LESSONS LEARNED FROM MPOX OUTBREAK IN PLWH

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QUID EST HOMO?

DISCLOSURES

- I received speaker and consultancy honoraria from BMS, Gilead Sciences, Janssen-Cilag, MSD and ViiV Healthcare

- I received grants from Gilead Sciences and ViiV Healthcare

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Monkeypox Virus Infection in Humans across 16 Countries — April–June 2022

J.P. Thornhill, S. Barkati, S. Walmsley, J. Rockstroh, A. Antinori, L.B. Harrison, R. Palich, A. Nori, I. Reeves, M.S. Habibi, V. Apea, C. Boesecke, L. Vandekerckhove, M. Yakubovsky, E. Sendagorta, J.L. Blanco, E. Florence, D. Moschese, F.M. Maltez, A. Goorhuis, V. Pourcher, P. Migaud, S. Noe, C. Pintado, F. Maggi, A.-B.E. Hansen, C. Hoffmann, J.I. Lezama, C. Mussini, A.M. Cattelan, K. Makofane, D. Tan, S. Nozza, J. Nemeth, M.B. Klein, and C.M. Orkin, for the SHARE-net Clinical Group*

- Observational case series, multicentric
- 528 cases
- 7 days from exposure to symptoms onset (range 3-20 days) in 23 cases
- 13% hospital admissions for complications or pain management
- 5% received treatment with cidofovir or tecovirimat or vaccinia immunoglobulin

Table 1. Demographic and Clinical Characteristics of the Persons with Monkeypox.*

Characteristic	All Persons (N=528)
Median age (range) — yr	38 (18–68)
Sex or gender — no. (%)	
Male	527 (>99)
Female	0
Trans or nonbinary	1 (<1)
Sexual orientation — no. (%)†	
Heterosexual	9 (2)
Homosexual	509 (96)
Bisexual	10 (2)
Race or ethnic group — no. (%)†	
White	398 (75)
Black	25 (5)
Mixed race	19 (4)
Latinx	66 (12)
Other or unknown	20 (4)
HIV positive — no. (%)	218 (41)
HIV negative or status unknown — no. (%)	310 (59)
Use of preexposure prophylaxis against HIV — no./total no. (%)	176/310 (57)
Foreign travel in month before diagnosis — no. (%)‡	147 (28)
Continent of travel — no./total no. (%)	
Europe	132/147 (90)
North America	9/147 (6)
Australasia	0/147
Africa and Middle East	2/147 (1)
Central and South America	2/147 (1)
Not stated	2/147 (1)
Known to have undergone STI screening — no. (%)	377 (71)
Microbiologically confirmed concomitant STI present — no./total no. screened (%)	109/377 (29)
Gonorrhea	32/377 (8)
Chlamydia	20/377 (5)
Syphilis	33/377 (9)
Herpes simplex virus infection	3/377 (1)
Lymphogranuloma venereum	2/377 (1)
Chlamydia and gonorrhea	5/377 (1)
Other or not stated	14/377 (4)
Sexual history not known — no./total no. (%)	122/528 (23)
Median no. of sex partners in previous 3 months (IQR)	5 (3–15)
"Chemsex" reported in the previous month — no. (%)	106 (20)
Reported attendance at a sex-on-site event in the previous month — no. (%)	169 (32)

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7 days from exposure to symptoms onset (range 3-20 days)

Figure 7: Evolution of cutaneous lesions in an individual with Human Monkeypox infection first presented with a single anal lesion. A1-A3 show evolution of the anal lesions. PCR status is indicated where available.

