TECHNICAL REPORT
MPOX IN INDONESIA
2023

Directorate General of Disease Prevention and Control

Ministry of Health Republic of Indonesia

2024

FOREWORD

Mpox emerges as one of the zoonotic infectious diseases with outbreak potential in Indonesia. The World Health Organization (WHO) determined mpox as a Public Health Emergency of International Concern (PHEIC), and the PHEIC status was revoked on May 11, 2023. However, WHO emphasizes the necessity of implementing long-term control efforts by integrating mpox prevention, preparedness, and response efforts into the sexually transmitted infections program.

Lessons drawn from the COVID-19 pandemic, another emerging infectious disease, highlight the imperative for every country to develop capacities for prevention, preparedness, and response efforts. Each incident of emerging infectious diseases, including mpox, necessitates reporting and completing case data for epidemiological analysis. Consequently, the outcomes of data analysis can provide useful information as a basis for formulating policy recommendations to address emerging infectious diseases.

Although we are aware that the technical report on mpox may not be as perfect as expected, it serves as a vital resource for society and various stakeholders to obtain information on the epidemiology of mpox in Indonesia in 2023. This document remains dynamic, evolving alongside the evolution of information and mpox incidents in Indonesia. Ultimately, we hope that this report will benefit numerous parties and serve as valuable input material for relevant stakeholders.

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Directorate General Diseases Prevention and Control

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BACKGROUND

Mpox is a disease caused by the monkeypox virus (MPXV). Since its discovery in 1970 in central Africa, mpox has occurred sporadically and has been endemic in Africa, particularly central Africa, and western Africa. On 23 July 2022, the World Health Organization (WHO) declared mpox a public health emergency of international concern (PHEIC), considering the rise in cases in several non-endemic countries and the many information gaps. On 28 November 2022, WHO recommended the name of mpox to replace monkeypox. On 11 May 2023, the PHEIC was declared over, but alert levels remained as countries continued to report cases.

Globally, as of 30 November 2023, 92 783 cases with 171 deaths had been reported in 116 countries. Most cases on that November were reported from the Americas region (34%) and the European region (28.6%). In Indonesia, the first mpox case was reported in October 2022, which was an imported case. The next case was reported on 13 October 2023. Since then, cases had been reported until the end of 2023, recording 72 cases in six provinces: DKI Jakarta, Banten, West Java, East Java, Riau Islands, and DI Yogyakarta.

Epidemiological analyses into this situation have led to response recommendations in Indonesia in the form of this technical report. This technical report may also serve as learning materials for healthcare workers and other related parties.

GLOBAL SITUATION

According to WHO's Multicountry Outbreak of Mpox published on 22 December 2023, since 1 January 2022, mpox cases had been reported to the WHO from 116 countries in its six regions. As at 30 November 2023, 92 783 confirmed cases were recorded with 171 fatalities (case fatality rate/CFR of 0.18%). Most cases reported in the period to November 2023 came from the Americas region (60 400 or 65.1% of the confirmed cases) and the European region (26 395 or 28.73%).
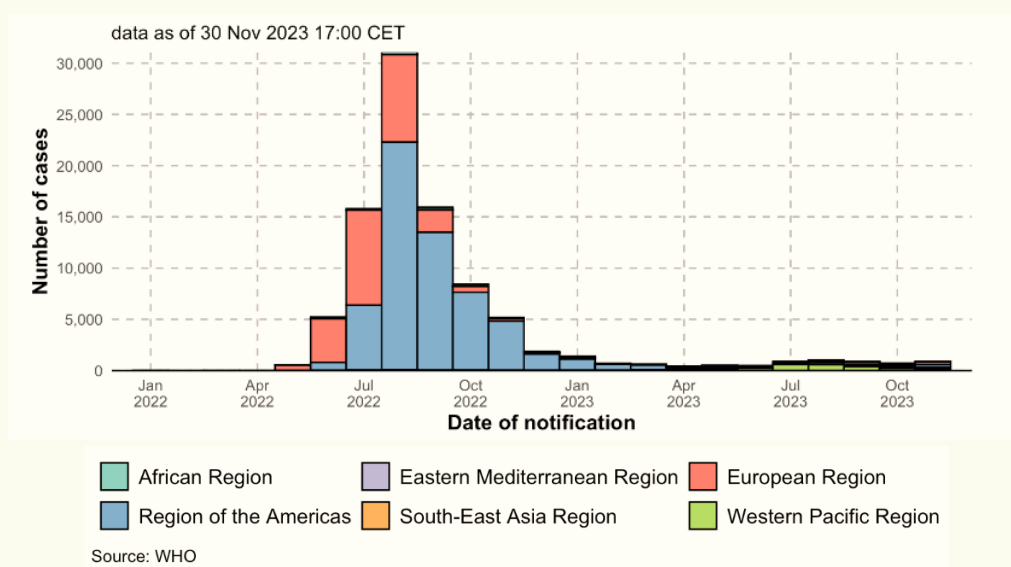
Figure 1 Global Mpox Epidemiology as at November 2023

Source : WHO, 2023
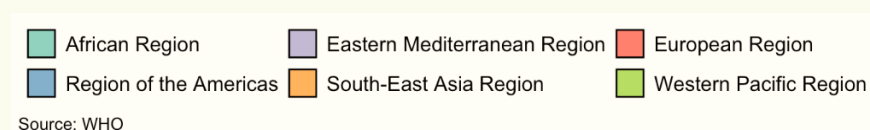
Figure 1 shows mpox case reporting peaked in August 2023, at a level lower than in the previous August 2022 peak. In 2022, most cases were reported from the Americas and European regions, whereas in 2023 most were reported from the Western Pacific and European regions. Ten countries with highest recorded mpox cases as at November 2023 were the US (31 070), Brazil (10 967), Spain (7 684), France (4 164), Colombia (4 090), Mexico (4 071), the UK (3 867), Peru (3 812), Germany (3 779), and China (2 024). Between them, these countries accounted for 81.4% of global cases.

In November 2023, 26 countries reported cases, 18 rise in cases, and one (Oman) its first country.
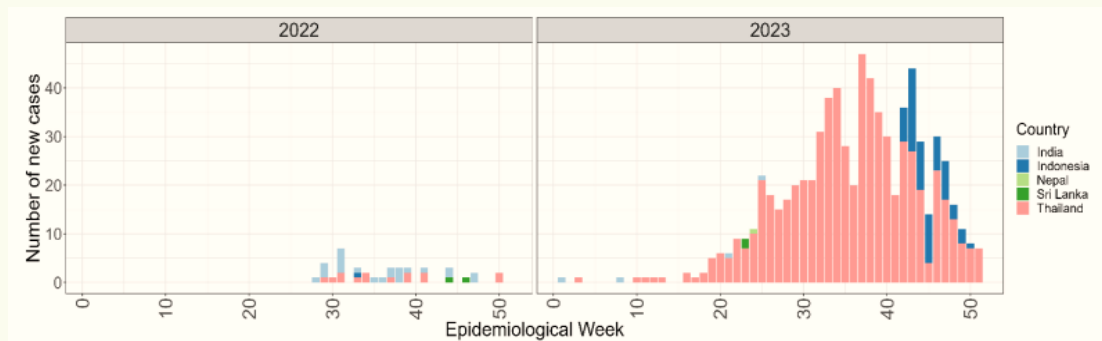
Figure 2 South-East Asia Region Mpox Epidemiology as at 24 December 2023

Source: WHO SEARO, 2023

Figure 2 shows the epidemiology in the South-East Asia region. The graph shows increase in cases starting in April 2023, with most cases reported from Thailand and Indonesia. Compared to 2022, the number of case reports in 2023 was significantly higher.

Some key findings on the characteristics of cases reported in the WHO global data as at 30 November 2023 are as follows:

a. Up to 96.4% (82 258 of 85 649) of cases were male, with a median age of 34 years.
b. Most cases (79.4%) were men in the 18–44 years age group.
c. Cases in women accounted for 3.6% (3 121) cases, with some being infected from a sexual partner.
d. According to sexual behaviour data, 85.1% of observed cases (28 769 of 33 794) were men who had sex with men (MSM).
e. Up to 52.1% (18 108 of 34 746) cases tested for HIV were HIV-positive.
f. As many as 1 263 cases were healthcare workers with community-acquired infection, and investigation was still ongoing into exposure to work.
g. Up to 83.1% (17 907 of 21 561 cases) reported transmission through sexual relations.
h. Most exposure (65.3% or 4 199 of 6 429 cases) occurred in parties with sexual contacts.

