

Sexual Health and Vaccines

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Disclosures

I have no relevant financial disclosures.

Outline

1. A case
2. Five vaccines
3. Implementation
4. Future directions

A case

- A 27-year-old cisgender man would like to start oral HIV pre-exposure prophylaxis (PrEP).
- He has had condomless sex with two cisgender men in the past six months.
- He received all recommended childhood vaccinations, including the hepatitis B and human papillomavirus (HPV) vaccines.
- His baseline laboratory studies show:

HIV antibody/antigen: Negative	Hepatitis B surface antibody: Negative
Treponemal antibody: Negative	Hepatitis B core antibody: Negative
Hepatitis C antibody: Negative	Hepatitis B surface antigen: Negative
Estimated creatinine clearance: 120 mL/min	Urine/throat/rectal gonorrhea/chlamydia: Negative

Which vaccines would you recommend now for his sexual health?

- A. Mpox
- B. Hepatitis B and meningococcal
- C. Hepatitis A and HPV
- D. Hepatitis A and mpox
- E. Hepatitis A, hepatitis B, and mpox

Vaccines are part of an expanding toolkit of preventive sexual health interventions.

Condoms

Doxycycline prophylaxis

Contraception

Vaccination

Oral or injectable PrEP

Point-of-care and home
testing

Five vaccines

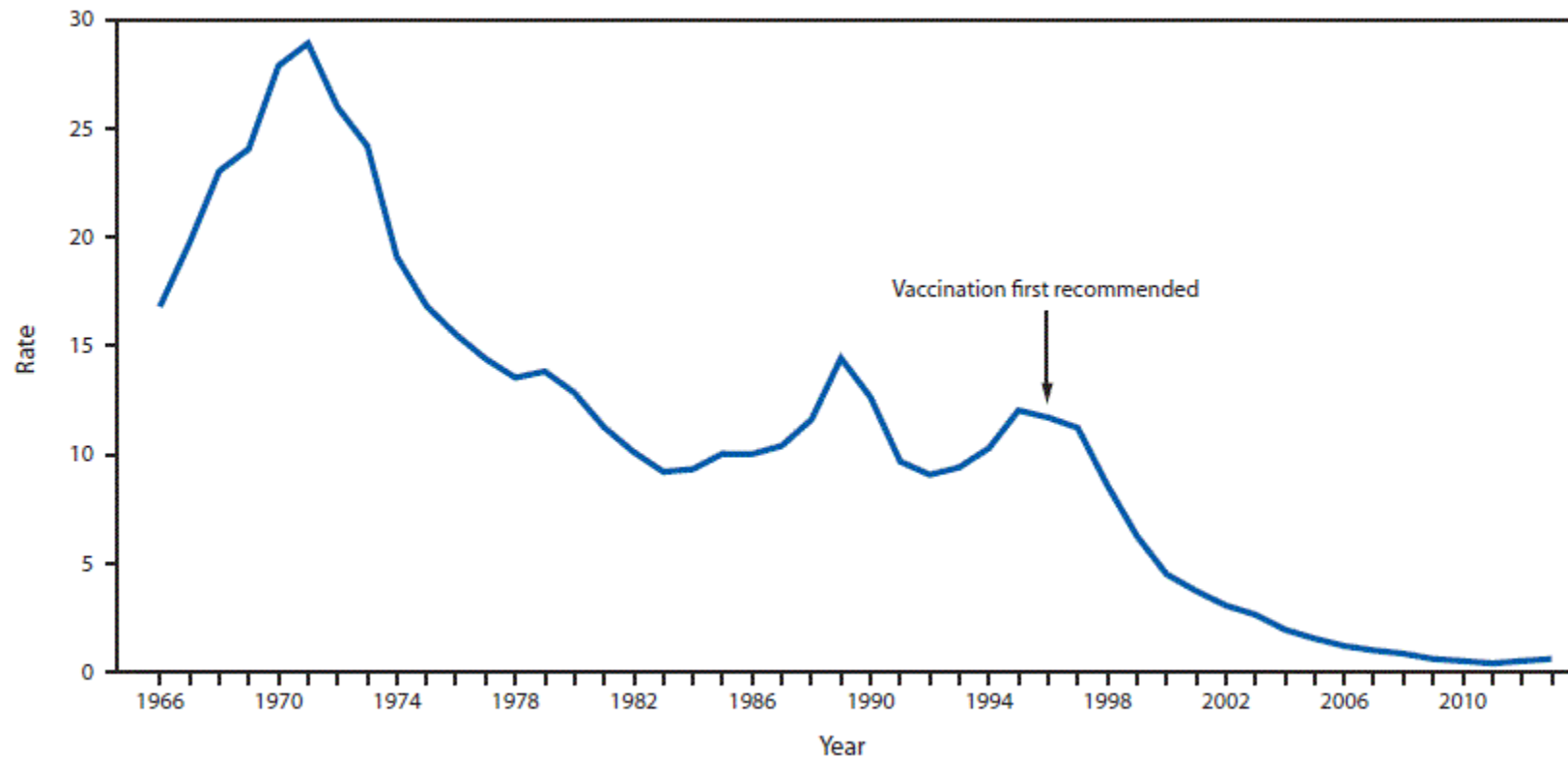
Vaccines with sexual health-related indications

