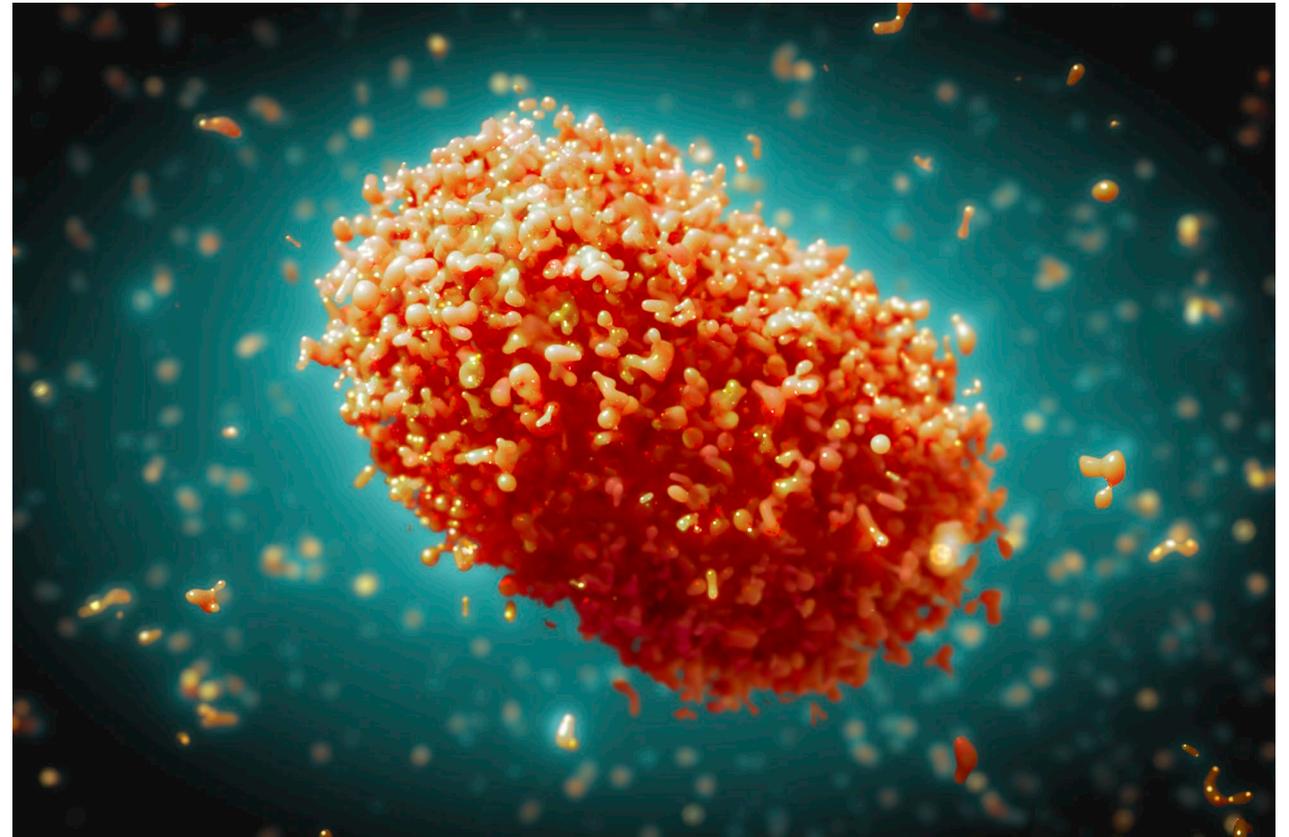


# What is the path to mpox elimination and control?

## Strategic framework for mpox elimination –

Dr Rosamund Lewis  
Technical lead mpox response  
Health Emergencies Programme  
WHO Geneva

Seminar on Infectious Disease and Infection Control Management  
Centre for Health protection, Hospital Authority  
Hong Kong SA  
7 December 2023



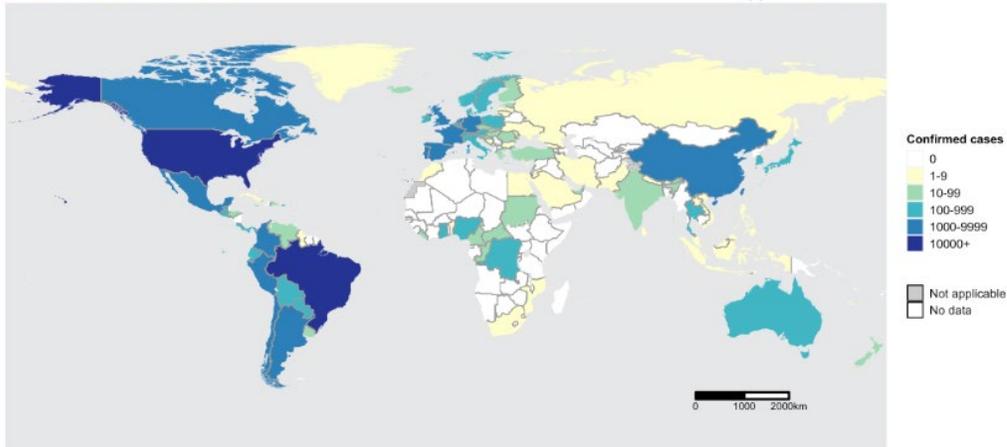
Monkeypox virus, illustration. Credit: MAURIZIO DE ANGELIS/SCIENCE PHOTO LIBRARY

# In your view, is mpox still an important public health issue?

## Polling

- yes
- no
- not sure

Total mpox cases  
from 1 Jan 2022, as of 30 Sep 2023



The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization  
Map Production: WHO Health Emergencies Programme  
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# Global situation – mpox

WHO global data

91 788

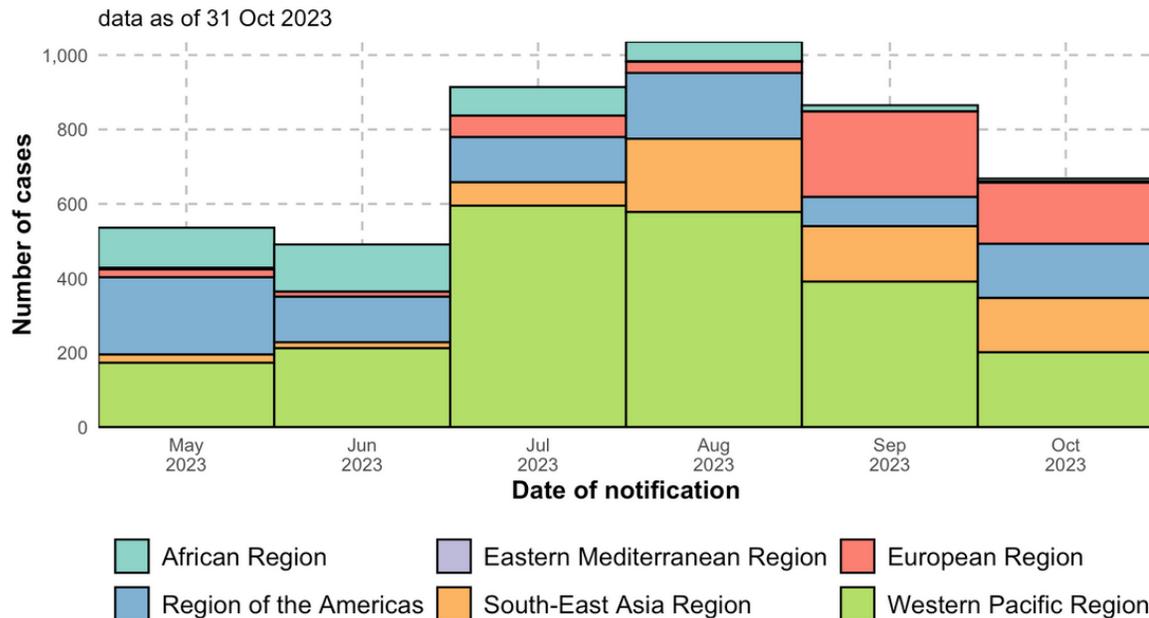
Confirmed cases

167

Deaths

116

Countries reporting cases



Source: WHO

Outside of Africa: mostly gay, bisexual and other men who have sex with men (multiple partners)