In response to this mpox situation, WHO conducted regular risk assessments, and a long-term mpox risk assessment was conducted in July 2023. Three population groups were considered in this assessment: the general population in countries that avoided the 2022 global outbreak, the general population in countries with a history of MPXV transmission and neighbouring countries, and gay men, bisexual men, MSM, trans and gender-diverse people, and sex workers. Conclusions drawn from this risk assessment are as follows:

Table 1 WHO Long-Term Risk Assessment in July 2023

Group	Risk
General population in countries outside 2022 global outbreak	Low
General population in countries with a history of MPXV transmission and neighbouring countries	Moderate
Gay men, bisexual men, MSM, trans and gender-diverse people, and sex workers	Moderate

INDONESIA SITUATION

1. Case Operational Definitions

The following operational definitions of cases apply for mpox case identification, based on the 2023 national prevention and control of mpox guidelines:

a. Suspect

1) A person with contact with a probable or confirmed cases in 21 days prior to the onset of symptoms or signs and with one or more of the following symptoms or signs:

    a) acute fever of >38.5°C,

    b) headache,

    c) muscle pains,

    d) back pain,

    e) fatigue

OR

2) A person with acute skin rash, mucosal lesion, or lymphadenopathy since 1 January 2022

AND

The following common causes of acute rash do not explain the clinical presentation: varicella zoster, herpes zoster, measles, herpes simplex, bacterial skin infection, gonococcus diseminata infection, primary or secondary syphilis, chancroid, lymphogranuloma venereum, granuloma inguinale, moluscum contagiosum, allergic reactions (for example, to plants), and other locally-relevant causes of papular or vesicular rash.

b. Probable

A person with unexplained acute rash, mucosal lesion, or lymphadenopathy

AND

Presenting one or more of the following conditions:

a) Epidemiologically-linked to a probable or confirmed case in 21 days prior to the onset of symptoms.

b) Identified as a member of the gay, bisexual, or MSM group.

c) Having more than one sexual partners or an anonymous sexual partner in 21 days prior to the onset of symptoms.

c. Confirmed

A suspect or probable cases testing positive for MPXV with laboratory polymerase chain reaction (PCR) testing and/or sequencing.

2. Epidemiological Situation in Indonesia

Indonesia reported its first mpox case in October 2022. On 13 October 2023, Indonesia reported another mpox case after a period of zero cases, and cases had continued to rise since. Throughout 2023, 72 cases were confirmed. This rise in cases was responded with active surveillance in HIV/AIDS care, support, and treatment services and in HIV counselling and testing services, involving key population networks. In addition, case finding was also carried out through tracking and testing on sexual partners, including the asymptomatic ones.

a. Mpox Epidemiology in Indonesia
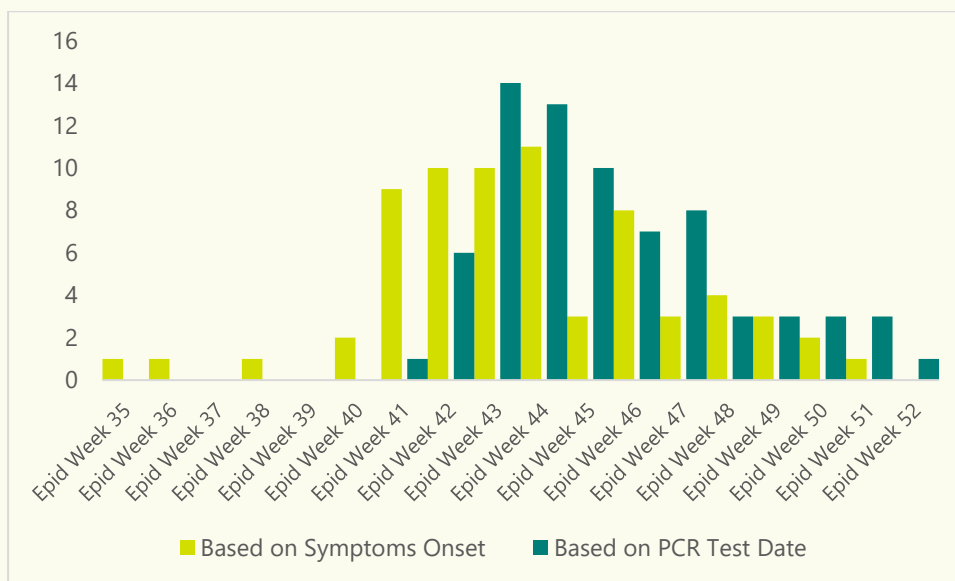
Figure 3 presents the mpox case epidemiology graph between week 35 to week 52 of 2023.
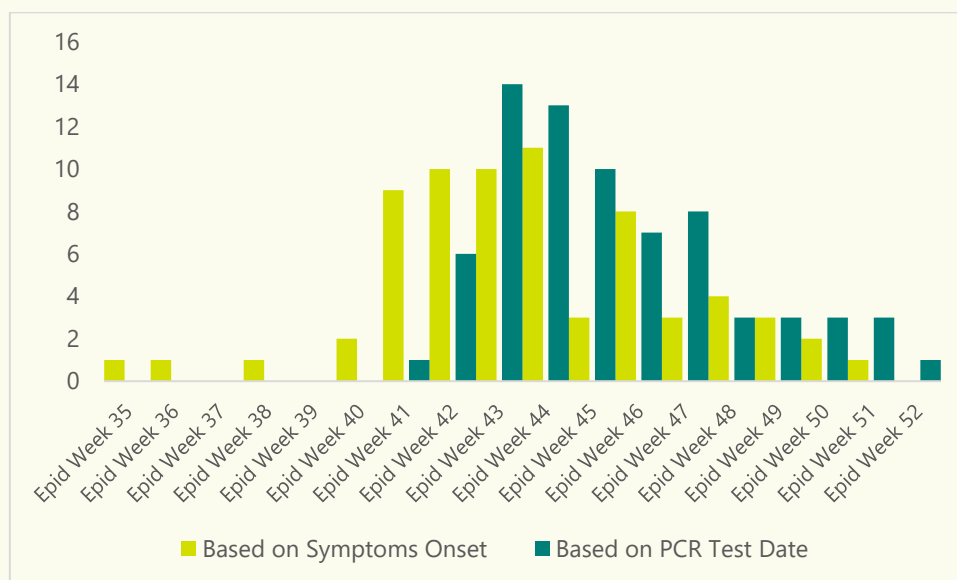
Figure 3 Mpox Case Epidemiology in Indonesia
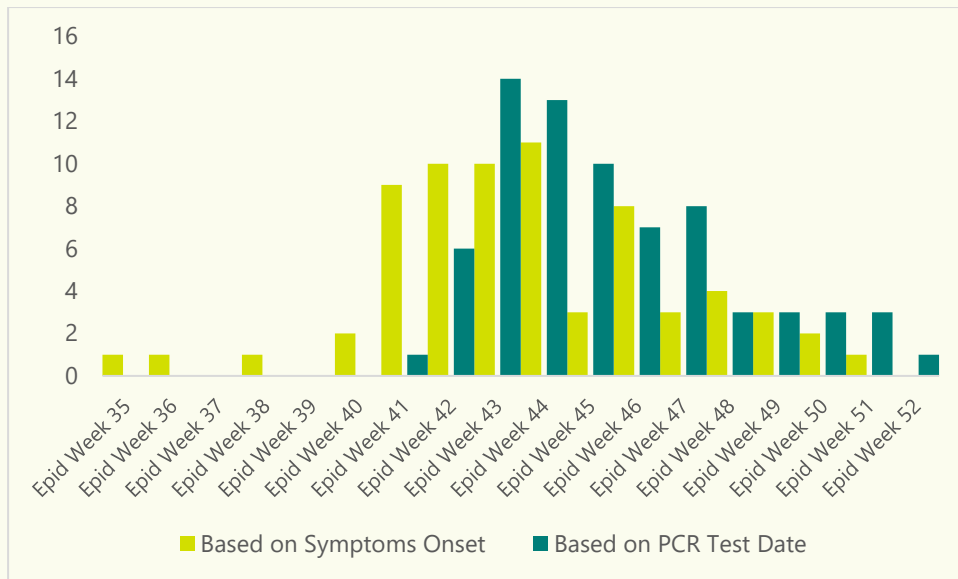
Figure 3 shows that the symptom onset in the first 2023 case in Indonesia occurred in week 35 (27 August to 2 September 2023), but the first detection was only made in week 41 (8 to 14 October). A rise in onsets followed, peaking in week 44 (29 October to 4 November), whereas PCR diagnoses peaked in week 43 (22 to 28 October. It was advisable to consider the onset peak, rather than PCR diagnosis peak, to be the actual peak of cases as the number of diagnoses might be affected by delays or health-seeking behaviour of individuals.

