



# 2022/2023 Mpox Outbreak: Situational Awareness and Updates

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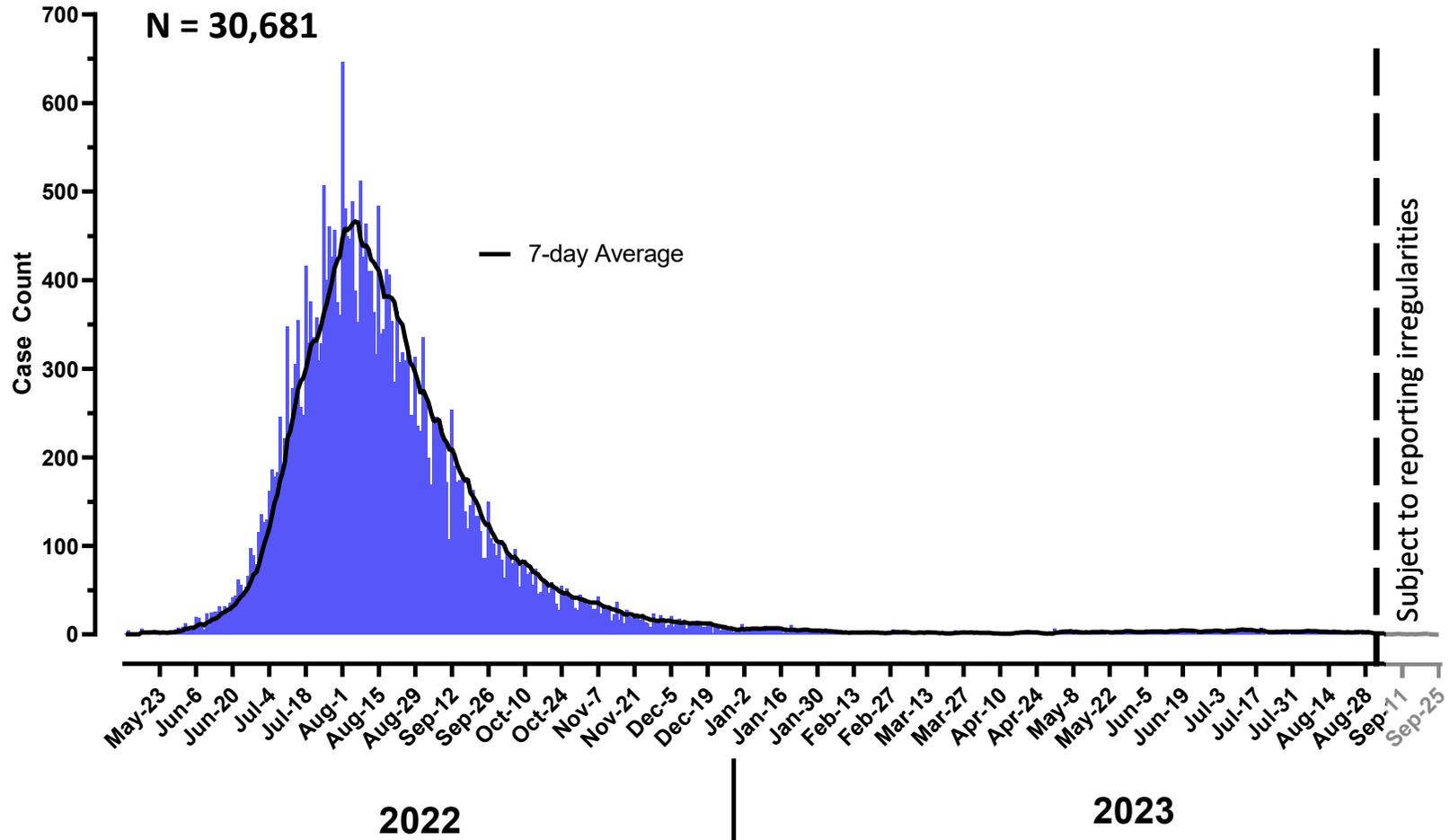
Poxvirus and Rabies Branch

Division of High Consequence Pathogens and Pathology

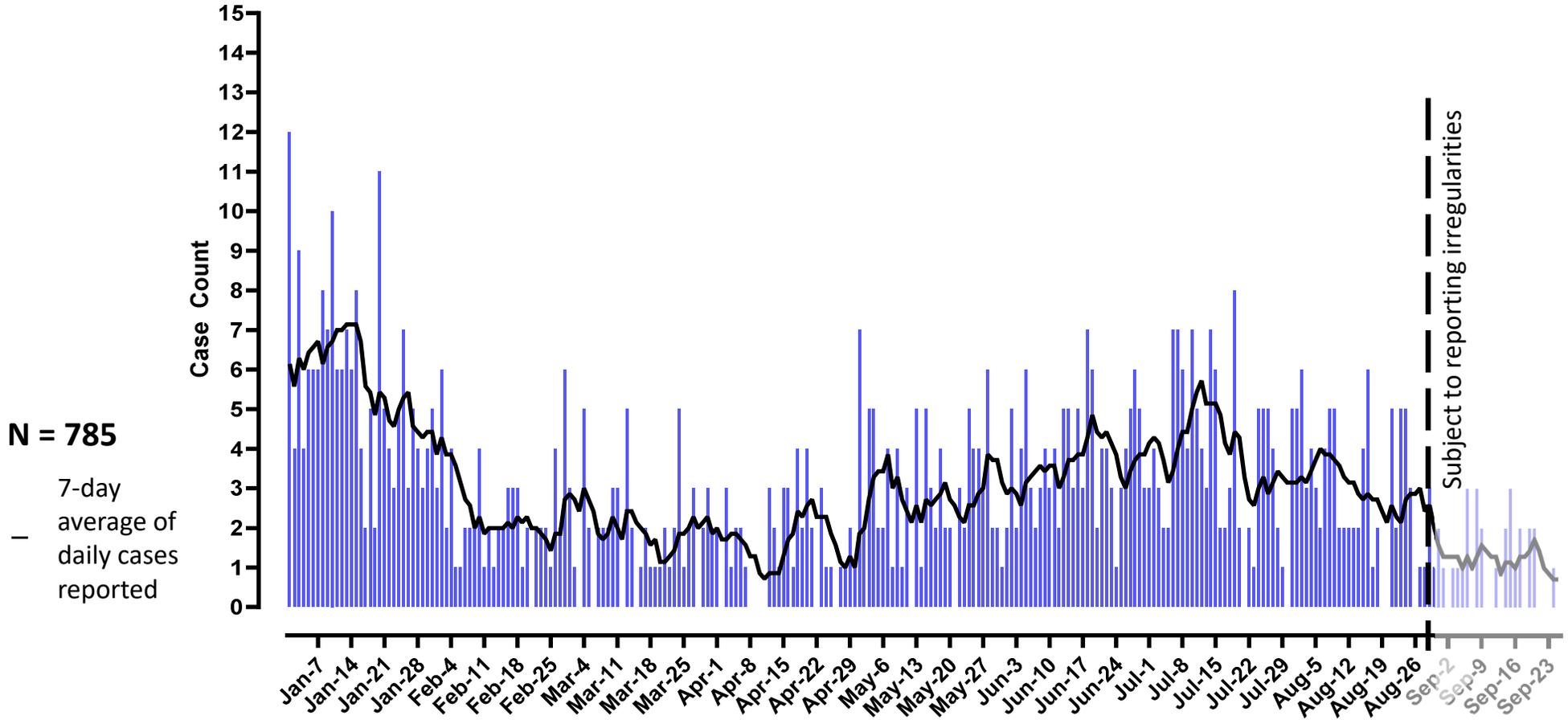
**ACIP Meeting**

**October 25, 2023**

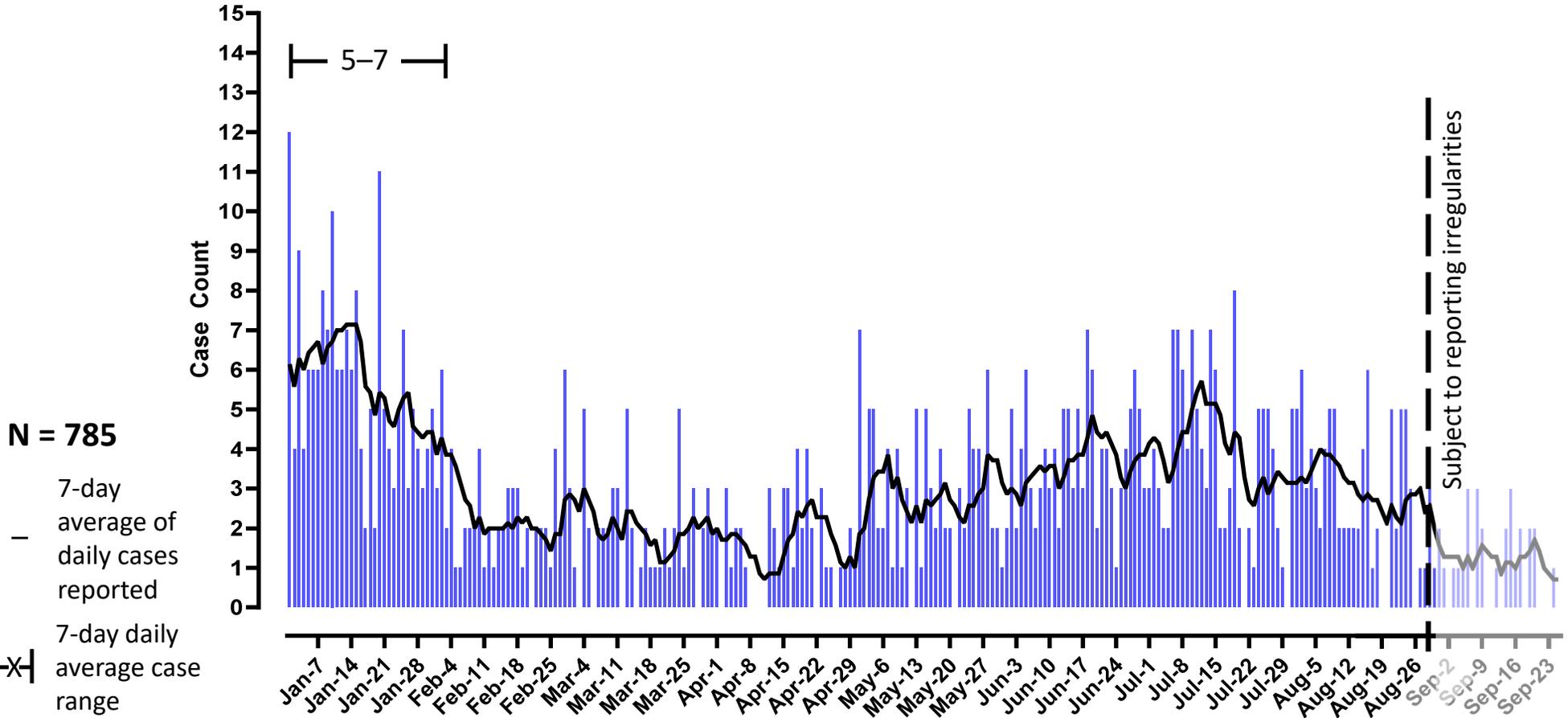
# United States Mpox Case Counts May 2022–Sept 28, 2023



