

For information on implementing IPC measures in a home/household setting refer to the good practice statement and its implementation considerations.

For persons with mpox recovering at home without implementing isolation, the following measures, in addition to the IPC measures described in the good practice statement, should be followed:

- Persons with mpox recovering at home should wear a medical mask (if a medical mask is not available, a fabric mask may be worn [118]) and cover their lesions when near others.

- Covering lesions can be done with the use of bandaging and/or by wearing clothing that comfortably covers the lesions.
- Clinical follow-up should be conducted using methods other than in-person visits (e.g. telemedicine, telephone).
- Regular cleaning and disinfection of the environment the person with mpox occupies and frequently touched surfaces should be implemented.
- Individuals with mpox should limit traveling outside their home.
    - If a person with mpox leaves their home they should wear a well-fitting medical mask and ensure all lesions are covered.
    - If they leave their home they should ideally use private transportation and ensure proper ventilation in the vehicle, such as open windows if feasible.
    - If a person with mpox leaves their home to seek medical attention, they should inform their health practitioner or the facility they will visit in advance of arrival (so the facility can implement transmission-based precautions).
- The person recovering at home should be able to manage their self-care or identify a designated caregiver, preferably someone who is in good health, has no underlying health conditions and has had previous smallpox or mpox vaccination or MPXV infection (for example, this may include preparing meals, going to the grocery store, getting medications, etc.).
    - If there is a designated caregiver they should maintain a distance of at least 1 m from the person with mpox.
    - When distance cannot be maintained, or when conducting activities such as assisting with laundry, cleaning the environment, the designated caregiver should wear a well-fitting medical mask and disposable gloves.*
    - Caregivers should clean their hands with either soap and water or an alcohol-based hand sanitizer, before and after contact with the person with mpox or the environment and before putting on and after removing their gloves.

In the event that a person with mpox cannot comply with wearing a mask and covering their lesions and therefore are required to isolate at home they should:

- Designate one person to facilitate their self-care: preferably someone who is in good health, has no underlying health conditions and has had previous smallpox or mpox vaccination or mpox virus infection. For example, this may include preparing meals, going to the grocery store, getting medications, etc.
    - The person with mpox and the designated person that is facilitating self-care should be counselled regarding the risks of transmission.

  - The person with mpox should stay in a dedicated, well-ventilated room (e.g. with windows that can be opened frequently) separate from others in the household. In addition, household members should avoid entering the room.
  - If the designated person that is facilitating self-care needs to enter the isolation area, ideally with ensuite toilet and shower, and they should refrain from close contact with the person with mpox.
  - When distance cannot be maintained, the designated caregiver should wear a well-fitting medical mask and disposable gloves.* They should clean their hands with either soap and water or an alcohol-based hand sanitizer, before and after contact with the person with mpox or surrounding environment and before putting on and after removing their gloves.
- The person with mpox should cover lesions (if tolerable) and wear a well-fitting medical mask when in proximity of others, and when moving outside of the designated isolation area (e.g. to use the toilet).
- If adequate isolation and IPC measures cannot be ensured at home, then isolation may need to be arranged, with informed consent from the person with mpox and agreement from the caregiver and members of the household, in a health care facility or other designated facility.

** For more information on implementation in resource-limited settings refer to the Infection prevention and control and water, sanitation and hygiene measures for home care and isolation for mpox in resource-limited settings: interim operational guide (2024) [119].*

Benefits and harms

The use of isolation at home may reduce potential contacts and protect household members and vulnerable people in the community however there was insufficient evidence to determine this. On the other hand, isolation can lead to mental health challenges such as loneliness, anxiety and depression, amplify stigmatization and impose an economic burden due to absence from work or daily activities [122]. Based on the available data and the evidence on the modes of transmission of mpox, the GDG determined the harms outweigh the benefits.

Certainty of the evidence Low

The certainty of evidence was judged to be low and was rated down once for indirectness and once for risk of bias. The GDG noted that while there were no randomized or observational randomized studies for isolation versus no isolation in

the home, inferences about the impact of isolation could be made on the basis of the epidemiological findings about the routes of transmission. Over 200 studies with over 32000 patients identified the primary mode of transmission as sexual (95.4%) or non-sexual close contact (2.9%).