b. Distribution of Mpox Cases in the Provinces

As at 31 December 2023, six provinces had reported mpox cases in Indonesia. Figure 4 presents the distribution of mpox cases across provinces.
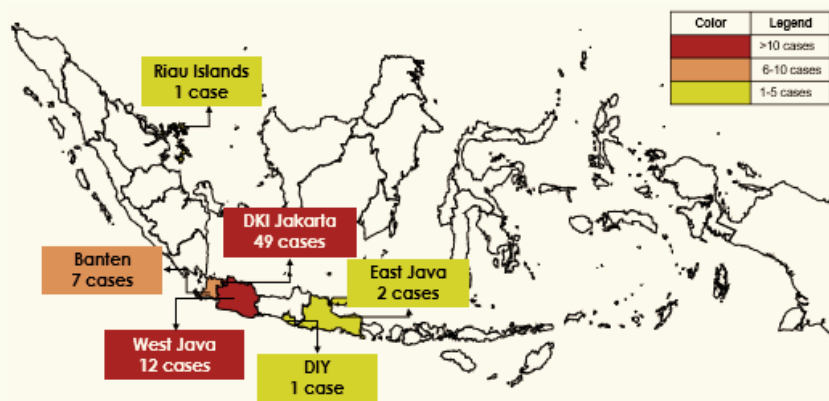
Figure 4 Distribution Of Mpox Cases across Provinces

Figure 4 shows that a large majority of cases (98.6%) were found and reported in Java. Cases were reported in five provinces, namely DKI Jakarta (49 cases), West Java (12 cases), Banten (seven cases), East Java (two cases), and DI Yogyakarta (one case). Another case was reported from Riau Islands provinces. Table 2 presents the distribution of mpox cases across districts.

Table 2 Distribution Of Mpox Cases across Districts

Province	District	Cases
DKI Jakarta	South Jakarta	21
	West Jakarta	11
	Central Jakarta	7
	East Jakarta	6
	North Jakarta	4
West Java	Depok City	3
	Bogor City	2
	Bandung City	2
	Bekasi City	2
	Cirebon	1
	Bogor	1
	Cirebon City	1
Banten	Tangerang	3
	South Tangerang City	3
	Tangerang City	1
East Java	Madiun City	1
	Surabaya City	1
Riau Islands	Batam City	1
DI Yogyakarta	Kota Yogyakarta	1

c. **Mpox Rapid Risk Assessment**

In response to the mpox situation in Indonesia, in line with WHO's stance, on 17 October 2023, the Ministry of Health and other relevant sectors conducted an online rapid mpox risk assessment. The assessment analyzed mpox risks in the coming three months. Results of the assessment are as follows:

Table 3 Mpox Risk Assessment in Indonesia

Group	Probability	Impact	Risk	Confidence level
General population in DKI Jakarta	Low	Small	Low	Medium
HIV and MSM populations in DKI Jakarta	High	Large	High	Medium
General population in South Jakarta	Low	Medium	Medium	Medium
General population in Indonesia	Low	Small	Low	Medium

Recommendations from the risk assessment include integration of early mpox case detection with HIV case detection and active surveillance, epidemiological investigation, contact monitoring, isolation monitoring, and response in clusters of at-risk populations. Further elaboration on the risk assessment is available at https://infeksiemerging.kemkes.go.id/document/download/Y2Y.

d. Demographic Characteristics and Risk Factors

Analyses were made on the demographic characteristics and risk factors based on data from submitted epidemiological investigation forms. Demographic data and risk factors are as follows in Table 4:

Table 4 Demographic Characteristics and Risk Factors

Variable	Cases (n=72)	Proportion
Sex		
Male	71	98,6%
Female	1	1,4%
Age Group		
<18 years	0	0%
18-24 years	15	20,8%
25-29 years	21	29,2%
30-39 years	32	44,4%
40-49 years	3	4,2%
>50 years	1	1,4%
Sexual Orientation		
Homosexual (MSM)	45	62,5%
Bisexual	17	23,6%
Heterosexual	10	13,9%
Possible Transmission Mode		
Sexual	64	88,9%
Unknown	8	11,1%

Table 4 shows the characteristics of mpox cases in Indonesia by gender, age group, sexual orientation, and possible mode of transmission. The majority of cases (98.6%) were male with the most cases in the 30–39 year age group (44.4% or 32 cases). The majority of cases were found in patients with homosexual orientation (MSM) amounting to 62.5% (45 cases), and the most likely mode of transmission was sexual transmission at 88.9% (64 cases). There was one female case who was a sexual contact/domestic partner of a confirmed case. This shows that members of the same household are a group at risk, and the risk is higher with sexual contact/partners.

Mpox can be transmitted through direct contact with lesions or body fluids through kissing; touch; and oral, vaginal, or anal penetration with someone infected with mpox. In addition, transmission can occur indirectly through contaminated objects, for example the patient's bed. The literature puts forward that sexual spread is possible and requires more in-depth research. Lesions can be found on the genitals and mouth which contribute to sexual contact (Kaya et al., 2023).

e. Mpox Case Finding at Healthcare Facilities

Mpox cases were found at private clinics, primary healthcare centres, and hospitals.
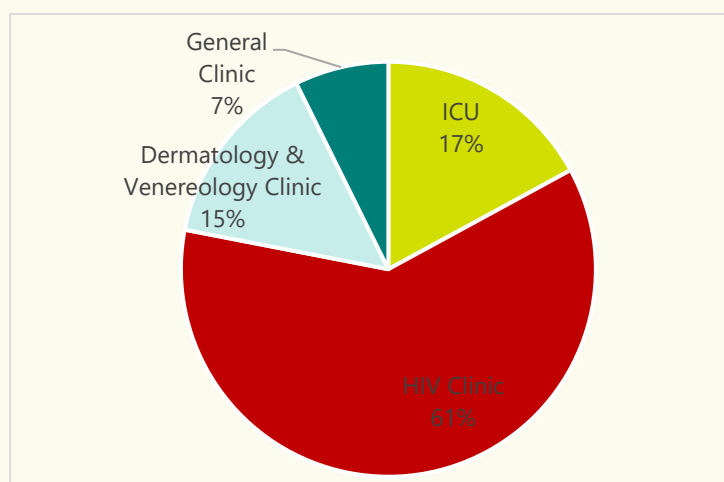
Figure 5 Case Finding At Healthcare Facilities (n = 41)

Figure 5 shows distribution of locations of mpox case finding at healthcare facilities. Of the 72 confirmed cases, 41 were found at hospital polyclinics, whereas 31 others at other healthcare facilities.

