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Evolution and Durability of Mpox-Specific Antibodies Among Vaccinated or Infected Individuals

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BACKGROUND

- While two-dose vaccination using MVA-BN vaccine has been shown to be effective in preventing Mpox among at-risk populations, breakthrough infections had been reported.
- Data on the short-term durability of serological responses are scarce.

METHODS

- MSM planning to receive two doses of MVA-BN vaccine and those diagnosed with Mpox in 2023 were enrolled.
- Participants undergoing Mpox vaccination were screened for the occurrence of Mpox through the reporting system of notifiable diseases of Taiwan CDC. In addition, those with suspicious lesions were tested for MPVX PCR at out-patient clinics of infectious diseases.
- Blood samples were collected on Month 1, 4, 7, 10 and 12 for all participants after the second dose of vaccination or Mpox infection. All serum specimens were tested for the presence of anti-A29 and anti-H3 MPVX IgG.
- Vaccinated individuals with a consecutive series of >3 positive tests of either anti-A29 or anti-H3 IgG, PRNTs were performed.

Table. Clinical characteristics of the participants

	Total (N=442)	PWH (N=285)	PWoH (N=157)	*p* value
Age (IQR), years	35 (31-40)	38 (34-43)	30 (27-32)	**<0.001**
Prior smallpox vaccination	70 (15.9)	66 (23.2)	4 (2.5)	**<0.001**
Complete 2 doses	429 (97.3)	276 (97.2)	153 (97.5)	0.87
Interval between 2 doses (IQR), days	37 (32-49)	35 (31-46)	40 (35-54)	**<0.001**
CD4 <350 cells/mm^3	NA	16 (5.6)	NA	NA
PVL >200 copies/mL	NA	4 (1.4)	NA	NA
Chronic hepatitis B	34 (8.0)	30 (10.8)	4 (2.7)	**0.002**
Anti-HCV positivity	48 (11.1)	47 (16.7)	1 (0.7)	**<0.001**
Acquiring other STIs within a year	260 (59.0)	200 (70.4)	60 (38.2)	**<0.001**

*PWH, people with HIV; PWoH, People without HIV

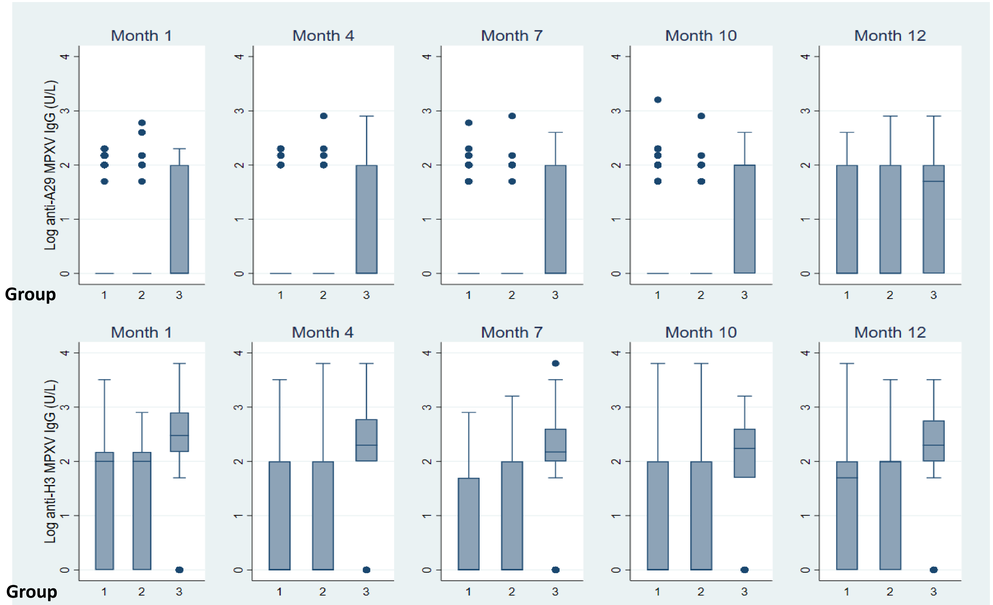


Figure 2. Serological responses of anti-A29 and anti-H3 MPXV IgG at different follow-up intervals among PWH (Group 1), PWoH (Group 2) and participants with prior smallpox vaccination (Group 3).