# United States Mpox Case Counts Jan 1–Sept 28, 2023

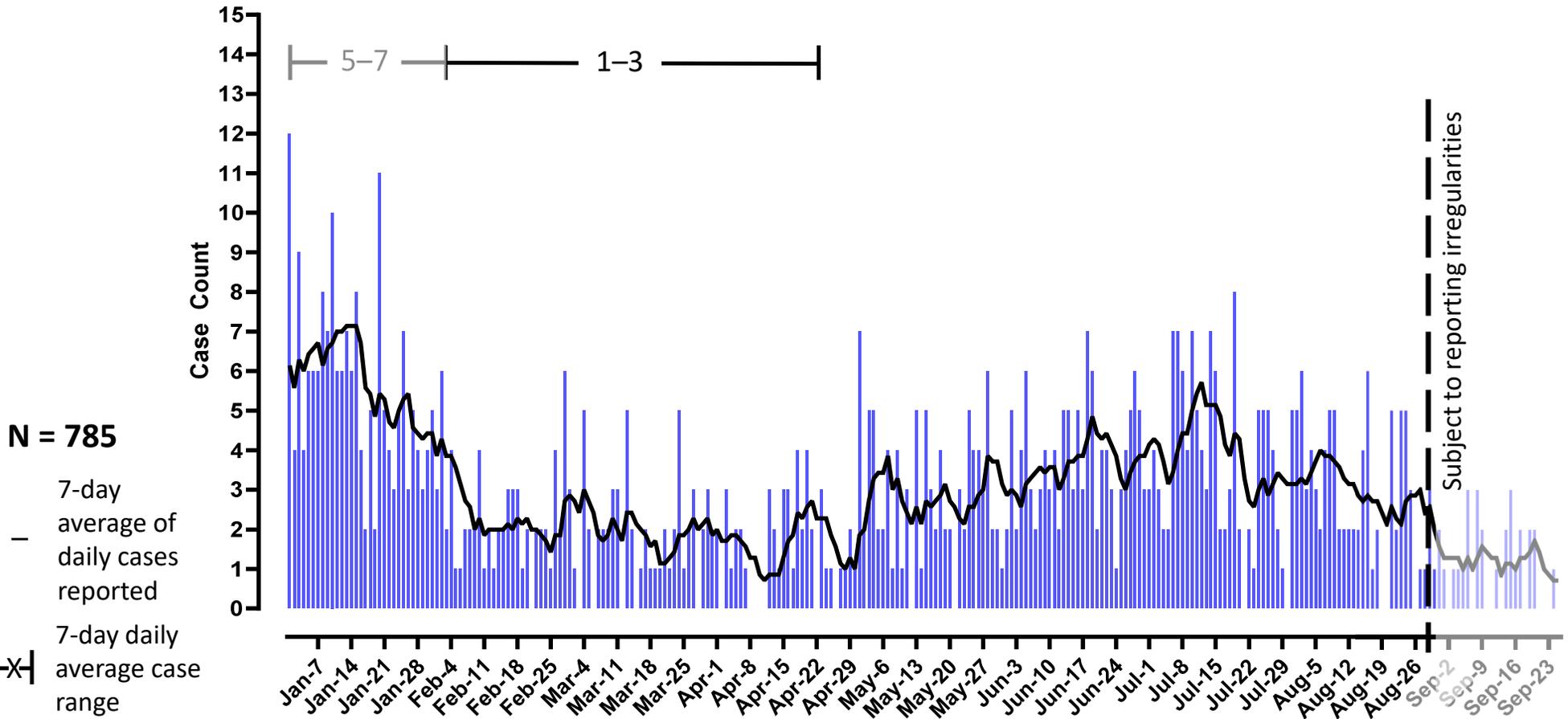


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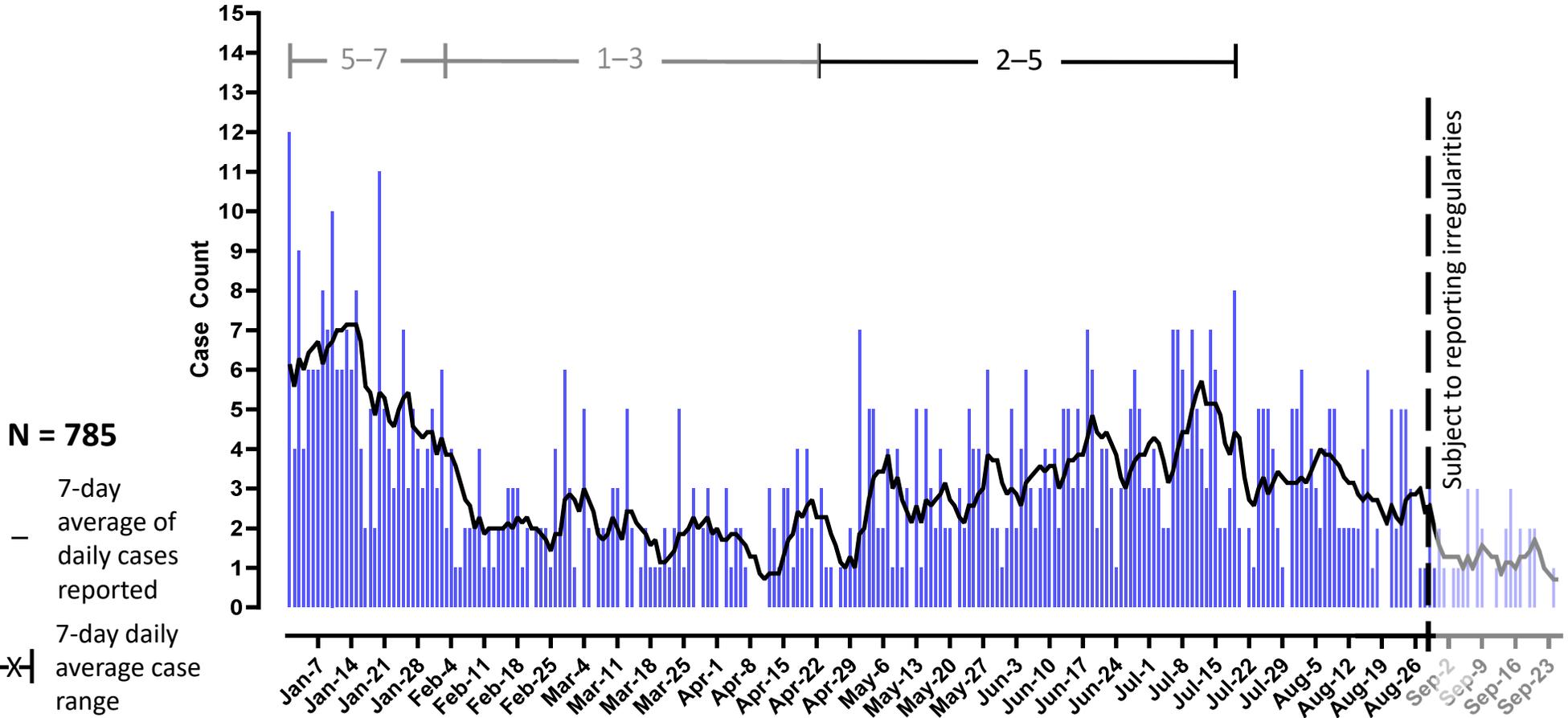
<https://www.cdc.gov/poxvirus/mpox/response/2022/mpx-trends.html>

# United States Mpox Case Counts Jan 1–Sept 28, 2023



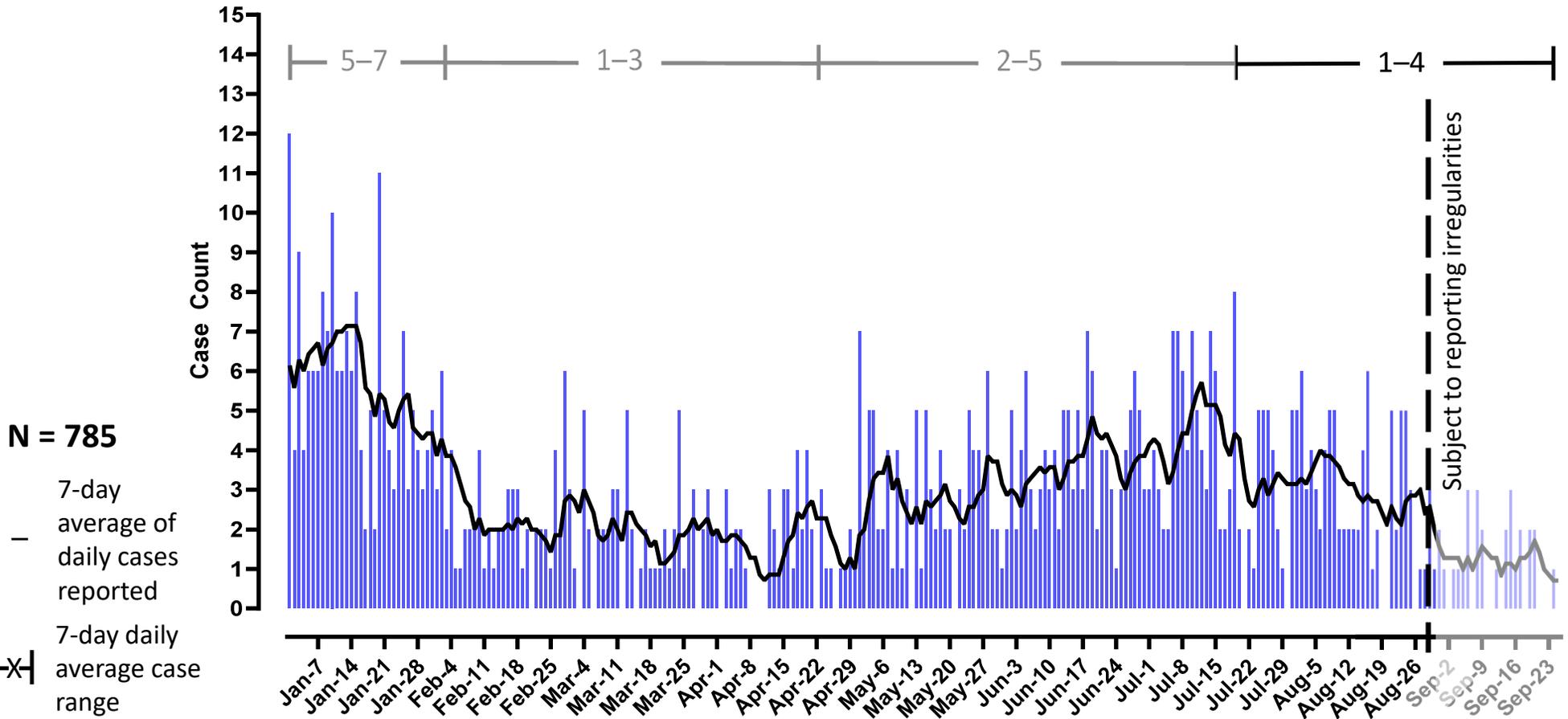
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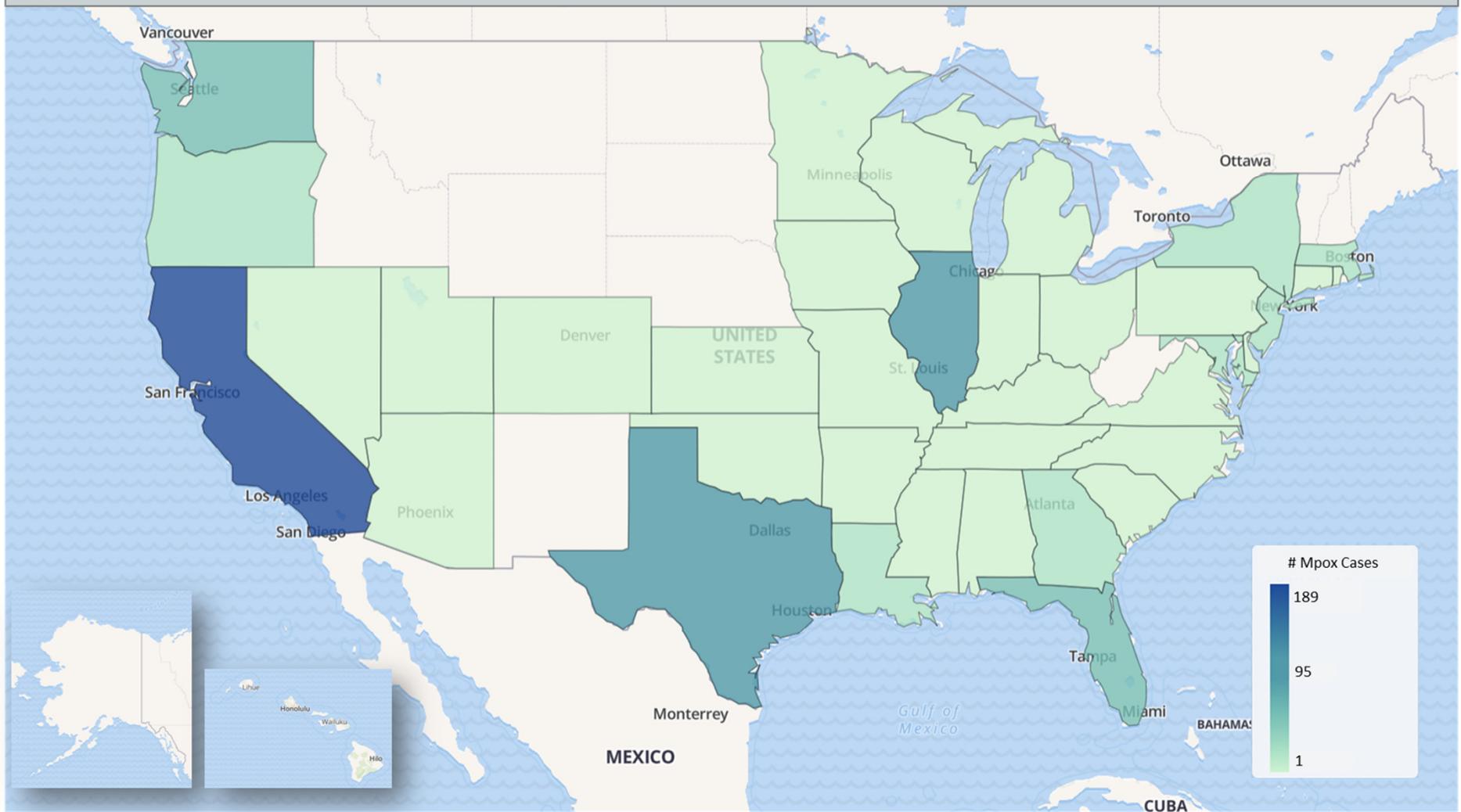


