

Strategic framework for enhancing prevention and control of mpox

2024–2027



World Health
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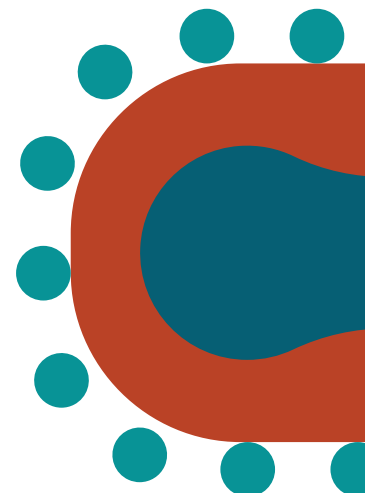
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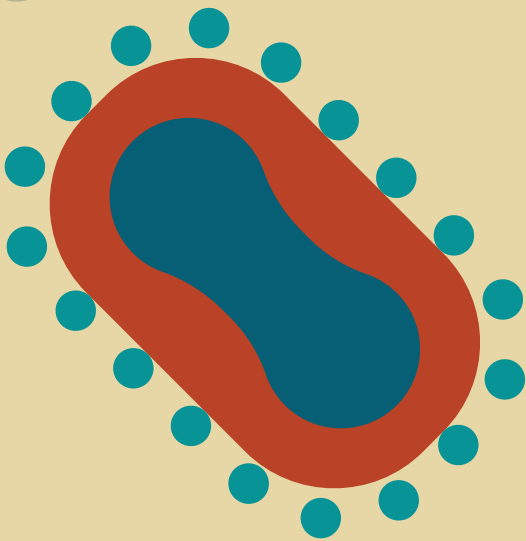
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Foreword



In 2022, while the world maintained an ongoing pandemic response, another extraordinary public health event unfolded: the multi-country outbreak of mpox. The rapid spread of mpox in countries around the world that had not previously noted cases, especially among men who have sex with men, prompted me to declare a public health emergency of international concern (PHEIC), in July 2022.

WHO Member States and communities deployed a timely and robust response, led and coordinated by WHO, which curbed the onset of new cases. There is however more work to do to stop the global outbreak of mpox. The changing epidemiology of mpox in central Africa is also very concerning, with endemic and previously unaffected areas reporting a rapid rise in cases in children as well as new outbreaks in linked sexual networks. The WHO Strategic

preparedness and response plan for mpox and Temporary recommendations were issued to support the response. Since August 2023, the Standing recommendations for mpox issued to all WHO Member States under the International Health Regulations (2005) (IHR) continue to provide essential guidance to meet ongoing and new challenges. WHO remains committed to providing longer-term support for the response.

Since the start of the global mpox outbreak, we have learned so much more about how mpox affects people, how it spreads, the importance of surveillance, the role of countermeasures, and the role of communities in stopping transmission. Even so, mpox continues to pose public health challenges that require continued, well-resourced and sustainable action. From experiences in widely differing contexts, we know it is possible to eliminate human-to-human transmission of mpox. To protect people from this emerging disease, it is necessary to be ambitious and aim for control and elimination by adapting the response to the needs of each local context. This must include addressing stigma and discrimination and building trust, strategic integration of mpox surveillance, prevention and clinical care into existing health programmes, and continuing to strive for equity in access to resources. We must also work to better understand and stop spillover from animals that puts people at risk.

This Strategic framework for enhancing prevention and control of mpox (2024–2027) provides the framework for health authorities, communities, and stakeholders worldwide to achieve control of mpox outbreaks in every context, advance mpox research and access to countermeasures, and to minimize zoonotic transmission. Coordination among our partners remains essential to ensure a continued robust response for mpox.

We trust that this Strategic framework will continue to support and strengthen global resolve and coordinated action to achieve these goals and prevent the next outbreak. With strong commitment from countries and global partners, we can stop mpox, continue to safeguard human rights and protect our global health security.

Dr Tedros Adhanom Ghebreyesus

Director-General

World Health Organization

Abbreviations

AAR	after action reviews
DRC	the Democratic Republic of the Congo
HEPR	health emergency prevention, preparedness, response and resilience
HIV	human immunodeficiency virus
IDSR	Integrated Disease Surveillance and Response
IHR	international health regulations
IPC	infection prevention and control
M&E	monitoring and evaluation
MPXV	monkeypox virus
NGO	non-governmental organization
PHEIC	public health emergency of international concern
R&D	research and development
RCCE	risk communication and community engagement
SAGO	WHO Scientific Advisory Group on the origins of novel pathogens
SOPs	standard operating procedures
SPRP	Strategic preparedness, readiness and response plan
STIs	sexually transmitted infections
UN	United Nations
WHO	World Health Organization

Executive Summary

The infectious disease now known as mpox is caused by the monkeypox virus (MPXV), an orthopoxvirus that transmits from person to person through close contact, and from unknown animal reservoirs in East, Central and West Africa. In May 2022, the first cases were reported in a global outbreak that rapidly spread to at least 117 countries in all six WHO regions. This outbreak has been characterized by sustained human-to-human transmission via direct skin-to-skin and sexual contact, and people living with HIV are disproportionately affected. While patterns of transmission which included human-to-human transmission were also evident in Africa for many years prior to 2022, efforts to develop laboratory diagnostics, vaccines and therapeutics for mpox were limited.

There are two known clades of MPXV with distinct epidemiological patterns and clinical outcomes. Clade I MPXV occurs primarily in East and Central Africa, notably in the Democratic Republic of the Congo where cases have been rising for decades and are associated with higher case fatality than clade II MPXV which first appeared in West Africa. A major emergence of mpox linked to clade II began in Nigeria 2017. Following this, subclade IIb has spread throughout the world beginning in 2022.

In July 2022, amid sharply rising case counts among key populations and newly recognized modes of transmission as well as those already known, the WHO Director-General declared the outbreak to be a public health emergency of international concern under provisions of the International Health Regulations (IHR) (2005). The IHR Emergency Committee for mpox recommended that all countries rapidly implement plans to control mpox, eliminate human-to-human transmission and reduce zoonotic transmission and associated risks. WHO Member States, communities and stakeholders worldwide worked to develop and implement effective strategies to stop the outbreak. Community action to share information, combat

stigma, and integrate mpox prevention and care in health and community services has been crucial to the response. With slowing of the global outbreak, the Public health emergency of international concern was lifted and in August 2023, the WHO Director-General issued Standing Recommendations for mpox to all Member States to support the goal to eliminate human-to-human transmission. As mpox due to clade I MPXV continues to emerge and spread in Central Africa, these recommendations have become even more salient.

Building on the Standing Recommendations, the Strategic framework for enhancing prevention and control of mpox is intended to support countries, communities, and stakeholders in all contexts in this effort. The overarching goal to achieve and sustain elimination of human-to-human transmission of mpox can be achieved with investment of the necessary resources and coordinated collaboration towards three core objectives, which are to: (1) achieve control of mpox outbreaks in every context; (2) advance mpox research and access to countermeasures; and (3) minimize zoonotic transmission. Importantly, these objectives do not require standalone programmes. This Framework emphasizes combining efforts with other health programmes, including epidemiological disease surveillance, sexual health services, HIV/STI testing, prevention and care supported by risk communication and community engagement, and primary health care, immunization programme delivery and other clinical services.

The Strategic framework rests on the guiding principles of support for community leadership, respect for equity and human rights, context-specific collaboration and integration, and commitment to continuous learning. Engaging affected communities is central to efforts to support health emergency prevention, preparedness, response and resilience. It also remains essential to strengthen health systems at all levels for collaborative surveillance,

community awareness and protection, clinical care of patients, access to diagnostics, vaccines and therapeutics, targeted research efforts, and ongoing coordination to sustain longer term efforts.

The first global outbreak due to an orthopoxvirus since the eradication of smallpox and surging outbreaks in Africa both make it clear that mpox can occur in any country or location, and that introduction or reintroduction of the virus that causes mpox remains an ongoing risk for all countries. Given new understanding of how mpox

spreads and affects people, this focus on human-to-human transmission is essential to check continuing expansion of outbreaks in endemic areas and avert the establishment of mpox as an endemic disease around the world. Following the end of smallpox under the leadership of WHO almost fifty years ago, this new effort is critical for global health security today.

This Framework offers guidance on defining, achieving and monitoring progress towards better control of mpox outbreaks and elimination of human-to-human transmission.

Part 1: Introduction and overview

Background

The infectious disease mpox (monkeypox) (1) is caused by the monkeypox virus (MPXV), an enveloped, double-stranded DNA virus of the *Orthopoxvirus* genus in the *Poxviridae* family, which includes cowpox, vaccinia, variola (which caused smallpox), and other viruses. (2) The two genetic clades of MPXV are clades I and II (see Box 1) each with distinct epidemiological patterns and clinical outcomes (3,4). (More information on the history of mpox, clinical presentation and other topics can be found in Annex 1.)

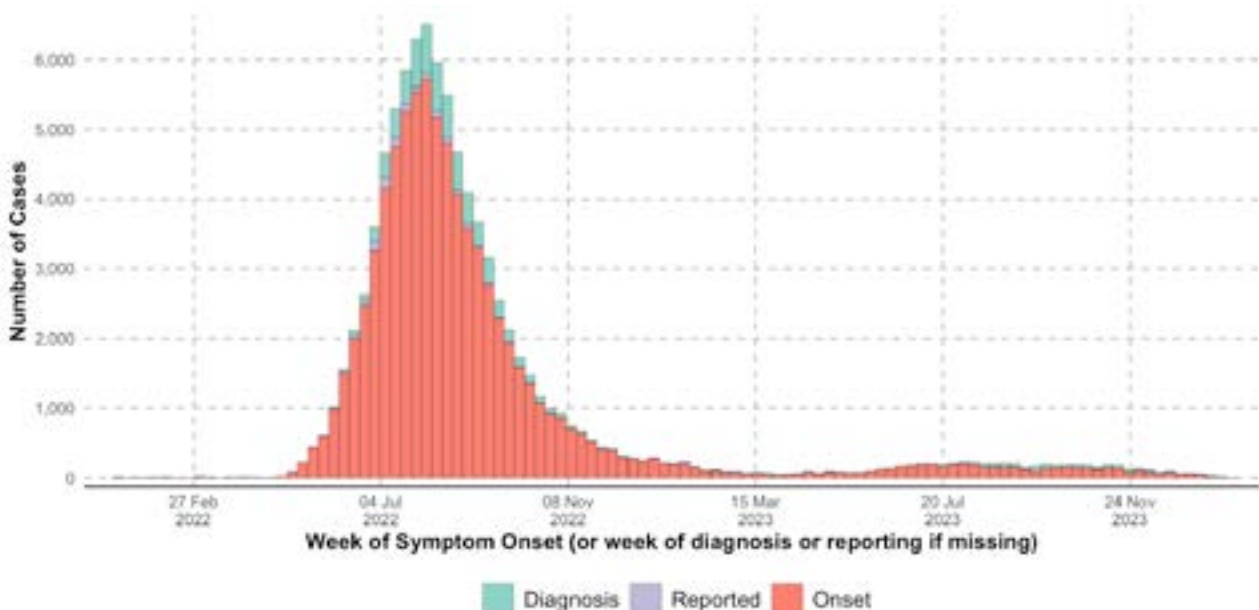
In 2022, a global outbreak began, with countries around the world reporting cases, most of which occurred in men and were associated with sexual contact (Fig. 1). By the end of 2023, this outbreak had resulted in more than 93 000 laboratory-confirmed cases in 117 countries (Fig. 2). Based on the history of mpox, the continuing spread in all regions, and the emergence of a new, severe outbreak in the Democratic Republic of Congo in 2023, coordinated, country-led action is needed

to detect and respond to this virus wherever it appears.