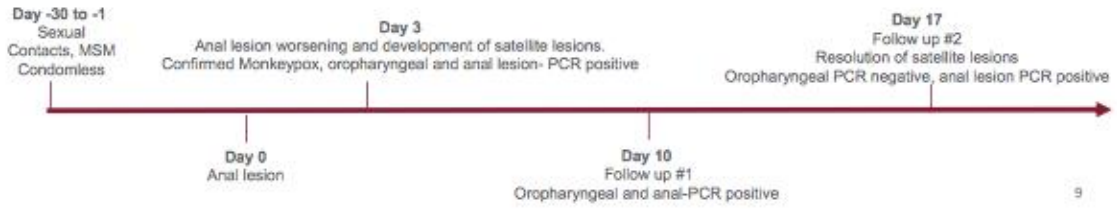
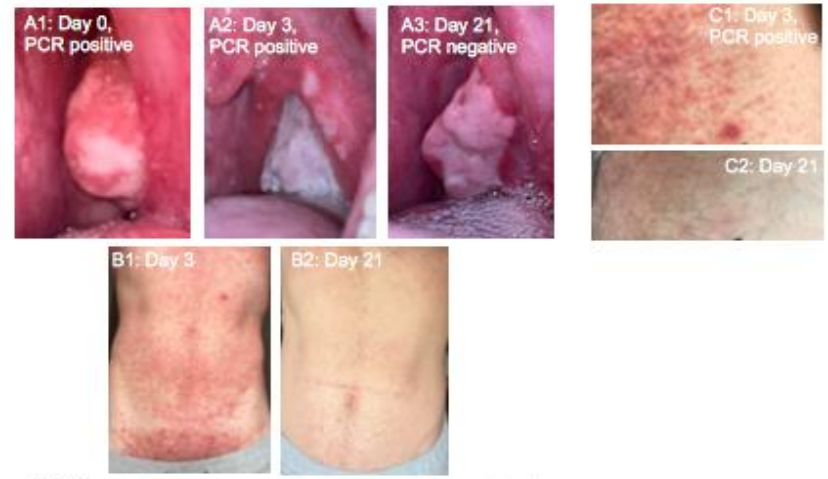


Figure 8: Evolution of cutaneous and pharyngeal lesions in an individual with Human Monkeypox infection. A1-A3 show pharyngeal lesions, B1-2 show truncal rash, C1-2 show lower limb rash. PCR status is indicated where available.



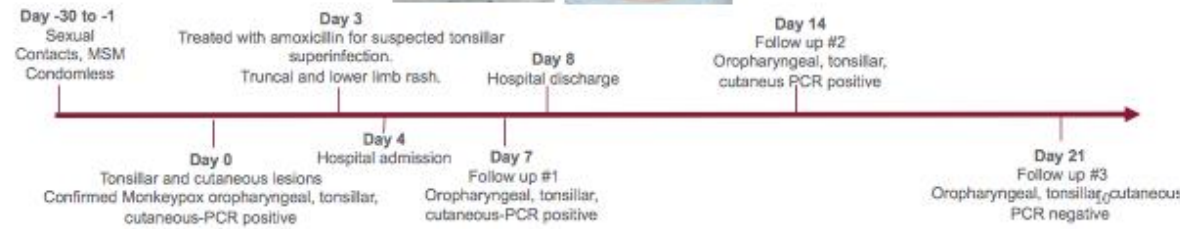
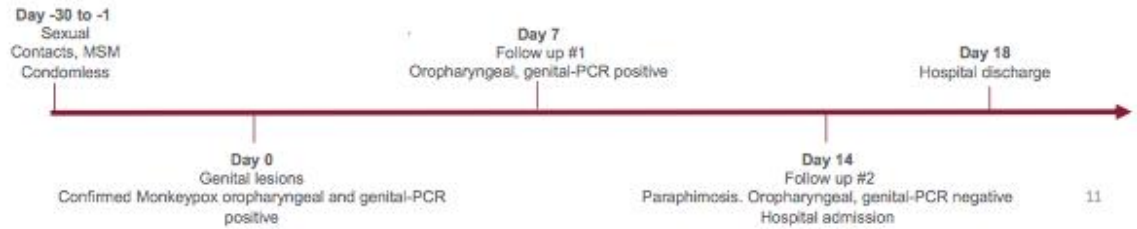


Figure 9: Evolution of genital lesions in an individual with Human Monkeypox infection. A1-A3 show genital lesions. PCR status is indicated where available.



viruses

MDPI

Article

Human Monkeypox Experience in a Tertiary Level Hospital in Milan, Italy, between May and October 2022: Epidemiological Features and Clinical Characteristics

Caterina Candela [1,*], Angelo Roberto Raccagni [1], Elena Bruzzesi [1], Costanza Bertoni [1], Alberto Rizzo [2], Gloria Gagliardi [2], Diana Canetti [3], Nicola Gianotti [3], Davide Mileto [2], Maria Rita Gismondo [2], Antonella Castagna [1,3] and Silvia Nozza [1,3,†] on behalf of Centro San Luigi (CSL) Working Group