Of the 41 cases, 61% (25 cases) were found at hospital HIV clinics, 17% (seven cases) at emergency units, 15% (six cases) at hospital dermatology and venereology clinics, and 7% (three cases) at hospital general clinics. This distribution suggests that healthcare workers need to be more aware of cases presenting at hospital HIV clinics.

f. **Laboratory Testing**

Diagnosis is made with specimens meeting clinical conditions under PCR tests. For symptomatic patients, specimens are collected from lesions, scabs, anal/rectal swabs, tonsil/oropharyngeal swabs, and serum. Currently serological testing for serum specimens remains unavailable. Specimen types tested from confirmed cases are as follows.
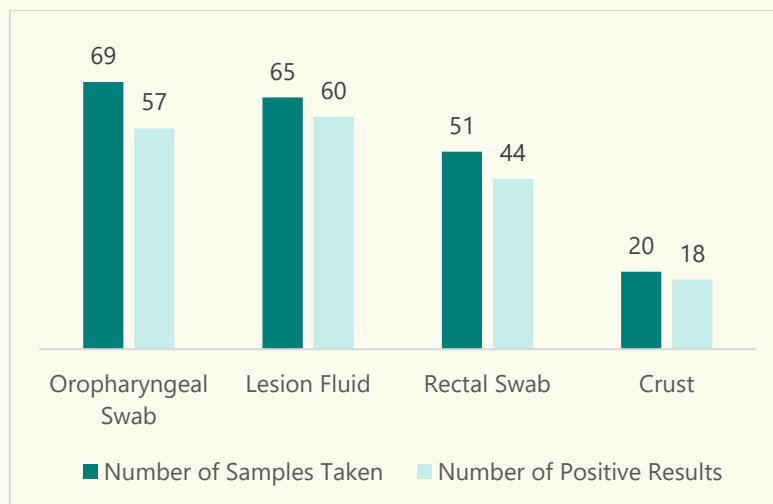
Figure 6 Specimens Tested and Positive Tests

As shown   Figure 6, 92.3% (60 of 65 specimens) of swab specimens, 90% (18 of 20 specimens) of scab specimens, 86.3% (44 of 51 specimens) of rectal swab specimens, and 82.3% (51 of 62 specimens) of oropharyngeal swab specimens tested positive. Health workers need to adhere to the procedures for collecting specimens as various types of specimens can produce different test results in the same case. For example, when patient A has lesion fluid, oropharyngeal swab, and anal/rectal swab specimens taken, the results of the lesion fluid examination can be negative, while the oropharyngeal swab and anal/rectal swab specimens can be positive.

g. **Incubation Period**

Incubation period is calculated from the date of exposure to the date of onset. Of the 69 symptomatic cases, 28 have their exposure and onset dates recorded.
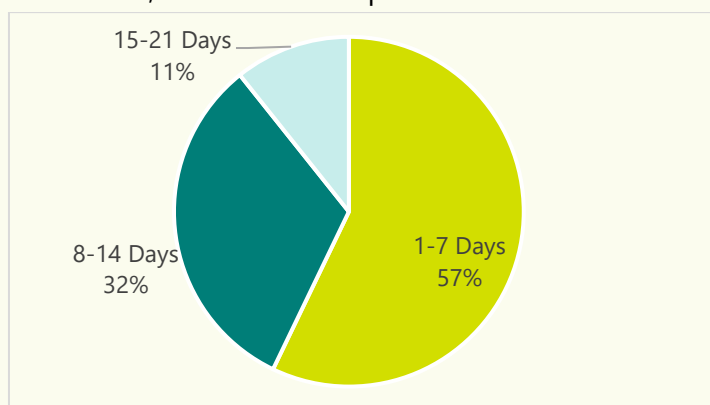
Figure 7 Distribution of Incubation Periods of Mpox Cases (n = 28)

Figure 7 presents incubation periods, which range from one to 21 days, with an average period of seven days. This is in line with a study in 17 countries with outbreaks in 2022 presenting incubation periods between three to 20 days (Thornhill et al., 2022). Another study also records an average incubation period of seven days (Charniga et al., 2022).

h. Clinical Characteristics

Clinical characteristics, signs and symptoms, lesion development, number of lesions, and location of lesions in symptomatic cases are presented in Table 5 below:

Table 5 Clinical Characteristics

Clinical characteristics	Frequency (n = 69)	Proportion
Symptoms*		
Lesion	69	100,0%
Fever	60	86,9%
Rash	47	68,1%
Lymphadenopathy	40	57,9%
Inguinal	25	62,5%
Axilla	3	7,5%
Cervical	12	30%
Lesion development		
Asynchronous	41	59,4%
Synchronous	28	40,6%
Number of lesions		
1-5	17	24,6%
6-25	35	50,7%
26-100	11	15,9%
101-250	3	4,3%
>250	3	4,3%
Lesion location**		
Face	42	60,9%
Legs	32	46,4%
Genital	32	46,4%
Hands/Arms	30	43,5%
Chest	25	36,2%
Generalized	20	29,0%
Perianal region	15	21,7%
Soles	15	21,7%
Mouth	12	17,4%
Others	22	31,9%

* One case can develop multiple symptoms

** One case can develop lesions in multiple locations

Among the 69 symptomatic cases, the most commonly reported sign/symptom is lesion, reported by 100% (69) of cases. Fever was reported by 86.9% (60), rash by 68.1% (47), and lymphadenopathy by 57.9% (40) cases.

Lesion development is categorized into vesicular, macular, papular, and crust stages. Lesions in the cases were found in different stages, and 59.4% (41) of cases developed synchronous lesions (all lesions at the same stages) but 40.6% (28) of cases asynchronous lesions (lesions at different stages).

Lesions were also counted across parts of the body. Lesion count is an indication on the degree of severity of mpox. In Table 5, most (50.7% or 35) cases developed six to 25 lesions, and 24.6% (17) developed one to five lesions.

At the time of epidemiological investigation, lesions in the cases were found on the face, legs, soles, genitals, mouths, the whole body, chest, hands/legs, perianal region, and other areas (anal area, head, neck, thighs, elbows, and bottoms). The most common location of lesions was the face, where 60.9% (42) of cases developed lesions, followed by legs and genitals in 46.4% (32) of cases each. Each developed lesions on more than one parts of their body.

Lesions include active lesions, crusts, scabs, and healed lesions. Below are descriptions of each type in cases in Indonesia. Pictures are taken from epidemiological investigation reports by the Ministry of Health.

1) **Active Lesions**

Morphologies described in active lesions on the skin are as follows:

a) **Early stage**

Early lesions, called **papules**, are usually 1–3 mm in size and appear solid. Other instances may appear clear and filled with fluid, called **vesicle**, or more commonly appear filled with white solid infiltrates (**pseudo-pustules**).

b) **Progression (development)**

As it develops, the central involution of a lesion may produce a torus (doughnut-like) shape (**umbilicated pseudo-pustule**). Crusts often develop for the first time around the central area of the umbilication area of the developing lesion.

c) **Final Stage**

Erosion and ulcers can also occur during the active lesion phase (transmissibility remains). Erosions happen as the epidermis is eroded, whereas partial erosion of the dermis layer is called an **ulcer**.

Three morphologies usually present with appearance similar to ulcers on the oral mucose: ulceration/erosion without surrounding induration; chancre-like

papules and nodules (durum ulcer); and psuedomembrane plaques similar to candidiasis. All lesions healed quickly without formation of crusts or dispigmentation. Active lesions are depicted below.

- **Active genital/mucosal lesions**

Figure 8 Papules on Suprapubic Region

Early-stage lesions in the suprapubic region: small in size, multiple, well-defined, protruding, and umbilicated

Figure 9 Umbilicated Pseudopustules

Early-stage lesions on glans penis and penile shaft lesions: small papules, multiple, well-defined, umbilicated centre

Figure 10 Umbilicated Pseudopustules

Early-stage lesions in the perianal region: small papules (3–5 mm in size), multiple, well-defined, protruding, and umbilicated

Figure 11 Ulcers

Advanced lesions on corona of glans penis: multiple papules, confluent, central ulcer

Figure 12 Ulcer and Multiple
Papules in Anal Region

Multiple papulous lesions:
confluent, ulcerated, in the anal
region

- **Active Non-Genital Lesions**

Figure 13 Lesions in Oral Cavity

Figure 14 Lesions on Tip of
Tongue

Early-stage lesions in the oral
cavity: multiple plaques, white
in colour, ulcerated central
parts

Early-stage lesions on the tip
of a tongue: solitary plaques,
white in colour, ulcerated
central parts

Figure 15 Pseudopustules on Palm

Advanced lesions in the form of solitary pustules with umbilicated centre

Figure 16 Pseudopustules on Back of Hand

Advanced lesions on the back of a hand: multiple papules, difussed, central ulcer, and crusts

Figure 17 Pseudopustules on Face

Advanced lesions in the form of solitary pustules with umbilicated centre

Figure 18 Pseudopustules on Back of Hand

Advanced lesions on the back of a hand: multiple papules, difussed, central ulcer, and crusts

Figure 19 Pseudopustules on Arm

Early-stage lesions: small, well-defined, redenned, protruding, and umbilicated.

Figure 20 Pseudopustules on Elbow

Early-stage lesions: small, well-defined, redenned, protruding, and umbilicated.

Figure 21 Pseudopustules on Back

Early-stage lesions on the back: multiple, discreet.