Vaccine	Selected indications related to sexual health
Hepatitis A	MSM
Hepatitis B	MSM, seeking STI testing or treatment, multiple sex partners, sex partner with positive hepatitis B surface antigen
Human papillomavirus	All people through age 26 years, shared decision-making for adults 27-45 years of age
Mpox	MSM, transgender and non-binary people who have had, in the past 6 months, an STI, more than one sex partner, sex at a commercial venue or public event, or sex partners with the above
Meningococcal	MSM in outbreak settings

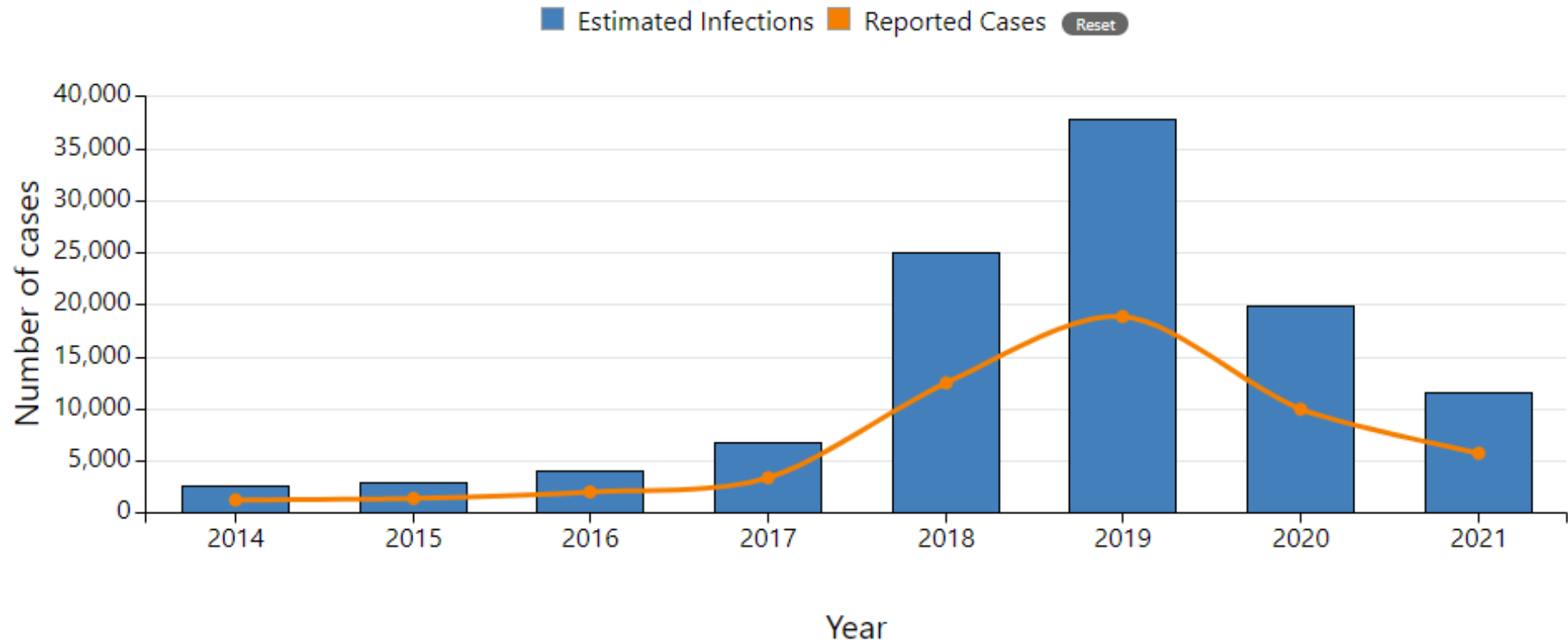
Hepatitis A vaccine

- **Schedule:** A 2- or 3-dose series
- **Recommendations:**
 - Any person who requests vaccination
 - Men who have sex with men

Hepatitis A incidence



Hepatitis A cases and estimated infections, 2014-2021





Massachusetts Department of Public Health

Clinical Advisory – Hepatitis A Among Persons Experiencing Homelessness and Who Use Injection and Non-injection Drugs