In Africa: men, women and children; incl. men who have sex with men and sex workers

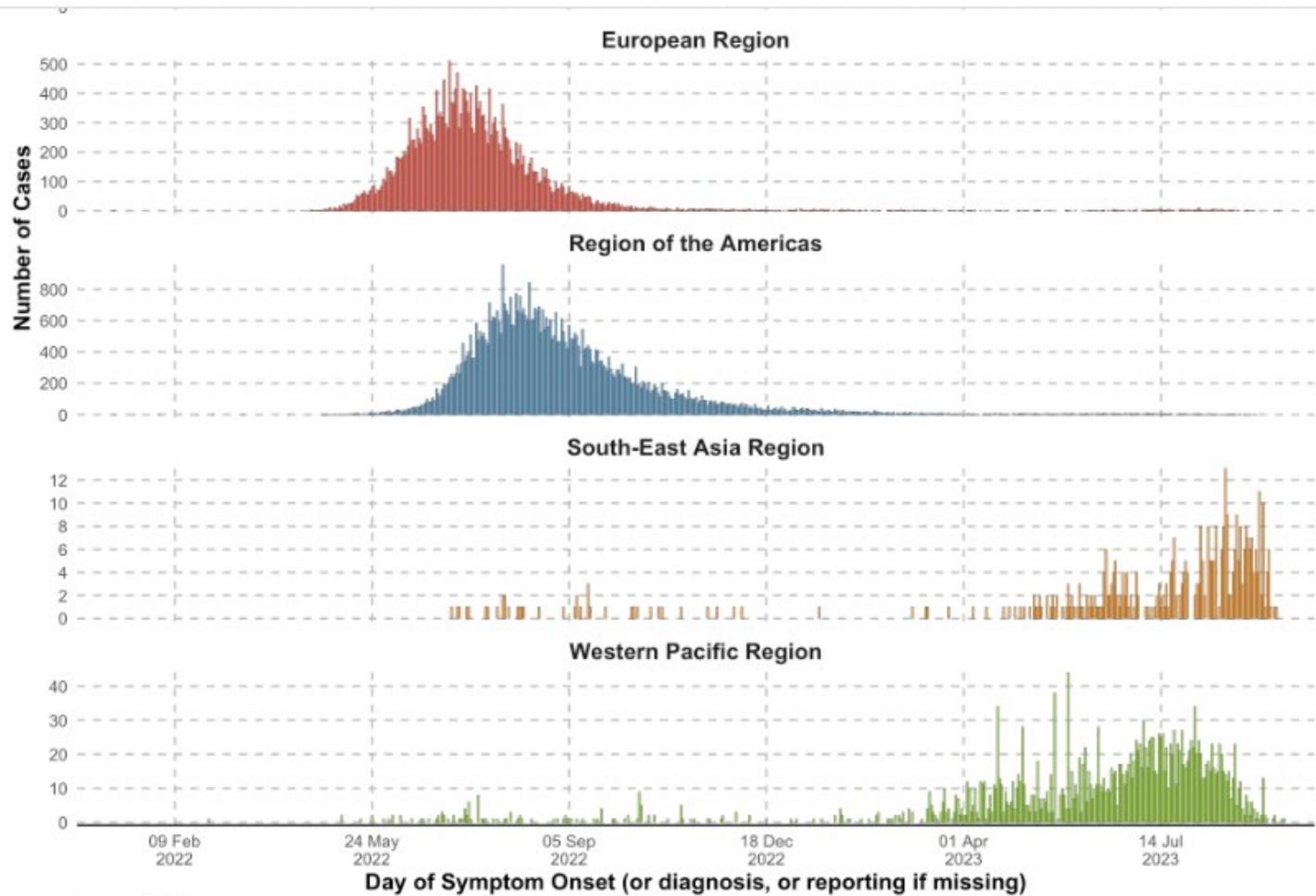
~ 50% are persons living with HIV

Immunosuppressed are at greater risk of severe disease

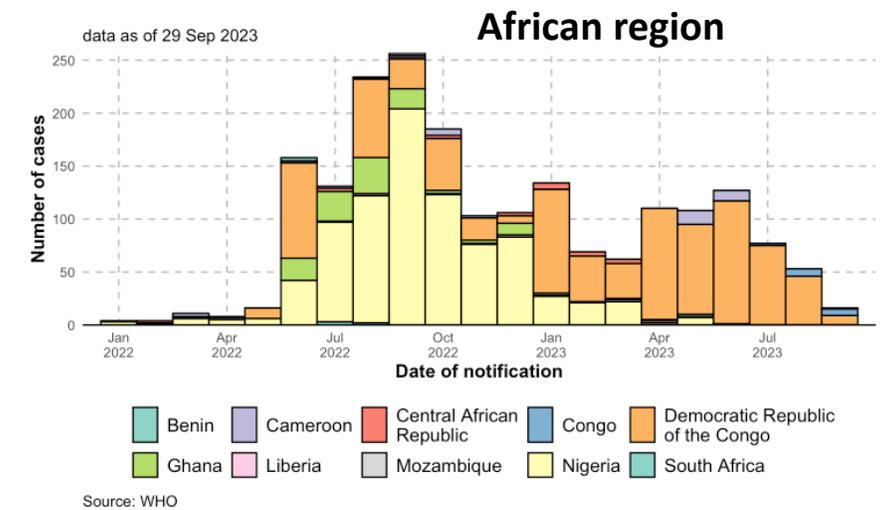
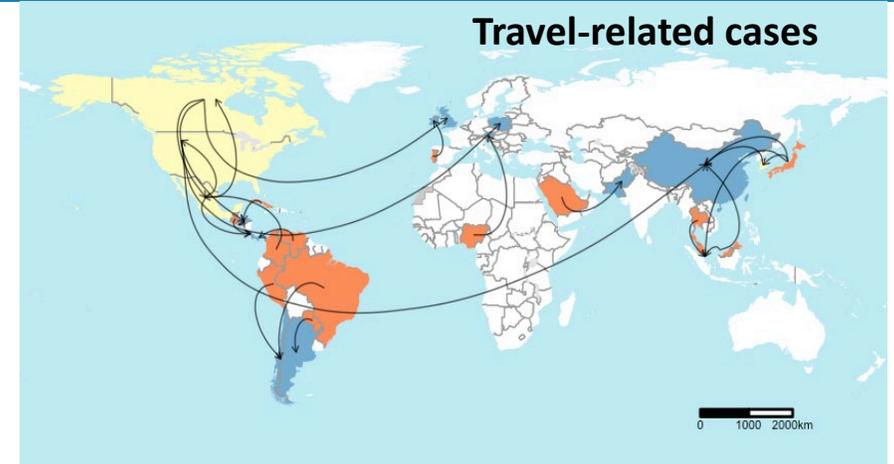
MPXV clades I and II both sexually transmissible