<https://www.cdc.gov/poxvirus/mpox/response/2022/mpx-trends.html>

# United States Mpox Case Counts Jan 1–Sept 28, 2023



# U.S. Mpox Cases: January 1, 2023 – October 18, 2023



## Cases Following Vaccination

- Reported since the outbreak started, including clusters
- Generally, most have had mild illness
  - Few requiring hospitalization
  - Many did not need any treatment
  - Low number of lesions

Mpox infection after two MVA-BVN vaccines (n=30)	
Type of rash	
Vesiculopustular rash	7/30 (23%)
Multiple ulcers	9/30 (30%)
Single ulcer	12/30 (40%)
Umbilicated lesions	2/30 (7%)
Number of lesions	2 (1-5); 1-50
Duration of rash, days	14 (10-16); 5-21; n=15
Did the patient receive mpox anti-viral (tecovirimat)?	
No	28/30 (93%)
Yes	2/30 (7%)

# Mpox Reinfection

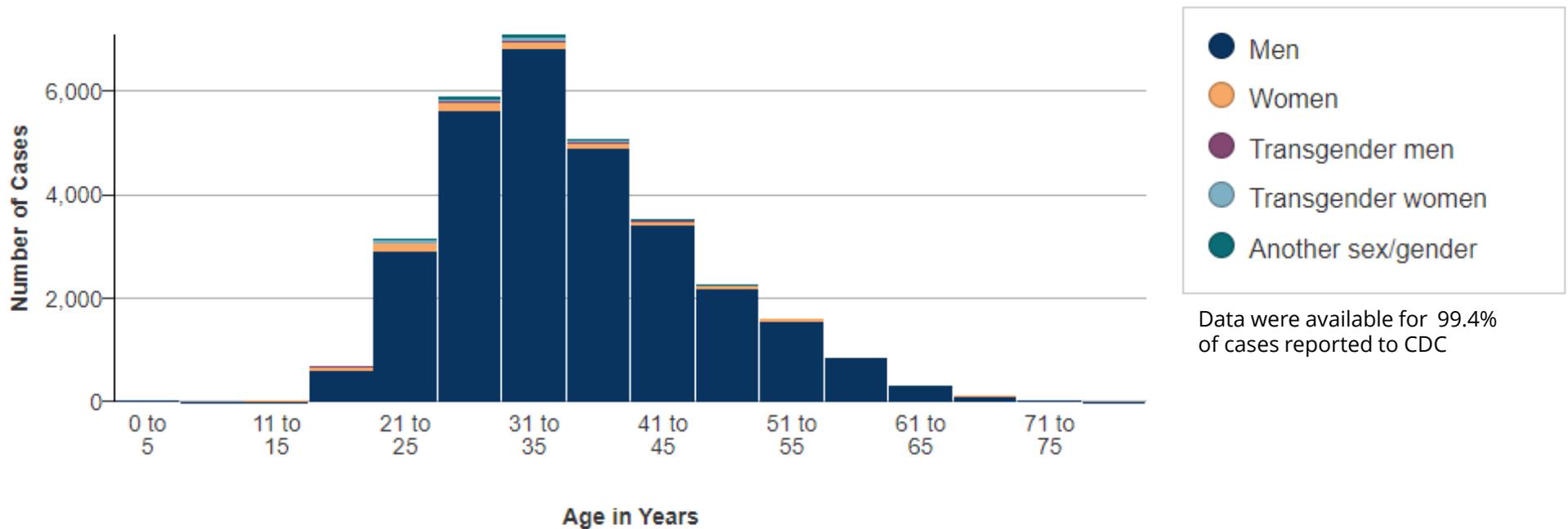
- Potential reinfection cases have been published in the literature, but only a few with convincing evidence of true reinfection
- CDC is aware of <10 cases of probable reinfection
- Probable reinfection cases seem to be milder than initial infection

Mpox after first infection		
	First infection (n=8)	Second infection (n=8)
Type of rash		
Vesiculopustular rash	4/8 (50%)	3/8 (38%)
Multiple ulcers	4/8 (50%)	3/8 (38%)
Single ulcer	0/8	2/8 (25%)
Umbilicated lesions	0/8	0/8
Number of lesions	10 (3-17); 2-30	5 (1-16); 1-50
Duration of rash, days	21.5 (18-30); 15-35; n=6	15 (5-20); 5-21; n=6

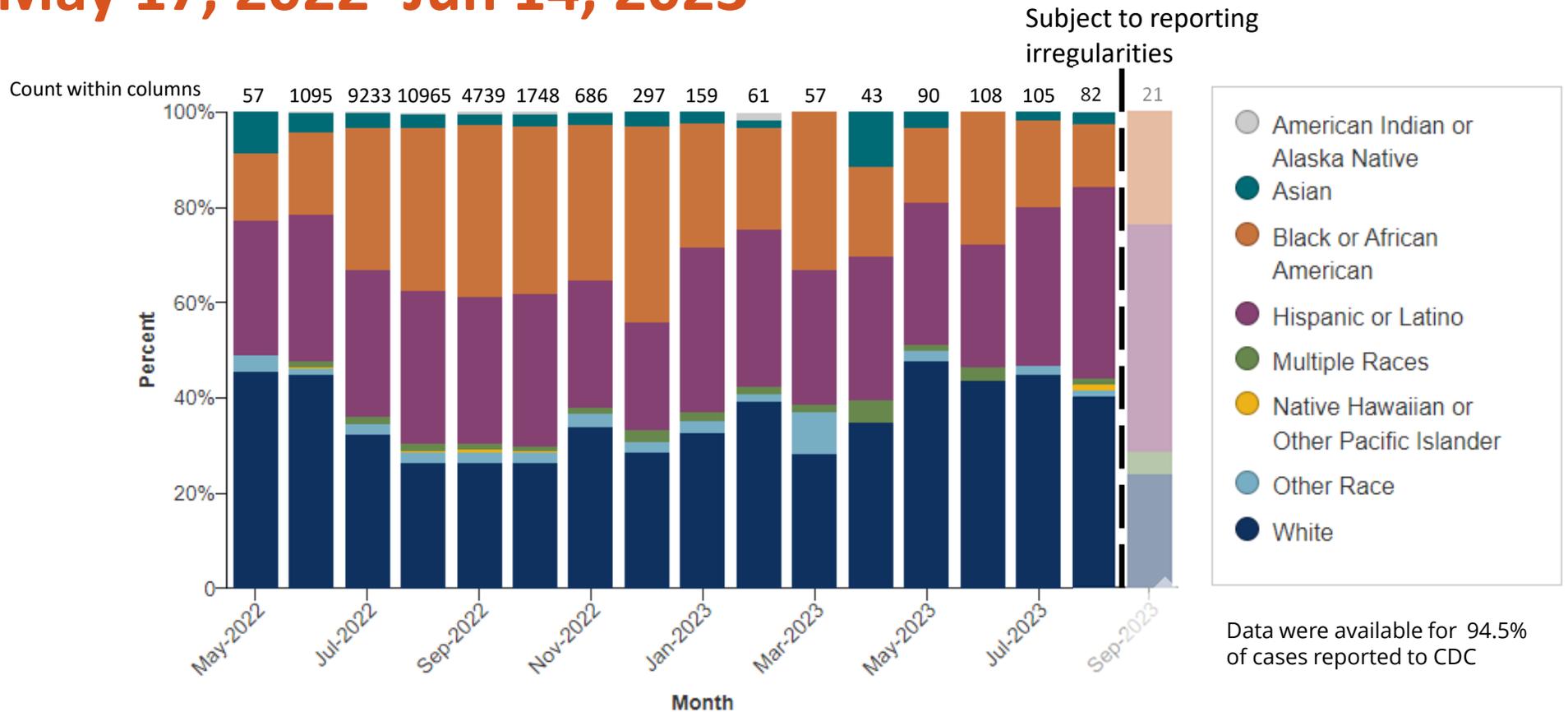
# CDC Continues to Consult on Severe Mpox Cases and Deaths

- CDC's mpox clinical consult service continues to consult on 2-6 new cases monthly over the last 6 months
- Repeat consultations are more frequent, and include severe cases with infections ongoing for months
- 54 people have died from mpox in the United States since May 2022, with 2 just this September
- Black persons, people living with HIV (mostly advanced HIV [AIDS]), and people experiencing homelessness are disproportionately affected

