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Characteristics of mpox vaccine recipients among a sample of men who have sex with men with presumed exposure to mpox

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Abstract

Mpox vaccination is recommended for persons exposed to or at risk for mpox. About 25% of an online sample of MSM with presumed mpox exposure were vaccinated (≥1 dose). Vaccination was higher among younger MSM and MSM concerned about mpox or reporting sexual risk behaviors. Incorporating mpox vaccination into routine sexual health care and increasing 2-dose vaccination uptake is essential to preventing mpox acquisition, improving MSM sexual health, and averting future mpox outbreaks.

Keywords

mpox; mpox vaccination; sexual behaviors and risk; MSM; mpox exposure

Background

Although anyone can contract mpox, gay, bisexual, and other men who have sex with men (MSM) represent the majority of mpox cases during the 2022 outbreak (1, 2). Published data show that approximately 95% of mpox cases occurred in men and of these, 70% reported male-to-male sexual contact (1, 2). Mpox can be spread through close, often skin-to-skin contact, including direct contact with a rash, scabs, or body fluids from an infected person (3). Sexual contact (oral, anal, or vaginal) is the predominant mode of mpox transmission in this outbreak (2, 3). Sexual behaviors like condomless anal sex (CAS) with multiple sexual partners and spaces like sex parties, sex clubs or bathhouses where intimate and often anonymous sexual contact with multiple partners occur are associated with mpox transmission (4).

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Vaccination is an important strategy to prevent the spread of mpox (5, 6). The U.S. Food and Drug Administration has approved the JYNNEOS vaccine for the prevention of mpox and smallpox (7). It is a 2-dose vaccine series administered four weeks apart (7). The current U.S. mpox vaccination strategy focuses primarily on vaccinating persons with known or presumed exposure to mpox or at risk of mpox exposure (8). Increasing vaccination coverage, especially in disproportionately affected populations like MSM, is critical to mpox prevention and control. Understanding the determinants of mpox vaccination among MSM can inform mpox vaccine uptake and delivery interventions focused on MSM. The objective of this analysis is to describe the prevalence and correlates of mpox vaccination among a national sample of U.S. MSM with presumed mpox exposure.

Methods

We obtained data for this analysis from the American Men's Internet Survey (AMIS) mpox survey. AMIS is an annual cross-sectional behavioral internet survey of MSM in the United States (9). AMIS participants are recruited through convenience sampling from a variety of websites or social networking applications using banner advertisements or e-mail blasts. Men who are ≥15 years of age, cisgender, live in the United States, and report ever having sex with another man are eligible to participate in AMIS. The AMIS mpox survey was a one-time online survey to collect data on sexual behaviors and mpox-specific behavioral risk-reduction strategies, self-perceived mpox risk, and mpox vaccination history. The AMIS mpox survey was sent to respondents who completed the AMIS 2021 survey and who had agreed to be recontacted. Overall, 2,999 AMIS 2021 participants were invited to participate in the mpox survey, and 824 (27.5%) responded. The AMIS mpox survey was administered from August 5–15, 2022, three months after the first U.S. mpox case of this current outbreak was reported in May 2022 and two months after mpox vaccine recommendations (1, 2, 10).

The analytical sample (n=553) included MSM who reported behaviors (group sex, attending a sex party/sex club/bathhouse, ≥2 sex partners, or a bacterial sexually transmitted infection [STI] diagnosis in the past three months) that are associated with mpox exposure and are indications for mpox vaccination (11). We calculated frequencies of socio-demographic characteristics, sexual behaviors, mpox vaccine receipt, and location of mpox vaccine receipt. Using log-binomial regression analyses, we calculated unadjusted prevalence ratios (uPR) and adjusted prevalence ratios (aPR) and 95% confidence intervals (CIs) to evaluate factors associated with mpox vaccination in univariable and multivariable analyses, respectively. The multivariable model included age group and variables that are indications for mpox vaccination. We analyzed data using SAS 9.4. Statistical significance was set at $p<0.05$. The Institutional Review Board of Emory University approved all procedures associated with the AMIS mpox survey. CDC IRB review was not required for this study. Each participant provided informed consent to participate in the survey. No incentive or compensation was provided to participants.

Results

Of 553 eligible MSM, 70.2% were non-Hispanic White, 59.9% were aged ≥40 years, 68.0% reported condomless anal sex (CAS) in the past three months, 60.6% reported a bacterial

STI test in the past three months, 56.9% reported current HIV PrEP use, and 58.5% were concerned about their risk of getting mpox (Table 1). Less than half reported group sex (43.4%) in the past three months, 36.3% attended a sex club/sex party/bathhouse in the past three months, and 43.0% reported ≥2 sex partners in the past 14 days. Of 335 MSM who reported a bacterial STI test in the past three months, 20.3% were diagnosed with a bacterial STI.