# Global situation – mpox

WHO global data



Source: WHO

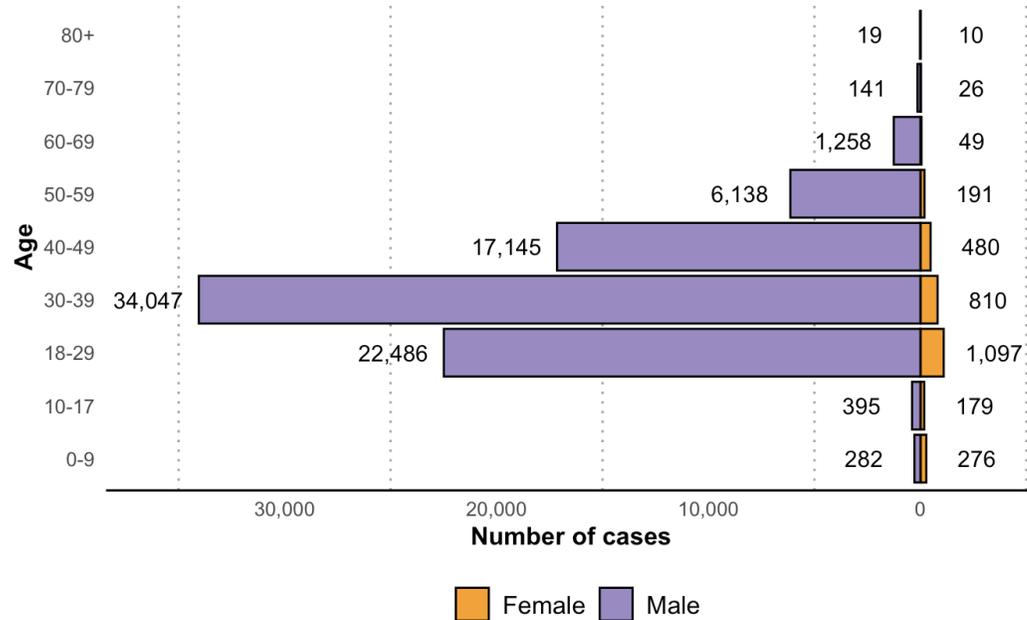


Source: WHO

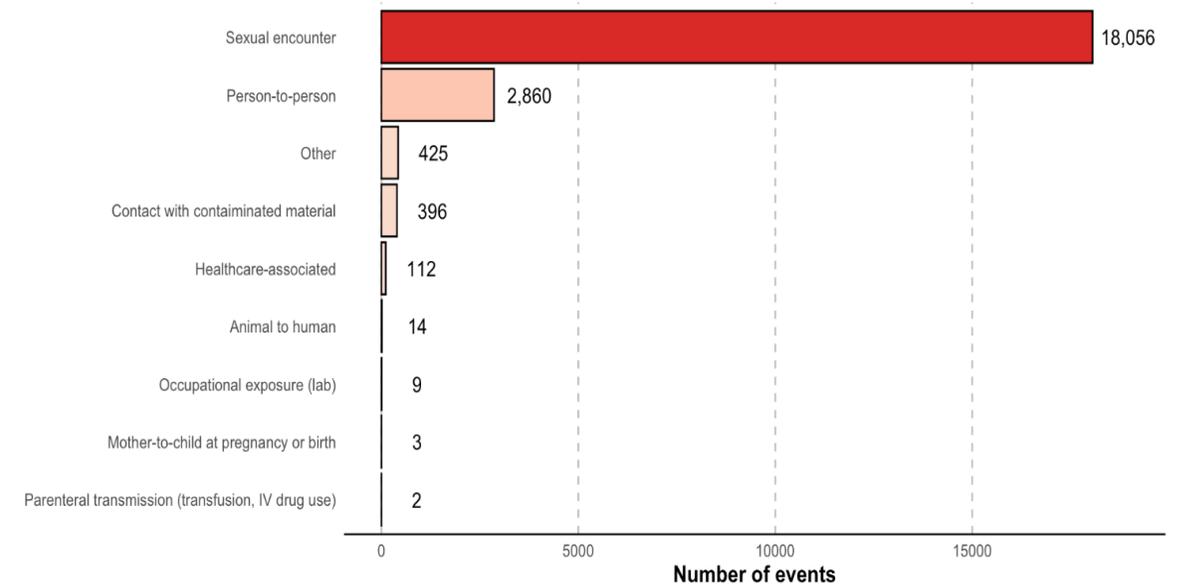
# Main characteristics of mpox cases

WHO global data

Data available for 85 215 cases, **96% are male**  
 Globally **83% self-identify** as men who have sex with men



Main route of transmission is **sexual contact**

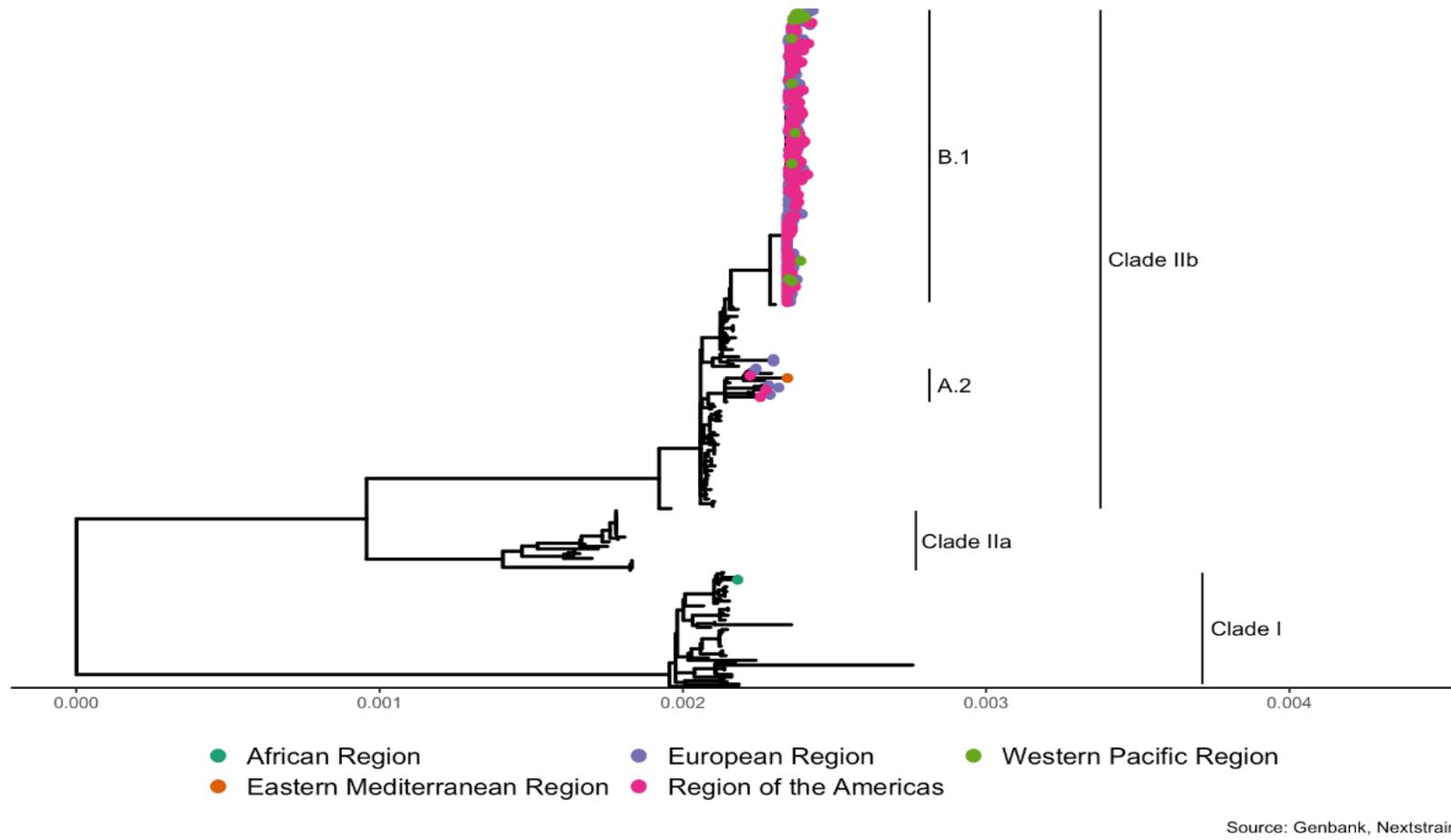


Source: WHO

Of all mpox cases reported to WHO with available data, **53% are in persons living with HIV**. This is remarkably constant across regions, countries and contexts, over time, and generally confirmed by studies and case series.