Values and preferences Substantial variability is expected or uncertain

The GDG acknowledged that many individuals (the person with mpox) would prefer not to implement isolation because of the negative mental health, social and economic consequences. Values and preferences may vary in family members and communities depending on their level of fear of getting mpox if the person is not isolated.

Resources and other considerations

The use of isolation at home may require significant operational and financial costs and support for the affected person with mpox, their family/caregiver and the health system. There may be costs and resource implications to the person with mpox or the health system to ensure access to medical masks and materials to cover lesions where isolation is not implemented.

Equity

The GDG acknowledged that there may be inequities in managing isolation at home, in particular in low- and middle-income countries where support may not be available including social and financial and stigmatization may be increased.

Acceptability

The GDG noted that in some situations, the person with mpox or their family members may prefer to utilize home isolation to potentially reduce transmission within the household. However, others may find isolation unacceptable or difficult to implement.

Feasibility

The GDG acknowledged there may be issues with the feasibility of isolation at home as well as the wearing of masks and covering of lesions.

5.1.2.2 Justification

The GDG noted that while there were no randomized or observational randomized studies for isolation versus no isolation in the home and the low certainty of the evidence, inferences about the impact of isolation could be made on the basis of the transmission route.

Over 200 studies with over 32 000 patients identified the primary mode of transmission as close contact (sexual or non-sexual) (data are not yet published but is available upon request). The review found that amongst 3331individuals documented to be exposed in the household, of whom 134 were infected (4.02% secondary infection rate) most reported non-sexual close contact or sexual contact.

Similarly, amongst 3643 individuals documented to have been exposed in community or congregate settings, of whom 91 were infected (2.5% secondary infection rate), most reported non-sexual close contact or sexual contact. It was not clear in many studies what protective measures, if any, had been taken. Only possible routes of transmission were described. The GDG noted that there were limited studies available that describe the different MPXV clades and there was some concern on the possible impact on transmission which may differ depending upon the clade.

The available evidence from the 2023 and 2024 systematic reviews presented on human-to-human transmission supports close contact (sexual or non-sexual) with the lesions of an infected person as, overwhelmingly, the primary mode of transmission [66]. The GDG acknowledged that while the main route of transmission is through direct contact (sexual or non-sexual) with the skin lesions (with fluids or exudate from those lesions of individuals infected with the MPXV), possible environmental contamination as well as the potential for IRP cannot be excluded. The GDG determined that IPC measures to prevent close contact would be paramount to transmission prevention while including the additional measure of isolation at home could cause undue hardship. IPC measures include avoiding direct contact with the lesions, use of source control measures for any IRP, and mitigating environmental contamination through use of cleaning and disinfection.

Based on the discussion of the evidence, the benefits and harms associated with isolation at home, as well as concerns regarding resource, equity, feasibility and acceptability, the GDG formulated a conditional recommendation that includes covering the lesions and wearing a medical mask, in addition to IPC measures, to prevent environmental contamination rather than isolation of the individual.

5.1.2.3 Clinical question/ PICO

- Population: Person with non-severe mpox is being cared for at home
- Intervention: Mpox patient isolated until all lesions are fully healed
- Comparator: Mpox patient does not isolate when all non-healed lesions are covered and wears a medical mask

5.1.2.4 Summary

The systematic review was conducted in two phases (see Annex 5 for details) and the data is not yet published but is available. The Summary of Findings table is based on non-comparative studies identified to indirectly inform the IPC PICO question. These studies described routes of transmission for suspected and confirmed mpox cases. Based on these studies, ten mpox transmission routes were identified amongst the 32 317 cases of MPXV infection reported in these studies: confirmed sexual contact(65.1% of mpox cases),, suspected sexual contact (30.3%)close contact (non-sexual)(2.9%), fomite/environment (0.36%), transplacental (0.01%), percutaneous injury (0.09%), direct deposition (formerly droplet) (0.003%),inhalation (0%), animal/animal products (0.48%) and multiple routes (0.83%)[26,27,47,57,86,87,97,102,103,128,130,131,132]. Close contact was the predominate route of transmission (95.3 %). Transmission through other routes including percutaneous injury with contaminated object, fomite and transplacental and animal products were uncommon, accounting for approximately 1.8%.