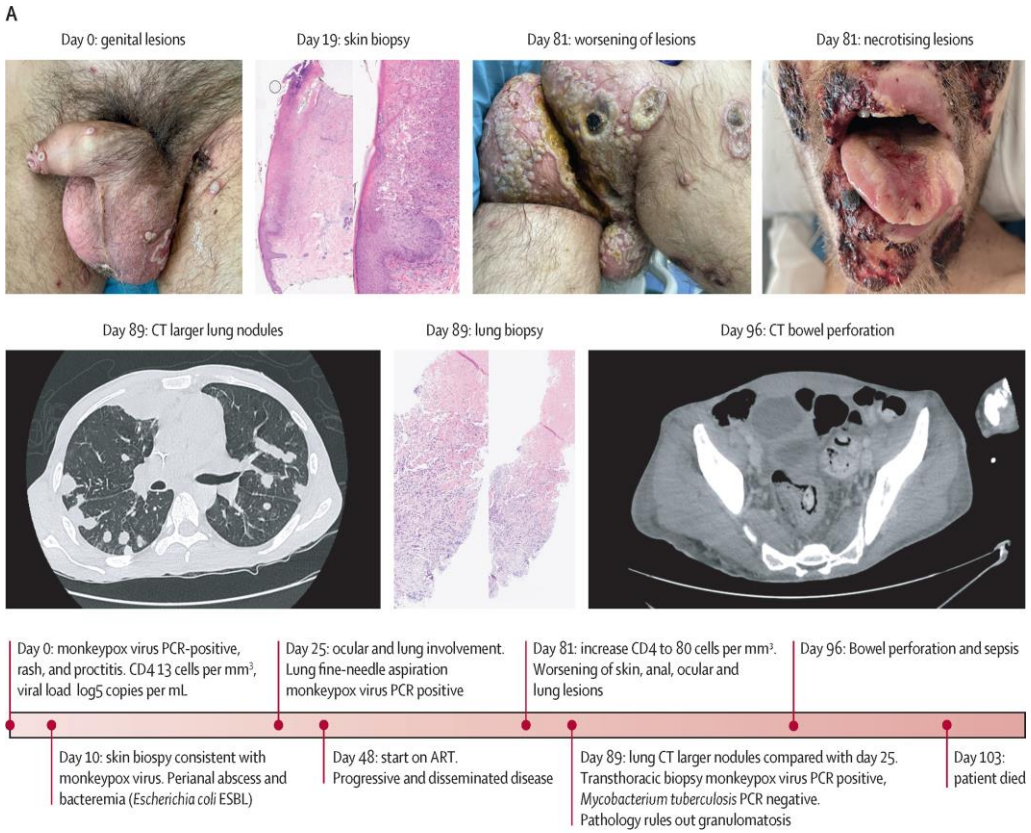
Table 1. Patients' descriptive characteristic.

