Association Between Mpox Vaccination and Disease Severity in Washington State, 2023-2025

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BACKGROUND

- Mpox infections can be severe for some individuals and can occur after vaccination.
- Previous studies demonstrated that mpox vaccination can prevent severe disease, but they lacked adjustment for differences in age or health status.

OBJECTIVES

(1) Compare disease severity among WA mpox cases who were vaccinated with the MVA-BN vaccine to those who were unvaccinated while adjusting for confounders.
(2) Explore whether time since vaccination impacted mpox disease severity among WA mpox cases who were vaccinated with the MVA-BN vaccine.

METHODS

- Study Population: All probable and confirmed cases of mpox reported in WA from January 2023 to June 2025 through electronic laboratory reporting. Excluded cases of reinfection.
- Data Source: WA state surveillance data enriched with immunization and medical records.
- Outcome: Disease severity, assessed through an adapted version of the Mpox Severity Scoring System (range 1-19).
- Vaccination Status: Someone who received at least one dose of the MVA-BN vaccine was considered to be vaccinated.
- Time since vaccination: Categorized as whether someone received their last dose of MVA-BN <12 months, 12-24 months, or 24+ months before their mpox diagnosis date.
- Statistical Analysis: Linear regression adjusted for age and immunocompromising condition.

People who are vaccinated against mpox have less severe illness than people who are not vaccinated. The mpox vaccine may not be as effective over time.

RESULTS

- 175 cases of mpox were reported, 164 cases met the inclusion criteria.
- The mean severity score of individuals who received at least one dose was 4.6 points (SD 1.7).

Figure 1. Mpox Severity Score[1] by Vaccination Status, WA 2023-2025

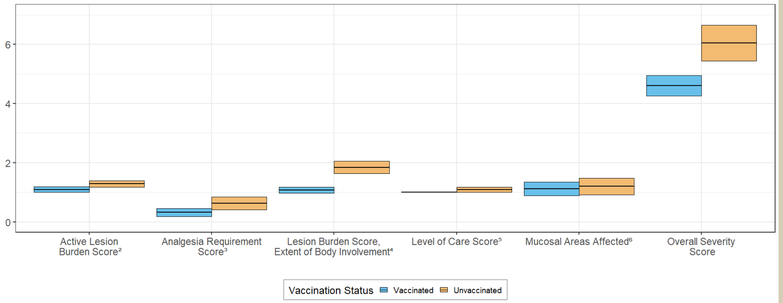


Table 1. Mpox Case Demographics by Vaccination Status, WA 2023-2025

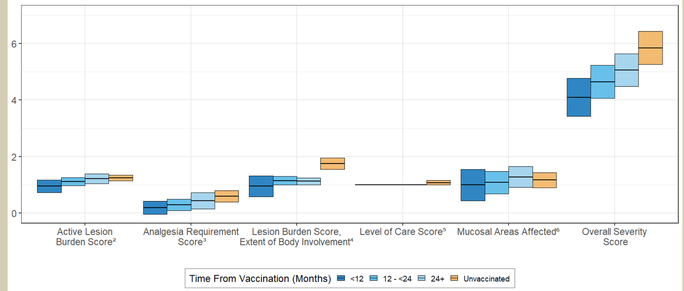
	Vaccinated N = 94[1,2]	Unvaccinated N = 70[1,2]
Age (Years)	36 (8)	35 (9)
Race/Ethnicity		
American Indian/Alaskan Native	<10	<10
Asian	12 (13%)	11 (16%)
Black/African American	<10	14 (20%)
Hispanic/Latine	14 (15%)	18 (26%)
Native Hawaiian/Other Pacific Islander	<10	0
White	73 (78%)	32 (46%)
Additional Identity Not Listed	<10	<10
Unknown	<10	<10
Gender Identity		
Cisgender Man	75 (80%)	60 (86%)
Cisgender Woman	0	<10
Transgender Man	<10	0
Transgender Woman	0	<10
Genderqueer/Nonbinary Person	<10	<10
Unknown	13 (14%)	<10
HIV Status		
HIV Negative or Unknown	78 (83%)	57 (81%)
HIV Positive	16 (17%)	13 (19%)
Immunocompromised Status		
No or Unknown	79 (84%)	56 (80%)
Yes	15 (16%)	14 (20%)

[1] Mean (SD); n (%)
[2] Counts less than 10 were suppressed in accordance to Washington Department of Health standards for reporting data with small numbers.

[1] Unadjusted mean with 95% CI.
[2] Approximately how many pox lesions someone had at their worst or from their medical records; score range from 0-3; (0) no reported lesions, (1) 1 to 9 lesions, (2) 10-99 lesions, or (3) greater than 100 lesions.
[3] Highest level of pain management needed; score range from 0-4; (0) no pain medications needed, (1) over the counter pain medications used, (2) prescription pain medications used, (3) inpatient, oral pain medications used, (4) inpatient, intravenous pain medications used.
[4] Each discrete area that pox lesions were located (face/head/neck, trunk, arms, hands, legs, feet, genitals/groin, buttocks/anus); score range from 0-4; (0) no area, (1) 1 to 2 areas, (2) 3 to 4 areas, (3) 5 to 6 areas, (4) 7 to 8 areas.
[5] Level of patient care needed; score range from 1-4; (1) outpatient, (2) inpatient, non-ICU, (3) inpatient, ICU, (4) death.
[6] Number of mucousal areas affected by mpox disease (oral mucousa, rectal mucousa, and ocular mucousa); score range from 0-4; (0) no mucousal area affected, (2) 1 mucousal area affected, (3) 2 mucousal areas affected, (4) 3 mucousal areas affected.

- **Vaccinated individuals had a lower mpox severity score by 1.44 points (95% CI 0.79-2.09, p<0.001) compared to those who were unvaccinated.**
- After adjusting for age and immunocompromising condition, vaccinated individuals had a lower severity score by 1.48 points (95%CI 0.77-2.19, p<0.001).
- Individuals vaccinated more than two years prior to infection had a greater severity score by 0.97 points (95% CI 0.07-1.87, p=0.035), compared to cases vaccinated within the prior year.
- After adjusting, the difference was 0.93 points (95% CI -0.12-1.98, p=0.082).

Figure 2. Mpox Severity Score[1] by Time of Vaccination from Diagnosis Date, WA 2023-2025



CONCLUSIONS

- Our results suggest that mpox vaccination protects individuals from having more severe disease.
- Individuals who received their vaccine more than two years ago may be at risk of more severe disease than those more recently vaccinated.
- The impacts of waning immunity need to be studied further to ensure that communities who are still impacted by mpox receive appropriate therapeutics and interventions.

LIMITATIONS

- Results may not be generalizable for individuals infected with clade I MPXV or cis-gender women.
- Potential lack of statistical power for an adjusted time since vaccination on disease severity analysis.
- Immunocompromised status included individuals living with HIV regardless of their immunocompetence.

CONTACT

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Abbreviations:
WA: Washington State
MVA-BN: Modified Vaccinia Ankara – Bavarian Nordic Vaccine
MPXV: Monkeypox virus