# MPXV genomic analysis, 2022-23

B.1 lineage reduced in scale for clarity  
Data as of 26 Jul 2023



**Clade IIb** – Nigeria, West Africa and global outbreak

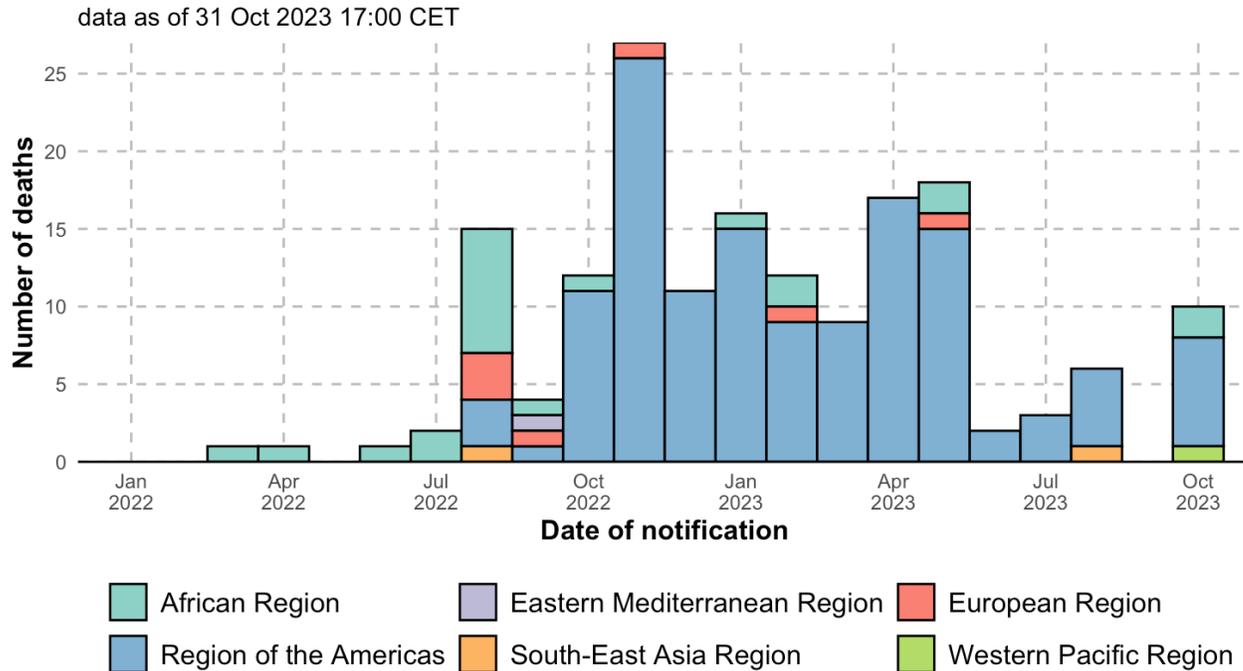
**Clade I** – Central (Cameroon, CAR, DRC) and eastern Africa (Sudan, South Sudan)

To date, only Cameroon has reported both clades I and II

Much more sequencing is needed in the African region to understand the epidemiology and viral evolution

# Mpox deaths by month and WHO region

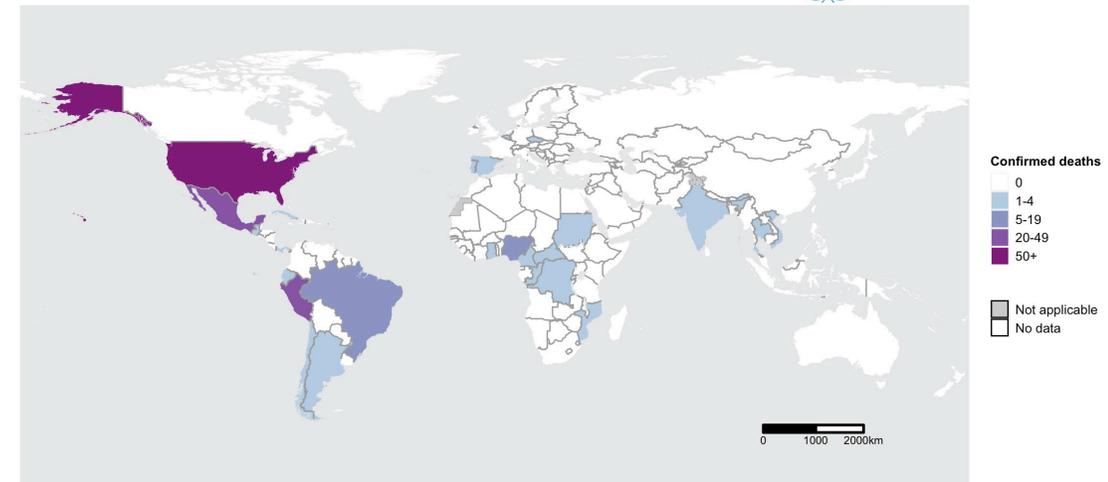
Please note that data for October 2023 is not complete!



Source: WHO

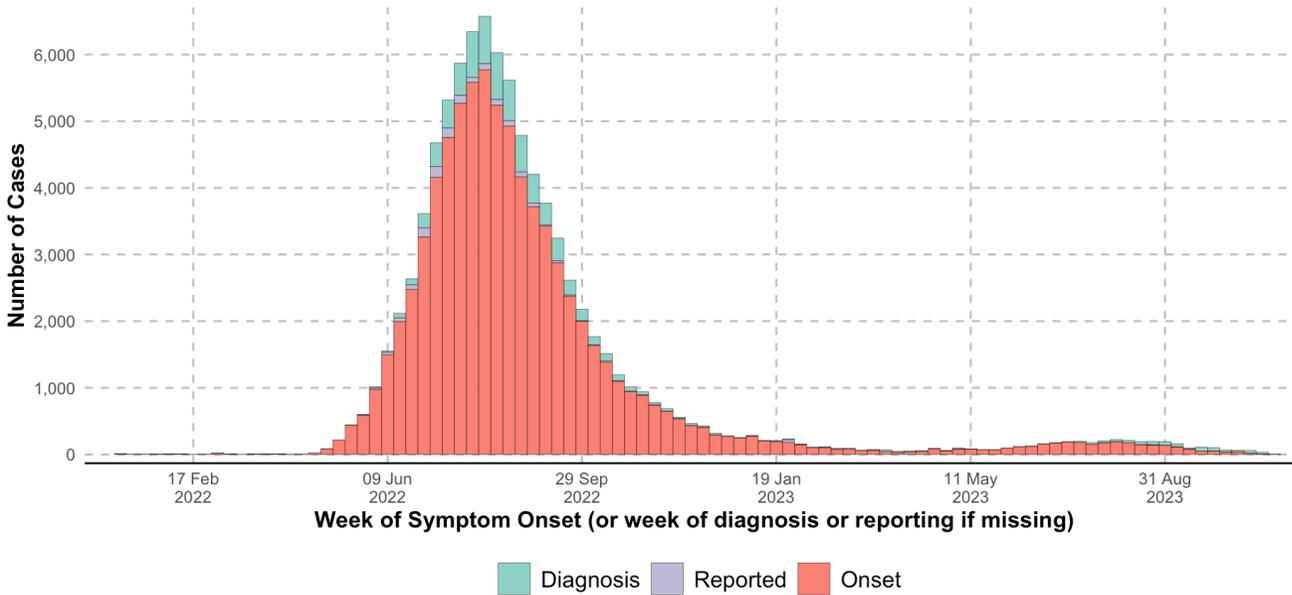
- Most deaths are reported by regions with more cases
- Case fatality ratio continues to be higher in the African Region