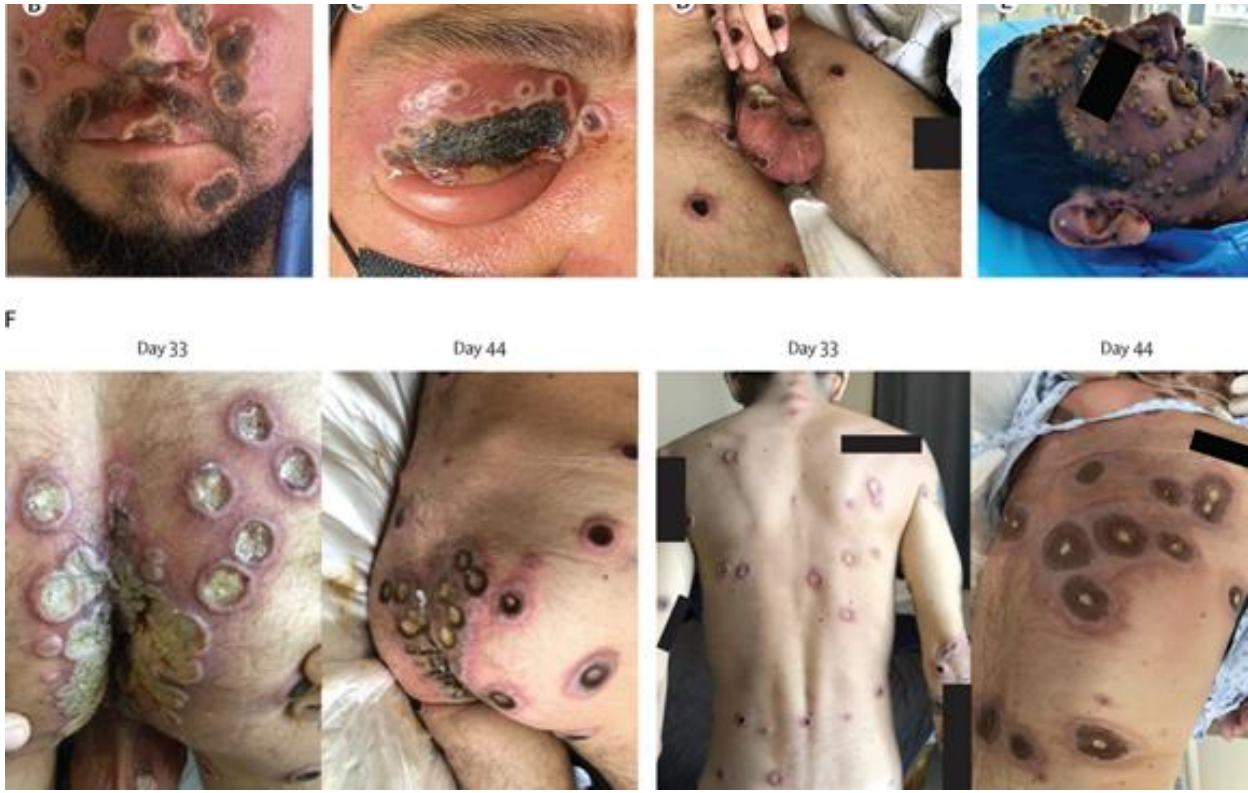
Variables	N = 140
Age (median, IQR)	37 (33, 43)
Male (n, %)	137 (98%)
MSM (n, %)	134 (96%)
Travel abroad (n, %)	35 (25%)
Close contact with mpox cases (n, %)	49 (35%)
Previous smallpox vaccination (n, %)	20 (14%)
HIV (n, %)	66 (47%)
HCV (n, %)	10 (7%)
HBV (n, %)	1 (1%)
Immunodepression other than HIV (n, %)	3 (2%)
PrEP (n, %)	43 (31%)

MPXV Infection in People With Advanced HIV: Outcomes

- Patients developed a severe necrotizing and disseminated form of MPXV with complications affecting a range of organs, including sepsis
- Mortality 7.1% overall; limited to patients with CD4+ counts <200 cells/mm^3
  - Mortality **15% with CD4+ counts <200 cells/mm^3**, **27.1% with CD4+ counts <100 cells/mm^3**
  - No smallpox-vaccinated patients died
- Tecovirimat (oral and/or IV) use **limited to 62 patients (16.2%)** due to lack of availability outside of Europe and the United States
- Initiation of or restarting ART in 85 patients led to suspected **IRIS in 21 (25%),** with **12** of these patients **dying (57.1%)**
- Patients should be monitored for sepsis, and timing of ART initiation or restart should be carefully considered