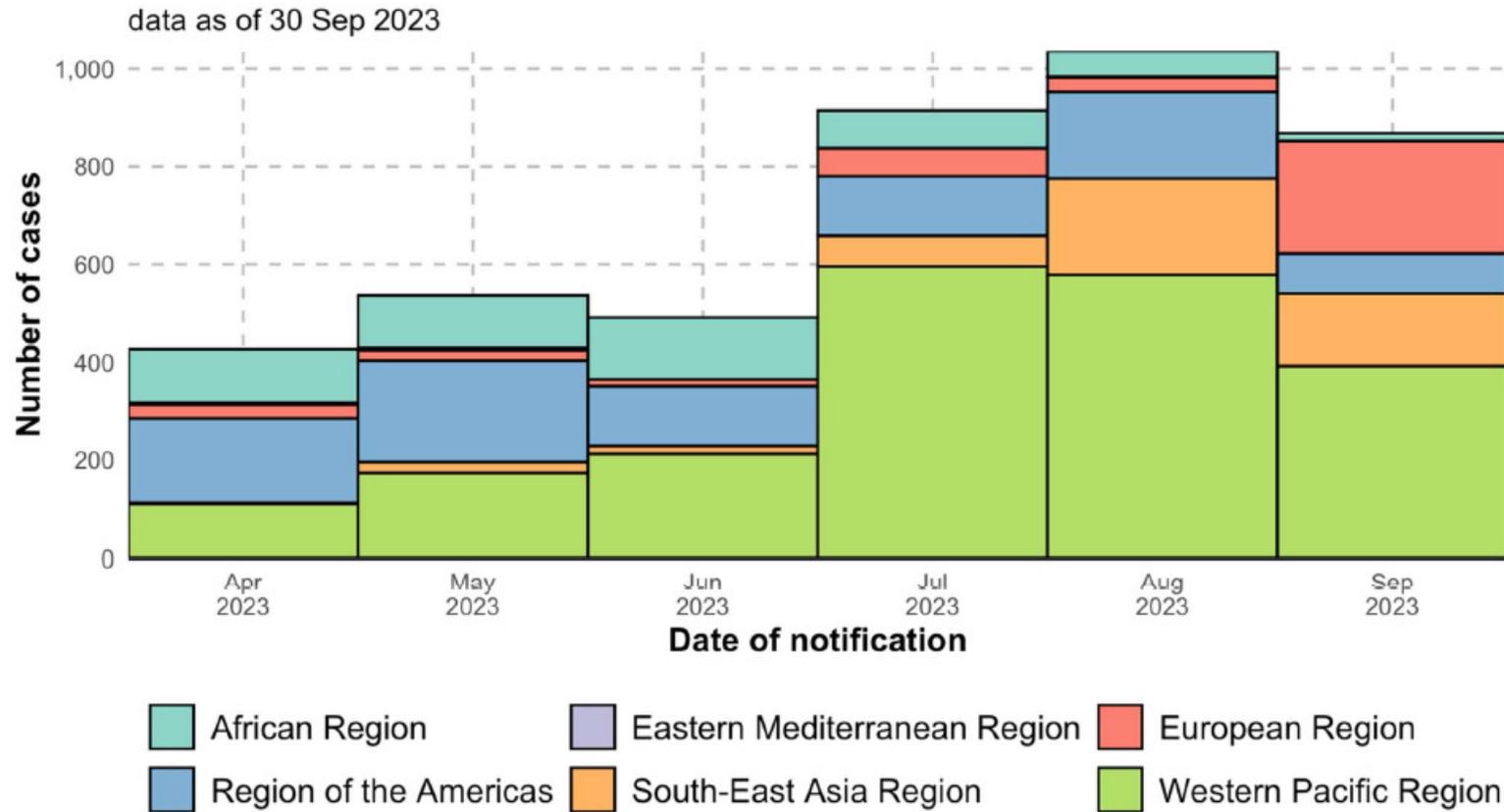
# Mpox Cases Reported to CDC by Age and Gender May 17, 2022–Sept 28, 2023



# Mpox Cases Reported to CDC by Race and Ethnicity May 17, 2022–Jun 14, 2023



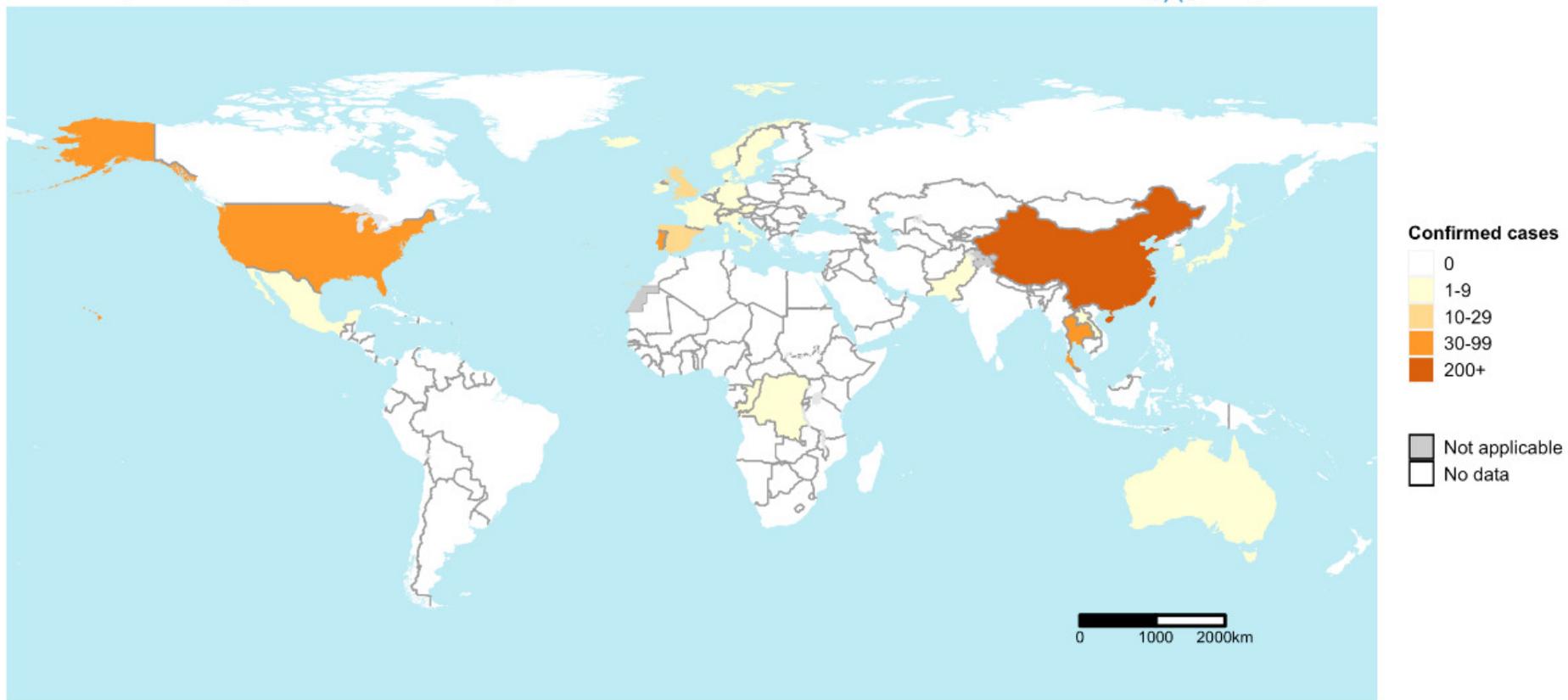
# Mpox Cases Globally Apr–Sept 2023



Source: WHO

## Confirmed cases of mpox, past three weeks

from 04 Sep to 24 Sep 2023, data as of 26 Sep 2023

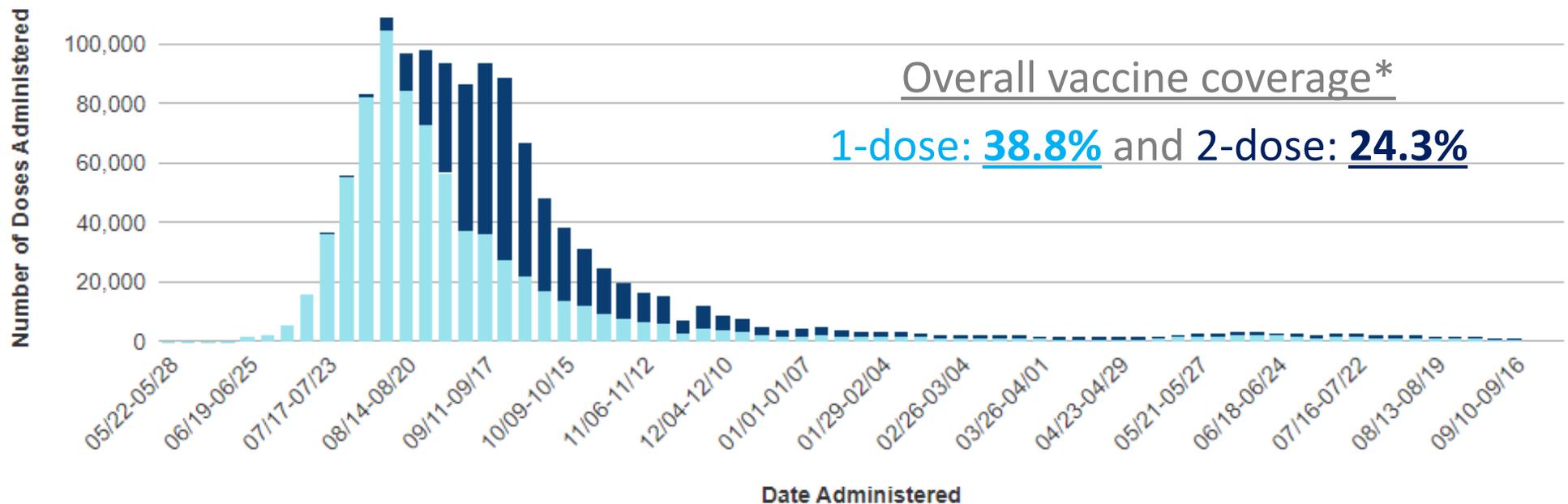


The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization  
Map Production: WHO Health Emergencies Programme  
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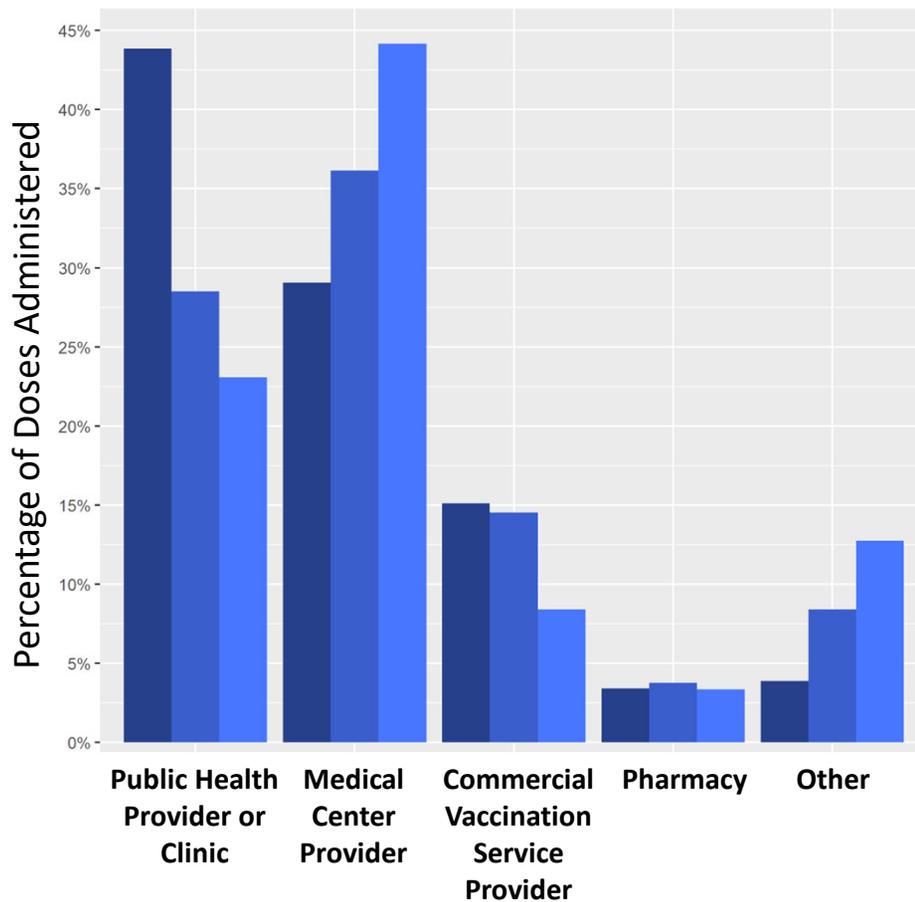
[https://worldhealthorg.shinyapps.io/mpx\\_global/](https://worldhealthorg.shinyapps.io/mpx_global/)