Total mpox deaths from 1 Jan 2022, as of 31 Oct 2023

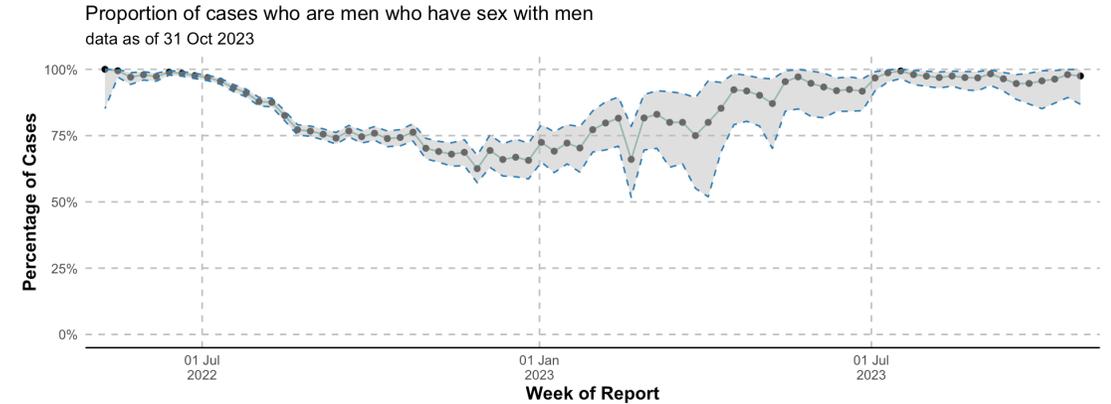


# Epidemic trend based on case-based data

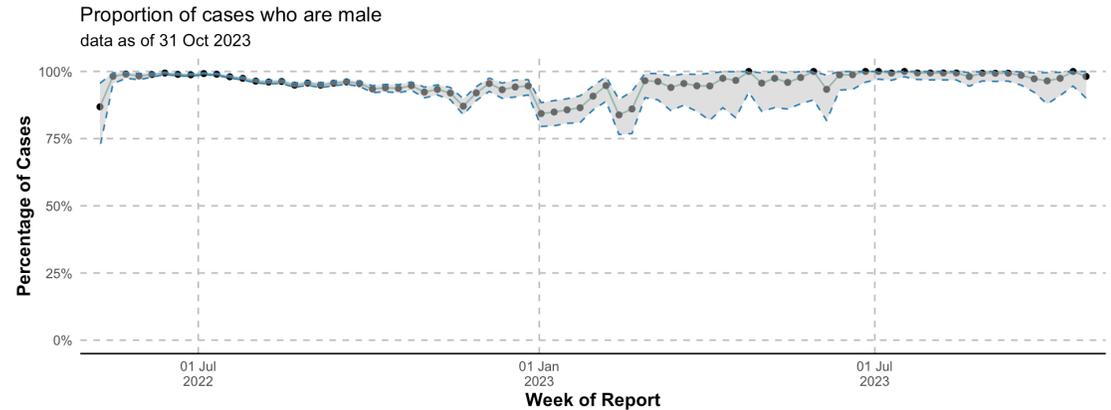
Please note that data for October 2023 is not complete!



Source: WHO



Source: WHO



Source: WHO

# Kinshasa outbreak and the Congo River

## Is history repeating itself?

HIV pandemic originated in Kinshasa in the 1920s, say scientists

Thriving city with multiple transport links and influx of male labourers made it perfect incubator for pandemic strain of HIV



An HIV-positive Congolese woman is carried to hospital. The virus spread rapidly from Kinshasa via rail and river from the 1920s onwards. Photograph: EPA

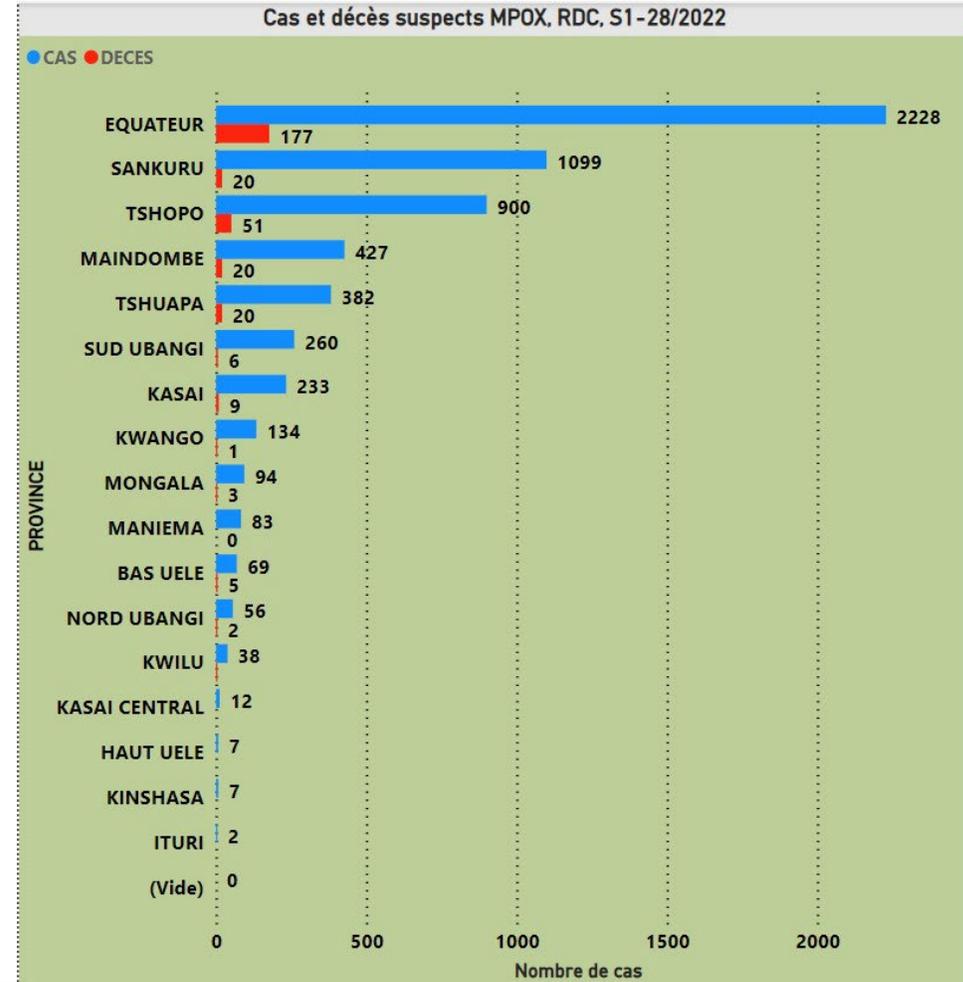


The Guardian (2014). HIV pandemic originated in Kinshasa in the 1920s, say scientists  
<https://www.theguardian.com/science/2014/oct/02/hiv-aids-pandemic-kinshasa-africa>