Mitja O et al. *Lancet* 2023 Feb 20;S0140-6736(23)00273-8

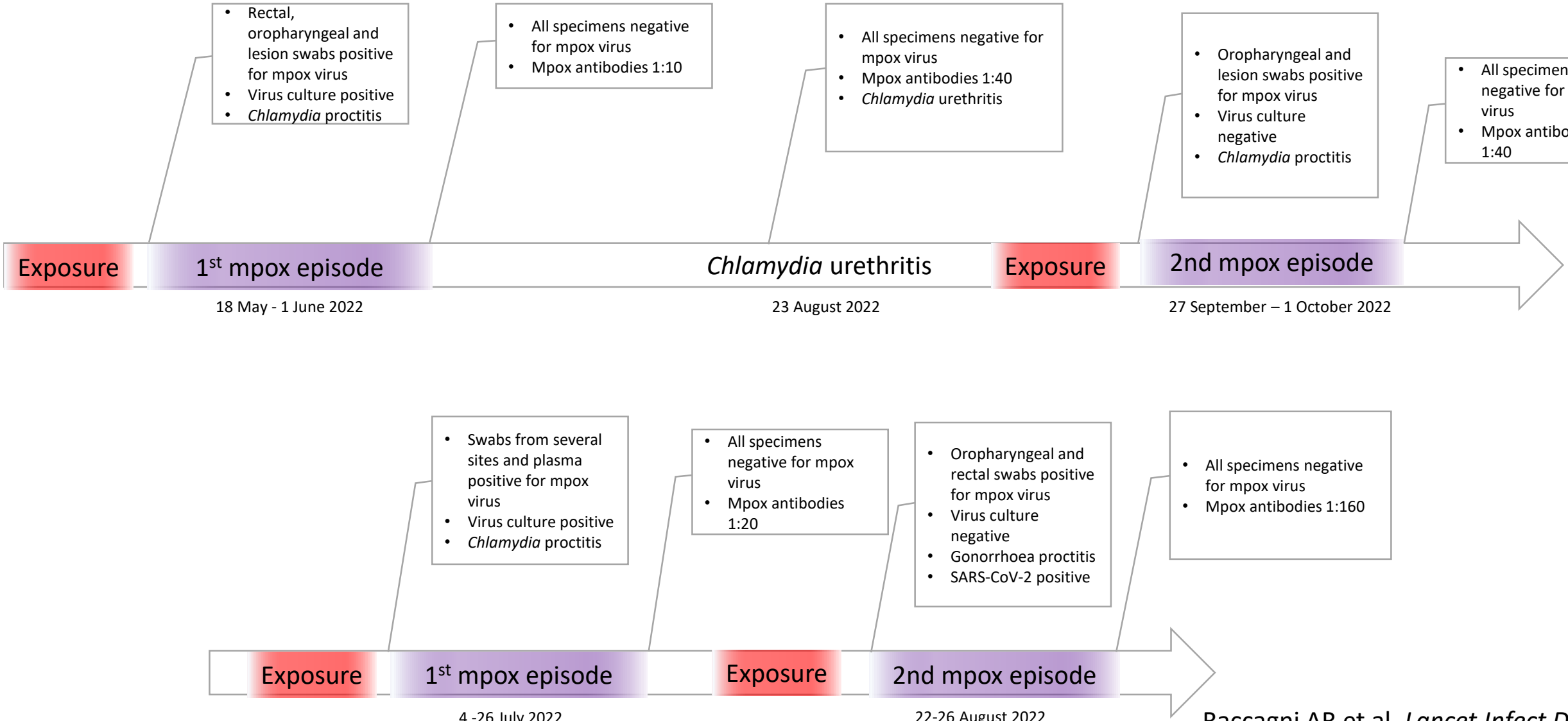




Mitja O et al. *Lancet* 2023 Feb 20;S0140-6736(23)00273-8

TREATMENT

• There are no treatments specifically for mpox. But because the viruses that cause mpox and smallpox are similar, antiviral drugs developed to protect against smallpox may be used to treat mpox effectively.
•The antiviral drug tecovirimat has been approved by the Food and Drug Administration (FDA) to treat smallpox in adults and children. Drugs developed to treat smallpox may be used to treat mpox.
•If you are prescribed tecovirimat, you will be asked to sign a consent form stating you understand tecovirimat is an investigational drug that has not yet been approved by the FDA for treatment of mpox. Investigational means there is not currently enough data available from testing in people on the safety and effectiveness of tecovirimat for treating people with mpox.
•Research is currently happening to test the safety and effectiveness for all people with mpox.
•Tecovirimat is currently only for people with severe mpox disease or who are at high risk of severe disease, like people with weakened immune systems or skin conditions, such as HIV that is not virally suppressed and eczema.
•Tecovirimat may help prevent or minimize severe mpox disease involving the eyes, mouth, throat, genitals, and anus (butthole). It may provide relief for short-term symptoms such as pain, swelling, and abscesses and long-term effects such as scarring.