Figure 22 Rashes and Pseudopustules on Arm

Early-stage lesions: small, well-defined, varied sizes, redenned, protruding, and umbilicated

Figure 23 Pseudopustules on Neck

Figure 24 Pseudopustules on Feet

Early-stage lesions on the neck: solitary, umbilicated centre.

Lesions on the back of the feet: small size, solitary, well-defined, protruding, umbilicated

2) **Crusts/Scabs**

Advanced lesions can take the form of stratum corneum, turn yellow, and haemorrhagic crusts. Crusts can still transmit disease through close contact. Crusts will peel of, and lesions will regenerate but leave scar tissues. At this stage, most lesions should have formed crusts without induration.

Figure 25 Crusts on Genital

Figure 26 Crusts on Face

Advanced lesions in the form of nodule plaques covered in thin crusts with ulcerations

Advanced lesions in the form of nodule plaques: central ulcers covered in blackened thin crusts

Figure 27 Crusts on Ear

Advanced lesions on the left ear in the form of papules: multiple ulcerated nodules, covered in blackened crusts

3) Healed lesions

Lesions are deemed to have healed if they no longer protrude, remaining crusts have desquamated, and underlying erosions or ulcers have healed with re-epithelialisation.

Figure 28 Healed Lesion on Forehead

Improved lesions with crusts and squamae peeled off, often leaving light atrophic scar tissues.

Figure 29 Healed Lesions on Arm

Fully-healed lesions

i. Comorbidities

Comorbidities in cases were examined, such as HIV, STIs (syphilis, HSV), active TB, diabetes, and hypertension.

Table 6 Comorbidities in Mpox Cases

Variable*	Case	Proportion
HIV	53	73,6%
On ARV	44	83,0%
Not on ARV	8	15,1%
Lost to follow up	1	1,9%
STI	21	29,2%
Syphilis	19	90,5%
Herpes Simplex	2	9,5%
TB Active	3	4,1%
Diabetes	2	2,8%
Hypertension	1	1,4%
None	15	20,8%

* Each case may have more than one coinfection and comorbidity

Table 6 shows that of the 72 confirmed cases, 73.6% (53 cases) had HIV, and 83.0% (44 cases) of them were taking ARVs. As many as 29.2% of cases (21 cases) also reported 19 cases of syphilis and two cases of herpes simplex. 4.1% (3 cases) were reported to have active TB, 2.8% (2 cases) diabetes, 1.4% (1 case) hypertension, and 20.8% (15 cases) had no co-infections or comorbidities. People living with HIV (PLHIV) had mpox due to weakened immunity and close contact with confirmed cases, resulting in many PLHIV to also develop mpox (Curran et al., 2022). In addition, mpox occurs in those who had same-sex sexual relations (homosexuals), a majority of whom had HIV (Ortiz-Saavedra et al., 2023). Mpox cases in PLHIV are also widely reported throughout the world and require full attention. Based on incidents in Indonesia, further research is needed regarding mpox transmission in PLHIV and MSM risk groups to produce effective countermeasures.

j. Severity and Symptomaticity

Severity was also analyzed based on symptoms and comorbidity, treatment status, and outcome. The 2023 national prevention and control of mpox guidelines specifies two severity levels: mild and severe. Several confirmed cases presented no symptoms.

Table 7 Clinical Severity

Variable	Case (n=72)	Proportion
Severity		
Asymptomatic	3	4,2%
Mild	51	70,8%
Severe	18	25,0%
Treatment		
Isolation in hospital	16	22,2%
Self-isolation	56	77,8%
Outcome		
Death due to other causes*	1	1,4%
Isolation	8	11,1%
Recovery	63	87,5%

*not *mpox*

Most (70.8% or 51 cases) cases experienced mild symptoms, while 25.0% (18 cases) experienced severe symptoms, and the rest were asymptomatic. Of the 72 confirmed cases, most (77.8% or 56 cases) underwent self-isolation, while 22.2% (16 cases) went into isolation in hospitals. In some situations, isolation in hospital was considered for cases with low compliance to and few means for self-isolation. As of 31 December 2023, 87.5% (63 cases) were declared to have made recovery. 11.1% (8 cases) were still in self-isolation and isolation in hospital. 1.4% (1 case) died due to other causes, namely HIV with low CD4 accompanied by other serious complications such as ileus (digestive problems).

Of the 72 confirmed cases, only 13 cases had CD4 data, with six with fewer than 200 CD4 cells/mm3. Of the six cases with fewer than 200 CD4 cells/mm3, 33.3% (2 cases) were classified as severe cases. Therefore, CD4 examination needs to be considered in PLHIV patients infected with mpox to treat mpox and other opportunistic infections.

Sixty-three cases were declared recovered. Next, the onset of symptoms and the date of recovery were calculated to measure recovery time. This is presented in Figure 30.
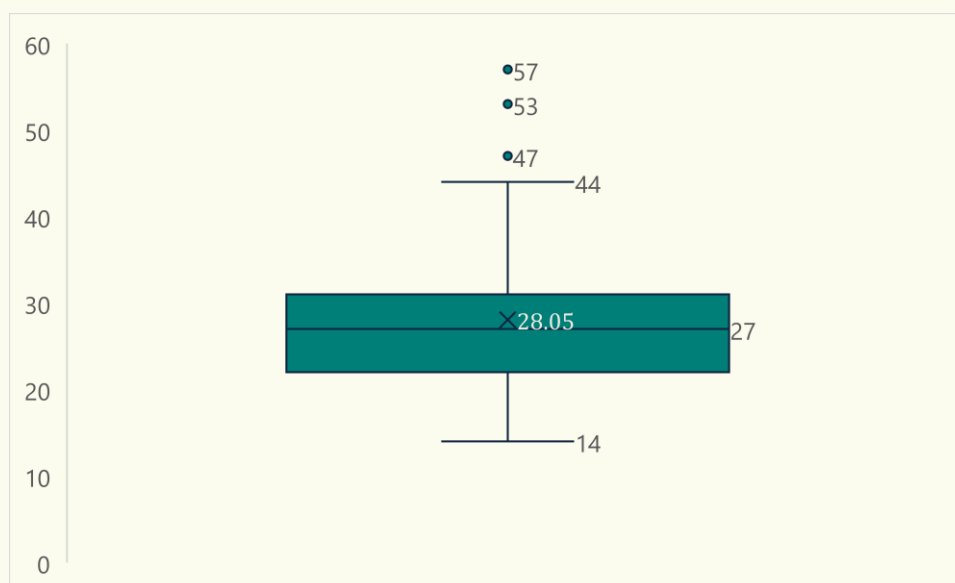
Figure 30 Recovery time in 63 Mpox Patients

Figure 30 shows the shortest period of illness was 14 days from the onset of the first symptoms. Meanwhile, the longest period was 57 days, with an average of 28 days for 63 cases. This is in line with existing evidence that the recovery time for mpox patients varies from two to four weeks. In cases with a recovery time exceeding 4 weeks, there were comorbidities, namely HIV with a CD4 count below 200 and there were cases that were detected late.

k. Close Contact Tracing

Epidemiological investigation allowed tracing of sexual and non-sexual close contacts in 47 confirmed cases. Table 8 presents the details.

Table 8 Close Contact of Confirmed Cases

Variable	Case	Proportion
Confirmed case close contact finding (n = 72)		
No close contacts	25	34,7%
Close contacts	47	65,3%
Types of close contacts (n = 47)		
No sexual close contacts	10	21,3%
Sexual close contacts	37	78,7%
Number of sexual close contacts (n = 37)		
1–3 close contacts	35	94,6%
>3 close contacts	2	5,4%

Of the 72 confirmed cases, close contacts of 65.3% (47 cases) could be identified. In other cases, close contacts were not identified due to for example confirmed cases not being available to contact by officers for further investigation, stigma against mpox

patients, confirmed cases refusing to provide information about their close contacts, history of recent sexual relations, and sexual orientation. HIV/AIDS partners were involved, but the approach to gathering information on cases could have been stronger. In addition, Most of the 78.7% (37 cases) of confirmed cases with close sexual contacts traced had one to three close contacts (94.6%; 35 cases).