This Framework provides guidance for all Member States on how to sustain and strengthen mpox responses that were launched at the beginning of the global outbreak and expanded during the period from 23 July 2022 through May 2023, in which the WHO Director-General declared the multi-country outbreak to be a Public health emergency of international concern (PHEIC). (5–7)

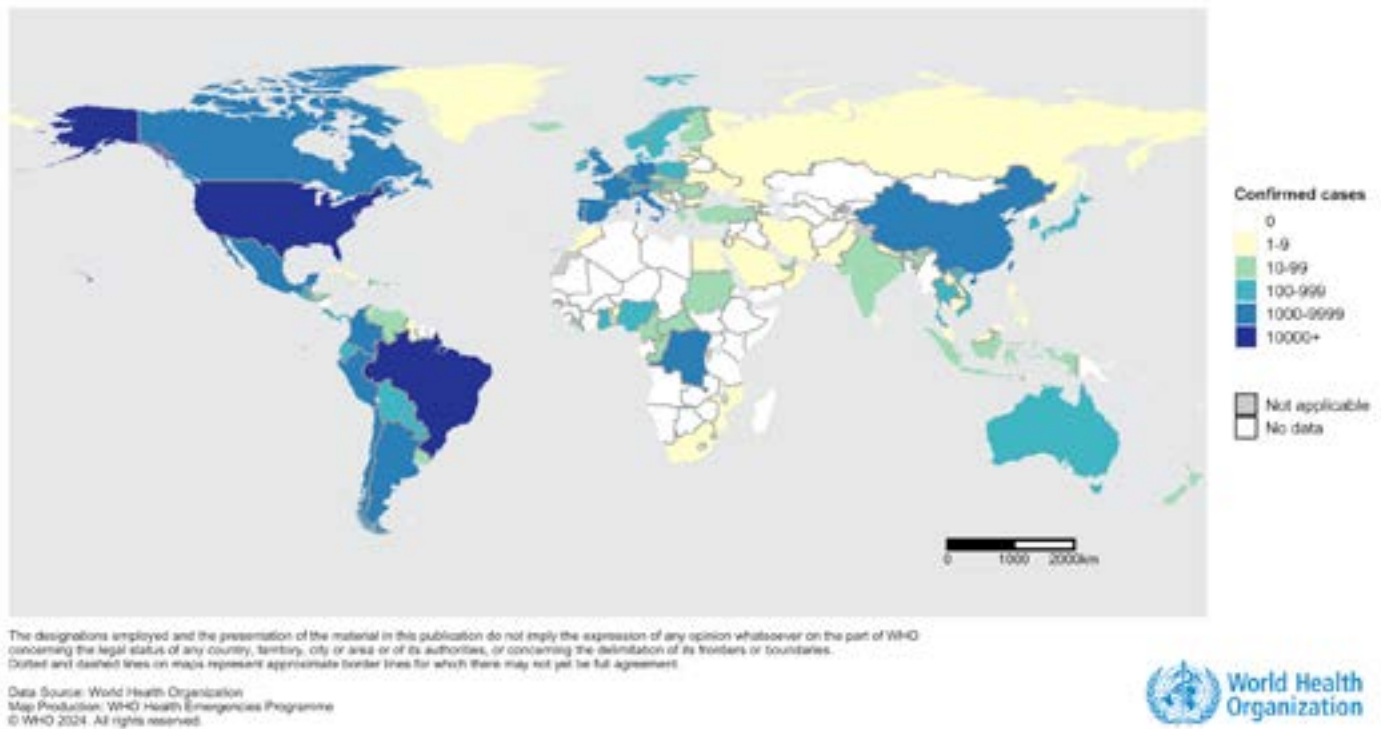
During the PHEIC, WHO mobilized surveillance, technical expertise, guidance and support for all WHO Member States, and issued an emergency appeal. (8) WHO Member States and stakeholders at all levels responded with immediate, collaborative action. WHO published outbreak bulletins, established global surveillance and data platforms for mpox and provided emergency interim guidance on the core components of the response. (See Annex 2 for a list of resources.)

Figure 1. Number of mpox cases reported to WHO, by week of symptom onset, 1 January 2022 – 31 January 2024



Source: WHO

Figure 2. Number of mpox cases reported to WHO by country, 1 January 2022–31 January 2024



Communities and health officials worked together to develop messages and public health approaches to reduce misinformation and stigma. (9,10) WHO made test kits available to all countries and worked with partners to enhance access to vaccines and treatments. However, the global outbreak highlighted the continuing inequity in access to diagnostics, vaccines and therapeutics within countries and between regions.

By mid-2023, the global outbreak had abated, due in part to the rapid response by health authorities and mobilization by affected communities collaborating on key interventions. However, as emphasized by the Director-General when lifting the PHEIC in May 2023, “mpox continues to pose significant public health challenges requiring a robust, proactive, and sustainable response.” (11)

This assessment has been borne out as countries continue to report cases for the first time. Moreover, in mid-2023 the Democratic Republic of the Congo documented sexual transmission of

clade I MPXV for the first time. Health authorities also reported a surging outbreak of mpox across the country; while the outbreak was mostly in endemic zones, cases were also reported in previously unaffected provinces. By the end of the year, almost 15 000 cases and hundreds of deaths had been reported, most of them in children under 15 years of age. (12,13)

Epidemiologic and surveillance data show that mpox is now a globally distributed infectious disease that can spread from person to person, and which disproportionately occurs in people living with HIV. (14) In many instances, mpox may be considered a sexually transmissible infection. In Central Africa, while the outbreak spreads among adults, children remain the most often affected in endemic areas with or without zoonotic exposure. Therefore, control and eventual elimination of human-to-human transmission can be pursued despite important gaps in the understanding of zoonotic sources and transmission dynamics.

A new framework for continued action

This Framework is an extension of, and informed by, WHO work on mpox to date, which has included convening a global consultation on necessary research; providing diagnostic protocols and kits to over 90 countries worldwide; development of a therapeutic trials protocol; establishment of a reserve of therapeutics for emergency and compassionate use; and facilitation of efforts to improve access to vaccines while mobilizing research on effectiveness and safety of these and other countermeasures deployed.

Continuing expansion of equitable access to diagnostics and vaccines is necessary to achieve and sustain elimination of human-to-human mpox transmission. Laboratory-based surveillance is critical to monitor the epidemiology of the outbreak, characterize the clinical features of the disease and support the use of clinical case definitions. (15) Sequencing and sharing of viral genomes are essential to monitor the epidemiology of the disease, support analysis of viral evolution, understand recurrence and possible recrudescence of infection, and monitor for appearance of antiviral resistant strains.

Access to vaccines and the best possible clinical care are essential to caring for patients and to support achievement of elimination. Emerging evidence suggests that mpox vaccines are equally effective regardless of MPXV clade. Immunization has been recommended by the WHO Strategic Advisory Group of Experts on Immunization (SAGE). (16) Research is underway on antiviral therapeutics, with studies occurring in the context of clades I and II outbreaks.

WHO issued a Strategic preparedness, readiness and response plan (SPRP), Operational guidelines, and a series of Temporary recommendations to support the global response. (5,17,18) In accordance with the International Health Regulations (2005) (IHR), in August 2023 the WHO Director-General, issued Standing recommendations for mpox to all Member States to develop and implement national

plans for mpox control and the elimination of person-to-person transmission. (19) This Strategic framework is designed to support these actions. Despite the complexities linked to varied epidemiology and national capacities, the objective of elimination is both ambitious and ultimately attainable, provided countries and global partners commit the necessary effort and resources. This document outlines how integration with other health programmes, strengthening of primary care and essential clinical services, and focussed and targeted effort where needed can all help achieve success.

The focus on human-to-human spread of mpox reflects a new appreciation of its importance in all contexts. Member States should, with multi-stakeholder support, develop and implement public health strategies to detect and stop outbreaks, including behavioural interventions and vaccination, while also continuing efforts to understand and minimize zoonotic transmission of MPXV where this is relevant. Further elucidation of the ecology of MPXV is essential to reduce its public health impact. (20) The ability to distinguish between viral clades through diagnostic methods and sequencing also remains critically important to monitor epidemiologic patterns, modes of transmission, viral evolution and actual or potential effectiveness of countermeasures.

This Framework applies to mpox in human populations anywhere and is designed to support countries in taking context-appropriate action. It reflects the experience to date that partnership with affected communities greatly strengthens the response and reduces stigma for patients. The core principles of this Framework emphasize the importance of an ethical, rights-based response in all contexts. (21)

It has also been developed with awareness that mpox is one of many priorities competing for constrained health system and pandemic response resources. Some steps can be taken without substantial additional investment of financial resources. In some settings,

mpox case detection, prevention, treatment and reporting can be integrated into HIV/STI, primary care or other health services to facilitate long-term responses without requiring standalone programmes. However, substantial additional financial and technical resources for

filling gaps in integrated disease surveillance, outbreak investigation, research and access to countermeasures especially in low-income settings will be also necessary. Continuing global commitment is needed to meet these gaps and facilitate local action.

Box 1. Origin and genetic diversity of the monkeypox virus: Implications for elimination and control



The monkeypox virus (MPXV) was first identified in 1958 in monkeys imported from Singapore and kept for research in Denmark. (22) MPXV in humans appears to have originated in parts of Africa, where hunting forest animals and preparation of wild game (bush meat) are considered sources of exposure.

Two clades of MPXV have been identified: clade I, formerly known as the Congo Basin or Central African clade, and clade II, formerly known as the West African clade, which is divided into subclades IIa and IIb. Clade I is found in both animals and humans and is linked to sporadic cases as well as large outbreaks. Limited new information suggests some clade I lineages (for example in East Africa) may differ from those found in Central Africa. Subclade IIb is the strain linked to the outbreak in Nigeria since 2017 which spread to other countries during the global outbreak that began in 2022 and has to date only been detected in humans. Subclade IIb lineage B and to a much lesser extent lineage A have both contributed to the global spread of mpox. Subclade IIa has been seen in humans only during the outbreak linked to pet prairie dogs in the United States in 2003 and in a single specimen from Liberia in 1970. All other publicly available sequences of clade IIa are from animal sources in West Africa.

The origin and animal reservoirs of MPXV are not known. Various small mammals such as rope squirrels, pouched rats and African dormice are susceptible, as are various species of monkeys and other non-human primates including chimpanzees. Presence of antibodies or detection of virus in several distinct species suggests the lifecycle may involve interaction of reservoir hosts and incidental species. Clade I MPXV has been shown to be more virulent in animal studies and human populations than clade II. Some outbreaks in Central Africa have been linked to contact with squirrels or monkeys or preparation and consumption of their meat.