Raccagni AR et al. *Lancet Infect Dis*. 2023 May;23(5):522-524.

Timeline of mpox infection among two men who have sex with men. Most relevant virologic and serologic testing is described. Second mpox episodes were potential re-infections, although recrudescence or residual virus from exposure cannot be excluded.

Results

Characteristics	Overall (N=180)	Mpox infected (N=95)	Vaccinated (N=85)	p-value
Living with HIV	65 (36.1%)	50 (52.6%)	15 (17.6%)	<0.001
Undetectable HIV-RNA	59 (92.2%)	44 (89.8%)	15 (100%)	0.329
CD4 (cells/microL)	790 [IQR=584-1024]	690 [IQR=559-1005]	853 [IQR=803-1107]	0.040
CD4 (%)	35.3 [IQR=29.1-39.2]	35.6 [IQR=28.9-39.7]	33.5 [IQR=31.7-37.9]	0.981
CD4/CD8	0.91 [IQR=0.61-1.23]	1.00 [IQR=0.60-1.28]	0.84 [IQR=0.74-1.02]	0.534
Nadir CD4 (cells/microL)	450 [IQR=253-587]	436 [IQR=228-529]	548 [IQR=375-815]	0.040
Years of ART regimen ongoing	8.93 [IQR=5.91-13.5]	10.2 [IQR=5.97-14.0]	8.08 [IQR=4.38-10.2]	0.118
Years from HIV diagnosis	10.2 [IQR=6.00-14.3]	10.9 [IQR=6.28-15.0]	9.28 [IQR=4.48-11.7]	0.121
PrEP	79 (43.9%)	33 (34.7%)	46 (54.1%)	0.014

Moschetta N et al., *Lancet Infect Dis* 2023

PRNT results

	Results PRNT sample	Overall (N=180)	Mpox infected (N=95)	Vaccinated (N=85)	p-value
					<0.001
Low response	<1:10	10 (5.56%)	0 (0.00%)	10 (11.8%)	
Low response	1:10	31 (17.2%)	2 (2.11%)	29 (34.1%)	
Medium response	1:20	26 (14.4%)	6 (6.32%)	20 (23.5%)	
Medium response	1:40	38 (21.1%)	20 (21.1%)	18 (21.2%)	
Medium response	1:80	34 (18.9%)	29 (30.5%)	5 (5.88%)	
High response	1:160	24 (13.3%)	21 (22.1%)	3 (3.53%)	
High response	1:320	17 (9.44%)	17 (17.9%)	0 (0.00%)	

Neutralizing antibody titers in persons that were infected with mpox or vaccinated against mpox at 6 months from infection or first dose of MVA-BN