Table 9 Characteristics of Close Contacts

Variable	Close Contacts (n=111)	Proportion
Criteria		
Sexual	68	61,3%
Non-sexual	43	38,7%
Testing of sexual close contacts (n = 68)		
Tested	18	26,5% (18/68)
Positive	9	50,0% (9/18)
Negative	9	50,0% (9/18)
Not tested	50	73,5% (50/68)
Testing of non-sexual close contacts (n = 68)		
Tested	4	9,3% (4/43)
Positive	0	0,0% (0/4)
Negative	4	100,0% (4/4)
Not tested	39	90,7% (39/43)

As shown in Table 9, 111 close contacts were identified from 47 confirmed cases. 61.3% (68 close contacts) were sexual contacts and 38.7% (43 close contacts) were non-sexual contacts. In accordance with the 2023 national prevention and control of mpox guidelines, close contact examination was considered for sexual close contacts.

In close sexual contact tracing, only 26.5% (18 sexual close contacts) were tested, with 50% (nine sexual close contacts) testing positive for mpox. Meanwhile, 73.5% (50 sexual close contacts) did not have specimens collected because confirmed cases refused to provide details about their close contacts, close contacts could not be contacted by officers, and close contacts refused to have specimens collected.

Even though testing non-sexual close contact was not mandatory, several regions conducted testing nonetheless. A total of 9.3% (4 non-sexual close contact) were tested, but none showed positive results.

I. **Pet Ownership**

In addition to contact tracing, pet ownership was a point of interest in the epidemiological investigation because of its potential for spillover from humans to animals.
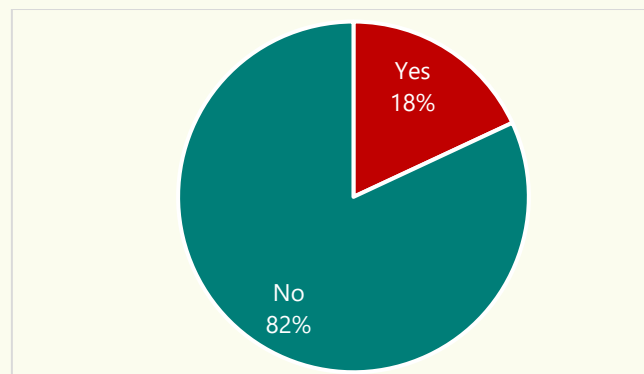
Figure 31 Pet Ownership

Figure 31 shows that 18% (13 cases) reported to have pets (cats or dogs). According to a study by Seang, et. Al in 2022, during the 2022 mpox outbreak in France, transmission from humans to pet dogs was reported. Therefore, health workers need to educate patients during self-isolation to avoid contact with pets to prevent spillover from humans to animals. In addition, collaboration with the animal health sector in the detection of mpox in pets of mpox cases is being considered.

m. Genomic Sequencing

Whole genome sequencing (WGS) was required to establish the clades and variants of MPXV in Indonesia and to plan activities based on that information. MPXV has two clades: clade I and clade II. Clade I, previously called the Congo Basin clade, is found mostly from the central-south region of Cameroon to the Congo Democratic Republic. This clade tends to cause a higher CFR (>10%). Clade II, previously called the West African clade, is found commonly from Cameroon to Sierra-Leone. It has two subgroups – IIa and IIb – and tends to cause mild symptoms and lower CFR (<1%). Increases in incidence since 2022 has been caused primarily by clade IIb.
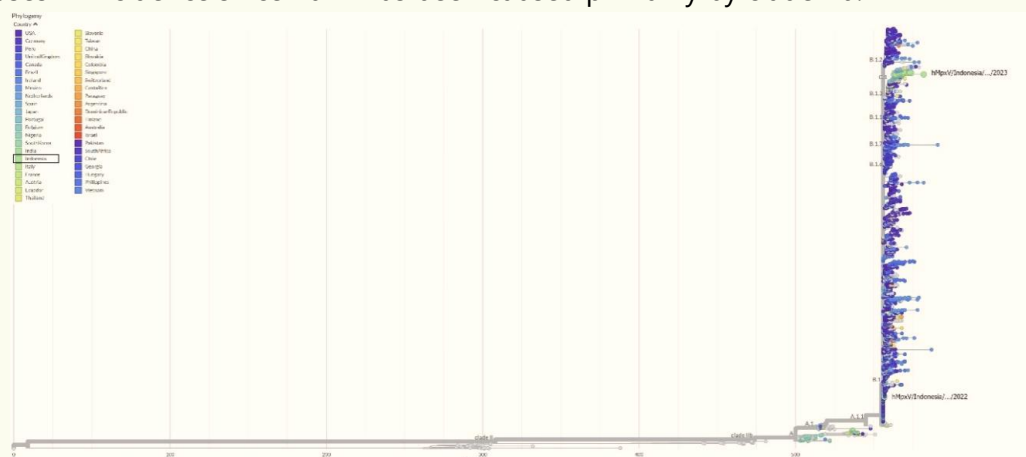

Figure 32 Phylogenetic tree of MPXV in Indonesia and other countries, 2022–2023

Source: GISAID, 2023

Of the 72 cases, 32 had their specimens subjected to WGS, but only 27 specimens were successfully sequenced. Figure 32 presents the phylogenetic tree of hMpxV links in Indonesia as available with GISAID. The tree can be used to infer the spread of the hMpxV to Indonesia based on similarities in the sequences or proximity in the tree. The Indonesian sequences in turquoise were classified under clade IIb, lineage B.1 for the 2022 sequences and lineage B.1.3 for the 2023 sequences.
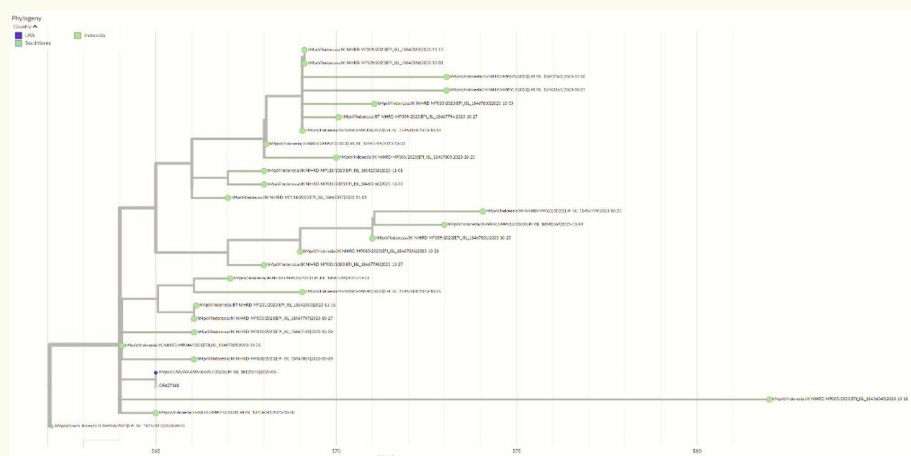
.

Figure 33 Phylogenetic tree of MPXV in Indonesia, 2022–2023

Source: GISAID, 2023

In Figure 33, the 26 sequences in Indonesia of 2023 are in a single group. One sequence from South Korea is in the outgroup with closest link to hMpxV/South_Korea/KDCA-P026/2023|EPI_ISL_18147347 obtained on 22 April 2023. The Indonesia group, there was one sequence from the United States taken in June 2023, hMpxV/USA/WA-UW-066957/2023|EPI_ISL_18125040.

n. Mpox Vaccination

Considering the increase in cases in Indonesia, the Ministry of Health is undertaking several mpox control efforts, including vaccination. Mpox vaccination is given in two doses with a minimum interdose distance of four weeks. Based on the results of the rapid risk assessment, members of the MSM community who had risky sexual relations in the past two weeks were prioritized for vaccination. Vaccinations were also given to laboratory staff who tested mpox samples. Vaccination is still being provided to date especially in four administrative areas in DKI Jakarta: Central Jakarta, West Jakarta, South Jakarta, and East Jakarta.