Additional research is needed to understand the impact of clade-specific epidemiology and transmission dynamics in human populations, as well as between animals and people where this occurs, and to understand how route of infection may influence clinical illness. In addition to recognized modes of transmission through direct contact, fomites and respiratory droplets (for example from oral mucosal lesions), clades I and II are now both known to be sexually transmissible.

Part 2: Goal and objectives

Goal, objectives, and guiding principles

The overarching goal of mpox prevention and response is to:
Achieve and sustain elimination of human-to-human transmission of mpox.

To achieve this goal, we must meet three objectives, with actions upheld by four guiding principles, and implemented through the five core components of the WHO Health emergency prevention, preparedness, response and resilience (HEPR) framework (see Fig. 3). (23)

Objectives

The objectives of the global mpox elimination strategy are to:

1. Achieve control of mpox outbreaks in every context
2. Advance mpox research and access to countermeasures
3. Minimize zoonotic transmission of mpox

Guiding principles

Work towards these objectives is underpinned and informed by four guiding principles.

- **Community leadership**
Mpox programmes and services are guided by well-resourced and robust community engagement and leadership.
- **Equity and human rights**
All people at risk of exposure to mpox have equitable access to stigma-free, non-discriminatory, safe and confidential services, within a continuing global effort to expand access to WHO-recommended tests, treatments and vaccines.

Figure 3. Core components of mpox preparedness, readiness, and response: 2024–2027



Source: WHO

- **Context-specific collaboration and integration**
Based on the epidemiology, preferences, needs and capacities of affected communities, mpox surveillance, prevention, diagnosis, treatment and care are integrated with existing programmes and services in health and congregate settings, including community-based services and close coordination with One Health programmes and stakeholders.
- **Commitment to continuous learning**
Stakeholders ensure findings from ongoing evaluation and applied research are used to enhance programmes and improve outcomes for all patients and communities.

Evolving epidemiological contexts

Since the onset of the global outbreak in 2022, it has become clear that mpox can occur in any location, as some countries continue to observe outbreaks, and others are reporting their first cases almost two years after the global emergency began. Introduction or re-introduction of the virus that causes mpox remains an ongoing risk for all countries. To support implementation of this Framework, five broadly schematic epidemiological contexts can be described. Most countries (or subnational areas) fall into one of the following contexts:

Context A: Areas reporting sporadic cases or sustained community transmission of mpox primarily linked to transmission through sexual networks (for example, Europe and the Americas in 2022-2024, Asia and the Pacific in 2023-2024, eastern DRC in 2023-2024)

Context B: Areas with mixed modes of human-to-human transmission (sexual and nonsexual), episodic or continuous over time, affecting men, women and children with known or presumed exposure to a person with mpox (for example, urban or peri-urban areas in West and Central Africa, no history of relevant animal contact)

Context C: Areas with mixed modes of transmission (human-to-human and animal-to-human), including episodic or recurrent outbreaks affecting mainly children and young adults in rural areas (for example, primarily endemic areas of East and Central Africa, parts of West Africa). The possibility of animal-to-human transmission should be considered for outbreaks of unknown origin (for example United States in 2003).

Context D: Areas where the situation is unknown or unclear due to lack of surveillance or conflicting information. This can include areas not reporting cases for which cases are reported by means other than national surveillance reports (for example scientific literature) or for which other jurisdictions are reporting cases linked to travel to the area (for example parts of the Arabian Peninsula).

Context E: Areas where there are no reported cases by any means, no credible reports via event-based surveillance, and no cases reported in other countries or areas linked to recent travel to or from the country/area in question, in the context of adequate surveillance.

These contexts are not rigid categories, and are not limited by viral clade, primary mode(s) of transmission, or other factors. Instead, countries and regions are encouraged to use these descriptions as a starting point for detailed planning and action, and as a common terminology for assessing regional and global conditions. They apply to different contexts for mpox regardless of viral clade, which is an additional consideration for public health, clinical care, and infection prevention and control.

While most countries or subnational areas will align with one of these descriptions for planning and implementation of long-term action, it is important to anticipate shifts in context. The epidemiological situation in any location may change suddenly as outbreaks occur or evolve as new patterns emerge.

Defining mpox outbreaks, community transmission, control and elimination

In public health, there are different approaches and goals for reducing the burden of infectious diseases, such as control or elimination of transmission, with definitions of each goal varying by disease. (24) WHO has developed

definitions to support regional, country and subnational planning and action (see Box 2). Using these definitions will support a harmonized approach to communication, collaborative surveillance and tracking progress.

Box 2. Defining mpox outbreaks, community transmission, control and elimination for human-to-human transmission



A suspected outbreak of mpox is the occurrence of one or more suspected or probable cases of mpox in a nationally or locally defined geographic area, regardless of the origin of the case or cases. *A suspected outbreak requires a detailed case investigation and active case search for more cases.*

A confirmed outbreak is the occurrence of two or more laboratory confirmed (or one laboratory confirmed and one or more epidemiologically linked cases) of mpox in a nationally or locally defined geographic area, regardless of origin of index case and timing of emergence of subsequent cases.^{a,b} *For a confirmed outbreak, thorough investigation is necessary to identify other cases as well as contacts for symptom monitoring before an outbreak can be ruled out.*

Community transmission of mpox is the continuing occurrence of new mpox cases spread via human-to-human direct or indirect (fomite) contact for \geq six weeks following the first reported (index) case.^{b,c}

Control of mpox is the absence of new mpox cases beyond six weeks (two maximum incubation periods) after the last case reported in an outbreak of any origin and in the presence of adequate surveillance.

Elimination of human-to-human transmission is the absence of new local cases (i.e. without any defined travel history or zoonotic exposure) for \geq three months in the presence of adequate surveillance.

An outbreak that is stopped within six weeks (no new cases after six weeks in a named geographic area) would not jeopardize elimination status in the area as, in the presence of adequate surveillance, it demonstrates capacity to detect cases and stop further transmission.

The above definitions can be used to support close monitoring at the local level.

- In endemic areas, a single laboratory confirmed or clinically compatible case (meeting national clinical case definitions) may be considered an outbreak, particularly in the absence of broader access to laboratory services. This definition of an outbreak in the context of an elimination strategy applies in endemic areas with regular occurrence of cases and emphasizes the need to take public health measures around every case to achieve elimination.
- In any context, emergence of additional cases without an epidemiological link may be indicative of undetected chains of transmission or new importations or spillover events.
- In the context of attendance at a gathering multiple separate cases occurring with or without additional spread would be considered epidemiologically linked and constitute an outbreak.

Implementation considerations

Assessment of the epidemiological situation and progress towards subnational and national control and elimination of human-to-human transmission is crucial and depends on the following:

- **The presence of adequate surveillance.** Absence of reported cases does not equate to elimination in the absence of well-functioning surveillance. Adequate surveillance refers to regular and systematic reporting of suspected, probable and confirmed cases (including zero-reporting when there are no cases) based on up-to-date context-specific case definitions, detailed case investigations with an agreed set of variables, use of contact-tracing and active case search, availability of laboratory and/or field-based diagnostics, and use of quality and performance indicators. All surveillance activities are underpinned by ongoing community engagement and health worker training. Development of surveillance strategies for mpox should be guided by and aligned with relevant resources such as the WHO interim guidance for surveillance, case investigation and contact-tracing and the HEPR collaborative surveillance conceptual framework. (15,23) Surveillance strategies, approaches and related trainings should ensure capacity for consideration and detection of cases acquired through sexual transmission.
- **Genomic sequencing and sharing.** Laboratory-based surveillance and virological monitoring with genomic analysis are critical for disease detection and to monitor key features of mpox outbreaks. These can also support traceback studies to identify the origins of outbreaks including in settings where clinical epidemiology is less well described. In addition, there is a need for development of diagnostic assays for use in decentralized sites or at point of care, guided by the WHO Target product profiles for tests for mpox diagnosis. (25)
- **Regional and global reporting of all new cases.** In all countries, mpox should be included in the national list of notifiable diseases in all jurisdictions, and probable and laboratory-confirmed cases should be immediately notified to health authorities at the next administrative level. Where access to diagnostics is limited, or as part of the elimination strategy, a suspected case that meets a clinical or syndromic case definition should also be notifiable.
- **Assessment of modes of transmission.** One prior mpox outbreak due to clade II MPXV linked to importation of small mammals in a non-enzootic setting (United States of America, 2003), and recent recognition of transmission of clade I MPXV through sexual contact in Central Africa (DRC, 2023) are both examples that emphasize the importance of assessing all possible modes of transmission for mpox and not making assumptions based on archetypal contexts. All countries should review and update case investigation forms to accommodate new understanding of this emerging disease and should be equipped with capacity to diagnose any clade of MPXV.
- **Attention to travel, events and gatherings.** International travel facilitates the movement of pathogens and can lead to outbreaks far from the original source. Information for travellers before departure particularly for specific events, gatherings, or themed cruises on conveyances and at points of entry can help to reduce risk for individuals and limit new outbreaks. Engagement with travel medicine specialists can further support offering tailored information on prevention measures for mpox. WHO does not recommend travel or trade restrictions for mpox. It is essential for each country to rapidly report to WHO all cases linked to international travel, to facilitate and support outbreak investigation which includes the country and location of origin of travel.

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- **Attention to congregate settings and population movements.** Persons in congregate settings including correctional or residential facilities, schools, hospitals and other such settings face higher risk of infectious diseases including mpox. Population movements such as migration due to conflict or other circumstances, including establishment of camps or other facilities for internally displaced persons or refugees, can lead to new outbreaks in countries that previously achieved control or elimination objectives. Vigilance, preparedness, timely detection of cases and robust outbreak response can help preserve prior public health achievements.

Implementation considerations by epidemiological context

In countries in context A (such as with transmission in sexual networks) it is recommended to ensure integration of mpox prevention and care for key populations with sexual health and HIV/STI health programmes and services, other relevant points of access to care such as travel health and urgent care. It is also essential to develop partnerships with local health authorities and community groups led by and for men who have sex with men, others at risk such as sex workers, and/or people living with HIV.

For countries with context B epidemiology (mixed modes of human-to-human transmission) it is recommended to anchor and complement actions described for context A with a focus on integrated disease surveillance, frontline primary health care, sexual and reproductive health

services including maternal and neonatal care, dermatology and other public health and clinical services that reach men, women and/or children who are or may be at risk.

For any areas with complex epidemiology where zoonotic transmission is documented or presumed to occur (context C) in addition to human-to-human spread, it is recommended to adapt actions based on modes of transmission through a One Health approach to better understand and reduce zoonotic transmission and the associated public health impact.

For contexts D (situation unknown, where better surveillance and further discovery are needed) and E (no cases in presence of adequate surveillance, where requirements for elimination are met or the area has never been affected), it is essential to ensure that mpox is a nationally notifiable disease and to sustain case reporting as provided for under the International Health Regulations (2005).

In every context, surveillance and risk communication and community engagement remain essential to raise awareness of collective and individual actions needed. These suggestions also apply to sub-national areas according to local contexts. It is further noted that these epidemiological contexts occur in countries with varying degrees of access to diagnostics, treatments and vaccines. It is crucial that all countries identify and quantify needs for medical countermeasures, particularly diagnostics and vaccines, and that there continue to be concerted global action to meet these needs.