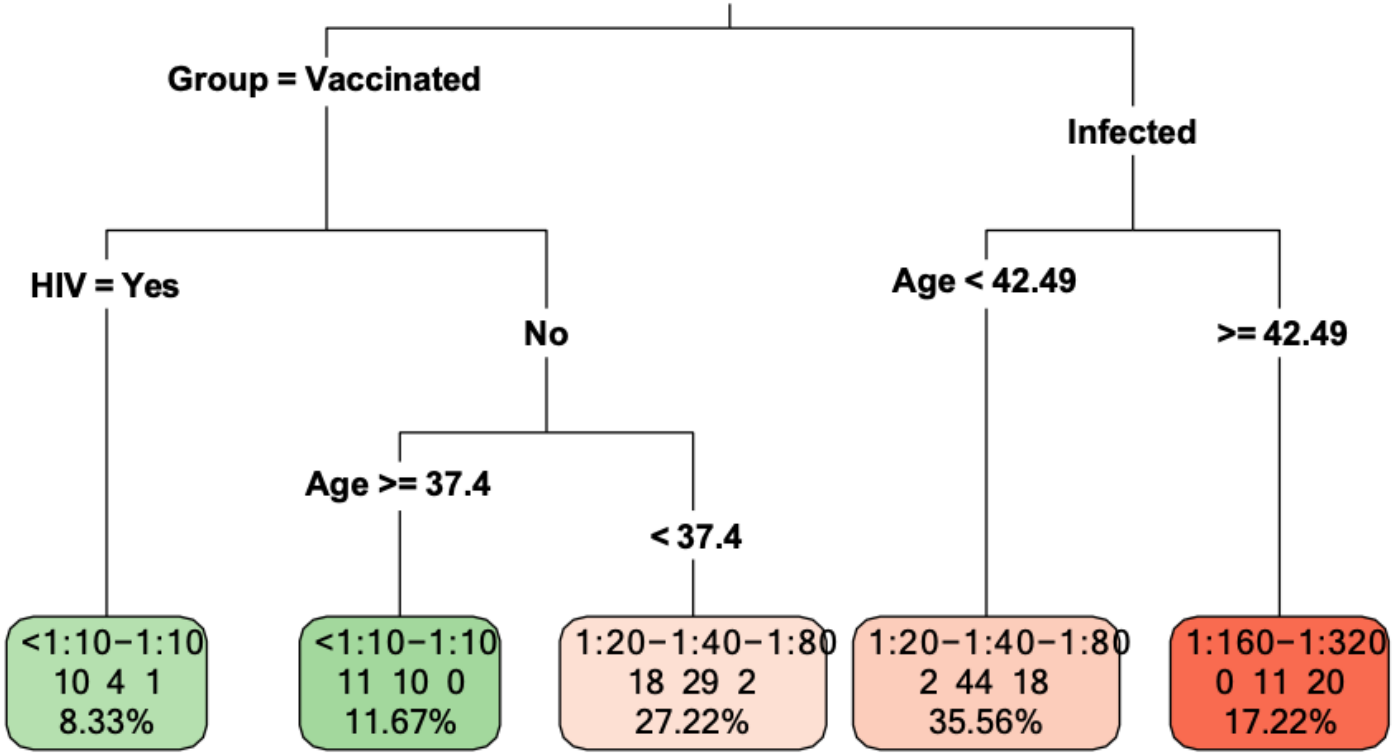
Moschetta N et al., *Lancet Infect Dis* 2023

Results: Multivariable analysis

Variables	Category	Adjusted OR for PRNT<1:10-1:10 (95%CI)	P-value	Adjusted OR for PRNT 1:20-1:40-1:80 (95%CI)	P-value
Group	Vaccinated vs infected	319.84 [43.44;2354.85]	<0.001	9.019 [2.44;33.31]	<0.001
Age	Per 1-year older	0.92 [0.85;1.00]	0.06	0.94 [0.89;0.99]	0.02
Immunodepression	Yes vs No	0.40 [0.02;6.66]	0.52	0.59 [0.10;3.30]	0.55
HIV	Yes vs No	3.99 [1.01;15.75]	0.05	1.63 [0.68;3.89]	0.27

Moschetta N et al., *Lancet Infect Dis* 2023

Results: Classification tree analysis



Moschetta N et al., *Lancet Infect Dis* 2023

HIV viral load monitoring during monkeypox virus infection among people with HIV

Angelo Roberto Raccagni[a], Davide Mileto[b], Laura Galli[c], Elena Bruzzesi[a], Diana Canetti[c], Alberto Rizzo[b,d], Costanza Bertoni[a], Tommaso Clemente[a], Francesca Alberton[a], Antonella Castagna[a,c] and Silvia Nozza[c]

AIDS 2023, **37**:779–783

Table 1. Individuals' and Mpox infection characteristics.

Individuals' characteristics	$n = 28$	Mpox characteristics	$n = 28$
Age (years, IQR)	38 (33–44)	Cutaneous lesions	24 (86%)
Years with HIV (IQR)	5 (3–7)	Rectal lesions	11 (39%)
Chemsex use	12 (43%)	Oral lesions	4 (14%)
Sexual contact with a Mpox case	10 (36%)	Genital lesions	13 (46%)
Previous smallpox vaccination	5 (18%)	Fever	15 (53%)
Recent Mpox vaccination	0 (0%)	Lymphadenopathy	21 (75%)
Previous STI	22 (78%)	Concurrent STI	10 (36%)
Syphilis	16 (57%)	*Syphilis*	2 (7%)
Gonorrhea	9 (32%)	*Gonorrhea*	4 (14%)
Chlamydia	6 (21%)	*Chlamydia*	4 (14%)
Travel history	9 (32%)	Positive swabs	28 (100%)
Spain	5 (18%)	*Cutaneous*	24 (85%)
United Kingdom	2 (7%)	*Oropharyngeal*	23 (82%)
Portugal	2 (7%)	*Rectal*	17 (60%)
Number of sexual partners[a]		Other fluids	
<10	8 (29%)	*Plasma*	19 (68%)
10–20	11 (39%)	*Seminal fluids*	12 (43%)
>30	9 (32%)	*Urines*	5 (18%)

[a]In the 3 months prior to Mpox diagnosis.
IQR, interquartile; STI, sexually transmitted infection.