RESULTS

- The study flow and participants' characteristics are shown in **Table** and **Figure 1,** respectively. There was one PWH with breakthrough Mpox infection on the 11th month after the second dose of MVA-BN vaccination.
- Smallpox-vaccinated participants had higher seroresponses after MVA-BN vaccination **(Figure 2).** After a 10-month observation, those with prior smallpox vaccination are more likely to achieve persistent presence of either anti-A29 (aOR, 5.54; 95% CI, 2.89-10.59) or anti-H3 (aOR, 5.00; 95% CI, 2.48-10.09) MPXV IgG, after adjusting for HIV infection.
- Of the 16 participants with recent Mpox, 3 (30.0%) and 9 (90.0%) of 10 remained seropositive for anti-A29 and anti-H3 IgG, respectively, at the end of 12 months of follow-up.
- Of the total of 150 samples (from 35 vaccinated participants) examined by PRNT, 103 (68.7%) showed neutralizing ability. Smallpox-vaccinated individuals showed higher PRNT titers than non-smallpox vaccinated ones **(Figure 3)**. The titers of anti-H3 MPXV IgG were more correlated with the titer of PRNT (r = 0.57; p < 0.001) than the titers of anti-A29 MPXV IgG (r = 0.27; p = 0.03).

CONCLUSIONS

- We found that the anti-A29 and anti-H3 antibodies waned quickly among those have undergone MVA-BN vaccination and even among those with natural infection.
- In addition, among those tested positive for Mpox-specific IgG, the titers of anti-H3L IgG might be a better index for predicting neutralizing ability compared with the titers of anti-A29 IgG.

Figure 1. Study population.

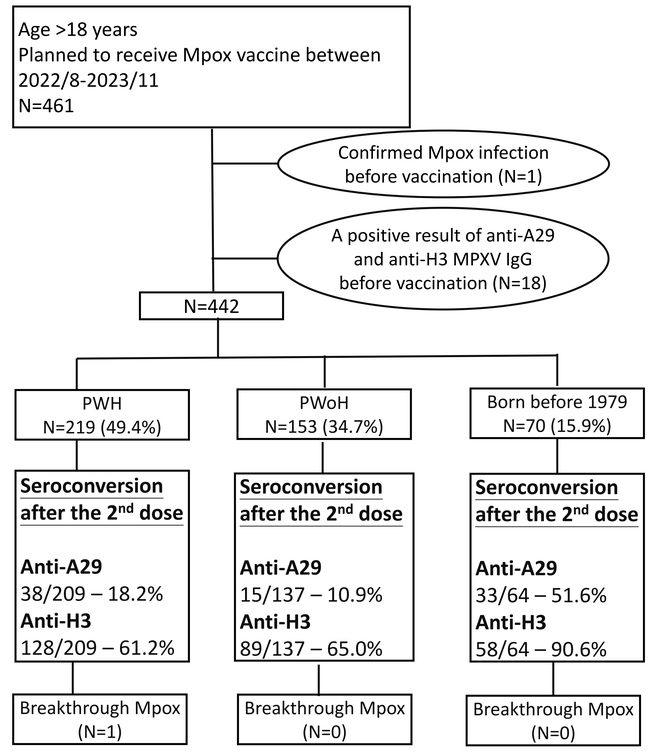
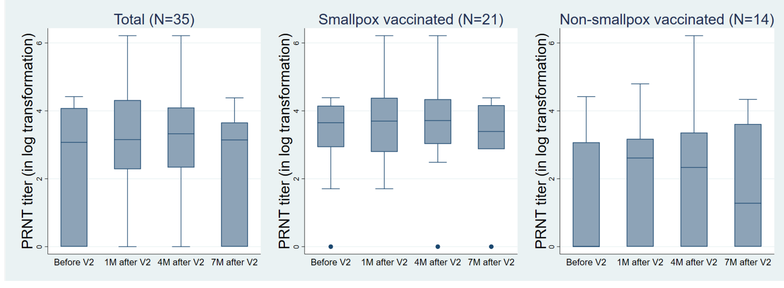


Figure 3. PRNT titers of the enrolled individuals at different follow-up intervals



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