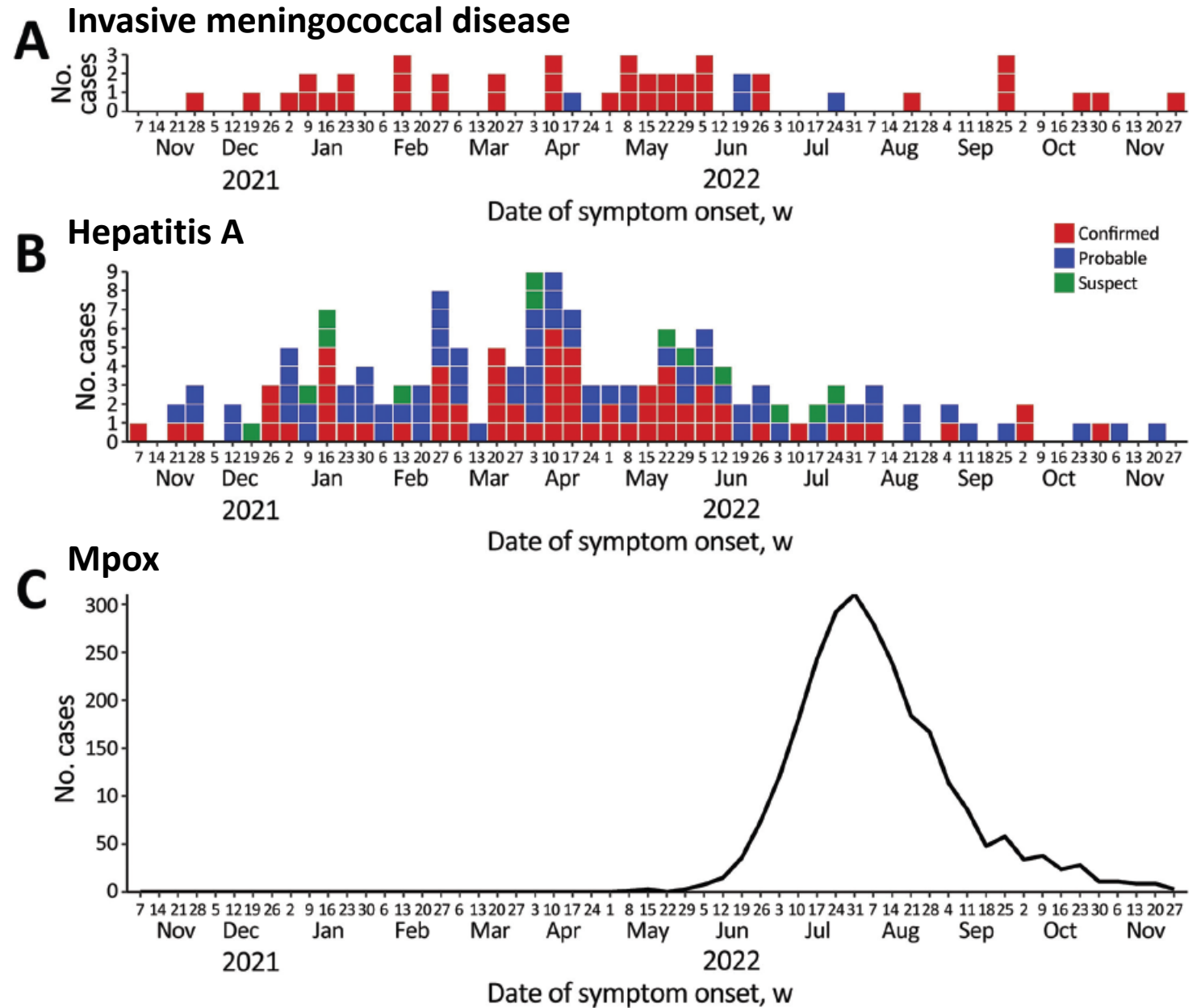
Outbreak

- At least 6 cases in November 2023
- 4 of 6 required hospitalization

Response

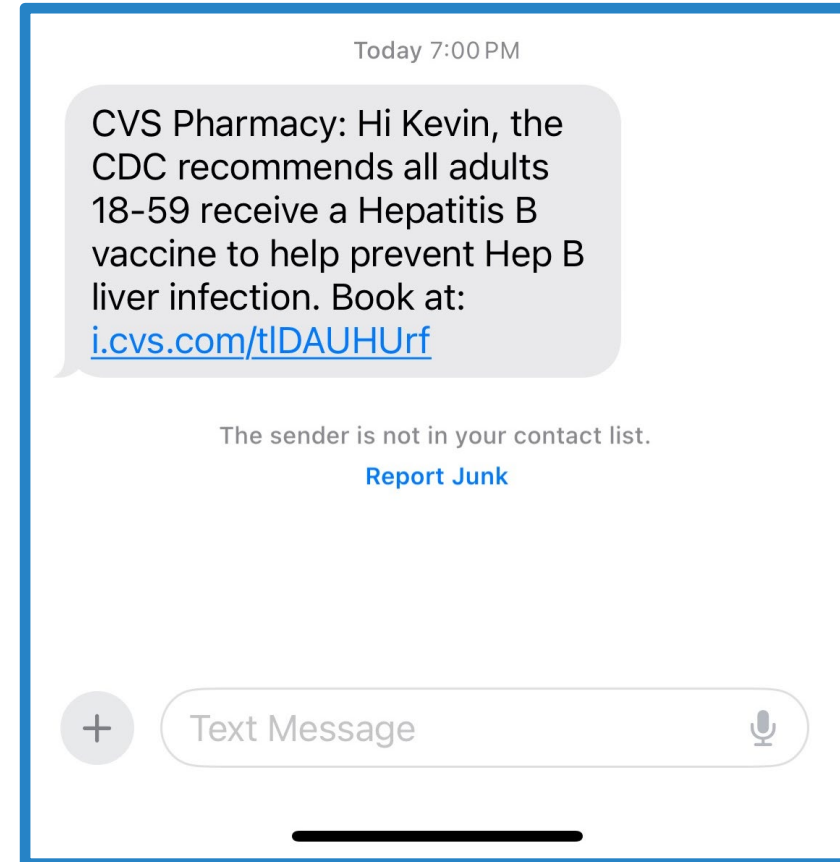
- Vaccinate people who inject drugs, people experiencing homelessness, those with chronic liver disease, and men who have sex with men
- Offer vaccination at the point of care, including in EDs and urgent care centers

Concurrent outbreaks of hepatitis A, meningococcal disease, and mpox affecting MSM