An additional sub-analysis was conducted to assess the route of transmission for each mpox clade: Clade I, Clade Ib, and Clade IIb. Only 29 out of 222studies reported clade information, covering 24% of patients. No cases of Clade IIa were reported in the literature. Among the 10788 patients in which the clades were identified, cases with clade Ib and IIb MPXV infection describe close contact (confirmed sexual, suspected sexual and non-sexual) as the primary routes of transmission. For clade 1a there was a total of 218cases identified. Amongst these cases, the routes of transmission were primarily described as 40.6% (205) as multiple routes, 30.9% (156 cases) as exposure to animals /animal products, 17% (86 cases) as close contact (non-sexual) and 11.5% (58 cases) as other routes of transmission. There was no description of droplet or inhalation transmission in any of the 29 clade specific studies.

These findings align with the previous systematic review [68].

Lastly the review also looked at secondary infections reported amongst 8712 patients by exposure setting, specifically in health care settings amongst health care workers, household exposures and congregate/community settings (including amongst community contacts, flight attendants, workplace, gay-oriented festivals, piercing and tattooing services, persons and students). A total of 3331 individuals were documented to be exposed in the household, of which 134 were infected (4.02% secondary infection rate), most of whom reported non-sexual close contact. There were 3643 individuals documented to be exposed in the community or in congregate settings, of which 91 were infected (2.5% secondary infection rate), most reported non-sexual close contact or sexual contact.

Amongst the 1738 health care workers documented to be exposed to mpox of which 13 were infected (0.8% secondary infection rate), three probable exposures were primarily described as due to unspecified occupational exposures and 10 (71.4%) of the cases involved percutaneous (needlestick) injuries.

Outcome Timeframe	**Study results and measurements**	**Comparator Covered lesions, medical mask, no isolation**	**Intervention Isolation until lesions fully healed**	**Certainty of the evidence (Quality of evidence)**	**Summary**
Mpox infection inferred from transmission route frequency data	(Observational (non-randomized))	31 742 reported cases of transmission as a result of close contact in 32 318 patients (210/222 studies). This can be disaggregated further as: 21 025 cases due to confirmed sexual contact; 9788 cases due to suspected sexual contact; and 930 due to non-sexual close contact. Inferred odds: 1		Low Due to serious risk of bias, Due to serious indirectness [1]	Isolating patients probably does not prevent transmission of mpox compared with not isolating patient provided all lesions are covered, a medical mask is worn and physical contact with others is avoided.

Risk of Bias: serious. Inconsistency: no serious. Indirectness: serious. Imprecision: no serious. Publication bias: no serious.

5.1.3 Symptomatic management

5.1.3.1 Pain and fever management

Interim guidance *(Published 10 June 2022)*
WHO recommends patients with mpox be given symptomatic treatment such as antipyretics for fever and analgesia for pain.

5.1.3.1.1 Practical info

- See Annex 2 for recommendations for symptomatic care.
- Headache and pain from skin rash, oral, ocular and genital lesions, swollen lymph nodes and generalized muscle aches are common.
- Pruritic lesions and itching can also be bothersome.
- For oral lesions, rinse the mouth with clean, salt water at least four times a day [135]. Consider use of oral antiseptic to keep lesions clean (e.g. chlorhexidine mouthwash) or local anaesthetic (e.g. viscous lidocaine) [136] [137].
- For genital or anorectal lesions warm sitz baths (warm bath made up of water and baking soda or epsom salt to heal and cleanse the perineal, perianal, penile and vulvar area) and/or topical lidocaine may offer symptomatic relief [135].