The targets in these four areas are as follows: 140 individuals in Central Jakarta, 142 in West Jakarta, 120 in South Jakarta, and 93 in East Jakarta, totaling 495 individuals.
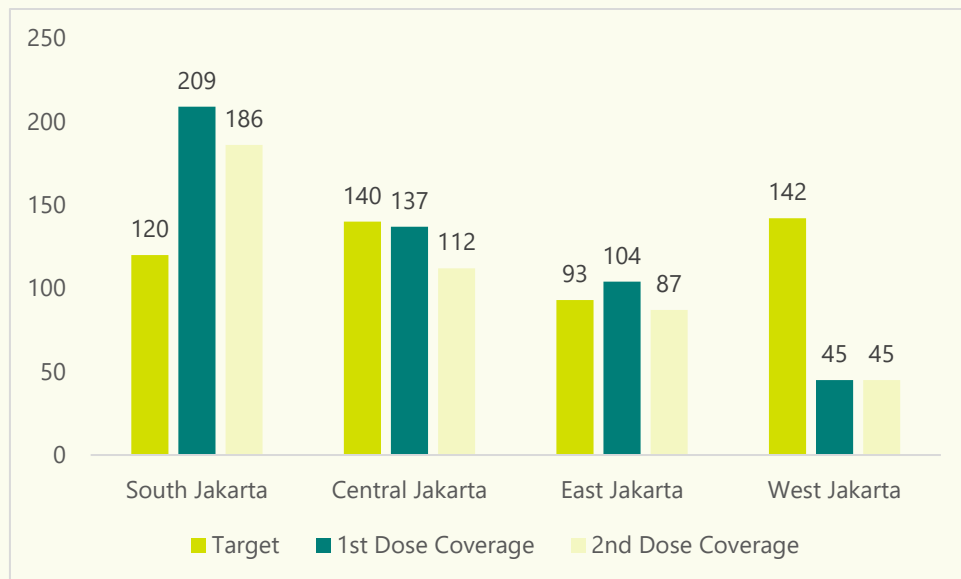
Figure 34 Mpox Vaccine Doses Administered in DKI Jakarta

As shown above, dose 1 administration in all administrative areas in DKI Jakarta has reached the targets (495 of 495 target individuals), while the rate of dose 2 is 86.9% (430 of 495 target individuals). The administrative regions to have reached the dose 1 target were South Jakarta at 174.2% (209 of 120 target individuals), East Jakarta at 111.8% (104 of 93 target individuals), and Central Jakarta at 97.9% (137 of 140 target individuals). Meanwhile, the target of dose 2 administration in all administrative areas was currently reached by South Jakarta at 155.0% (186 of 120 target individuals) and East Jakarta at 93.5% (87 of 93 target individuals).

Failure to reach dose 2 administration target was due to several obstacles, such as a lack of optimal coordination between primary healthcare centre immunization officers and related NGOs, preventing clear communication on the vaccination target and causing difficulty in following up for dose 2 administration.

In addition, mpox vaccines had to be stored at freezing temperatures (-25 to -15 ℃) and thawed at room temperature before use. Thawed vaccines could only be stored at 2–8℃ for 12 hours and could not be re-frozen. Therefore, care should be taken that vaccines are to be thawed only when target individuals have been present at the point of vaccination to prevent wastage.

o. Further Epidemiological Analysis

1) Bivariate Analysis of Mpox Risk Factors

Global data shows that most reported mpox cases across countries have similar risk factors, such as HIV coinfection, sexual behaviours, and history of sexual relations. Bivariate analysis was made to establish the links between mpox incidence and recorded risk factors such as sexual behaviour, coinfection, and sexual history in the past 21 days. Bivariate analyses were made with case-

control study design (1:3) with chi-square tests. There were 72 confirmed cases, and 214 discarded cases were used as control in this analysis.

Table 10 Bivariate Analysis of Mpox Risk Factors

No.	Variable	Odds Ratio (OR)	P-value	Confident Interval (95% CI)
1.	Coinfection (HIV)	9,96	0,0000*	5,15 – 19,60
2.	History of sexual relations	3,02	0,0001*	1,66 – 5,54
3.	Sexual behaviours	11,19	0,0000*	5,26 – 25,70

* p-value of <0.05 indicates significance

The analysis as presented above found that history of sexual relations, sexual behaviours, and coinfection were risk factors for the incidence of mpox in Indonesia with OR of >1 and significance, with a p-value <0.05.

The highest OR is found in the sexual behaviour variable with an OR of 11, which can be interpreted that the chances of someone contracting mpox are 11 times higher in MSM than in the control group (Amer et al., 2023). In cases in Indonesia, the number of MSM cases had a significant relationship with the incidence of mpox. This was because the prevalence of mpox cases which were also MSM constituted the majority of all existing cases (Gao et al., 2023). In people with HIV coinfection, the odds of contracting mpox were 9.96 times higher than in the control group (Castanares et al., 2023). In people who had a history of sexual relations, the odds of getting mpox were 3 times higher compared to the control group (Low et al., 2023). This analysis supports the initial hypothesis that transmission through sexual intercourse was statistically significant in relations to the incidence of mpox.

Other variable risk factors that were not available for analysis are history of contact with confirmed cases, consumption and contact with animal meat, co-infections other than HIV, and pet ownership. This was due to data inavailability and internal validity reasons such as large recall bias.

2) Diagnosis evaluation (sensitivity and bivariate risk factor analyses)

Diagnosis evaluation was undertaken to evaluate sensitivity and specificity of case definitions against existing criteria and to establish sufficiency or the need for improvement. This evaluation employed a numerical scale with 1 indicating risks and 0 indicating no risks. Currently, much of varicella case finding does not consider risk factors, which decreases the positive predictive value of mpox case definitions. Therefore, this diagnosis evaluation was deemed important to improve the efficiency and effectiveness of case finding

as per operational definitions in the guidelines. Case definitions are used for initial screening, and diagnosis are made with PCR testing as its gold standard.

Table 11 Case Definition Sensitivity

No.	Variable	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
1.	Symptoms	95,8	5,63	25,3	80
2.	Symptoms, sexual behaviours	81,9	67,6	45,7	91,8
3.	Symptoms, coinfection	70,8	79,6	53,7	89,1
4.	Symptoms, sexual behaviours, HIV coinfection	65,3	82,9	56	87,7

The data above includes 72 confirmed cases and 216 control cases. The analysis shows that the positive predictive value (PPV) of each case definition continues to increase. It can be inferred that the statistical analysis is in agreement with the case definition given in the guidelines. The analysis also considered symptoms and co-infections, such as HIV, which were found to have high sensitivity and PPV. Therefore, HIV may need to be inserted into analyses to cover more cases effectively and efficiently.

Sensitivity and specificity considerations depend on the combination of variables analyzed. To assess symptoms and risk factors, it is recommended to consider case definitions with higher sensitivity to reduce the risk of cases missed. These variables above include symptoms, sexual behaviour, and HIV.

According to the analysis results, the best combination for sensitivity seems to be symptoms, sexual behaviour, and HIV with a sensitivity of 65.3% and a PPV of 56%. This can be interpreted as follows: in those who developed one or more symptoms (fever, rash, lesions, and/or lymphadenopathy), have risky sexual behaviour, and are infected with HIV, the probability of being positive for mpox is 65.3%. With this proportion, if a PCR examination is carried out, the probability of catching a truly positive case is 56%.

p. **Surveillance Indicator**

The mpox prevention and control guidelines set out three mpox surveillance monitoring and evaluation indicators:
Indicator 1: The proportion of suspect and probable cases tested. This is the number of suspect and probable cases tested divided by the total number of suspect and probable cases and multiplied by 100.
Target: 100%

In practice: Specimens were taken from 100% of suspect and probable cases of blood sera and oropharyngeal, anal, rectal, and/or lesion swabs.

Indicator 2: The proportion of confirmed cases with complete epidemiological investigation data and clinical data. This is the number of confirmed cases with complete epidemiological investigation data and clinical data divided by the total number of confirmed cases and multiplied by 100.

Target: 100%

In practice: 68% of confirmed cases had complete epidemiological investigation and clinical data. Some missing important information include occupation, phone number, address, and number of close contacts. These might have affected epidemiological analyses.

Indicator 3: The proportion of close contacts monitored. This is the number of close contacts monitored for 21 days divided by the total number of identified close contacts and multiplied by 100.

Target: 100%

In practice: 54.9% of close contacts were monitored. Some sexual close contacts could not be monitored because they could not be contacted.

INTERVENTIONS

Mpox designation as a emerging disease of outbreak potential and the interventions against it have been set out in Ministry of Health Decree no. Hk.01.07/Menkes/1977/2022. Four main interventions according to the decree include surveillance, therapeutics, vaccination, and risk communication.

1. Surveillance

Mpox surveillance is carried out through active case detection strengthening in healthcare facilities that focuses on high-risk groups who visit HIV/AIDS care, support, and treatment services and HIV counseling and testing services, emergency units, and general, infectious diseases, dermatology, urology, obstetrics-gynecology clinics.