# First and Second Doses of JYNNEOS Vaccine Administrations—United States, May 2022–Sept 2023



\*Coverage is the estimated proportion who have received vaccination divided by the population recommended to receive the vaccine, which is estimated using 2021 data for MSM with HIV pre-exposure prophylaxis (PrEP) indications and 2020 data for HIV prevalence among MSM from [CDC AtlasPlus](#). These estimates are increased by 25% to account for additional vaccine eligible people not captured by these data sources totaling approximately 2 million people.

# Shift in Vaccine Administration Sites From Public Health Clinics to Medical Centers

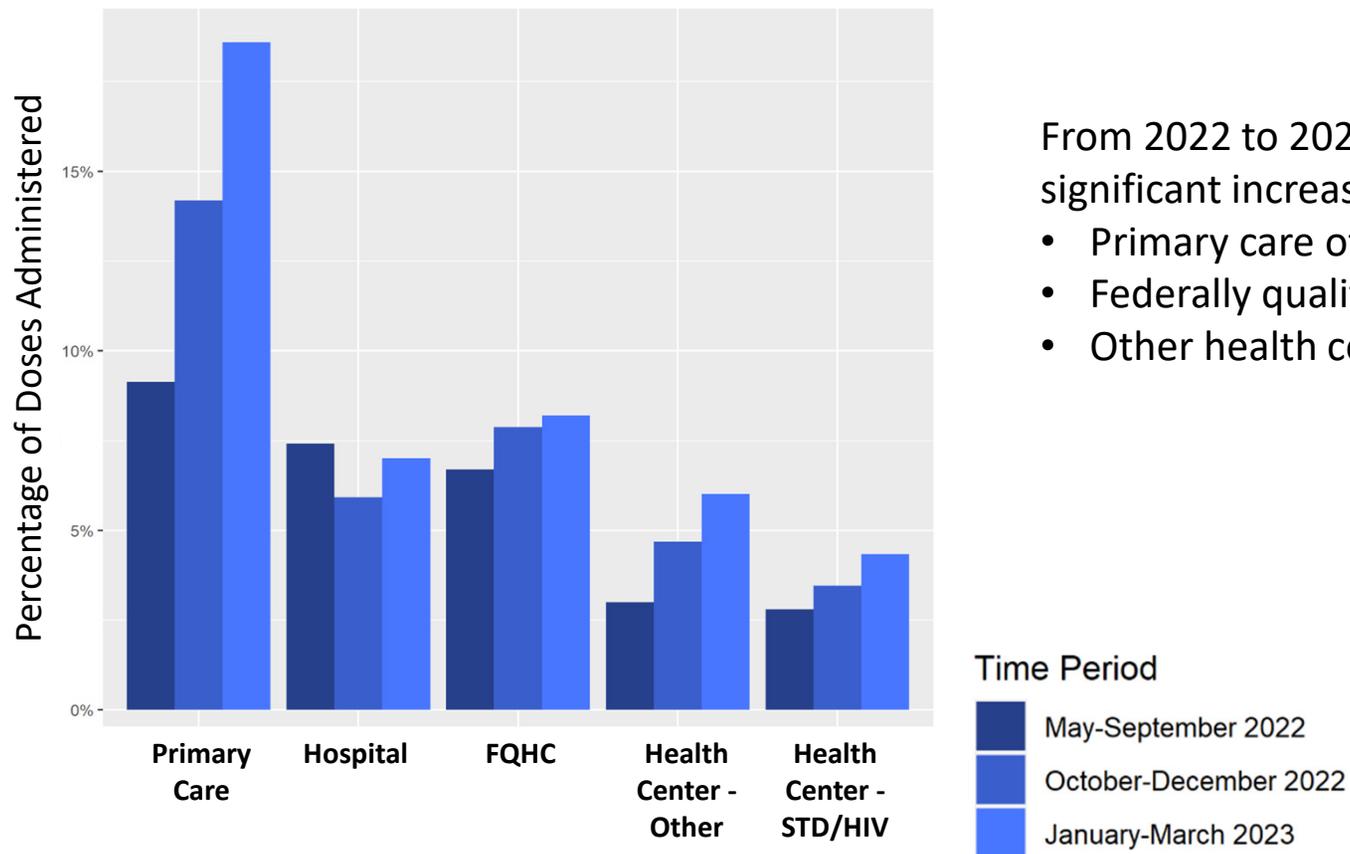


- Public health providers administered 40% of all vaccines through Mar 2023
- Medical care providers administered an increasing proportion of vaccines since the start of the outbreak
- Pharmacies consistently provided 3-4% of all vaccines

## Time Period



# Categories of Medical Providers Administering Vaccines

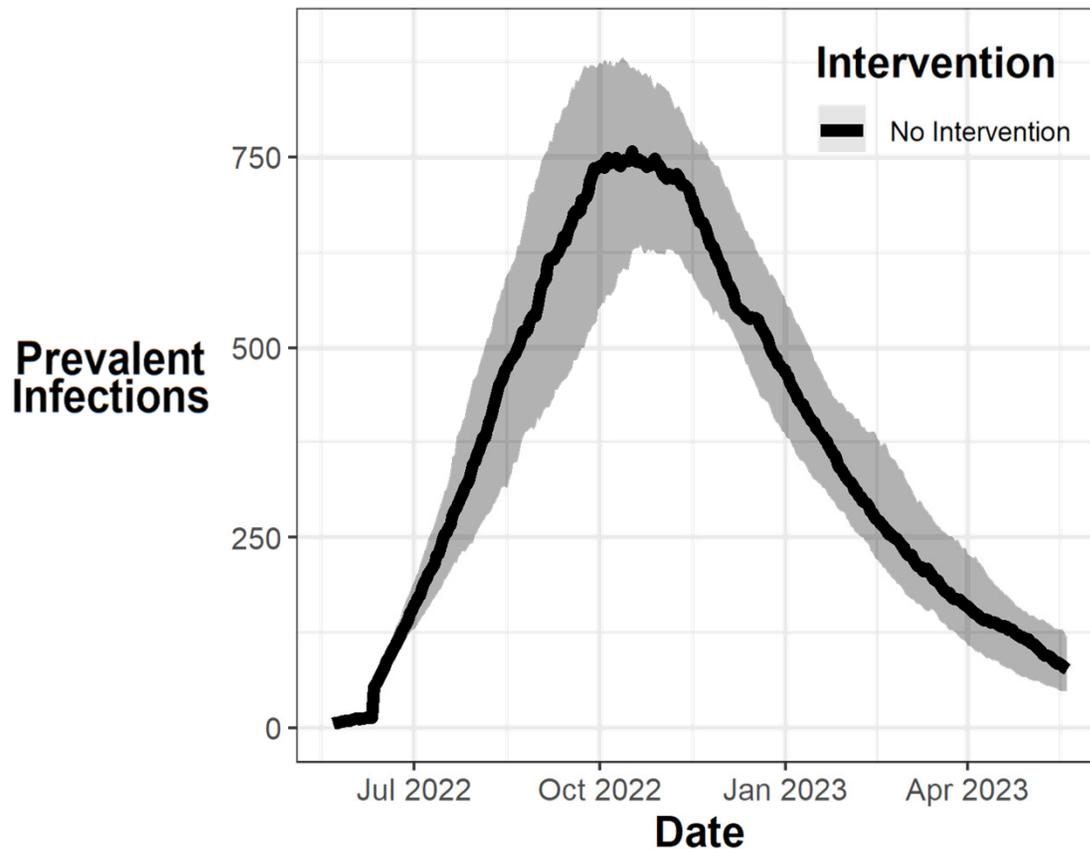


From 2022 to 2023, there were statistically significant increases in vaccines provided by

- Primary care offices
- Federally qualifying health centers (FQHC)
- Other health centers

# Modeling

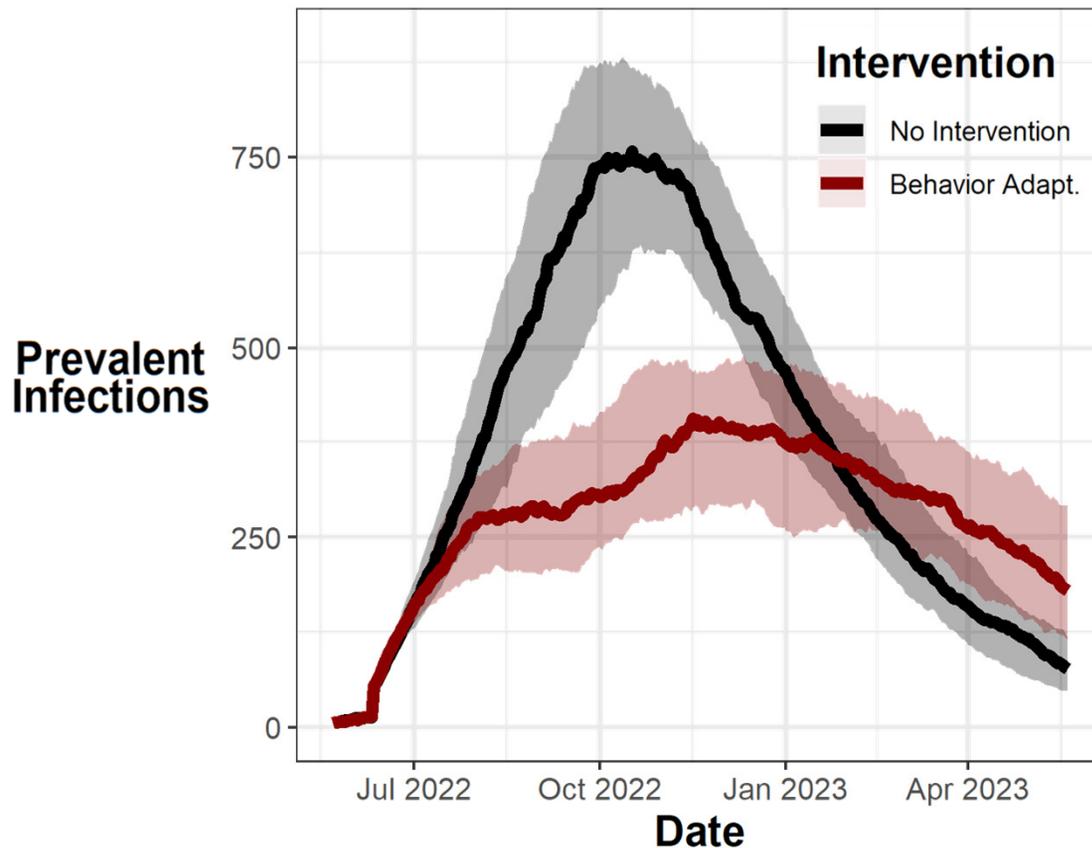
# Estimating Averted Cases from Vaccination and Behavioral Adaptation in DC



- Estimated prevalent infections over time with no vaccination or behavioral adaptation.