Approximately 25% (139/553) of MSM reported receiving ≥1 dose of mpox vaccine and, of vaccinated MSM, 95.7% had received only one dose. Among vaccinated MSM, most were non-Hispanic White (69.0%), aged ≥40 years (48.9%), currently taking HIV PrEP (80.7%), living with HIV (16.6%), concerned about their risk of getting mpox (67.6%), and reported CAS (81.3%), group sex (54.8%), attending a sex club/sex party/bathhouse (50.7%), and bacterial STI testing (75.5%) in the past three months. Most vaccinated respondents (78%) reported receiving their vaccine at a public health clinic/community health clinic.

In univariable analyses, younger MSM (15–24 years, 25–29 years, and 30–39 years) were more likely to be vaccinated compared with MSM ≥40 years (Table 1). MSM who reported CAS (uPR=2.06, 95% CI=1.40–3.04), group sex (uPR=1.59, 95% CI=1.18–2.13), attending a sex club/sex party/bathhouse (uPR=1.80, 95% CI=1.36–2.40), bacterial STI testing (uPR=2.12, 95% CI=1.43–2.85), or a bacterial STI diagnosis (uPR=1.43, 95% CI=1.02–2.01) in the past three months were more likely to be vaccinated. MSM who reported ≥2 sex partners in the past 14 days (uPR=1.38, 95% CI=1.04–1.83), current HIV PrEP use (uPR=3.16, 95% CI=2.06–4.84), or were concerned about their risk of getting mpox (uPR=1.48, 95% CI=1.08–2.02) were more likely to be vaccinated. In multivariable analysis, the prevalence of mpox vaccination was significantly higher among younger MSM (15–24 years, 25–29 years, and 30–39 years) compared to MSM ≥40 years, MSM who were concerned about their risk of getting mpox (aPR=1.36, 95% CI=1.01–1.85), and MSM who reported CAS (aPR=1.84, 95% CI=1.18–2.87), attending a sex club/sex party/bathhouse (aPR=1.51, 95% CI=1.11–2.04), or bacterial STI testing (aPR=1.60, 95% CI=1.12–2.27) in the past three months (Table 1).

Discussion

Approximately 25% of respondents in this online sample of MSM reported receiving ≥1 dose of mpox vaccine in the three months after the U.S. mpox outbreak. Even among MSM who reported sexual behaviors that are associated with mpox exposure, such as group sex or attending a sex club/sex party/bathhouse, vaccination prevalence was low (~50%). MSM who were younger, reported sexual risk behaviors associated with mpox exposure, or were concerned about their mpox risk were more likely to be vaccinated. Younger MSM may be more likely to perceive themselves as being at higher risk of mpox than older MSM (1). This may account for increased vaccination prevalence among younger MSM. Early vaccination messages or vaccination eligibility criteria that focused on MSM engaging in sexual behaviors that increase the likelihood of mpox exposure may also explain the higher vaccination prevalence in MSM who reported these behaviors or were concerned about their mpox risk. The finding that most vaccinated respondents received the mpox vaccine at public/community health clinics may reflect the survey administration at the beginning of

the outbreak when vaccines were in short supply and were predominantly available at public health clinics.

Although mpox vaccine availability has increased since the beginning of the outbreak, increasing vaccine uptake, particularly second dose uptake, should be a major focus moving forward. Fewer than 5% of vaccine recipients in this survey had received a second vaccine dose, although this may be because of vaccine shortage at the time of survey administration. Compared to unvaccinated persons, two doses of JYNNEOS vaccine afford more protection against mpox than a single dose (6). Expanding vaccine accessibility in healthcare and non-healthcare settings, especially among MSM who report behaviors that may expose them to mpox, remains a public health priority (1, 2). Healthcare providers who serve MSM populations should routinely assess mpox exposure risk and offer vaccination to those who have been exposed to mpox or at high risk of mpox exposure (11). Local health departments can also partner with lesbian, gay, bisexual, transgender, queer community-based organizations to organize community-based mpox vaccination events (12). These community-based vaccination events may provide an opportunity to offer vaccination to MSM in a culturally competent and stigma-free environment, especially for MSM who may not have access to or are unable to go to healthcare facilities. Community-based vaccinations have successfully increased vaccine uptake among MSM, particularly those disproportionately affected by mpox (12). Increasing vaccination uptake is essential to preventing mpox transmission, improving MSM sexual health, and averting a future mpox outbreak.

There are limitations to this analysis. These findings may not be generalized to all MSM because these data were obtained from an online sample of predominantly white MSM during the early phase of the outbreak. The racial distribution of MSM is this sample is different from the racial distribution of people affected by mpox, which may have limited our ability to detect differences in vaccination uptake by race/ethnicity (1). Vaccination prevalence may have increased from the beginning of the outbreak when vaccines were not widely available or receipt of one dose was prioritized. Receipt of vaccination was self-reported and can be subject to recall and social desirability biases. These factors may have biased the prevalence estimates in this analysis.