5.1.3.2 Nutrition

Interim guidance *(Published 10 June 2022)*

WHO recommends patients with mpox be assessed for their nutritional status and given adequate nutrition and appropriate rehydration.

- Symptomatic and supportive care is essential to maintain good nutrition and hydration.

5.1.3.2.1 Practical info

Key actions:

- Assess the nutritional and hydration status of all patients with mpox whether on admission to a health facility or when seen in the community. Nutritional intake can be compromised due to oropharyngeal lesions and/ or painful cervical lymphadenopathy. Nutritional support is described as an important intervention [33].
  - **Adults:** history of reduced appetite or weight loss, body weight, height, calculation of body mass index (BMI), look for signs of malnutrition (e.g. muscle wasting, nutritional oedema etc.); a standardized tool can be used (e.g. Malnutrition Universal Screening Tool [138]).
  - **Children:** same as above plus mid-upper arm circumference (MUAC) (6–59 months). A nutrition specialist or trained clinician should evaluate children and those with severe malnutrition [139].

- Oral nutrition should be encouraged daily, as patients need sufficient energy (kcal) and essential nutrients, in addition to fluids and electrolytes [140]. If the patient is well enough for oral food intake, offer nutrient dense therapeutic foods; especially for children and those at risk of malnutrition per the WHO Pocket book of hospital care for children [141].
- If food intake is not tolerated, evaluate for reason and treat appropriately. For example, if poor feeding is a result of nausea or vomiting, antiemetic medication can improve intake ability; if it is due to weakness, the patient should be assisted with feeding by a health care provider; or, if tolerated, due to pain from oral lesions or cervical adenopathy, treat pain.
- Provide vitamin A supplements according to standard recommendations, especially for children who have not recently received a dose. It plays an important role in all stages of wound healing and eye health [142].

5.1.3.3 Monitoring of signs and symptoms of complications

Interim guidance *(Published 10 June 2022)*
WHO recommends to counsel patients with mild mpox about signs and symptoms of complications that should prompt urgent care.

5.1.3.3.1 Practical info

- Communication between the patient and trained health workers, should be established for the duration of the home-based care period.
- Monitoring patients and caregivers in the home can be done by trained community workers or outreach teams by telephone, telemedicine or email initially on a daily basis (when possible) or as considered clinically necessary after initial assessments. The patient's willingness to engage in medical assessments should also be considered.
- Patients with mpox infection and their families should be counselled about the signs and symptoms of complications and how to recognize a deterioration in their health status that requires medical attention. For example, patients should be informed to contact their health worker immediately if their lesions get worse or increase in quantity, if they develop worsening pain, persistent fever, nausea or vomiting and decreased oral intake, visual symptoms, difficulty breathing or dizziness or confusion.

- If a pregnant person has chosen to be cared for at home, counsel the person about maternal, fetal and newborn signs and to seek care if they develop worsening illness or danger signs. Self-care interventions should be encouraged.
- Counsel about healthy behaviours including diet, physical activity, intake of micronutrients, tobacco alcohol and other substance use, per WHO recommendations on antenatal [143] and postnatal [144] care.
- For people requiring abortion services, consider alternative modes of service delivery, including self-management of medical abortion up to 12 weeks' gestation, where there is access to accurate information and to a health care provider at any stage of the process, per the WHO Abortion care guideline [145].

5.1.3.4 General skin care

Interim guidance *(Published 10 June 2022)*

WHO recommends conservative treatment of rash lesions, dependent on their stage, with aims to relieve discomfort, speed healing and prevent complications, such as secondary infections or exfoliation.

- Patients should be instructed to avoid scratching the skin and keeping skin lesions clean and dry to prevent bacterial infection. They should be instructed to wash hands with soap and water or use alcohol-based hand sanitizer before and after touching the skin rash or lesions to prevent infection. Lesions may be cleaned gently with sterile water or antiseptic solution (see poster Care of skin lesion in mpox Infection, WHO [242]).
- Healing of lesions would by promoted by being uncovered and exposed to air when possible. However, while in the proximity of other people, lesions should be covered to reduce the risk of transmission.
- For complications of skin lesions, such as exfoliation or suspicion of deeper soft tissue infection (pyomyositis, abscess, necrotizing infection), consider consultation with an appropriate specialist (i.e. wound care specialist, ID specialist, and/or surgeon). Debridement of the skin should not be done unless performed by an expert wearing appropriate PPE [156].