One Health: understanding and minimizing zoonotic transmission

Control and elimination of human-to-human mpox transmission are possible in all epidemiological contexts, including those settings where outbreaks are linked to animal-human contact (such as hunting and butchering or preparing wild animals for food). Ensuring One Health-guided risk communication and community engagement (RCCE) to reduce transmission at the animal-human interface, providing health information and implementing infection control measures when such transmission does occur can help reduce the risk of new cases within households and/or onward spread in communities. Work to better understand zoonotic events can contribute to effective responses. Countries which experience outbreaks from confirmed or presumed zoonotic sources can achieve control as stated above.

The ability to prevent zoonotic transmission and mitigate the associated public health risk requires multidisciplinary investigation and research to fill knowledge gaps about reservoir species and transmission dynamics in families and communities, and to assess and scale up effective RCCE strategies to support community-level action to stop outbreaks. Evidence from recent outbreaks in contexts with presumed animal-to-human transmission strongly suggests that most cases are the result of human-to-human contact within families and communities. Thus, transmission can occur between children,

between adults and children, and between adults through different forms of direct physical contact. Interventions to reduce health impact will include community engagement, risk communication, isolation of cases wherever feasible, covering of lesions and wearing of masks where isolation is a challenge, infection prevention and control measures to reduce fomite transmission, optimal clinical care to reduce the duration of illness, protection of health workers, and vaccination programmes. Vigilance must also be maintained to anticipate and detect any possible occurrence of spillback of MPXV from people to domestic pets, livestock or animal wildlife.

Studies needed to better understand the origins of MPXV and factors behind its continuing emergence have been outlined by the WHO Scientific Advisory Group on the origins of novel pathogens (SAGO). (20) In addition to animal surveillance and One Health coordination, countries should take steps to create, maintain and update strategies with operational and outcome targets to reduce risk to individuals, including health workers, and members of other communities at risk such as hunters and animal handlers. In the longer term, nearly all presumed zoonotic infections could be accounted for by documented exposures to animal reservoirs or vectors and onward spread in families and communities.

Part 3: From planning to action: implementing the strategic framework

Implementation priorities for preparedness and response operations

This Strategic framework for enhancing prevention and control of mpox (2024–2027) builds on the previous mpox Strategic preparedness and response plan and continues to focus on five core capacities of health emergency preparedness, response, and resilience: emergency coordination, collaborative surveillance, community protection, clinical care, and access to countermeasures (see Fig. 3). (17) This includes attention to research and development across all areas of work. Stakeholders in all contexts can use the following priority areas and sample milestones to initiate action and benchmark progress.

Priority 1: Coordinated planning for sustainable long-term action

Coordinated planning is essential for implementation of this Framework to ensure sustainable long-term action to prevent and stop mpox outbreaks, reduce risk to individuals and communities and eliminate human-to-human transmission in each context.

Milestone

End of 2027: All countries have completed at least one review of their response for mpox, and their elimination and control plans, to address current status and anticipated future risks.

Action: Identify common and unique contextual characteristics essential for planning

The Strategic framework rests on the guiding principles of support for community leadership, respect for equity and human rights, context-specific collaboration and integration, and commitment to continuous learning. As

Action: Assess mpox response to inform new plans and adapt strategies

Implementation of the Framework should begin with an action review or other form of assessment of the mpox response to date, an initiative all countries and stakeholders can consider. This can take different forms, such as debriefs, working group discussions, key informant interviews, or formal evaluation of specific elements of the response, including barriers to implementation, employing a range of methods. (26)

Informed by the outcome of these reviews, policies, plans and resources for mpox prevention and response should be updated and adapted to support long-term control and elimination efforts. Countries with plans, policies, and programmes that predate the 2022 multi-country outbreak and/or those countries that did not report cases during the outbreak should also assess their risks, capacities and needs in order to update or develop their plans. This national planning effort should be supported by WHO Regional Plans in all regions. (27,28)

outlined, the epidemiological context may differ significantly from one country to another, or from one place to another within national borders. The extent to which groups or communities affected have access to accurate information and medical countermeasures, and/or the means to take steps to reduce risk by adapting their activities, will also differ.

In places where commercial sex work or same-sex relationships or activities are stigmatized and/or criminalized, disclosure of mpox symptoms and possible sexual exposure will be difficult for many. Individuals with mpox may be hesitant to seek care when symptoms emerge or to share information about contacts to support an effective outbreak response due to cultural or religious considerations. In these settings, public health authorities should work with key populations and community groups to gain trust, convey information, and create spaces for accessing safe, high-quality care in a health services or community-based harm reduction approach.

It will also be important to devise new approaches to risk communication and community engagement in settings where zoonotic transmission may occur. Local leaders, communities, health workers and animal health specialists must collaborate to develop strategies that both limit risk from interactions with wild animals or consumption of bushmeat,

and address and minimize the resultant risk of person-to-person spread of mpox which often occurs within households and communities.

In all countries, efforts will be needed to better understand the relationship between HIV, other sexually transmissible infections (STIs) and mpox, and to address and reduce risk for the most marginalized through integrated outreach efforts that may include immunization as well as information. Box 3 outlines an approach that can anchor planning based on local epidemiology, risk assessment, identification of needs, and working with communities to design interventions and take action from local to national levels. As previously noted, it is important to plan for and anticipate shifts in understanding, as new information emerges about modes of transmission, mpox reinfection and recrudescence (see Box 4), circumstances that put people at risk, and the effectiveness of public health measures in protecting people.

Milestone

End of 2024: All countries have a detailed mpox epidemiological picture, risk assessment and needs assessment for mpox which can be adapted as needed based on local and external events.

Action: Define context-appropriate control and elimination objectives

Each national mpox control and elimination strategy or plan should articulate clear objectives and targets to align the efforts of all stakeholders towards a common goal. Table 1 offers suggested epidemiological criteria for progression from community transmission of mpox to elimination of human-to-human transmission and provides examples of control levels that can be set and adapted as needed. These examples may not capture all eventualities. Fig. 4 offers illustrative timelines for characterizing outbreak, control and elimination status. The need for geographic (for example regional, national or local) milestones for enhancing access to diagnostics, vaccines and optimal clinical care should also be considered. Each country or subnational jurisdiction will

have unique challenges that require tailored considerations and approaches. Countries should make every effort to distinguish between local community transmission and mpox that may be linked to recent national or international travel, with staging levels reflecting rapid response to importations and prevention of community spread. This distinction depends on rapidly gathering travel history during investigation of cases even prior to laboratory confirmation. Country plans that address travel-related risk as a consideration will therefore address the need for safe, confidential, and effective collection and use of relevant data. Where animal-to-human transmission is a consideration, objectives would also address how progress will be made in this area.

Box 3. Global strategic framework – an adaptive approach



Global, regional and local action is needed to enhance control and achieve elimination of human-to-human transmission of mpox and minimize zoonotic transmission. To achieve impact, actors at each level should:

- **Know your epidemic** and collaborate with others to devise context-specific surveillance and provide timely, accurate information on cases, affected groups, and modes and circumstances of transmission, and rapidly detect outbreaks linked to travel or contact with animals.
- **Know your risks** for individuals, communities and in health care settings. Consider risks related to travel, modes of transmission (such as sexual contact, close contact in the household, congregate settings, contaminated materials or sharps, preparation or consumption of wild game), as well as risks linked to evolving epidemiology or viral evolution. Develop risk assessment and mitigation strategies with and for people at risk, including actions to communicate risk, address barriers to care, and reduce stigma and discrimination.
- **Know your community** and work with people and local organizations to improve health and strengthen community. This work can include collection, analysis and use of socio-behavioural data to inform planning, response, and integration of services. For mpox, regardless of context, persons at risk of severe disease include people living with untreated or advanced HIV disease, especially those who may not know their HIV status.
- **Know your needs** through undertaking detailed needs assessments, including for policies on case reporting and notification, contact tracing, and infection prevention and control. Assess community priorities, information gaps and research needs. Quantify diagnostic, therapeutic and vaccine requirements and other resource needs.
- **Take action** to integrate interventions to eliminate human-to-human transmission of mpox wherever appropriate and feasible. Ensure that readiness and rapid response capacities for mpox are in place within existing health programmes and services, including disease control and community-based services and initiatives. Establish new initiatives where required, such as training for immunization, optimal clinical care, and infection prevention and control for mpox.

As existing capacities, reporting structures, integration approaches and other factors will affect timelines for being able to assess and achieve control and elimination, willingness to adapt and develop new approaches will be paramount for success.

The country planning guide developed alongside this framework provides additional detailed guidance and support in developing tailored plans even in challenging circumstances.

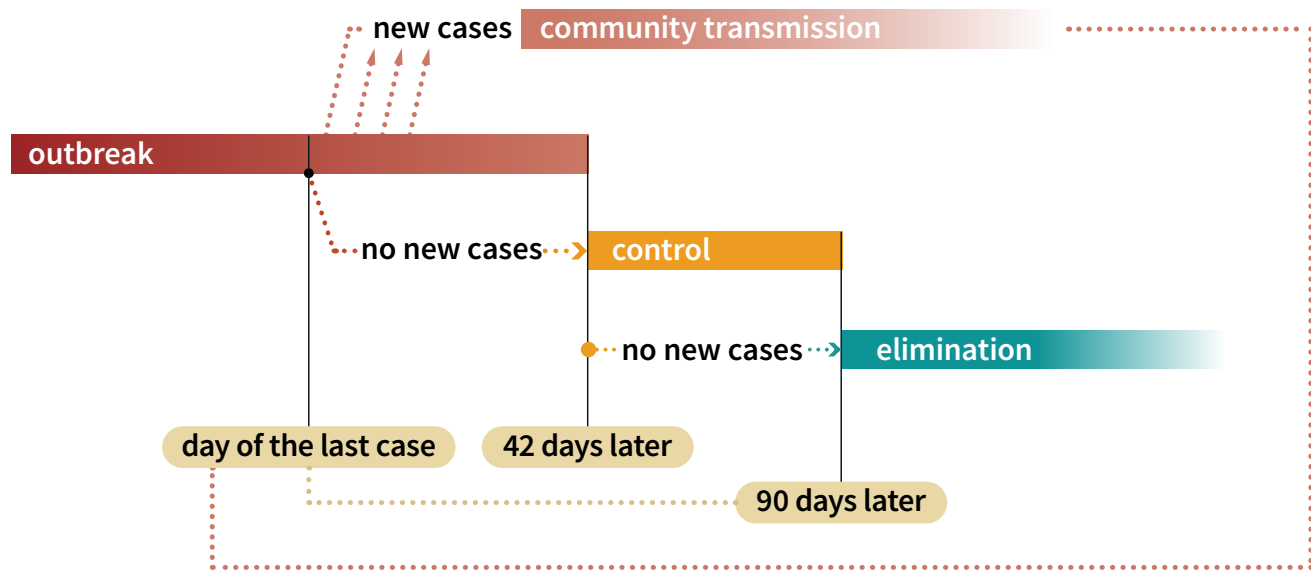
Milestone

End of 2024: All regions and countries have updated plans, inclusive of context-specific goals, outcomes and activities to (i) achieve control of mpox outbreaks, (ii) advance research and access to countermeasures and (iii) minimize zoonotic transmission of mpox.