Increasing mpox vaccination among MSM, especially those reporting behaviors that increase the likelihood for mpox exposure, is essential to mpox prevention and control. Emphasizing the importance of completing the 2-dose vaccination series is essential to optimize MSM protection against mpox. Expanding mpox vaccination to include non-healthcare/community settings may increase vaccination coverage in MSM. These findings may inform the design and implementation of mpox vaccination programs that aim to increase vaccination coverage among MSM at risk of mpox exposure.

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Table 1.

Characteristics of and factors associated with mpox vaccination among an online sample of men who have sex with men with presumed mpox exposure – American Men's Internet Survey, United States, August 5–15, 2022 (N=553)

	Total (N=553)		Vaccine recipients (N=139)			
Variable	**No.**	**Column %**	**No.**	**Column %**	**Unadjusted prevalence ratios (95% CI)**	**Adjusted prevalence ratios (95% CI)**
Race						
Black, non-Hispanic	57	10.3	10	7.2	0.70 (0.39–1.26)	
Hispanic	59	10.7	19	13.7	1.28 (0.85–1.93)	
Other, multiple, unknown[1]	49	8.9	14	10.1	1.16 (0.72–1.87)	
White, non-Hispanic	388	70.2	96	69.0	1.00	
Age group (year)						
15–24	26	4.7	10	7.2	1.86 (1.09–3.15)	1.84 (1.18–2.88)
25–29	48	8.7	16	11.5	1.61 (1.02–2.53	1.53 (1.01–2.37)
30–39	148	26.8	45	32.4	1.50 (1.08–2.07)	1.51 (1.11–2.06)
≥40	331	59.9	68	48.9	1.00	1.00
Condomless anal sex in past three months						
Yes	376	68.0	113	81.3	2.06 (1.40–3.04)	1.84 (1.18–2.87)
No	177	32.0	26	18.7	1.00	1.00
Group sex in past three months						
Yes	238	43.4	74	54.8	1.59 (1.18–2.13)	1.15 (0.84–1.58)
No	310	56.6	61	45.2	1.00	1.00
Attended a sex club/sex party/bathhouse in past three months						
Yes	199	36.3	70	50.7	1.80 (1.36–2.40)	1.51 (1.11–2.04)
No	349	63.7	69	49.3	1.00	1.00
Bacterial STI testing in past three months [2]						
Yes	335	60.6	105	75.5	2.12 (1.43–2.85)	1.60 (1.12–2.27)
No	218	39.4	34	24.5	1.00	1.00
Bacterial STI diagnoses in past three months [3]						
Yes	68	20.3	28	26.7	1.43 (1.02–2.01)	

	Total (N=553)		Vaccine recipients (N=139)			
Variable	**No.**	**Column %**	**No.**	**Column %**	**Unadjusted prevalence ratios (95% CI)**	**Adjusted prevalence ratios (95% CI)**
No	267	79.7	77	73.3	1.00	
≥2 partners in past 14 days						
Yes	238	43.0	68	48.9	1.38 (1.04–1.83)	1.02 (0.75–1.39)
No	315	57.0	71	51.1	1.00	1.00
Living with HIV						
Yes	78	14.1	23	16.6	1.19 (0.81–1.74)	
No	475	85.9	116	83.4	1.00	
Current HIV pre-exposure prophylaxis use [4]						
Yes	265	56.9	92	80.7	3.16 (2.06–4.84)	
No	201	43.1	22	19.3	1.00	
Concerned about risk of getting mpox						
Yes	320	58.5	94	67.6	1.48 (1.08–2.02)	1.36 (1.01–1.85)
No	227	41.5	45	32.4	1.00	1.00
Mpox vaccination						
Yes	139	25.4	–	–		
No	408	74.6	–	–		
Number of mpox vaccine doses [5]						
1	–	–	133	95.7		
2	–	–	6	4.3		
Location of mpox vaccine receipt						
Private doctor’s office	–	–	9	7.0		
Public health clinic/community health clinic	–	–	100	78.1		
Street outreach program/mobile unit	–	–	9	7.0		
Sexually Transmitted Disease clinic	–	–	8	6.3		
Hospital (inpatient)	–	–	1	0.8		
School or university health clinic	–	–	1	0.8		

Multivariable model included age, condomless anal sex, group sex, attending a sex club/sex party/bathhouse, bacterial STI testing, group sex, ≥2 sex partners in the past 14 days, and concern about risk of getting mpox

[1] Asian, American Indian, Native American, Pacific Islander, multiple races, unknown

[2] Testing for gonorrhea, chlamydia, or syphilis

[3] Among those tested for gonorrhea, chlamydia, or syphilis

[4] Among those who reported not living with HIV

[5] Among those who reported mpox vaccination