5.1.3.4.1 Justification

Optimal management of skin lesions is uncertain and needs further research.

5.1.3.5 Antimicrobial therapy or prophylaxis

Interim guidance *(Published 10 June 2022)*

WHO recommends that antibiotic therapy or prophylaxis NOT be used in patients with uncomplicated mpox. However, lesions should be monitored for secondary bacterial infection (i.e. cellulitis, abscess) and if present be treated with antibiotics with activity against normal skin flora, including *Streptococcus pyogenes* and methicillin-sensitive *Staphylococcus aureus* (MSSA).

- The decision to initiate antimicrobial therapy should be based on individual clinical assessment and local antimicrobial resistance patterns. If the patient does not improve clinically or the infection continues to spread, reassess the patient and the antibiotic regimen to consider if adjustments are necessary. See WHO Essential Medicines List: antibiotic book for more information regarding selection of antimicrobials and appropriate use [147] (see Annex 3. Antimicrobial recommendations and dosages for secondary bacterial skin infection).

5.1.3.5.1 Practical info

- The skin lesions in patients with mpox may be inflamed causing mild erythema and/or skin hyperpigmentation – this does not need to be treated with antimicrobial therapy [45]. Empiric or prophylactic use of antibiotics should be discouraged, as it increases the risk of emergence and transmission of multidrug-resistant (MDR) bacteria and places individuals at risk of possible side- effects of antibiotics such as *Clostridium difficile* associated diarrhoea. Infections with MDR bacteria are more difficult to treat, and associated with increased morbidity and mortality [147,148,149].
- Secondary bacterial infection of skin lesions has been reported as a common complication of mpox and patients should be monitored closely [45,32,40,146]. A swab of a superficial skin infection is unlikely to be helpful unless the patient has had a prolonged hospitalization and there is concern for an MDR organism. Signs of bacterial infection include erythema, induration, warmth, worsening pain, a purulent drainage, malodorous discharge or recurrence of fever. See Annex 3 for oral options of antibiotics. In selected cases based on individual risk factors, known colonization and local prevalence, consideration may be given to initiate

treatment for community-acquired methicillin-resistant Staphylococcus aureus (MRSA).

- Patients with bacterial superinfection of mpox rashes may develop an abscess which is the collection of pus within the dermis or subcutaneous tissue and most commonly due to bacteria from the skin (*Streptococcus* spp. and *Staphylococcus* spp.) [150]. An abscess may appear as a painful, red, shiny nodule with or without fluctuance. This may be associated with surrounding cellulitis, fever and worsening pain at the site of infection.
- Treatment of an abscess is incision and drainage done by sterile aseptic technique by a qualified health worker using appropriate IPC measures, to prevent complications related to untreated abscess such as osteomyelitis, septic arthritis, pyomyositis, sepsis and shock. Depending on the location in the body (e.g. adjacent to major blood vessels), size and complexity of the abscess, the incision and drainage may need to be performed in the operating theatre. Fluid should be aspirated and sent for microbiology and culture to help target antimicrobial therapy [150].

6. Recommendations for patients at high risk and those with complications or severe mpox

There is one updated IPC (Infection prevention and control in health facilities) and two new clinical management recommendations (Timing of ART initiation in people living with HIV and Breastfeeding and mpox) in this section that are focused on patients at high risk for developing severe mpox.

6.1 Infection prevention and control in health facilities (New recommendations)

Implementation of appropriate IPC measures is essential to mitigate and control risks of transmission of mpox in health care facility and community settings [109,151]. Implementing a hierarchy of controls [152] is central to reducing the risk of exposure to mpox within health care settings. As such, considerations for the application of engineering and administrative controls and the use of PPE have been integrated throughout the recommendations outlined.