Table 1 . Defining mpox control and elimination phases and operational targets: Sample definitions and epidemiological criteria

Level or status	Action	Epidemiological criteria
Community transmission	Ongoing response	<ul style="list-style-type: none"> • Cases continue to occur for more than 6 weeks following travel-related cases or local outbreaks of unknown origin OR • Cases due to human-to-human transmission continue to occur for more than 6 weeks following an outbreak suspected or confirmed to be linked to contact with animals or bushmeat OR • Sporadic or continuing transmission across set geographic areas or population groups, for which no travel-related index case is identified despite thorough case investigations OR • Sporadic or continuing transmission across set geographic areas or population groups, for which no zoonotic source is identified despite thorough case investigations.
Control phase	Readiness & response to prevent and stop outbreaks	<ul style="list-style-type: none"> • Travel-related case(s) or local outbreak stopped within 6 weeks of first confirmation (without elimination having previously been achieved) OR • Sporadic cases or outbreaks for which a zoonotic source is identified or suspected stopped within 6 weeks AND • Suspected cases are investigated, tested and classified based on a rigorous standard to confirm, discard or assign a clinical diagnosis of mpox according to national case definitions (including for clinically compatible cases) or a different diagnosis
Unknown	Readiness & response	<ul style="list-style-type: none"> • Mpox surveillance not in place or not adequate (e.g. does not include zero-reporting) OR • Country or region no longer reporting surveillance data to next administrative level (or from national level to WHO) OR • No cases reported, while confirmed cases elsewhere report travel to area within last 21 days OR
Elimination of person-to-person transmission	Readiness & response	<ul style="list-style-type: none"> • No cases in the last three months (where previously reported) in the presence of adequate surveillance OR • Travel-related case or local outbreak stopped within 6 weeks (where elimination had been achieved) AND • Presence of adequate surveillance as defined in this framework AND • All suspected cases are investigated, tested and classified based on a rigorous standard to confirm, discard or assign a non-mpox aetiology or diagnosis • Countries with high incidence of mpox can adapt these criteria to their context to develop a framework for monitoring of national and subnational progress towards elimination subnationally and nationally
Not affected	Readiness	<ul style="list-style-type: none"> • No confirmed or clinically compatible cases reported, with zero reporting in place nationally and to WHO AND • No confirmed cases elsewhere report travel from this country or area within last 21 days AND • All suspected cases are investigated and classified as discarded or as having a non-mpox aetiology or diagnosis.

Figure 4. Illustrative schematic timelines for mpox outbreak control



Box 4. Mpox reinfection, recrudescence and implications for elimination and control



The duration of immunity following primary MPXV infection and protection from reinfection is not well understood. Reinfection (a new infection after complete clearance of the virus) is distinct from recrudescence of the infection (in which virus has remained dormant in the body). A few case reports and case series have presented instances where individuals previously diagnosed with PCR-confirmed MPXV infection developed the disease and tested PCR positive for MPXV for a second time. (29,30–32) It is currently unclear whether these episodes represent new infections following clinical recovery and the apparent clearance of the virus, a recrudescence of a latent prior infection, or lack of complete viral clearance. Genetic analysis identifying specific viral variants may distinguish a reinfection from recrudescence infection. However, in practice, genomic sequencing is not commonly performed where capacity is limited in certain settings. There may be technical constraints stemming from the possible low viral load in subsequent mpox episodes, and difficulties in sequence data interpretation for reinfection determination due to generally slower viral mutation. There is need for more evidence to accurately characterize the burden, natural history, clinical characteristics and capacity for onward transmission associated with MPXV reinfection. There is a need to better understand factors that influence risk of reinfection and recrudescence such as presence of concurrent STIs, prior vaccination, antibody titres after immunization and/or initial infection, and the possibility of virus remaining dormant in reservoir organs. Investigation of these factors will enhance understanding and support development of strategies to reduce and mitigate recurrent mpox disease. WHO has developed and proposed case definitions for mpox reinfection and recrudescence. (33)

Priority 2: Integration of mpox considerations and activities into relevant health, laboratory and community-based programmes

The Strategic framework reflects the need to ensure close collaboration within and across a range of relevant national programmes and does not envision “standalone” vertical mpox elimination and control plans.

Action: Identify context-relevant options for integration of mpox planning and services with others

Implementation of the Framework continues with planning across core areas of emergency preparedness and response (Table 2) and includes attention to research across all areas of work. Options for integration should be guided by the epidemiology of mpox and related risk assessments, other disease control priorities and programmes, the organization of health services, community engagement activities, and sociocultural considerations. Surveillance, case investigation and notification for rash and fever, diagnostic tests and laboratory services, immunization schedules and services, enhancing provision of clinical care, and health worker training can all be opportunities for existing programmes and services to support mpox control wherever possible.

Milestone

End of 2024 – All countries have identified programmes and services where consideration of mpox surveillance, prevention and care from a One Health and multisectoral perspective can be included in the design, planning and implementation of activities as appropriate.

Given the risk of outbreaks in congregate settings including hospitals, prisons, residential facilities for migrant workers or refugee camps, infection prevention and control (IPC) measures are crucial in all settings; health facilities in particular should seek to comply with minimum IPC requirements. (34–36) Considerations for mpox should be included in IPC policies, trainings, and educational materials. Many other areas for integration exist, depending on epidemiological context.

Considerations for integration can thus cover a wide range of programmes, services and health settings, including community-based services. These will necessarily involve close coordination with One Health partners to improve understanding of the ecological niche of the monkeypox virus, knowledge of transmission dynamics at the animal-human interface and ensure vigilance for human-animal infection.

In every case, national programmes should continue to monitor overall preparedness, readiness and outbreak response capacity for mpox. To enhance global health security, and as many of the same countermeasures may be used, linking to smallpox preparedness should also be considered.

Action: Operationalize integrated mpox planning and response

Regional and national mpox control and elimination plans structured around the core components outlined in Table 2 will be more easily comparable and compatible, facilitating collaboration on mpox and on other disease threats and readiness activities. (23) Integration efforts should therefore include epidemic and pandemic preparedness, emergency coordination, integrated disease surveillance and response and relevant clinical and public health programmes and services. (37–39)

In all contexts, it is important for managers and stakeholders for HIV and sexually transmitted infections programmes to engage in mpox control planning and implementation. Integration with HIV/STI prevention and care will be essential, including for community-based services, as evidence to date shows that untreated or advanced HIV disease puts people at higher risk of severe mpox. (40) For example, persons attending HIV PrEP services should also be given information on prevention of mpox, including information on behaviour change strategies, the potential benefits and limitations of condom use, and vaccination against mpox in line with current recommendations of the WHO Strategic Advisory Group of Experts on Immunization (SAGE). (16) In most settings, and particularly where sexual transmission of mpox is a concern, a person with mpox with unknown HIV status should be offered an HIV test and access to well-monitored HIV prevention or care, wherever possible, regardless of known or presumed route of exposure. (35) Mpox should be considered a possible diagnosis, and testing arranged for any person living with HIV who develops an unexplained rash, particularly for those at risk or marginalized

with limited access to care. Likewise, sex workers should be provided with the necessary information and services as outlined above to protect themselves. While these may have important implications for programmes, this synergy of effort will lead to timely detection of outbreaks and chains of transmission that can be stopped for mpox, HIV, STIs and other communicable diseases.

As not everyone who is at risk of mpox is necessarily reachable through such targeted programmes, other options should also be considered. For example, in settings where children are affected, assessment for mpox may be combined with a syndromic approach to diagnosis and surveillance of other rash and fever illnesses, such as measles and rubella. Paediatric mpox and varicella (chicken pox) infections may be similar in the early stages; children should be tested for mpox where appropriate (such as settings that experience recurrent or ongoing outbreaks) to ensure appropriate diagnosis. It is also noted that co-infections with MPXV and varicella zoster virus (VZV) have been reported and may aggravate the severity of illness. (35,41,42) Every effort should be made to understand the local epidemiology through enhanced testing and sequencing capacity in order to tailor programmes to reach those at risk.

Table 2 outlines examples of operational response and integration options in each core area of health emergency preparedness and response. In all planning and integration efforts, the supportive or operational role of national partners and community-based civil society and non-government organizations should be considered. Planning should include timelines for actions, and monitoring and evaluation with key indicators for integration.

Milestones

End of 2024 – All countries have included mpox as a nationally-notifiable disease and have integrated surveillance and reporting functions into relevant programmes.

End of 2025 – WHO shares early ‘best practices’ resources for countries and communities, drawing from experiences with integration for service delivery.

Table 2. Core components of health emergency preparedness and response for mpox with selected options for integrated planning and implementation

Core component	Operational response	Integration options
<i>Continuing coordination for preparedness and response</i>	<ul style="list-style-type: none"> • Planning, coordination and partnerships • Budget, resource mobilisation and finance • Monitoring and evaluation 	<ul style="list-style-type: none"> • Emergency operations centres • One Health approach • Integrated funding proposals • Key indicators included in surveillance, monitoring and evaluation efforts
<i>Collaborative surveillance</i>	<ul style="list-style-type: none"> • Event-based monitoring • Surveillance, case investigation and contact tracing • Laboratories and diagnostics • Epidemiological investigation • Risk assessment • Wildlife surveillance • Wastewater surveillance • Patient environment (home/hospital) surveillance 	<ul style="list-style-type: none"> • National notifiable diseases list • Integrated disease surveillance and response (IDSR) • Community-based surveillance • Rash and fever surveillance • HIV/STI case detection • Animal health research activities • Disease control programmes
<i>Community awareness and protection</i>	<ul style="list-style-type: none"> • Risk communication and community engagement (RCCE) • Infodemic management • Public health and social measures • Gatherings and population movements • Travel health • Immunization policy, strategies and access to vaccines 	<ul style="list-style-type: none"> • Education, outreach and health communication centred on and/or led by and for key populations • Sexual health communication initiatives • Digital health initiatives • Risk and benefit assessments for events and gatherings • Information and services offered at travel medicine clinics • Information and services offered to support the life course approach to immunization

Core component	Operational response	Integration options
<i>Clinical care</i>	<ul style="list-style-type: none"> • Case management, clinical operations and therapeutics • Psychosocial support and prevention of stigma and discrimination • Safe and dignified burial • Testing and care for HIV, STIs, varicella zoster infection and immunocompromising conditions • Infection prevention and control • Health systems integration and strengthening • Protection of the health workforce 	<ul style="list-style-type: none"> • Inclusion of mpox in health services for key populations to support rapid case detection • Care pathways with integrated triage, differential diagnosis and infection prevention and control measures • Integrated sexual health services • Person-centred patient care • Person-centred risk and benefit assessment for health workers
<i>Access to countermeasures</i>	<ul style="list-style-type: none"> • Diagnostics and genomic sequencing • Vaccines and immunization • Specific therapeutics • Operational support, logistics and supply chains 	<ul style="list-style-type: none"> • Convening of national immunization technical advisory group • Provision of immunization services in sexual health clinics • Public health and needs-based allocation where supplies are limited • Integrated supplies planning • Training and capacity building
<i>Research & development across all areas of work</i>	<ul style="list-style-type: none"> • Virology and viral origins • Pathophysiology and clinical evolution • Risk factors and behavioural studies • Reinfection and relapse • Vaccine efficacy trials • Communications strategies • Prevention and care protocols • Implementation of public health programmes • Targeted research and development • Animal studies and One Health 	<ul style="list-style-type: none"> • Standard protocols • Research collaboration and meta-analyses • Target product profiles for diagnostics, vaccines and therapeutics • Digital health studies • Continued assessments of vaccine interest, communication and outreach strategies to improve vaccine uptake • Continued assessments of vaccine effectiveness • Studies of small mammals, wildlife and domestic pets • Studies of non-human primates