Table 2. HIV immuno-virologic parameters before, at time of Mpox diagnosis and following Mpox virologic clearance.

	Before Mpox diagnosis[a]		At Mpox diagnosis[b]		Following Mpox virologic clearance[c]			
Cases	CD4+ [d]	HIV-RNA[e]	CD4+ [d]	HIV-RNA[e]	CD4+ [d]	HIV-RNA[e]	Duration of Mpox symptoms (*Days*)	Number of Mpox lesions (*n*)
Case 1	767	Undetectable	913	38	739	Undetectable	14	2
Case 2	528	Undetectable	488	Undetectable	722	Undetectable	28	6
Case 3	810	Undetectable	812	Undetectable	797	Undetectable	18	50
Case 4	821	Undetectable	976	Undetectable	752	Undetectable	14	3
Case 5	846	Undetectable	1017	Undetectable	946	Undetectable	29	9
Case 6	990	Undetectable	1080	Undetectable	872	Undetectable	28	12
Case 7	962	Undetectable	1082	Undetectable	1112	Undetectable	24	32
Case 8	1131	Undetectable	1074	Undetectable	1207	Undetectable	7	2
Case 9	781	Undetectable	795	Undetectable	780	Undetectable	23	22
Case 10	317	Undetectable	386	Undetectable	675	Undetectable	23	3
Case 11	832	Undetectable	968	Undetectable	942	Undetectable	21	10
Case 12	563	Undetectable	802	Undetectable	812	Undetectable	12	6
Case 13	438	Undetectable	612	Undetectable	408	Undetectable	24	5
Case 14	1363	Undetectable	1521	Undetectable	1615	Undetectable	7	5
Case 15	917	Undetectable	870	Undetectable	1023	Undetectable	16	7
Case 16	731	Undetectable	514	Undetectable	758	Undetectable	12	1
Case 17	630	44	880	41	706	Undetectable	14	1
Case 18	426	Undetectable	595	196	390	Undetectable	28	50
Case 19	605	Undetectable	850	Undetectable	842	Undetectable	14	1
Case 20	637	Undetectable	927	Undetectable	931	Undetectable	15	4
Case 21	1121	Undetectable	836	Undetectable	987	Undetectable	11	2
Case 22	1042	Undetectable	945	Undetectable	1120	Undetectable	25	1
Case 23	829	30	945	Undetectable	842	Undetectable	21	5
Case 24	674	39	736	Undetectable	674	Undetectable	26	20
Case 25	937	Undetectable	797	Undetectable	792	Undetectable	24	5
Case 26	1433	Undetectable	1467	Undetectable	956	Undetectable	22	3
Case 27	773	79	567	81	951	109	32	2
Case 28	909	263	686	1220	1352	Undetectable	30	20

[a]Mean of the 12 months before Mpox diagnosis.
[b]Within 1 week from Mpox diagnosis.
[c]Within 1 month from Mpox virologic clearance.
[d]cells/μl.
[e]copies/ml. Undetectable: <20 copies/ml.

Summary

- PLWH have not an increased risk of Mpox infection.
- Higher mortality in PLWH is limited to patients with CD4+ counts <200 cells/mm^3.
- PLWH have a strong indication to tecovirimat treatment.
- PLWH have not a different response to disease.
- PLWH developed much more frequently low or medium neutralizing antibody titers, with PLWH vaccinated with MVA-BN developing the lowest neutralizing antibody titers between all subgroups.
- PLWH that were infected with mpox developed higher neutralizing antibody titers compared to PLWH vaccinated with MVA-BN
- We advise monitoring HIV viral load at Mpox diagnosis due to the important individual and community implications.

Thank you

Tutte le persone che partecipano ai trials clinici