It is critical to ensure that basic IPC standards are put in place at the national and health facility level to provide adequate protection to patients, health workers, caregivers and visitors and thereby protect the community. WHO provides guidance on the minimum requirements [153] for IPC at the national level and in health care facilities. Achieving the IPC minimum requirements and more robust and comprehensive IPC programmes based on WHO Guidelines on core components of infection prevention and control programmes at the national and acute health care facility level across health systems is essential to sustaining efforts to control emerging infectious diseases, health care-associated infections (HAIs) and antimicrobial resistance [151].

Health and care workers should always follow standard precautions and perform a risk assessment to evaluate the need to use transmission-based precautions. Standard precautions are summarized in the WHO aide-memoire [14].

Infection prevention and control is crucial in mitigating and containing the spread of MPXV. If appropriate IPC measures are not taken, transmission can be amplified via health care-associated (nosocomia) [153]) infections and/or health and care worker infections within health-care settings [154]. This can result in further spread into

communities and across borders, resulting in increased morbidity and mortality. Public health officials should ensure that robust IPC measures, environment infection control and practices accompanied by WASH services are in place at all health care settings, as well as in all communities, to mitigate these impacts. During an outbreak, support for IPC should include all relevant points of health-seeking practices within the local context, including government health facilities, private facilities, traditional healers and facilities such as mpox treatment centres established to manage the care of patients suspected of having or confirmed to have the pathogen of interest during an outbreak.

Strengthening IPC preparedness and operational readiness will lead to more robust responses, contain outbreaks and prevent health systems from becoming overwhelmed. Existing IPC capacity should be mapped and assessed (e.g. using the Health Emergency Readiness to Response Operations Capabilities checklist [HERO] tool), identifying the critical areas that are missing or that need development. Additional information can be found in the Framework and toolkit for infection prevention and control for outbreak preparedness readiness and response at the National Level [154] and the Framework and toolkit for infection prevention and control in outbreak preparedness, readiness and response at the health-care facility level [155].

Outbreak management is optimal where established national or subnational IPC programmes exist, with dedicated support and trained IPC teams at the national, local and health care facility level. Although MPXV has specific IPC considerations, standard and transmission-based precautions should be followed when caring for suspected or confirmed mpox patients.

All patients with mpox should receive respectful, patient-centred care that respects and promotes gender equity, maintains dignity, privacy and confidentiality [1].

Further research needs for IPC focusing on understanding transmission routes and IPC measures in health care settings are listed in the section Uncertainties, emerging evidence and future research.

6.1.1 Infection prevention and control considerations

Conditional recommendation for, low certainty evidence (published May 2025)

In patients with suspected or confirmed mpox, WHO suggests that health and care workers use contact and droplet precautions.*

- Consider using a respirator when the ventilation is poor or unknown or based upon a risk assessment (e.g. immunocompromised status or presence of mucosal lesions).
- Airborne precautions should be implemented if varicella zoster virus (i.e. chickenpox) or measles are suspected and until they are excluded.
- Airborne precautions should be implemented when performing aerosol-generating procedures (AGPs).
- If single rooms are not available or in limited supply, cohort confirmed patients and prioritize single rooms for suspect and probable patients.

** **Contact precautions** include the following PPE: gloves, gown.*

***Droplet precautions** include the following PPE: a medical mask, consider eye protection based upon a risk assessment.*

*** Confirmed mpox means via laboratory confirmation; probable meets clinical signs and symptoms with epidemiological link.*

6.1.1.1 Practical info

6.1.1.1.1 Implementation considerations

- Contact and droplet precautions should be used by all health and care workers providing direct or indirect care (e.g. cleaning the environment, handling linen or waste) to patients with mpox.
- In addition to droplet and contact precautions, standard precautions should be followed for all patients at all times. The measures described below provide additional considerations for implementing droplet and contact precautions [7] in the context of mpox.
- Health and care workers should be trained in the use of standard and transmission-based precautions such as contact and droplet precautions and the proper use of PPE.