Lines and shaded regions reflect median and interquartile range from 120 simulations  
<https://www.medrxiv.org/content/10.1101/2023.02.10.23285772v1.full.pdf>

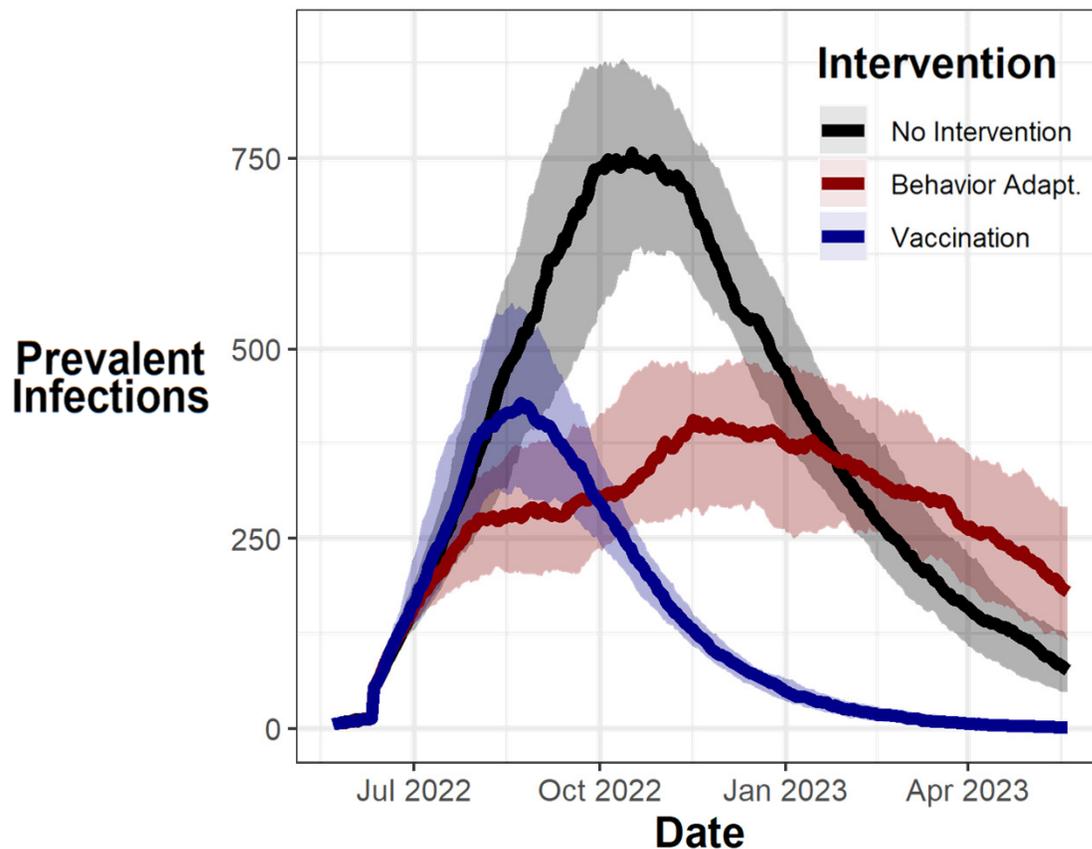
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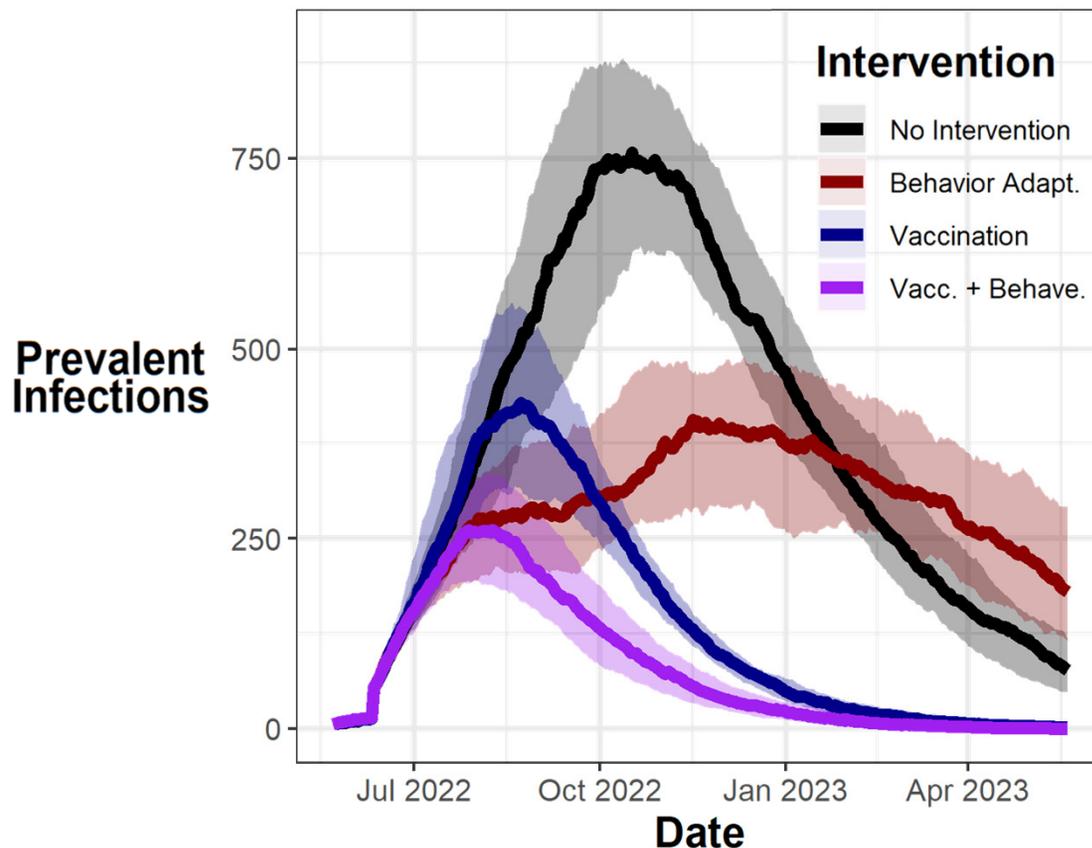
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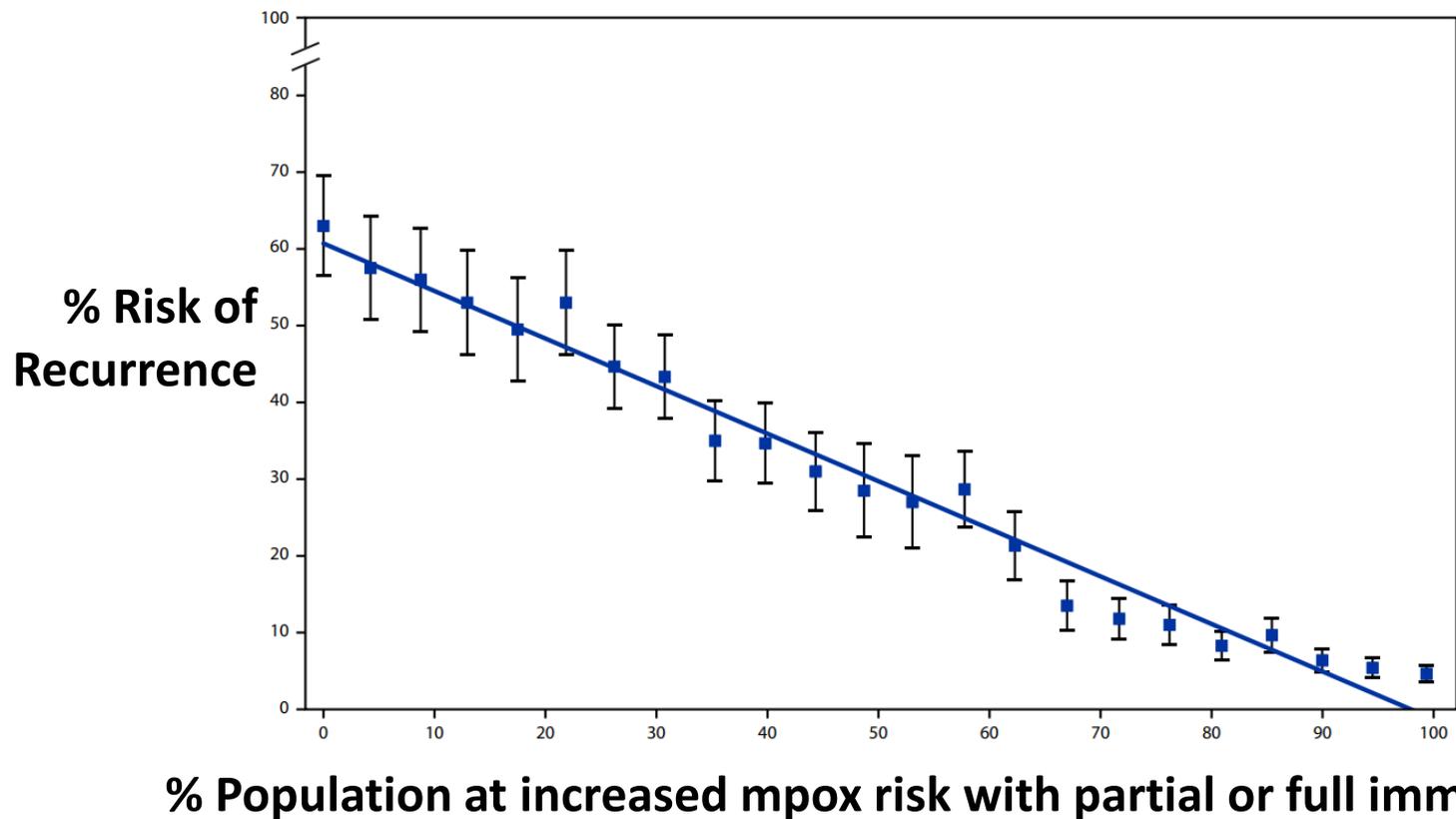
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- Combined, behavioral adaptation and vaccination averted 80% of cases 1 year into the outbreak

