Mpox seropositivity in a cohort of males with sexual risk factors in the Philippines

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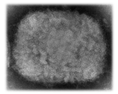
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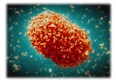
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Background

Monkeypox virus (MPXV)

- Enveloped double-stranded DNA virus of Orthopoxvirus genus of the Poxviridae family with distinct genetic clades/strains of the MPXV





- Recent Outbreaks
  1. May 2022: Outbreak of MPXV in non-endemic countries (United States, European Union and UK) started May 2022
  2. July 2022: WHO has declared that the outbreak meets the International Health Regulation criteria for a Public Health Emergency of International Concern (PHEIC)
     - Risk groups: MSM
  3. Aug 2024: Increase of cases in D.R. Congo, with spread of clade 1b outside of Africa (Sweden and Pakistan) → 2nd PHEIC
     - Risk groups: Broader; children younger than 15 years account for 66% of reported cases and more than 82% of deaths.



MOCHI

- RV583 or Multinational Observational Cohort of HIV and Other Infections (MOCHI) is a prospective observational cohort of MSM who are vulnerable to HIV and other STIs. Study objectives are:
  - To determine the HIV incidence rate in a cohort of HIV vulnerable individuals across multiple sites
  - To determine prevalence, incidence, clinical presentation, predictors, and associations with HIV of other infections.



Objectives of this analysis

- **Determine the seroprevalence of Mpox in a cohort of people vulnerable to HIV acquisition.**
- **Identify the risk factors for asymptomatic Mpox transmission in at risk populations in the Philippines.**

Methods

- Study Sites: Love yourself Inc, Manila Philippines (Figure 2)
- Sample Downselection: Participants enrolled from May2024 to Feb 2025 were included and downselected based on risk factors identified from previous studies (Table 2 and Figure 1). Data were from the Screening A0 visit (screening visit)
- Lab Methods: Seropositivity detected on the Orthopoxvirus Meso Scale Discovery (MSD) MULTI-SPOT system and V-PLEX Orthopoxvirus Panel 1 (IgG) Kit (Meso Scale Discovery)
  - ❑ Cut-offs from previous study in Thailand were used, based on period when mpox infection in Thailand was not expected (2014-2016) (M'hamdi et al. MHSRS 2024) 386 AU/mL
- Participant Case report forms (CRFs) from time of visit were reviewed for physical exam findings, lab results and other clinical information that may suggest Mpox infection. Behavioral categories (such as DoxyPEP use) was ascertained by self-professed concomitant med use on the CRF.
- Baseline characteristics were summarized by serostatus and compared using Welch's two-sample t test for continuous variables, with odds ratios estimated for age and STI results. All analyses were two-sided with a significance threshold of $p < 0.05$ and performed using Python (SciPy).

Findings suggest possible unrecognized sub-clinical mpox transmission in the Philippines circulating since at least May of 2024, earlier than previously reported by public health systems.

Figure 1. Participant selection flow diagram. This chart illustrates the screening process for a study conducted between May 16, 2024, and February 15, 2025.



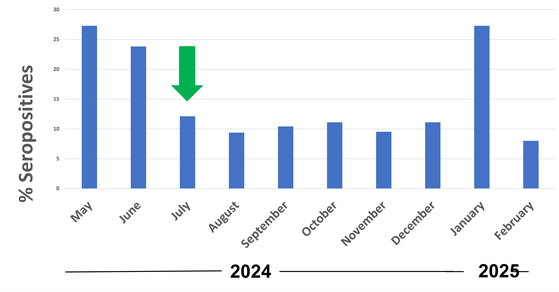


Figure 2. Love yourself Inc site. Left shows Uni location, right is the Anglo site in Mandaluyong, Manila

Table 2. Downselection criteria

Criteria	Source Document
≥10 sex partners in the past year or ≥4 sex partners in the past 3 months	DOH HIV Testing (HTS) Form A: Participants who self-reported having ≥4 male sex partners
History of STI in the past month	MOCHI Laboratory Database: Participants with any one reactive/positive STI result at baseline for SY, CT, NG, HBV or HCV
Reported drug use	DOH HIV Testing (HTS) Form A: Participants who self-reported ever using drugs
MSM aged 18 yo & above	MOCHI Screening/Enrollment Log: All participants excluding 15-17 yo
PrEP use	MOCHI PrEP Use Log: Participants who are current PrEP users at baseline
Attendance to sex on premises venues	Excluded due to lack of consistent, standardized documentation
Known close contact with suspected/confirmed mpox case	LoveYourself Acuity Appointment Scheduling Software: Participants who answered yes to this question on the Mpox triage questionnaire when booking their study visit

Results



Month	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
# Tested	11	21	33	32	48	18	21	9	22	25
# Positive	3	5	4	3	5	2	2	1	6	2

Figure 2. Monthly percentage distribution of MPVX seropositive cases. Table below shows the number of seropositive participants and the total tested participant specimens for that month. Green arrow denotes the month when 1st positive mpox case was reported in the Philippines (July 2024).