National Geographic (2023): From forest to table: Inside the world's bushmeat problem. Growing demand for wild meat for subsistence as a luxury food is emptying forests and risking spread of deadly diseases.  
<https://www.nationalgeographic.com/premium/article/bushmeat-trade-alternatives-feature>

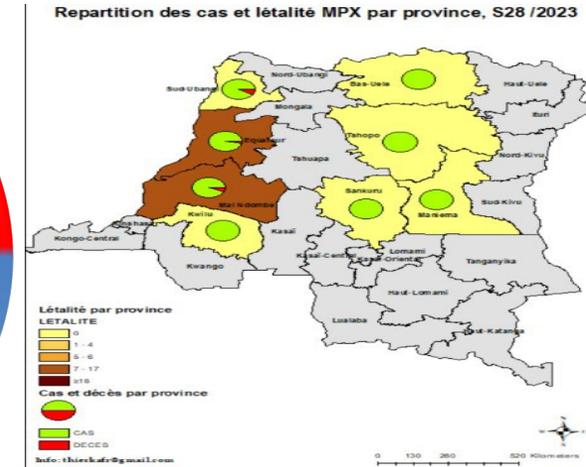
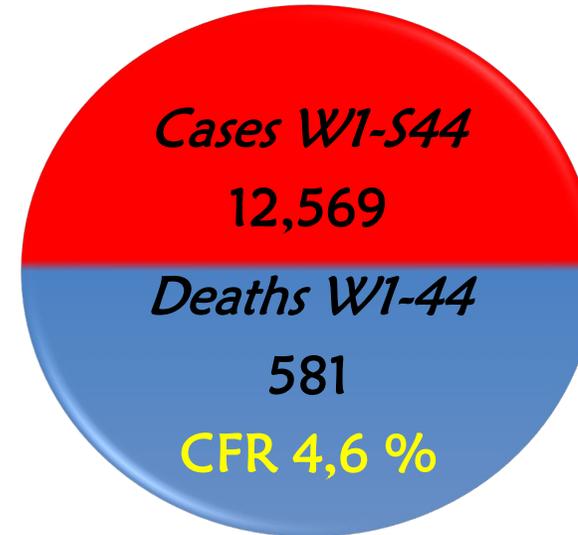
# The Democratic Republic of the Congo: mpox situation, cases and deaths

Source: WHO African Region situation report, 2023



PROVINCE	CAS	DECES
EQUATEUR	2228	177
SANKURU	1099	20
TSHOPO	900	51
MAINDOMBE	427	20
TSHUAPA	382	20
SUD UBANGI	260	6
KASAI	233	9
KWANGO	134	1
MONGALA	94	3
MANIEMA	83	0
BAS UELE	69	5
NORD UBANGI	56	2
KWILU	38	1
KASAI CENTRAL	12	0
HAUT UELE	7	0
KINSHASA	7	0
ITURI	2	0
	0	0
<b>Total</b>	<b>6031</b>	<b>315</b>

Most affected age group: 5 - 15 years (31%)

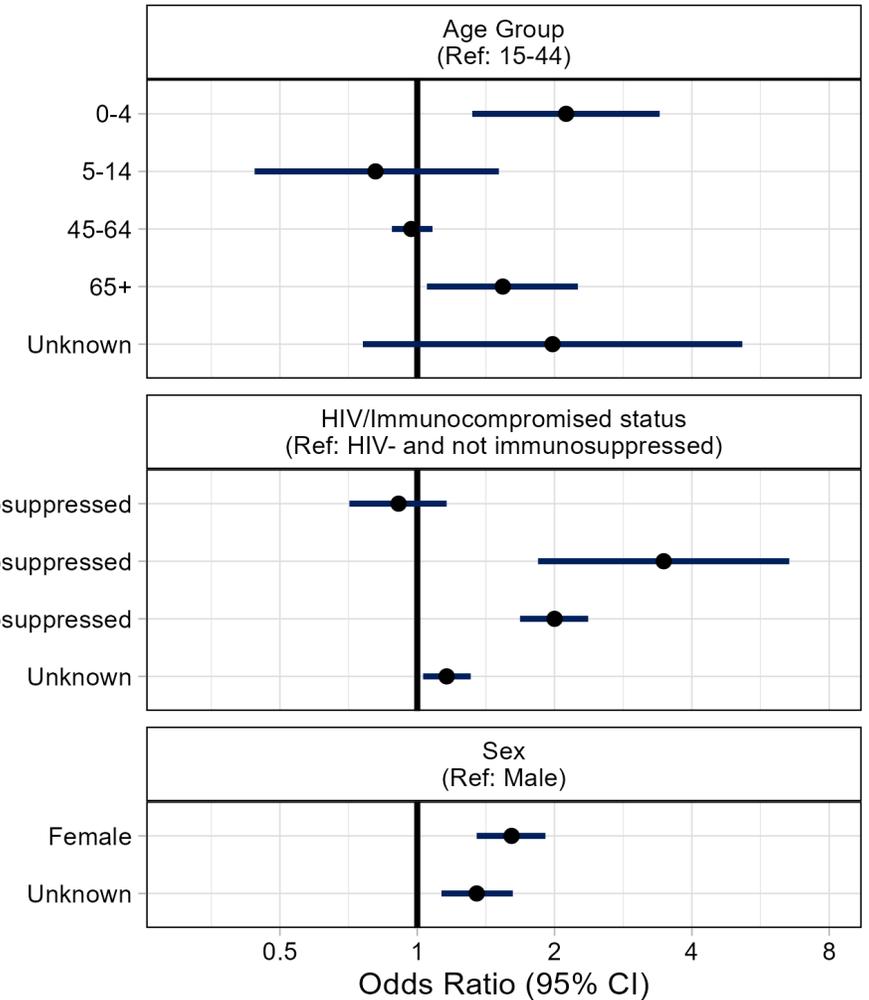


- Outbreaks due to sexual transmission of clade I MPXV in Kwango, Mbandaka, South Kivu
- Kinshasa experiences first ever outbreak in 2023
- Continuing geographic expansion of mpox in previously unaffected provinces
- Men and women affected

# Role of HIV in mpox outcomes

WHO global data

- Risk factor analysis shows an **increased odds of hospitalization** for:
  - **Children** < 5 years old
  - **Older persons** > 65 years old
  - **Female sex**
  - **Immunocompromised**, due to HIV or other immunocompromising conditions
- **Risk for death** (data not shown) higher odds for:
  - **Immunocompromised** due to HIV or other
- **HIV infection** alone, treated, controlled does not lead to higher risk of mpox complications



# Intersection between HIV & mpox

## What we know

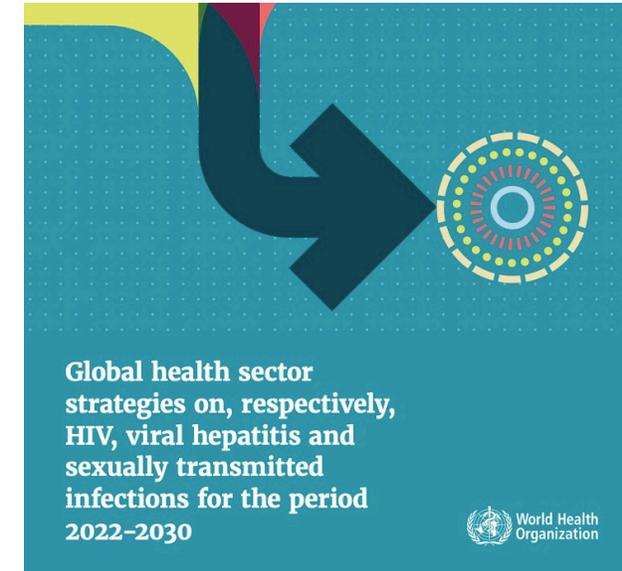
- Both mpox and HIV can be transmitted in sexual networks
- Among outbreak cases with known HIV status, ~ **30-50%** are living with HIV
- Immune suppression from uncontrolled HIV infection or other conditions is a risk factor for severe or fatal disease