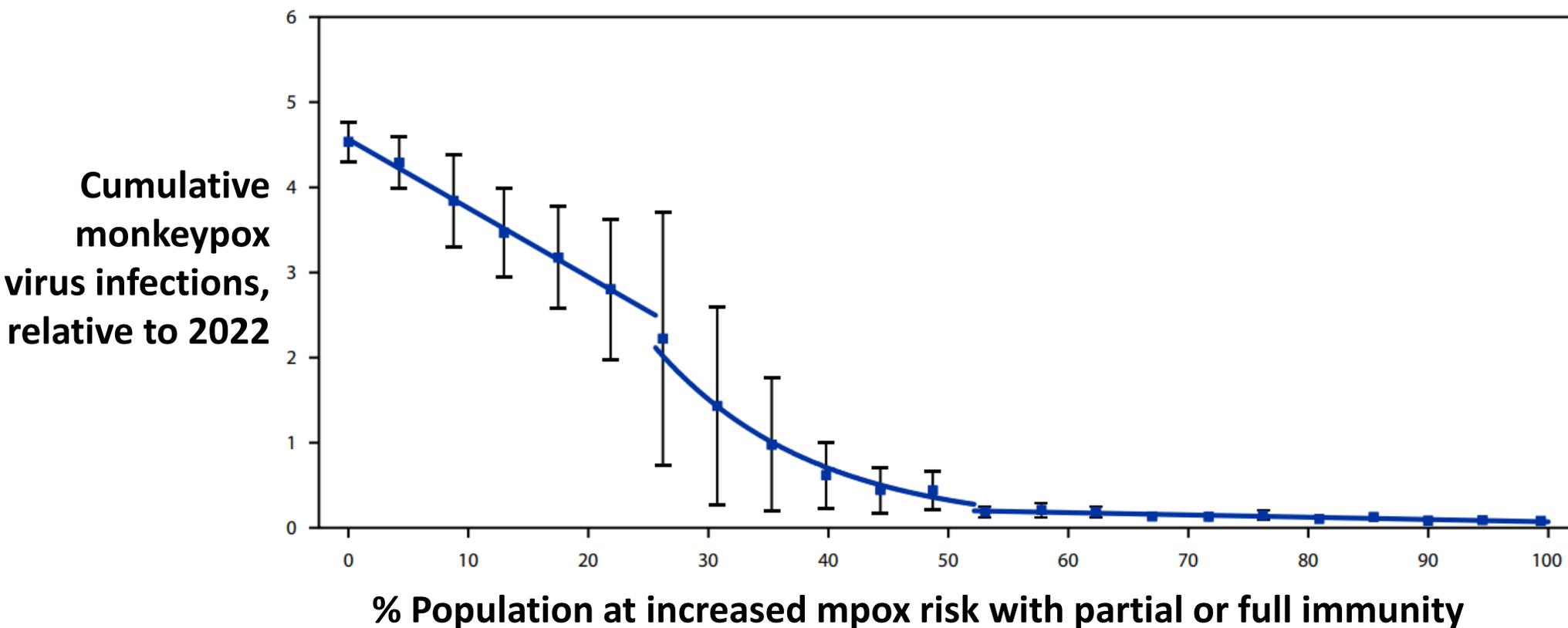
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# Risk for Recurrent Mpox Outbreak Lasting >3 Months, by Immunity Level — United States, 2023

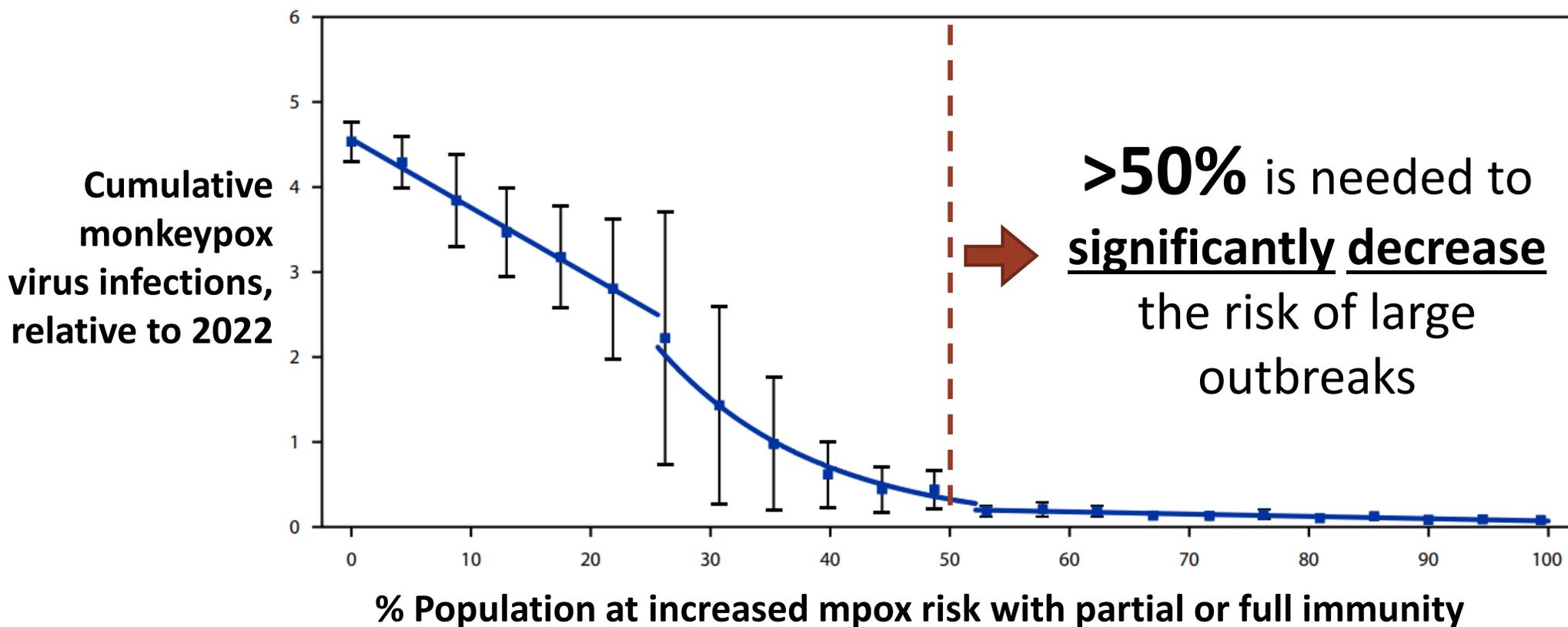


Risk of recurrence increases linearly as the percent of the high-risk population with full or partial protection decreases

# Cumulative *Monkeypox virus* Infections Relative to 2022, by Immunity Level — United States, 2023



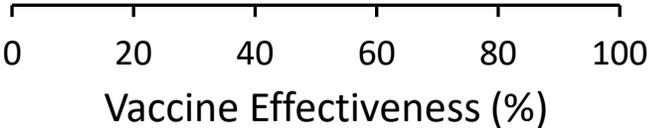
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# Vaccine: Effectiveness and Safety Updates

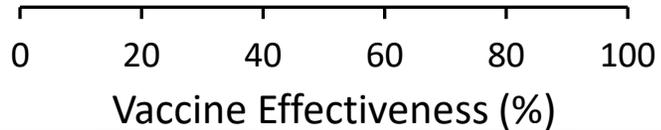
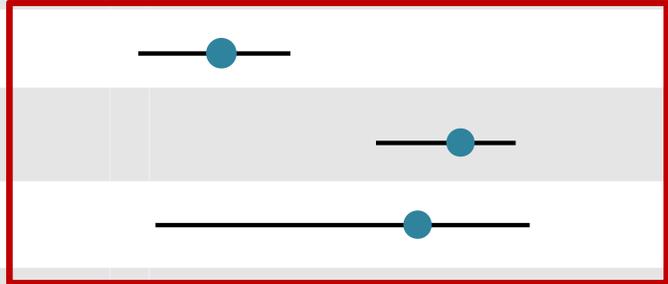
# Vaccine effectiveness of JYNNEOS against mpox ranges from 36%–75% for 1-dose vaccination and 66%–89% for 2-dose vaccination

	Cases	Controls	Adjusted* VE (95% CI)	
<b>1-dose JYNNEOS</b>				
Epic Cosmos case-control study	146	1000	36% (22–47)	
Multi-jurisdictional case-control study	58	237	75% (61–84)	
New York State case-control study	10	23	68% (25–86)	
<b>2-dose JYNNEOS</b>				
Epic Cosmos case-control study	25	335	66% (47–78)	
Multi-jurisdictional case-control study	14	122	86% (74–89)	
New York State case-control study	2	19	89% (44–98)	



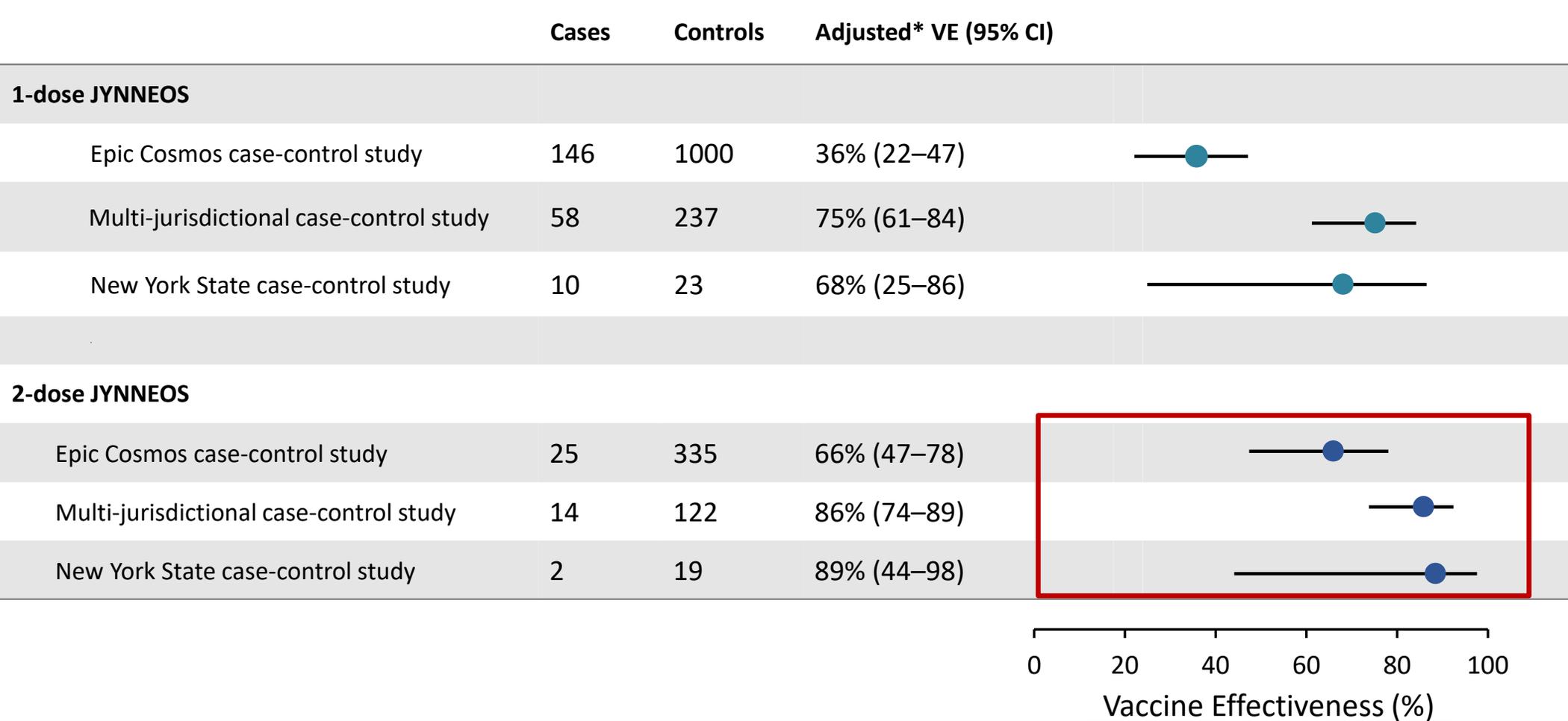
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0 20 40 60 80 100  
Vaccine Effectiveness (%)