Variable	Seronegative (N=108) Mean ± SD	Seropositive (N=35) Mean ± SD	Odds Ratio (95% CI)	p-value
Age (years)	**26.9 ± 7.19**	**30.5 ± 7.38**	**1.58 (1.10–2.27)**	**0.014**
Temperature (°C)	36.55 ± 0.22	36.55 ± 0.24	1.00 (0.73–1.38)	0.996
WBC (×10⁹/L)	7.11 ± 1.94	6.66 ± 1.52	0.81 (0.60–1.10)	0.161
Platelets (×10⁹/L)	305.9 ± 56.5	318.0 ± 63.8	1.23 (0.82–1.85)	0.321
Neutrophils (%)	56.42 ± 9.02	56.09 ± 9.81	0.96 (0.72–1.27)	0.863
Lymphocytes (%)	32.21 ± 7.70	32.67 ± 7.96	1.05 (0.78–1.41)	0.763
Monocytes (%)	7.40 ± 1.81	7.38 ± 1.65	0.99 (0.74–1.33)	0.96
Eosinophils (%)	3.31 ± 2.80	3.06 ± 2.02	0.91 (0.67–1.24)	0.571
Basophils (%)	0.69 ± 0.36	0.79 ± 0.47	1.32 (0.81–2.16)	0.266
DoxyPEP use (%)	20.4% (22/108)	11.4% (4/35)	0.50 (0.16–1.58)	0.24†

Infection / Site	Seronegative (N=108)	Seropositive (N=35)	Odds Ratio (95% CI)	p-value
CT Oro-pharyngeal	4/107 (3.7%)	2/34 (5.9%)	1.61 (0.28–9.18)	0.59†
NG Oro-pharyngeal	10/107 (9.3%)	3/34 (8.8%)	0.94 (0.24–3.61)	0.93†
CT Urine	7/108 (6.5%)	3/35 (8.6%)	1.35 (0.33–5.55)	0.68†
GC Urine	1/108 (0.9%)	0/35 (0%)	1.02 (0.04–25.7)*	0.98†
CT Urogenital	30/108 (27.8%)	7/34 (20.6%)	0.67 (0.27–1.66)	0.38†
GC Urogenital	12/108 (11.1%)	2/25 (8.0%)	0.69 (0.14–3.43)	0.65†
CT (any site)	36/108 (33.3%)	9/35 (25.7%)	0.69 (0.30–1.57)	0.38†
GC (any site)	18/108 (16.7%)	5/35 (14.3%)	0.83 (0.28–2.46)	0.74†
CT/GC co-infection	6/108 (5.6%)	2/35 (5.7%)	1.03 (0.20–5.40)	0.97 †
RPR reactive, n (%)	10 (9.3%)	1 (2.9%)	0.29 (0.04–2.32)	0.18†
Hepatitis B positive (%)	2.77% (3/108)	0% (0/35)	0.42 (0.02–8.20)	0.57†
Hepatitis C positive (%)	6.48% (7/108)	8.57% (3/35)	1.36 (0.33–5.63)	0.67†

Tables 3-4. Odds ratios for continuous variables represent the change in odds of seropositivity per one standard deviation increase in the predictor, estimated using a normal-approximation method. Categorical values were analyzed using Fisher's exact test†.

Discussion and Conclusions

- There is evidence of potential earlier mpox transmission in the Philippines, as early as three months prior to first reported cases.
- 24.8% (N=35) had detectable MPVX IgG with mean signal of 1151.87.
- Seropositive individuals were modestly but significantly older than seronegative individuals, with increasing age associated with higher odds of seropositivity. No differences were observed in temperature or hematologic parameters, suggesting seropositivity was not associated with acute inflammatory or hematologic changes.
- DoxyPEP use showed as non-significant protective, while RPR reactivity was lower among seropositive participants but not statistically significant. Similarly, CT/GC infection prevalence did not differ significantly between seronegative and seropositive participants across clinical sites.
- Limitations:
  - ➢ Convenience sample
  - ➢ Seropositive group is relatively small (N = 35), reducing statistical power and precision of effect estimates, particularly for hematologic and infection parameters.
  - ➢ MSD cut-offs assume that there is no endogenous pox virus transmission in country

Acknowledgements and Disclaimers

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