6.1.1.2 Risk assessment

- Health and care workers should conduct a risk assessment to determine if additional PPE is required, such as a respirator rather than a medical mask and eye protection. The risk assessment should take into consideration: 1) the ventilation rate of the room and if an AGP is being performed; or 2) other activities are taking place that may increase the presence and risk of infectious respiratory particles, such as changing the bed linens of a patient with suspect or confirmed mpox; and 3) the patient's condition (e.g. number of lesions, location, i.e. mucosal, and patient's immune status).

6.1.1.2.1 Hand hygiene

- Hand hygiene should be performed according to the WHO 5 moments for hand hygiene[240].

6.1.1.2.2 Patient placement

- Place patients on contact and droplet precautions for mpox in a single room.
- If a single room is not available or single rooms are limited:
  - Patients suspected to have mpox and patients deemed as probable mpox cases should be prioritized for a single rooms;
  - Consider cohorting patients who are confirmed to have mpox.
- Physically separate patients by at least 1 metre (3 feet) and draw privacy curtains.
- Whenever others are in the room and if transport is necessary:
  - Cover any wounds or lesions on the patient's body though the use of bandages, clothing and/or sheet that comfortably covers the lesions.
  - The patient should wear a wear a medical mask (if able and tolerates) and follow respiratory hygiene and cough etiquette.

6.1.1.2.3 Personal protective equipment

- Contact and droplet precautions include the following PPE: gown, gloves, medical mask and eye protection based upon a risk assessment.
- Consider a respirator instead of a medical mask based on a risk assessment (details above).
- Use dedicated footwear that can be decontaminated. Disposable shoe covers are not recommended [171,172,173].

6.1.1.2.4 Safe injections and sharps injury prevention

- Follow standard precautions for safe injections and sharps injury prevention.

- Avoid use of sharp instruments for specimen collection. Lesions should be swabbed. Follow WHO guidance for diagnostic testing for MPXV.

6.1.1.2.5 Environmental cleaning and disinfection

- Increase cleaning and disinfection of mpox patient care areas to at least twice daily as well as immediate cleaning and disinfection of any surface that is visibly soiled with blood or body fluids.
- More frequent cleaning and disinfection should be performed on frequently touched surfaces including toilets, latrines and showers.
- Clean first with detergent and water then disinfect surfaces with a chemical disinfectant and allow disinfectant to remain untouched on surface for the contact time recommended by the manufacturer. Alternatively, a combined detergent-disinfectant product (when available) can be used to perform both cleaning and disinfection in a single step, provided it is effective against the targeted pathogens.
- Use products for disinfecting the environments that are approved for environmental cleaning in health care with virucidal activities (follow national or facility guideline) and will not damage surfaces or equipment.
- Disinfectants should be prepared and applied to surfaces according to manufacturers' instruction:
- One study found that the use of 0.05% and 0.5% sodium hypochlorite solutions and 70% ethanol is efficacious against MPXV when wiped on common non-porous surfaces in low-resource settings with a 1 minute contact time [117]
- Quaternary ammonium compounds were found to achieve sufficient log reduction of the MPXV on non-porous surfaces only with a contact time of between 1–10 minutes (not on porous surfaces such as wood) [117].

6.1.1.2.6 Handling and transport of linen

- Handle soiled linen from patients with mpox carefully (with minimal manipulation or agitation) to prevent personal contamination and transfer to other patients.
- Carefully lift and roll linens. Do not shake linen or laundry.
- Linens should be carefully placed into designated containers or bag for transport to laundry services.
    - Remove heavily soiled material (e.g. faeces) from linen, while wearing appropriate PPE, before placing it in the laundry bag.

- Laundry and linen may be decontaminated by manual or machine washing for at least 20 minutes with hot water (70°C, hot water mixed with detergent or hot water mixed with a low-concentration sodium hypochlorite solution (0.05%) [116].

6.1.1.2.7 Decontamination and reprocessing of reusable patient care items and equipment

- Use disposable or dedicated patient care equipment.
- Clean and disinfect equipment before use on other patients.
- Clean and disinfect or sterilize reusable equipment/devices according to the manufacturer's instructions, and national or international standards, using efficient methods and based on intended use.