Priority 3: Strengthened global support for implementation of mpox plans

The global mpox outbreak and the changing epidemiology of mpox in Central Africa have highlighted global inequities in access to medical countermeasures, as well as challenges related to the limited data available and evidence gaps that still hamper the introduction of vaccines and therapeutics. The steady rise of mpox in Africa did not garner the world's attention prior to the global outbreak, and interest is waning. Stigma related to the high predominance of cases among key populations including gay men, bisexual men and other men who have sex with men has played a role in the pace and intensity with which countries or local health authorities sought to procure countermeasures or access them through available channels. This includes diagnostic test kits made available by WHO, treatment through emergency and compassionate use programmes, and vaccines available through collective procurement, purchase or donation mechanisms. Previously-affected countries in Africa engaged minimally with these various mechanisms during the early phases of the global outbreak. Persons living with or at risk of HIV infection have also been marginalized, including in high-income settings. The momentum created by the global outbreak can and should, however, be leveraged to improve access to diagnostics, vaccines and therapeutics as needed for all who are or may be at risk through thoughtful, locally-relevant programme design.

Action: Improve access to diagnostic tests, vaccines and therapeutics

Even while data on effectiveness of countermeasures continue to emerge (see Box 5), improving access to countermeasures is a key component of prevention, readiness, and response which requires action. Countries should quantify, cost, and take steps to meet the needs for tests, treatments and vaccines as part of control and elimination plans. All parties in a position to support Member States, communities or individuals to negotiate and secure access to effective and affordable care when needed in their settings should do so with vigour. As

a committed partner in this effort, WHO will continue to work with development partners, Member States, academic and commercial partners and affected communities to advance equity, secure access and monitor effective use of countermeasures.

Many stakeholders can contribute to this work, which is fundamental to the success of the Framework, with key roles suggested below on actions to:

- Strengthen policies and procedures to collaborate on and advance equitable development, maintenance, and deployment of emergency reserves, nationally and internationally (**WHO and Member States**).
- Maintain and develop access and allocation mechanisms for deployment of products through emergency or compassionate use, research protocols and other procurement mechanisms, before and after new products are prequalified, as appropriate (**WHO, academic, development, and commercial partners, civil society and non-government organizations**).
- Collaborate on assessment and procurement of tests, vaccines, and therapeutics to expand access to all countries through existing or new channels (**WHO, UN agencies, global health partners including FIND, CEPI, Gavi, Global Fund and others, and communities**).
- Establish and maintain key partnerships with other agencies and entities to support and implement initiatives for access to countermeasures for smallpox and mpox (**WHO, Member States, development partners, and communities**).
- Support progress towards WHO prequalification as appropriate to global health circumstances and needs (**WHO, National Regulatory authorities, and commercial partners**).
- Consider programmes, approaches and avenues to integrate and decentralize testing, vaccines and therapeutics as appropriate into health programmes and services at every level to advance access (**Health authorities at all levels, health service providers, community services and civil society**).

Milestones

2025: WHO-approved rapid diagnostic test for MPXV.

2026: Global mpox rapid vaccine deployment mechanism in place.

Box 5. Evidence for mpox vaccine effectiveness



The WHO Standing recommendations on mpox issued in August 2023 state that States Parties should “make mpox vaccines available for primary prevention (pre-exposure) and post-exposure vaccination for persons and communities at risk of mpox, taking into account recommendations of the WHO Strategic Advisory Group of Experts on Immunization (SAGE)”. (16,19)

In the early 1980s, smallpox vaccination was shown in Zaire (now the DRC) to be 80-85% effective in protecting people from mpox linked to clade I MPXV. Smallpox/mpox vaccines are composed of live vaccinia virus (another orthopoxvirus). Vaccines deployed for the global public health response to mpox are primarily MVA-BN, a non-replicating live vaccinia virus vaccine consisting of a modified Ankara strain of vaccinia which requires two doses and is approved for use in adults, and LC16-KMB, a single-dose minimally-replicating live vaccinia virus vaccine derived from the Lister strain of vaccinia and approved for use in adults and children. Both these live attenuated vaccines were developed with the purpose of improving the vaccine safety profile through attenuation of strains used to eradicate smallpox globally. Due to the cross-protection which is a feature of orthopoxviruses, these newer minimally-replicating or non-replicating vaccinia virus vaccines which were developed for smallpox preparedness were also approved for prevention of mpox prior to (MVA-BN) or during (LC16) the global outbreak.

Clinical evidence data on vaccine effectiveness (VE) for mpox vaccines from studies implemented during the global outbreak is being collected. A review of data from published studies of MVA-BN yielded an estimated VE of 66% to 90% for two doses. (43) An unpublished WHO meta-analysis found that estimated VE was 74% for a single dose of MVA-BN prior to exposure in persons at risk (13 studies), 82% for the recommended two-dose pre-exposure regimen of MVA-BN (6 studies), and 20% for one dose as post-exposure prophylaxis (irrespective of time between exposure and vaccination) (seven studies). Vaccine effectiveness studies for the vaccine LC16 are underway. Both these vaccinia-based vaccines have been shown to have a good safety profile. The LC16 vaccine is contraindicated in persons with severe immune deficiency or medical treatment that results in immune suppression.

Other platforms for mpox vaccines such as mRNA and protein subunit vaccines are in development.

Action: Advance the research agenda

As previously noted, commitment to continuous learning is a guiding principle for this strategy. WHO has worked with collaborators to establish an agenda for research and development (20,44–46) to accompany the immediate response. In the next phase of the emergency management cycle, it is crucial to continue research on countermeasures, operations research and learning on integration of mpox into other health services, and investigations to better understand zoonotic transmission. Multistakeholder initiatives can support evidence generation in lower resource settings and in the elimination phase of mpox control.

WHO Member States, communities and research and development stakeholders must develop and collaborate on a prioritized research agenda that includes but is not limited to the following topics:

- Disease epidemiology, risk factors and modes of transmission, including social and behavioural drivers of risk and protection in different contexts;
- Transmission dynamics including risk and determinants of acquisition and transmission of monkeypox virus through different modes of transmission;
- Spectrum and determinants of mpox clinical presentation, pathogenesis and disease course, including severity, progression and complications, recurrence and recrudescence, and dynamics of viral persistence;
- Viral evolution in different contexts and implications;
- Continued investigation of zoonotic transmission and reservoirs;
- Ongoing assessment and evaluation of surveillance;
- Development of appropriate countermeasures for orthopoxviruses with focus on mpox, including development of rapid, accurate point of care diagnostics;
- Efficacy and effectiveness of smallpox/mpox vaccines and duration of protection against infection and/or severe disease; optimization of use of available vaccines through research on immunization strategies, and development of new vaccine platforms as needed;
- Optimal care protocols for standard patient care and prevention of complications and sequelae; research on treatment approaches in the context of advanced HIV disease or other immunocompromising conditions;
- Efficacy and effectiveness of antiviral and adjunct treatments for people with mpox for non-severe infections and severe disease; optimization of care through flexible research protocols to support access and data collection with pooling of data where indicated;
- Evaluation of elimination strategy implementation in different contexts.

Milestones

End of 2023 (completed): WHO publishes target product profiles for diagnostic tests. (25)

End of 2024: WHO, Member States, academic and commercial partners develop and disseminate a comprehensive and prioritized research agenda, supported by data sharing, trial activities and new funding for core activities.

Action: Global support for regional and country efforts

WHO and global partners are committed to supporting ongoing work towards the goals of this Strategic framework. Specifically, WHO and partners will work with collaborators to ensure timely, high-quality support, including in the following areas:

- Collection, validation, analysis and dissemination of information on aspects of mpox pertinent to its epidemiology, impact and implementation of regional and country plans;
- Policy dialogue to develop and implement efficient, well-functioning approaches to surveillance, service delivery, integration, civil society engagement and other key areas of the Strategic framework;
- Strategic support in developing and implementing research protocols, national and subnational surveys, health services, vaccination strategies and other programme elements;
- Technical assistance through regular update of guidance following the emerging evidence, and targeted support to service delivery where needed;
- Resource mobilization and allocation via contributions and identification of efficiencies in integrated programmes and opening of funding windows and/or opportunities in relevant mechanisms;
- Advancing global partnership to support countries and encouraging civil society to strengthen community agency in priority areas of work. WHO will build on the lessons learned during this outbreak to engage others and advance towards the goals and objectives of this Framework.

Milestone

End of 2024: WHO and partners create global mpox partnership or initiative to harness efforts, mobilize resources and advance all areas of work, and support countries towards control of mpox and elimination of human-to-human transmission.

Monitoring implementation

WHO has published a Monitoring and Evaluation (M&E) Framework for the global mpox response and has been reporting data, monitoring progress and updating products in line with the milestones and indicators outlined in this document. (47) WHO will publish an update to accompany this Framework for elimination of human-to-human transmission of mpox. Fig. 5 illustrates the proposed progression from planning to implementation that should occur over the next three years. All Member States should establish or update their own M&E plan to monitor progress towards elimination of human-to-human transmission of mpox, and update metrics to include surveillance and response indicators. The following core elements of a revised M&E Framework will support progress towards the collective goal and objectives.