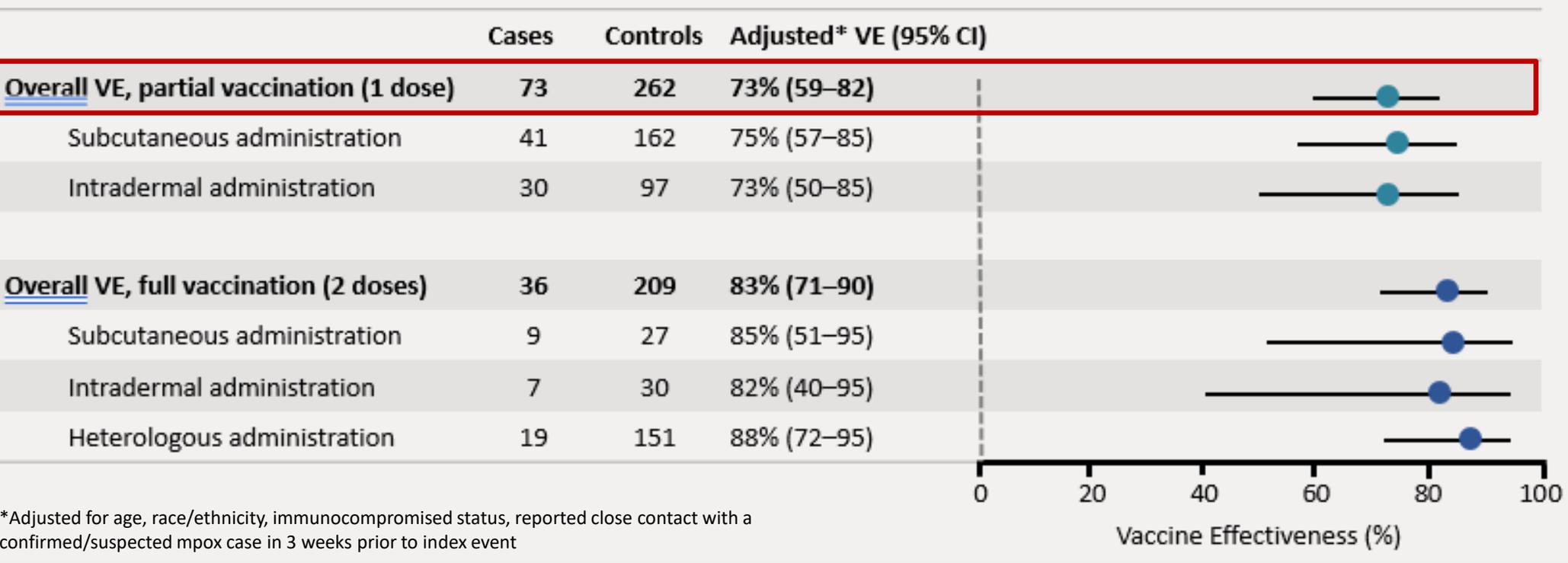
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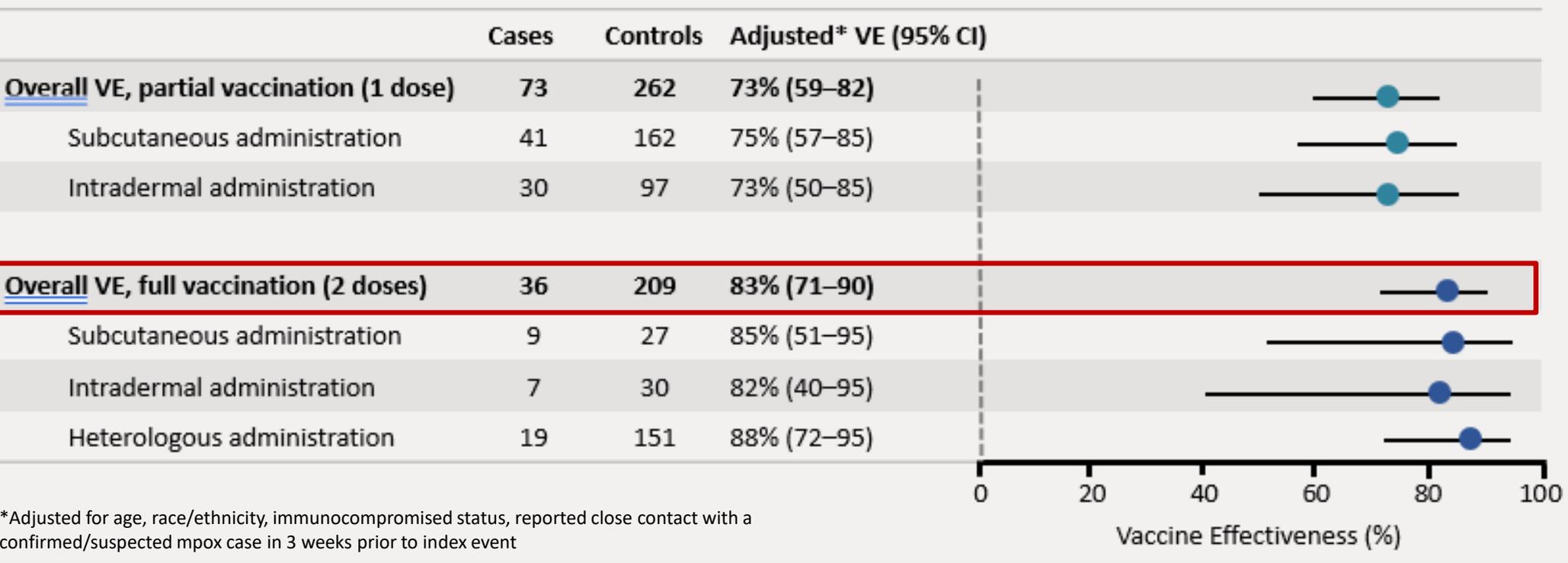
# Multi-jurisdictional Case-Control Study: Methods

- **Population:** Men who have sex with men; ages 18-49; 12 U.S. jurisdictions
  - **Time Period:** August 19, 2022, to September 27, 2023
  - **Methods:**
    - **Cases** identified from jurisdictions' probable and confirmed mpox case lists
    - **Controls** identified from healthcare settings providing HIV PrEP or sexually transmitted infection (STI) clinics
    - Demographics, immunocompromised status, exposure history, and vaccination history collected using electronic surveys
    - Vaccination status confirmed by state immunization registries
  - **Analysis:**
    - **VE estimated** using conditional logistic regression
    - **Adjusted for** age, race/ethnicity, immunocompromising conditions
    - **Stratified by** route of administration and immunocompromised status
- 

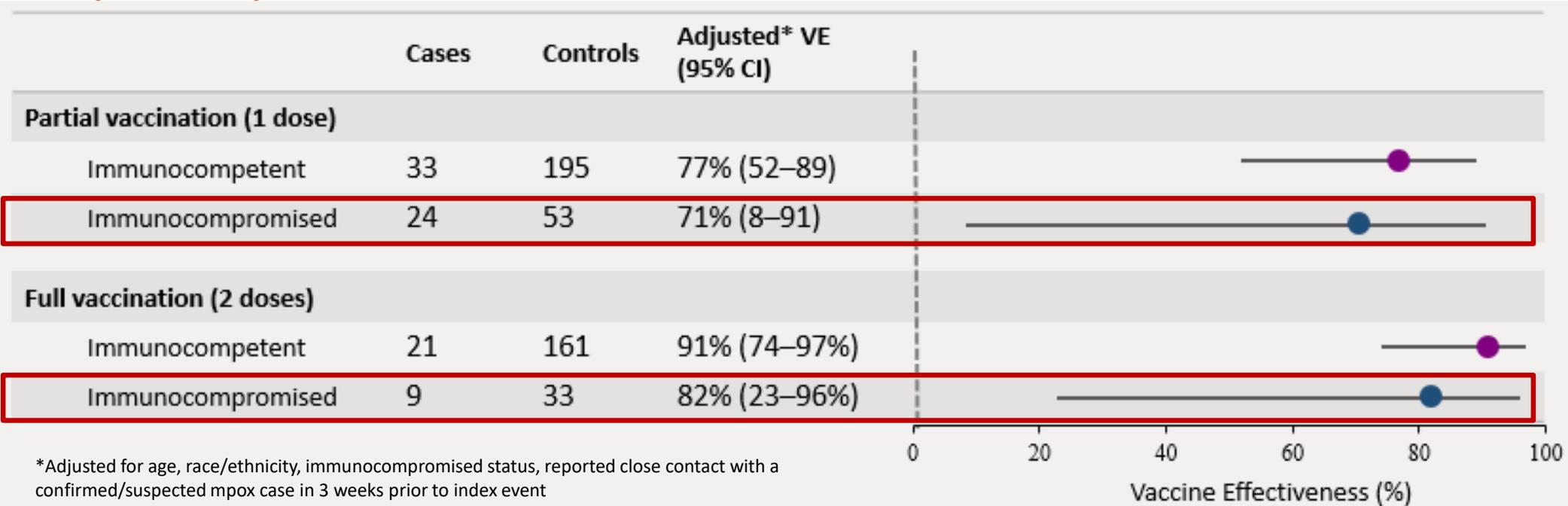
# Both partial and full vaccination with JYNNEOS showed effectiveness against mpox, regardless of administration route



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# VE trended higher for immunocompetent participants compared to self-reported immunocompromised participants



- Confidence interval remains very wide
- More work is needed to understand VE in objectively confirmed immunocompromised people

## JYNNEOS Vaccine Safety Monitoring

- CDC vaccine safety monitoring is ongoing using two surveillance systems:
  - Vaccine Adverse Event Reporting System (VAERS)
  - Vaccine Safety Datalink (VSD)
- V-safe data collection for mpox vaccines was available from November 2022 through March 21, 2023

# JYNNEOS Vaccine Safety Findings Summary

- 90% of VAERS reports were submitted in 2022
- The adverse events most commonly reported to VAERS have been injection site symptoms (redness, swelling, pain, itching)
- Myocarditis and pericarditis are adverse events of special interest
  - Observed rates are consistent with expected background rates

## JYNNEOS Vaccine Safety Conclusions

- VAERS and VSD data do not suggest an increased risk for myocarditis or pericarditis following JYNNEOS, but the possibility of a small risk cannot be excluded
  - The frequencies of local and systemic reactions reported to v-safe after mpox vaccine were similar to those reported in clinical trials
  - No new or unexpected safety concerns have been identified
- 

## Summary

- Mpox cases and deaths continue to be reported domestically and globally
  - Need to improve our overall vaccine coverage; <25% of the eligible population is fully vaccinated with 2 doses
  - Modeling suggests that without vaccination, transmission of mpox will continue with sporadic outbreaks
  - No new safety signals from VAERS or VSD
  - VE appears stable for immunocompetent people
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# Acknowledgements

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- Christina Hutson
- Ian Spicknall
- Patrick Clay
- Emily Pollock

# Questions?

For more information, contact CDC  
1-800-CDC-INFO (232-4636)  
TTY: 1-888-232-6348 [www.cdc.gov](http://www.cdc.gov)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

National Center for Emerging and Zoonotic Infectious Diseases  
Division of High-Consequence Pathogens and Pathology