## Clinical and public health implications

- Strong HIV prevention and care are central for mpox preparedness and response
- Eliminating stigma and discrimination supports equal access to services
- Person-centred delivery of mpox interventions in sexual health services (including HIV programmes) can improve outcomes and efficiency

## What we don't know – research priorities for HIV-mpox

- Therapeutics RCTs are still underway
- Role of HIV immune reconstitution inflammatory syndrome (IRIS)
- Relationship between HIV infection and mpox immune response [antibodies/cell mediated immunity]
- Interactions between antiretrovirals and mpox antivirals/therapeutics



# mpox prevention



## Vaccine

Prevents infection and complications of mpox



## Education

Helps people make informed decisions about their sex lives and how to protect themselves and others



## Testing

Allows for public health action, supportive care and access to therapeutics.



World Health  
Organization

HEALTH  
**MO** programme

# mpox: challenges



Fear and stigma



Declining surveillance and reporting



Gaps in testing capacity and genomic sequencing



Equity in access to countermeasures



Understanding MPXV ecology and dynamics of spillover events



Elimination of human-to-human transmission depends on local action



Funding

World Health Organization

Public health advice for gay, bisexual and other men who have sex with men on the recent outbreak of monkeypox

World Health Organization

Home / Newsroom / Fact sheets / Detail / Monkeypox

## Monkeypox

19 May 2022

**Key facts**

- Vaccines used during the smallpox eradication program... Newer vaccines have been developed of which one has...
- Monkeypox is caused by monkeypox virus, a member of Poxviridae.
- Monkeypox is usually a self-limited disease with the syn... can occur. In recent times, the case fatality ratio has bee...
- Monkeypox is transmitted to humans through close con... material contaminated with the virus.

**What you need to know if you are recovering from monkeypox at home**

Self-isolate and contact a health worker. Seek immediate advice if:

- Your rash becomes very painful/gets infected
- Your fever, nausea or vomiting gets worse
- You can't eat or drink
- You have difficulty breathing, feel dizzy or confused

04/08/2022

# WHO Standing recommendations for mpox issued by Director-General in accordance with the IHR (2005) – August 2023

## Recommendations directed to all countries:

- A. Have national mpox plans integrated into broader health systems. Capacities that have been built in resource-limited settings and among marginalized groups should be sustained.
- B. Strengthen and sustain testing and surveillance capacity and ensure that new cases of mpox are notified nationally and to WHO.
- C. Protect communities through communication and engagement; continue to build trust and fight stigma and discrimination.
- D. Invest in research to better understand mpox disease and transmission patterns, and to develop improved vaccines, tests, and treatments.
- E. Provide travelers with information to protect themselves and others before, during and after travel and refrain from implementing travel-related health measures, including mpox screening and testing for travelers.
- F. Deliver optimal clinical care for mpox patients, integrated within HIV and STI programmes, with access to treatments and measures to protect health workers and caregivers.
- G. Work towards equitable access to safe, effective and quality-assured vaccines, tests and treatments for mpox.

# WHO Strategic framework for mpox elimination

## Goal

Sustained elimination of human-to-human transmission of mpox

## Objectives

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



**Elimination of human-to-human transmission** is the absence of new cases (without defined travel history or zoonotic exposure) for  $\geq$  three months in the presence of adequate surveillance. **This goal applies to all countries and contexts.**

# WHO Strategic framework for mpox elimination

## Approach

Know your epidemic

Know your risks

Know your needs

Take action

## Guiding principles

Context appropriate and community led

Equity and human rights

Integrated programmes and services

Continuous learning

This approach and these principles reflect the crucial role **of community-led action** in achieving control of the outbreak that began in 2022— and building on the lessons learned in tackling the HIV epidemic.

# WHO Strategic framework for mpox elimination

## WHO definition of integrated health services

Effective, safe, people-centred services

Based on a primary health care approach

Includes health promotion, prevention, and curative care.

Health services 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

# Options for integration of mpox actions



## Community experiences of the 2022–2023 mpox outbreak in Europe and the Americas

A cross-sectional survey using geo-social networking applications

July 2023



World Health Organization

Community survey report here:

<https://www.who.int/publications/i/item/9789240077287>

Component	Integration options (examples)
<b>Coordination for preparedness and response</b>	<ul style="list-style-type: none"> <li>- Prevention and control measures</li> <li>- Emergency operations</li> <li>- Funding proposals</li> </ul>
<b>Collaborative surveillance</b>	<ul style="list-style-type: none"> <li>- National notifiable disease lists</li> <li>- Integrated disease surveillance and response</li> <li>- Early case detection in context of HIV/STI</li> <li>- Access to testing</li> </ul>
<b>Community awareness and protection</b>	<ul style="list-style-type: none"> <li>- Sexual health communication</li> <li>- Digital health initiatives</li> <li>- Outreach for and/or led by key populations</li> <li>- Reducing stigma</li> <li>- Risk and benefit assessment for events and gatherings</li> </ul>

# Options for integration of mpox actions



Component	Integration options (examples)
<b>Clinical care</b>	<ul style="list-style-type: none"> <li>- Health services for key populations</li> <li>- Integrated sexual health services and care pathways - Person-centred patient care (e.g. HIV/STI, PrEP clinics, primary care)</li> </ul>
<b>Access to countermeasures</b>	<ul style="list-style-type: none"> <li>- Provision of immunization in sexual health clinics and/or HIV/STI services</li> <li>- Integrated supplies planning</li> </ul>
<b>Research and development</b>	<ul style="list-style-type: none"> <li>- Research collaborations</li> <li>- Diagnostics, vaccines and therapeutics</li> <li>- Role of HIV/STIs in mpox</li> <li>- Digital health studies</li> </ul>

# An action-oriented approach

The Strategic Framework and a complementary Country Planning Guide will guide action, with practical steps and milestones to:

- Develop national and regional plans to enhance control, minimize zoonotic transmission and achieve elimination of human-to-human transmission.
- Ensure that all WHO Regions and Member States have mpox preparedness and response integrated into relevant health, laboratory and community-based programmes.
- Strengthen and support links to achieve progress at every level.