- **Policy and programme surveys:** WHO will continue to conduct a regular Member State survey to monitor development and implementation of regional and national plans.
- **Surveillance quality indicators:** WHO will develop and encourage use of surveillance quality indicators including timeliness of reporting and laboratory processing for mpox diagnostics.
- **Outbreak performance indicators:** Outbreak control is a core strategic objective. Progress towards rapid, effective outbreak response should be measured by outbreak performance indicators informed by best practices and the definitions outlined in this Framework.
- **Progress towards elimination.** All WHO regions are encouraged to set targets and monitor progress towards elimination of human-to-human transmission of mpox in line with the objectives, control levels

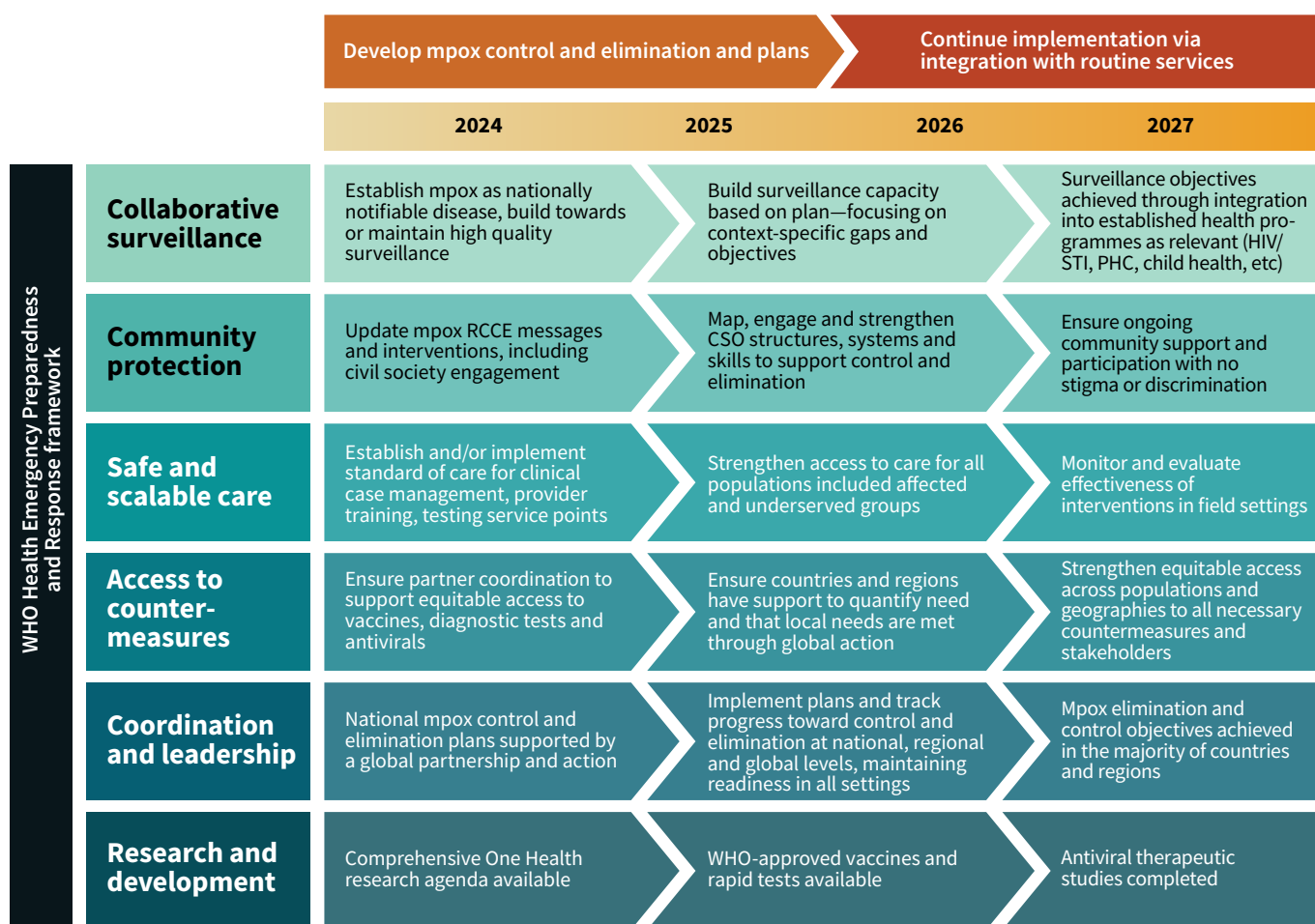
and priority actions for implementation outlined in this Framework.

Countries are encouraged to assess mpox control efforts through simulation exercises and action reviews, including intra- or after-action review as appropriate. (26) Further WHO guidance and tools are listed at the end of this document and are available on the WHO website. WHO will continue to provide support in the form of technical guidance, public health advice and training resources. (48)

In the first 24 months covered by this Strategic framework, WHO will conduct two surveys of countries and regions, adapting the policy tracker and survey instrument developed during the emergency response. WHO will initiate monitoring of progress across regions and sectors, such as advancing a comprehensive public health research agenda for helping to achieve elimination objectives, meeting targets such as development of low-cost, point of care rapid diagnostics, and financing integrated programmes that include mpox control and elimination goals.

Under this Strategic framework, all countries and regions should have control and elimination plans in place by 2025 inclusive of metrics for policies and practice, surveillance, outbreak response and progress towards elimination. The indicators selected will vary by context and may be updated over time. For example, diagnosis by clinical symptoms may be replaced by laboratory-confirmed diagnostics as their availability expands. In years 2, 3 and 4 of the period covered by this Strategic framework, WHO will disseminate country and regional progress toward adequate surveillance, rapid outbreak control and elimination of human-to-human transmission.

Fig. 5: Illustrative timeline for progress towards mpox control and elimination, 2024–2027



Part 4. Conclusion: Time for local action, global partnership and financing

This Framework has a global application. The success of efforts to control and eliminate human-to-human transmission of mpox depends on the engagement of Member States and their partners. Immediate action is needed to ensure that surveillance, testing, treatment and vaccination responses established in the context of the global outbreak make the transition from emergency action to sustainable preparedness and response with elements integrated within the health system, including for improved clinical care and infection control measures. For countries with gaps in high-quality surveillance or in access to countermeasures, defining and making plans to fill these gaps is key.

Further international cooperation, resource sharing and stakeholder support are needed in the form of financial contributions, technical assistance and research and development expertise in support of low- and middle-income settings within and across countries. Likewise, all regions can support implementation of this Framework through continued strategic action on mpox, regardless of the presence or absence of cases. All stakeholders are called to local, national, and global action to reduce the risks of mpox at individual, community, national and global levels. This action will reduce suffering

and save lives; it will also address inequities and advance broader pandemic preparedness by strengthening core capacities for collaborative surveillance and more.

Crucially, partnership at any level must centre and engage communities as leaders. The global outbreak has shown the resilience and innovation of affected communities in leading the response, advocating for access to resources, driving behaviour change and mobilizing for protective action. Continuing these partnerships and engaging and supporting affected communities in all epidemiological contexts will make the mpox response effective, nimble, and attentive to ethical challenges including the needs of local communities and issues of stigma and discrimination.

Success also depends on mutual accountability. WHO Member States and global, regional, and country offices will work to track needs, commitments and progress. Committed countries and communities are invaluable partners in ensuring accountability, and WHO will work with these and other stakeholders to make control and elimination of human-to-human transmission of mpox a reality.

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Annex 1. History and background of mpox

The first reported human case of mpox was observed in 1970 in a nine-month-old boy in the Democratic Republic of the Congo. Following eradication of smallpox in 1980 and the end of smallpox vaccination worldwide, mpox emerged in central, East and West Africa, where it was viewed as a zoonotic disease. Of the two genetic clades of MPXV, clade I is found in East and central Africa; the Democratic Republic of the Congo reports thousands of cases per year. Clade II is found in West Africa and in cases linked with travel from Nigeria. Cameroon is the only country to have reported both clades of MPXV.

Historically, mpox was most often reported in forested, rural areas where populations might be dependent on wild animal meat for protein and/or exposed to sick or infectious animals, and mpox was considered a predominantly zoonotic disease. Nonetheless, even in these contexts mpox spreads from person to person, often through caregiving activities. Lengthening chains of transmission have been observed since the eradication of smallpox. (1)

Following years of rising case counts in Africa, a global outbreak emerged in Europe and the Americas in May 2022, seizing global attention when community transmission sustained via sexual contact occurred in many countries. The clade and lineage most frequently linked to the outbreak is subclade IIb. By December 2023, over 93 000 laboratory-confirmed cases of mpox (see Fig. 1) and 176 deaths were reported to the World Health Organization (WHO) from 117 Member States (see Fig. 2). Significant new outbreaks occurred in South-East Asia and the Western

Pacific in the latter half of 2023 while all regions continue to report cases in 2024. Among cases with available data, more than half have been in people living with HIV.

Transmission via sexual contact had previously been identified during an outbreak that began in the Federal Republic of Nigeria in 2017. (2) While this outbreak affected men, women and children and gave rise to transmission in a congregate (prison) setting, it also provided the first clues to a link between mpox and HIV, with advanced HIV infection leading to a higher risk of death. (3) Prior to 2017, mpox had not been reported in Nigeria for four decades. In West Africa, outside of the global outbreak, other countries only rarely report sporadic cases.

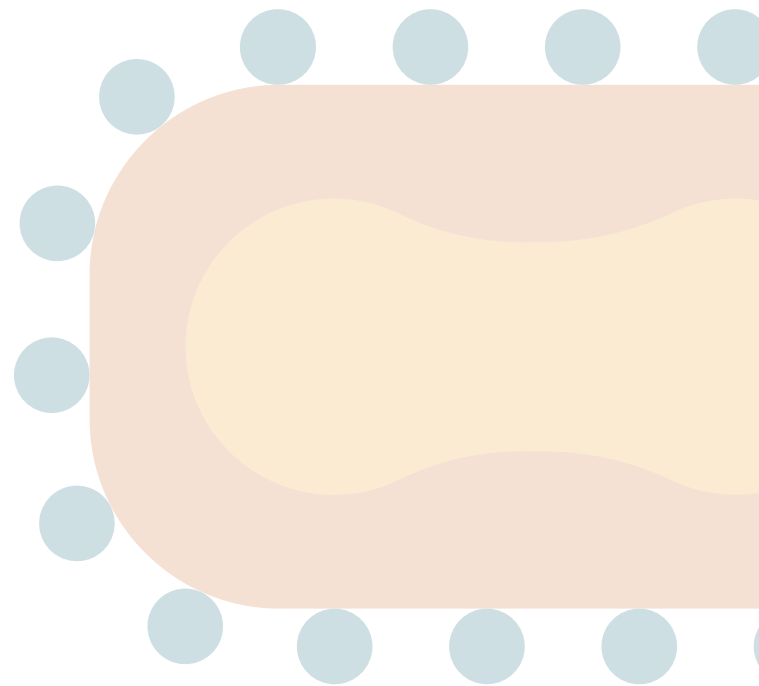
In contrast, the number of annually reported cases in central Africa has been rising for decades, with the DRC reporting almost 15 000 suspected (clinically compatible) cases in 2023 alone, in accordance with a national case definition and following investigation of community outbreak alerts. In July 2023, the national health authorities reported to WHO the first confirmed cases of clade I MPXV infection acquired through sexual contact. Subsequently, significant outbreaks began and continue to occur among sex workers and other key populations. (4,5) Several countries such as, Cameroon, the Central African Republic and the Republic of the Congo continue to report sporadic cases and small outbreaks, while others such as Ghana were affected primarily during the global outbreak due to clade IIb. In 2022, the Republic of Sudan reported sporadic cases across the country as

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well as large outbreaks of mpox due to clade I MPXV among children in camps for refugees. (6)

The Nigerian outbreak offered a preview of the epidemiology later seen in the global outbreak, in which sexual contact was identified as the primary route of transmission, and the new outbreaks linked to sexual transmission of clade

I MPXV now emerging in the Democratic Republic of the Congo. (7) While coinfection of mpox with HIV and syphilis have been observed for clade I MPXV, the nature of interactions between HIV infection and mpox in East and Central Africa are as yet unknown.