Epidemiological investigation, including contact tracing, was carried out on every identified case. Needless to say, obstacles were encountered in these efforts in establishing risk factors, such as stigma against mpox patients. "The stigma in the public means patients are less able to be open and cooperative in disclosing their history of close contacts and sexual behaviour. Some of them even asked that their information be kept secret from their surroundings and family," said the DKI Jakarta Health Office. These challenges meant close contact tracing involving local parties such as community health workers, neighbourhood units, community units, village heads, or subdistrict heads cannot be implemented. In response, key population networks or HIV/AIDS partners were involved to gather information without the baggage of perceived stigma and discrimination. In addition, for cases found across regions, health offices coordinated to identify the whereabouts of cases and their close contacts. Case identification reports are submitted via event-based surveillance on the SKDR early warning and response system.

Laboratory-based mpox surveillance was supported by 15 laboratories that had been equipped with trained workers and mpox reagents from Prof. Dr. Oemijati laboratory (currently the Health Biology Laboratory) to in September 2022 in anticipation of additional cases after the first mpox case was reported on 20 August 2022. However, in 2023 most of the specimens were sent to the Health Biology Laboratory because the mpox reagent in network laboratories had expired. There were also several other laboratories with capacity to test for mpox. Therefore, it is necessary to strengthen capacity, map, and re-form mpox testing network laboratories in Indonesia.

In strengthening the capacity of network laboratory officers, the Prof. Dr. Oemijati laboratory held an mpox molecular detection workshop on 5–8 November 2022. The workshop was attended by technical laboratory officers from 18 public health laboratories, namely: Salatiga Environmental Health Laboratory; Regional Public Health Laboratories of Jakarta, Makassar, and Surabaya, Public Health Laboratories of Ambon, Banda Aceh, Banjarnegara, Batam, Donggala, Magelang, Makassar, Manado, Medan, and Palembang;

DKI Jakarta Provincial Health Laboratory; and District Public Health Laboratories of Baturaja, Pangandaran, and Tanah Bumbu.

Laboratory testing was also carried out to detect clades via WGS in confirmed cases. The results of the mpox laboratory examination are reported in real time and integrated via the All Record Tc-19 system.

In accordance with the provisions of IHR (2005), every confirmed case identified are reported to WHO by the director-general of disease prevention and control as IHR National Focal Point (NFP) Indonesia.

2. Therapeutics and Vaccination

Currently, oral and injection mpox antivirals are available for patients with certain conditions. Since 2022 the Ministry of Health has been working to fulfill vaccines and medicines (including antivirals and probenecid). Most mpox cases in Indonesia are provided with supportive and symptomatic therapy. These cases are treated and isolated in hospital or in self-isolation. Case management is coordinated. Health workers have undergone capacity building in detecting and managing mpox cases by the Ministry of Health. In addition, WHO has delivered 10 courses of tecovirimat. This medicine has been used in one case from DKI Jakarta, resulting in improvement of the lesion.

The mpox vaccine was developed in 2019 for use in preventing mpox but its global availability is still limited. Mpox vaccination remains a complement to other prevention efforts such as surveillance, contact tracing, isolation, and treatment. However, the 2022 and 2023 risk assessments indicated that Indonesia needed to provide vaccination logistics, especially to prevent wider transmission in high risk groups. In 2022, 1 000 doses of the Bavarian mpox vaccine (JYNNEOS) were made available. Administration began on 23 October 2023 in DKI Jakarta. The administration of the second dose (after a four-week interval) started on 21 November 2023.

In accordance with the recommendations of the Indonesian Technical Advisory Group on Immunization (ITAGI), the mpox vaccine was given as primary preventive (pre-exposure) vaccination or post-exposure preventive vaccination. Vaccination targets vulnerable groups:

a. MSM group who had sexual relations in the past 2 weeks, and
b. Laboratory staff testing mpox samples.

3. Risk Communication

Risk communication employed various health information, education, and communication (IEC) efforts and community empowerment. The following actions were taken to address mpox:

a. Awareness-raising for health workers and the public. Mpox awareness outreach, involving key populations and outreach workers, has been carried out periodically since 2022 to provide updated information to health workers and also to raise awareness in the community on the prevention and control of mpox.

b. Issuance of reminder circulars to health offices, port health authorities, laboratories, healthcare facilities, and partners.

c. Publication of communication media such as FAQs, videos, and infographics available on the sehatnegeriku.kemkes.go.id; infeksiemerging.kemkes.go.id; and kemkes.go.id websites.

d. Public communication through the Ministry of Health's official information channels on various social/digital media platforms (X, Facebook, Instagram, YouTube, and talk shows on health radio broadcasts).

e. Media briefings, press conferences, and press releases uploaded on the website sehatnegeriku.kemkes.go.id

f. Empowering HIV/AIDS partners to educate key populations.

g. Managing misinformation and disinformation, ranging from public education/digital literacy (recognizing, stopping, and reporting hoaxes) and developing counternarratives to law enforcement, supported with channels for the public to verify information such as Aduankonten.id; Instansi.aduankonten.id; aduankonten@kominfo.go.id; WhatsApp channel at 08119224545; @aduankonten on X; aduankonten.official on Instagram; aduankontenOfficial on Facebook; layanan.kominfo.go.id; lapor.go.id; @misslambehoaks on Instagram; chatbotantihoaks on Telegram; and s.id/cekhoaks

SUMMARY AND RECOMMENDATIONS

1. Summary

The mpox situation analyses above can be summarized as follows:

a. As at 31 December 2023, there were 72 mpox cases across 6 provinces, namely DKI Jakarta with 49 cases, West Java 12 cases, Banten seven cases, East Java two cases, Riau Islands one case, and DI Yogyakarta one case. The peak of cases based on the onset of symptoms occurred in week 44 of 2023 (29 October–4 November 2023), while based on the date of PCR diagnosis in week 43 (22–28 October 2023).

b. All cases were male with the largest age group of 30–39 years. Most cases were MSM. Most cases had mild symptoms and self-isolated. Clinical characteristics include lesions, fever, rash and lymphadenopathy. Most lesions were found on the face and were asynchronous. Lesion fluid specimens contributed the most positive results. The majority of the cases had HIV.

c. Only 13 known of the 72 confirmed cases had their CD4 count known. There were two severe cases with fewer than 200 CD4 cells/mm3.

d. Only 47 confirmed cases had their close contacts identified, amounting to 111 close contacts. The majority of close contacts were sexual close contacts, but only a small percentage were tested. Nine of the 18 sexual close contacts tested were confirmed to have mpox.

e. A total of 28 specimens that underwent WGS were all clade II type, IIb sub-clade.

f. Sensitivity analysis on case definitions suggested the combination of symptoms, sexual behaviour, and HIV to be the most efficient definition. It is necessary to consider adding history of HIV to the case definition to improve mpox case finding. Bivariate analyses showed that history of sexual relations, history of HIV, and sexual behaviour are risk factors for the incidence of mpox.

g. Of the three indicators for evaluating and monitoring mpox surveillance, to date only one indicator has reached the target, namely the proportion of suspected and probable cases that are tested.

h. Response actions carried out include surveillance, therapeutics and vaccination, and risk communication.

2. Recommendation

a. Improve case finding with active and passive surveillance, especially in areas that have not reported mpox cases. In addition, case finding needs to be integrated with HIV services.

b. Increase participation across programmes and stakeholders, especially HIV/AIDS partners, to strengthen detection, trace close contacts, and increase participation of at-risk populations in mpox vaccination.

c. Enhance efforts to have close contacts tested, especially close sexual contacts.

d. Improve risk communication for at-risk groups in practicing safe sexual behaviours.

e. Consider HIV status as a criterion in detecting mpox cases.

f. Carry out HIV testing on every suspected case of mpox and CD4 testing on PLHIV infected with mpox and other opportunistic infections.

g. Encourage health workers to ensure the suitability of operational case definitions in accordance with guidelines for case detection.

h. Strengthen capacity, mapping and re-forming the mpox testing laboratory network in Indonesia.

i. Encourage health workers to complete epidemiological investigation and clinical case forms, as well as stronger monitoring of close contacts.

j. Integrate mpox prevention and control efforts with sexually transmitted disease programs including HIV and other sexually transmitted infections.

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