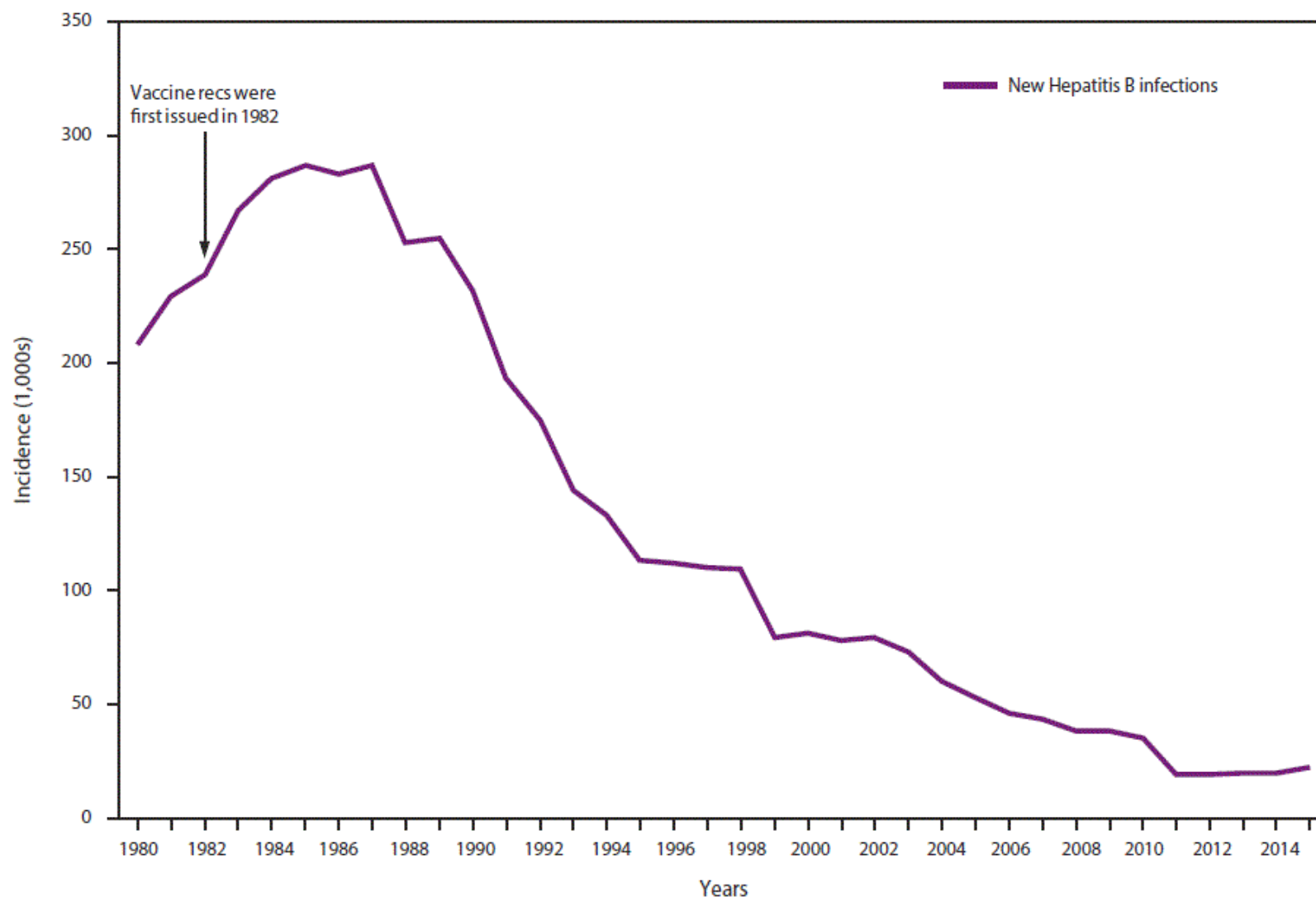


Hepatitis B vaccine

- **Schedule:** A 2-, 3-, or 4-dose series
- **Recommendations:**
 - Routinely for adults ages 19-59 years
 - Age 60 years or older with known risk factors, including:
 - Sex outside of a mutually monogamous relationship
 - Sex with someone who is positive for hepatitis B surface antigen
 - Seeking evaluation or treatment for sexually transmitted infections (STIs)
 - Men who have sex with men



**Hepatitis B
incidence has
declined
substantially in
the vaccine era.**



For which adults are post-vaccination hepatitis B antibody titers recommended?