6 Multi-country outbreak of mpox: External situation report #8 – 19 October 2022. Geneva: World Health Organization. 2022. (<https://www.who.int/publications/m/item/multi-country-outbreak-of-monkeypox--external-situation-report--8---19-october-2022>, cited 4 April 2024)

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Annex 2. Resources and further reading

Websites

- Health Topics: Mpox <https://www.who.int/health-topics/monkeypox>
- Mpox outbreak page <https://www.who.int/emergencies/situations/monkeypox-oubreak-2022>
- WHO Standing recommendations for mpox. August 2023. [https://www.who.int/publications/m/item/standing-recommendations-for-mpox-issued-by-the-director-general-of-the-world-health-organization-\(who\)-in-accordance-with-the-international-health-regulations-\(2005\)-\(ihr\)](https://www.who.int/publications/m/item/standing-recommendations-for-mpox-issued-by-the-director-general-of-the-world-health-organization-(who)-in-accordance-with-the-international-health-regulations-(2005)-(ihr))
- WHO. Mpox outbreak global trends. https://worldhealthorg.shinyapps.io/mpx_global/
- World Health Organization. Mpox outbreak toolbox. <https://www.who.int/emergencies/outbreak-toolkit/disease-outbreak-toolboxes/mpox-outbreak-toolbox>

Interim guidance

- Diagnostic testing for the monkeypox virus (MPXV): interim guidance. 2023. <https://www.who.int/publications/i/item/who-mpx-laboratory-2023-1>
- Vaccines and immunization for mpox. Interim Guidance. 2022. November 2022. <https://www.who.int/groups/strategic-advisory-group-of-experts-on-immunization/monkeypox-vaccines-technical-documents> and https://cdn.who.int/media/docs/default-source/immunization/sage/2024/march/sage-meeting-highlights_v3-march2024.pdf
- Clinical management and infection prevention and control for mpox: Interim rapid response guidance, 2022 <https://www.who.int/publications/i/item/WHO-MPX-Clinical-and-IPC-2022.1>
- Risk communication and community engagement for mpox outbreaks. Interim guidance. 2022 <https://www.who.int/publications/i/item/WHO-MPX-RCCE-2022.1>

- Target product profiles for tests used for mpox (monkeypox) diagnosis. 19 July 2023. <https://www.who.int/publications/i/item/9789240076464>

Public health advice

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- Monkeypox Q&A, 12 May 2023. <https://www.who.int/news-room/questions-and-answers/item/monkeypox>.
- Public health advice on mpox and congregate settings: settings in which people live, stay or work in proximity, 20 March 2023. <https://www.who.int/publications/m/item/public-health-advice-on-mpox-and-congregate-settings--settings-in-which-people-live--stay-or-work-in-proximity>
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- Mpox Q&A - on mpox testing for health workers. 11 December 2023. <https://www.who.int/news-room/questions-and-answers/item/testing-for-mpox--health-workers>
- Mpox Q&A - on mpox testing for individuals and communities. 2 March 2023. <https://www.who.int/news-room/questions-and-answers/item/testing-for-mpox--individuals-and-communities>
- Public health advice on mpox and sex-on-premises venues and events. 1 March 2023. [https://www.who.int/publications/m/item/public-health-advice-on-mpox-\(monkeypox\)-and-sex-on-premises-venues-and-events](https://www.who.int/publications/m/item/public-health-advice-on-mpox-(monkeypox)-and-sex-on-premises-venues-and-events)
- Infographic on getting tested for mpox. 27 February 2023: <https://www.who>.

[int/multi-media/details/getting-tested-for-mpox--what-you-need-to-know](https://www.who.int/multi-media/details/getting-tested-for-mpox--what-you-need-to-know)

- Public health advice for sex workers on monkeypox. 30 September 2022. <https://www.who.int/publications/m/item/public-health-advice-for-sex-workers-on-monkeypox>
- Public health advice on understanding, preventing and addressing stigma and discrimination to monkeypox. 1 September 2022. <https://www.who.int/publications/m/item/communications-and-community-engagement-interim-guidance-on-using-inclusive-language-in-understanding--preventing-and-addressing-stigma-and-discrimination-related-to-monkeypox>
- Public health advice for gatherings during the current monkeypox outbreak, 28 June 2022. <https://www.who.int/publications/i/item/WHO-MPX-Gatherings-2022.1>
- Mpox infographics (all): <https://who.canto.global/v/UNNOPG0353/folder/K677K?viewIndex=0>

Training online

English

- Mpox: introduction. OpenWHO online training. January 2020. <https://openwho.org/courses/monkeypox-introduction> and <https://openwho.org/courses/mpox-global-outbreak-2023>
- Mpox: intermediate training. OpenWHO online training. December 2021. <https://openwho.org/courses/monkeypox-intermediate>
- Mpox: the global outbreak. OpenWHO online training 2023. August 2023. <https://openwho.org/courses/mpox-global-outbreak-2023>

Français

- Variole du singe : Cours d'introduction aux contextes d'épidémies en Afrique. Formation en ligne OpenWHO. 2020 <https://openwho.org/courses/varirole-du-singe-introduction>
- La variole du singe: formation intermédiaire. Formation en ligne OpenWHO. 2021 <https://openwho.org/courses/varirole-du-singe-intermediaire>

- La variole simienne et l'épidémie mondiale de 2022–2023. August 2023. <https://openwho.org/courses/varirole-simienne-epidemie-mondiale-2023>

Most of the above resources are available in several languages. WHO regional offices continue to adapt or develop guidance documents and resources which are also available online.

For assistance in finding resources, contact mpox@who.int.

Slidesets

- WHO EPI-WIN Update 77: Monkeypox outbreak, update and advice for health workers
- WHO EPI-WIN update 78 – Monkeypox and mass gatherings
- WHO EPI-WIN 79: Monkeypox outbreak update: situation - transmission - countermeasures
- WHO EPI-WIN 81: Managing stigma and discrimination in healthcare settings during monkeypox outbreaks

EPI-WIN Webinars

- Global mpox strategy for elimination and control: open consultation (<https://www.youtube.com/live/FjfHHdhX0rY?si=RZiqGcZ4FWt1Ap3g>)
- Changing perspectives of the mpox outbreak (https://youtu.be/qGLzQ511-m8?si=0IINSi2_e10iLogs)
- Monkeypox outbreak: What we need to know (<https://www.youtube.com/live/2PUW9hfS-Gw?si=mk0ml6VI3xjKVHNT>)
- How is monkeypox spreading? What we know so far (<https://www.youtube.com/live/BsHli-FUSPI?si=UUIQ9yaOxhV-F355>)
- Monkeypox and mass gatherings: Protecting yourself in festivals and parties (https://www.youtube.com/live/8N4_Fy8h2Rk?si=Hcb6xs7oPTkpZPIU)

Annex 3. Glossary

Access to countermeasures refers to timely, sufficient, equitable and medically appropriate access to medical countermeasures, such as diagnostics, therapeutics, vaccines, medical devices and medical equipment, involving a broad network of potential collaborations that span distinct functional areas (such as research and development, manufacturing and procurement, or provision of health services), geographical regions, integration within national and local health systems including reaching marginalized areas or groups, and phases across the health emergency cycle.

Collaborative surveillance refers to the collection, linkage, and analysis of data and insights from cases, pathogens, and context, which includes intentional collaboration across diseases, sectors, geographies, and event lifecycles, for timely decision making to mitigate public health threats.

Community protection refers to community-centred actions that protect the health and wellbeing of those affected, such as engaging with communities to raise awareness, provide correct and up-to-date information and communicate risk. Offering vaccination to protect from an infectious disease is also often included in the concept of community protection.

Emergency coordination is continuing coordination for emergency preparedness and response which enables all the other subsystems to deliver on their capabilities at global, regional, national, and sub-national levels. Effective emergency coordination hinges on developing the capabilities to deliver three key objectives: strengthened workforce capacities for health emergencies, health emergency preparedness, readiness and resilience, and health emergency alert and response coordination.

Integrated health services are effective, safe, people-centred, based on a primary health care approach, and inclusive of promotion, prevention, curative, rehabilitative and palliative care for a range of health concerns. Health systems that are organized around the needs of people and communities perform more effectively, cost less, improve health literacy and patient engagement, and are better prepared to respond to health crises through early warning systems and community engagement. People-centred health services integrate service delivery in new ways, support a coordinated continuum of care within and beyond the health sector throughout the life course, and develop referral networks and approaches to support, enable and empower patients and communities to participate in their own care.

International Health Regulations: an overarching legal framework that defines Member State rights and obligations in handling public health events and emergencies that have the potential to cross borders, Adopted by the World Health Assembly in 2005 and referred to as the International Health Regulations (2005), the IHR are an instrument of international law that is legally-binding on 196 countries, including the 194 WHO Member States, Liechtenstein and the Holy See.

National notifiable diseases/conditions surveillance: Mandated reporting of notifiable diseases or conditions to public health authorities in a specified and timely manner for effective disease monitoring, control and management.

One Health: an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes that the health of humans, domestic and wild animals, plants and the wider environment (including ecosystems) are closely linked and inter-dependent. The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development.

Safe and scalable care refers to resilient health systems that are based on strong primary health care, and have the resources and capacity to re-organize and deploy existing resources in response to increased demands imposed by health emergencies with agility and flexibility, while maintaining essential health services and protecting and supporting health workers and patients. Resilient health systems should promote equitable access to care and mitigate financial, contextual, and cultural barriers.

Annex 4. Acknowledgements

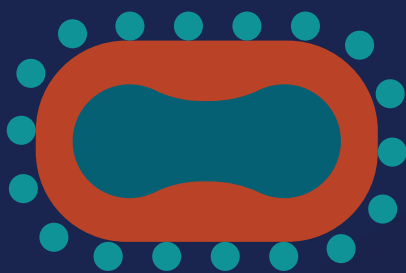
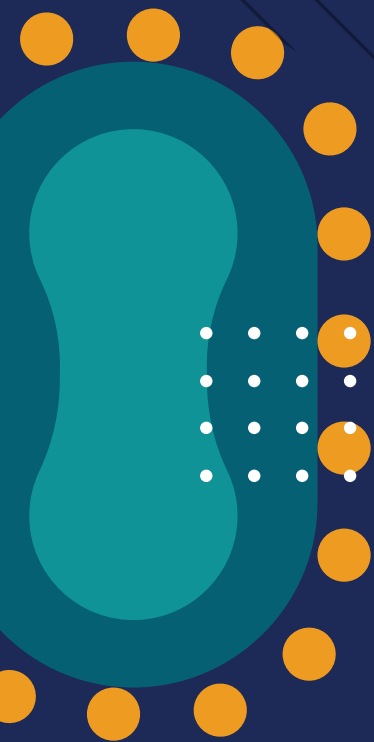
WHO is grateful to the International Health Regulations (2005) (IHR) Emergency Committee on the multi-country outbreak of mpox, the IHR Review Committee regarding Standing Recommendations for mpox, the WHO Advisory Committee on Variola Virus Research (ACVVR), the WHO Strategic Advisory Group of Experts on Immunization (SAGE) and the WHO Strategic and Technical Advisory Group on Infectious Hazards (STAG-IH) who have provided strategic guidance and support for this framework. Members and advisors reviewed and provided feedback in their individual capacity as experts, including Preben Aavitsland, Inger Damon, David Heymann, Dimie Ogoina, Daniel Tarantola, and David Ulaeto. The following WHO personnel contributed to the development of the framework.

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