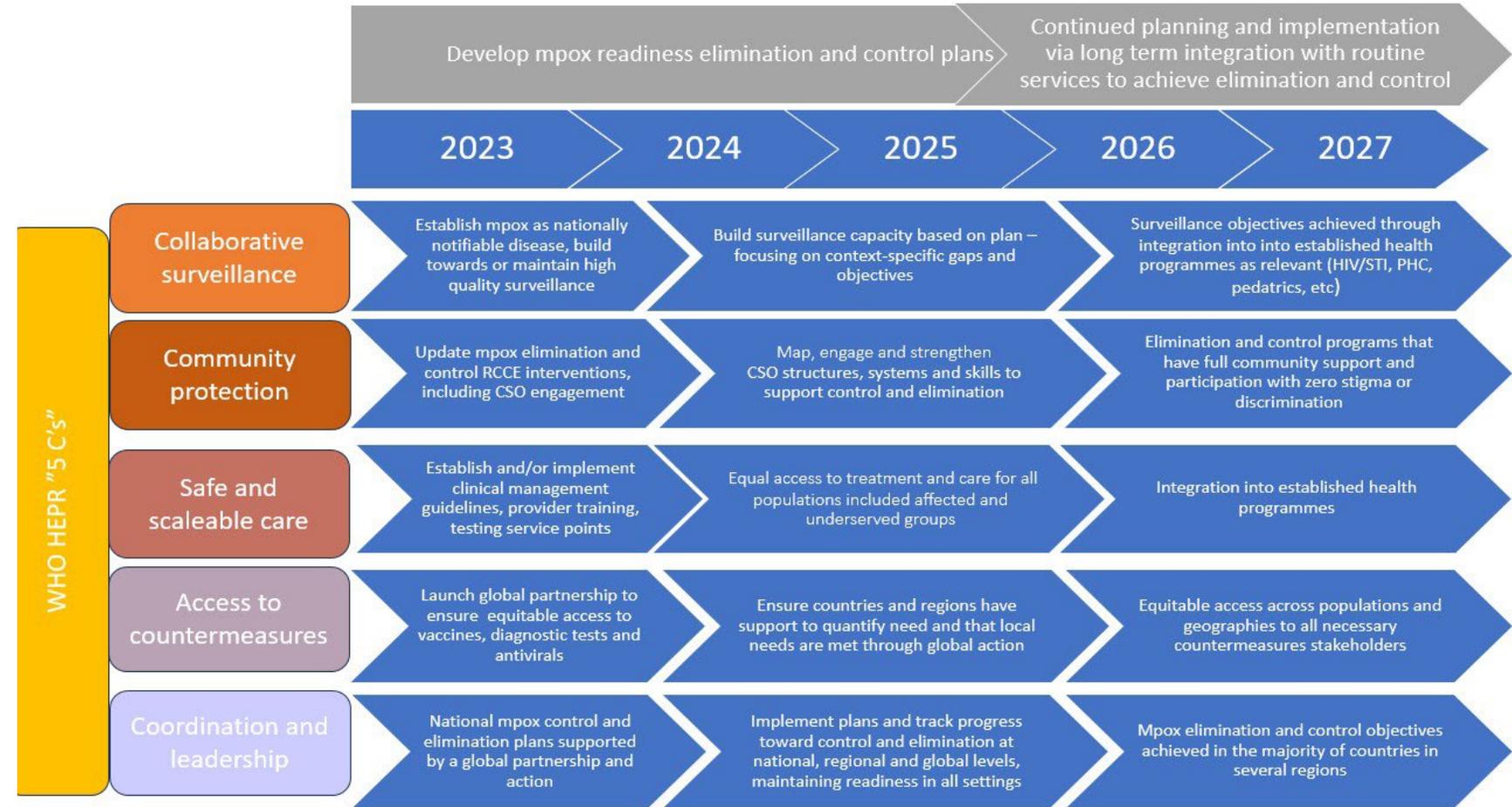
# In line with Health Emergency Preparedness and Response Architecture

Transitioning to long-term action leading to control and elimination will take years.

Integration of mpox activities with other HEPR-focused work and with health programmes including HIV/STI, PHC and others is key

WHO Regional offices will have a key role in defining regional strategies and targets

Global stakeholders, including WHO, have crucial roles within this framework



# Performance, quality, M&E areas of work

- **National programme surveys**
  - continue 2 times/year, adapt as needed, programme integration policies/ initiatives
- **Surveillance quality indicators**
  - timeliness, lab processing time
- **Outbreak performance indicators**
  - % suspected cases at national/local level
  - response time, feedback time...
- **Progress towards elimination**
  - % regions/countries with plans
  - n (%) countries in elimination/control/community transmission status
  - time since last case
  - absence of viral material in wastewater surveillance

# Elimination of human-to-human transmission

## Key considerations & challenges

### Considerations

- Focus on human-to-human transmission essential to avert establishment of mpox a “new” human poxvirus.
- Following eradication of smallpox 45 years ago, this is critical for global health security today.
- Elimination of human-to-human transmission of mpox is a global effort that depends on community engagement and local action.
- Comprehensive research agenda to be coordinated and funded.

### Challenges

- Continuing fear of stigma and need for RCCE adapted to different contexts.
- Continuing gaps in testing capacity and genomic sequencing with the need for new testing modalities.
- Lifting the PHEIC following by decline in surveillance & reporting.
- Continuing equity gaps in access to vaccines and therapeutics.
- Understanding of monkeypox virus ecology and dynamics of spillover events is limited.
- Funding for WHO and Member States, particularly for extensive needs in Africa.

# Clinical care and mpox – what is your role?

Some thoughts ... to prevent new outbreaks

1. **Maintain your index of suspicion for mpox** and always take a travel history
2. **Refer suspected cases** for testing, contact-tracing, notify public health; offer any person with mpox a test for HIV; management complications early to prevent sequelae
3. **Assess risk and advise** persons at risk or planning travel (destination, themed festivals, cruises..)
4. **Protect patients and communities** – offer targeted prevention and risk communication info
5. **Offer mpox vaccination** & information where available
6. **Enroll willing patients in studies** where possible



Thank-you



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# **Assessment of the status of implementation of SAGO recommendations on mpox**

# Recommendations to better understand the origins of and factors for the emergence and re-emergence of mpox

	Objectives and Key Recommendations	Objectives	Implemented studies activities	Status
1	Clinical and epidemiological retrospective studies	Define the role of human-to-human transmission dynamics and drivers for spread in previously reporting countries	Modelling studies Nigeria and DRC (GAVI) Mission to DRC to support design of outbreak investigation protocols (WHO)	Underway  Planned
2	Review clinical and laboratory records in target settings in locations where Clade I, subclade IIa and early subclade IIb cases	Identify possible missed cases prior to outbreak detection	Some local studies done/ongoing Canada - <a href="https://doi.org/10.3138/jammi-2022-0024">https://doi.org/10.3138/jammi-2022-0024</a> Belgium- <a href="https://www.nature.com/articles/s41591-022-02004-w">https://www.nature.com/articles/s41591-022-02004-w</a> California- <a href="https://doi.org/10.1016/j.jcv.2023.105493">https://doi.org/10.1016/j.jcv.2023.105493</a>	A commissioned study or review to be considered
3	Perform genomic sequencing of historical cases of mpox, with metadata links to clinical histories, phylogenetic studies	Understand viral mutation patterns and the emergence of subclade IIb viruses with APOBEC3 changes	<a href="#">Genomic epidemiology of the monkeypox virus: a global analysis of sequence data</a>	Completed Some studies ongoing
4	Conduct infectiousness studies	Understand transmission dynamics: reproductive number, duration of viral shedding and all possible transmission routes	Many studies published of epidemic parameter estimates (PHAC living review)	Continuous - For systematic review

# Recommendations to better understand the origins of and factors for the emergence and re-emergence of mpox

	Key Recommendations	Objective/s	Implemented studies activities	Status
5	Conduct multidisciplinary and multisectoral zoonosis studies	Identify animal reservoirs or animal sources of infection	WHO/NVRI: MPXV animal surveillance at the animal-human interface in Nigeria DRC: studies underway	Strategic Research document completed
6	Animal, environmental and ecological studies	To identify animal reservoirs or animal sources of infection in endemic and non-endemic regions	WHO/Ibadan: Understanding risk factors for mpox in wildlife hunters and bushmeat vendors in Nigeria WHO/Ibadan: FAO ECTAD funded KAP study on mpox in bushmeat value chain in Nigeria.	Completed, report and manuscript in prep  Completed
7	Conduct environmental, anthropological, behavioural and social science studies	To understand transmission dynamics between humans	Experimental studies for inactivating MPXV in laundry and surface.	Study on surface disinfectants, protocol finalized, study ongoing

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**Discussion**

**Thank-you!**