6.1.1.2.8 Waste management

- Handle and treat bodily fluids and solid waste of patients with mpox as infectious waste.
- Segregate waste according to standard precautions (general waste, infectious waste and sharps) and place in appropriate bins at point of use.
- Management and disposal of waste (including PPE) should be performed in accordance with local regulations for infectious waste.

Evidence to decision

Benefits and harms	Small net benefits, or little difference between alternatives

The GDG assessed the benefits and harms of respirator use; from a public health perspective, the GDG felt it was important to reserve respirators for situations where respirators are known to make a difference. The GDG also highlighted potential challenges in availability, particularly in low- and middle-income countries.

Limited access in these settings may reduce supply in areas where respirators are essential. GDG members noted that other potential harms include the possible mental health consequences such as anxiety and stress related to wearing respirators.

Certainty of the evidence	Low

The certainty of evidence was judged to be low and was rated down once for indirectness and once for risk of bias. The use of a respirator possibly makes little or no difference in prevention MPXV transmission compared with a medical mask.

Values and preferences Substantial variability is expected or uncertain

The GDG anticipated that although health and care workers caring for patients with mpox will place priority on safety, when evidence does not support the effectiveness of an intervention, such as the use of respirators, most would decline use of the intervention. The GDG acknowledged the uncertainty and the likelihood of variability in the values and preferences of health and care workers. Furthermore, the GDG placed a high value on avoiding wasteful expenditure on interventions unlikely to be effective and thus on preserving resources for interventions with a higher certainty of benefit.

Resources and other considerations

Resources

The GDG anticipated that the use of respirators for the care of patients with mpox in health care facilities requires additional investment of financial and logistical resources (including fit testing), particularly impacting low- and middle-income countries.

Equity

The GDG acknowledged that health and care workers believe safety is a priority and respirators should be available, however, in low-resource settings supply may be limited and respirators need to be prioritized for other pathogens where it is known that they are required.

Acceptability

Some health and care workers may not like to wear a respirator and may prefer the use of a medical mask. Use of respirators has been associated with reports of communication barriers (verbal and non-verbal).

Feasibility

The GDG expressed concern over supply chain implications and availability of respirators where needed if they are used for pathogens where the evidence

> suggests they possibly make little or no difference in prevention compared with a medical mask.

6.1.1.3 Justification

The GDG noted that that among more than 32 000 cases of infections there were no reports of transmission by inhalation, and only one case of self-reported droplet exposure, and thus concluded the use of a respirator possibly makes little or no difference in prevention MPXV transmission compared with a medical mask. Amongst 1738 health and care worker documented exposures to mpox, of which there were 14 infections, 10 cases (71.4%) were identified as related to percutaneous injuries (needlesticks), one ocular exposure and three due to unspecified factors.

There may be situations where the use of a respirator is required such as during an AGP or if varicella zoster virus (chickenpox) or measles are suspected and until they are excluded. The GDG stressed that health and care workers should conduct a risk assessment to determine the need for a respirator or any additional PPE (e.g. eye protection). In areas where ventilation is poor or unknown or it is not possible to ensure adequate ventilation a respirator may be preferred.

The GDG also highlighted the importance of assessing the risk of transmission related to the status of the patient, noting the patient's condition (number and location of lesions, immune status) may increase the risk of transmission and should be taken into consideration during the risk assessment to determine the use of a respirator.

Given the primary mode of transmission described was close contact (sexual or non-sexual) this conditional recommendation for mpox should be considered in the context of accepted practices (transmission-based precautions) for IPC. The GDG acknowledged that while the main route of transmission is through direct contact (sexual or non-sexual) with skin lesions (with fluids or exudate from those lesions of individuals infected with the MPXV), possible environmental contamination as well as the potential for IRPs cannot be excluded. A conditional recommendation was made to implement droplet and contact precautions when interacting with patients with mpox or their environment, in addition to the use of standard precautions. PPE, including gown, gloves and eye protection (based on a risk assessment), must be worn as per contact and droplet precautions.