Healthcare and public safety workers

People on hemodialysis

People with HIV

Immunocompromised people

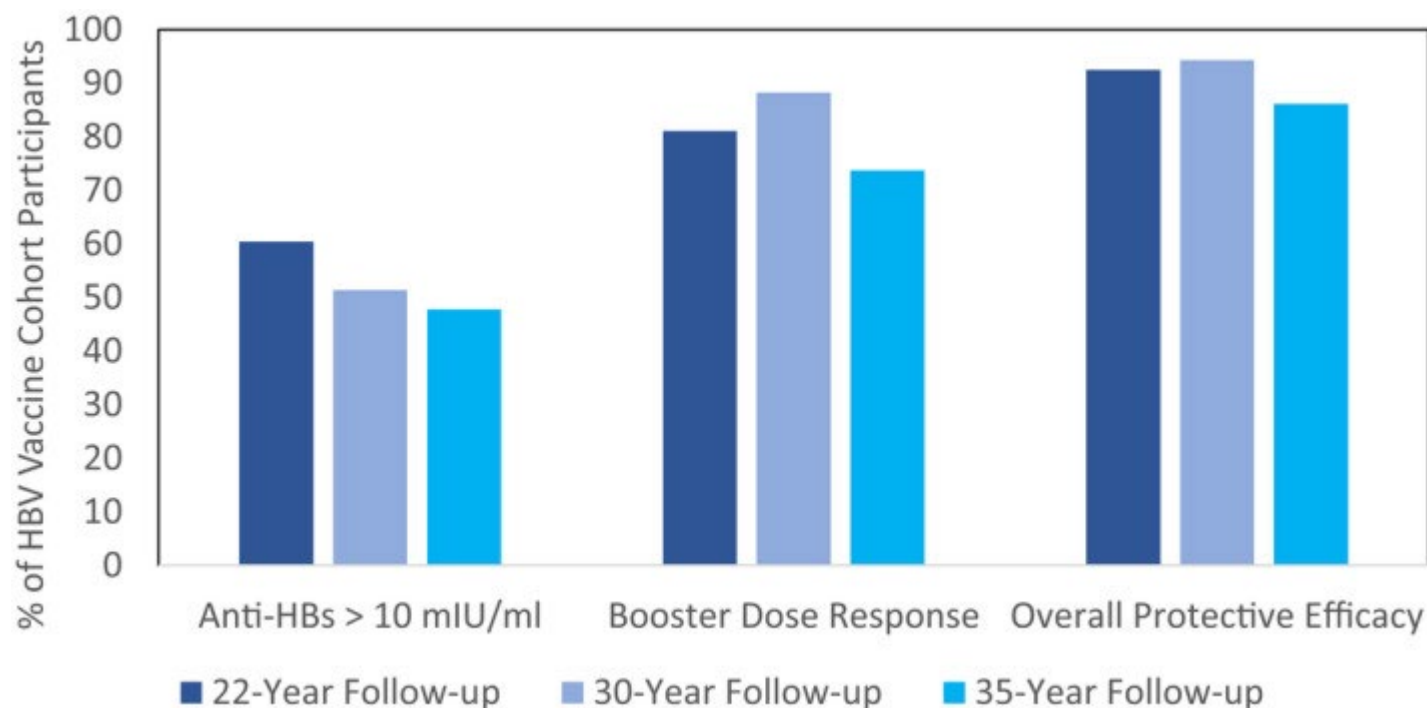
People whose sex partners are positive for hepatitis B surface antigen

Testing should be performed 1-2 months after the final vaccine dose.

Should patients such as ours receive additional hepatitis B vaccines?

Generally, no. Studies suggest that people such as our patient are immune and would mount an immunologic response if exposed to hepatitis B.

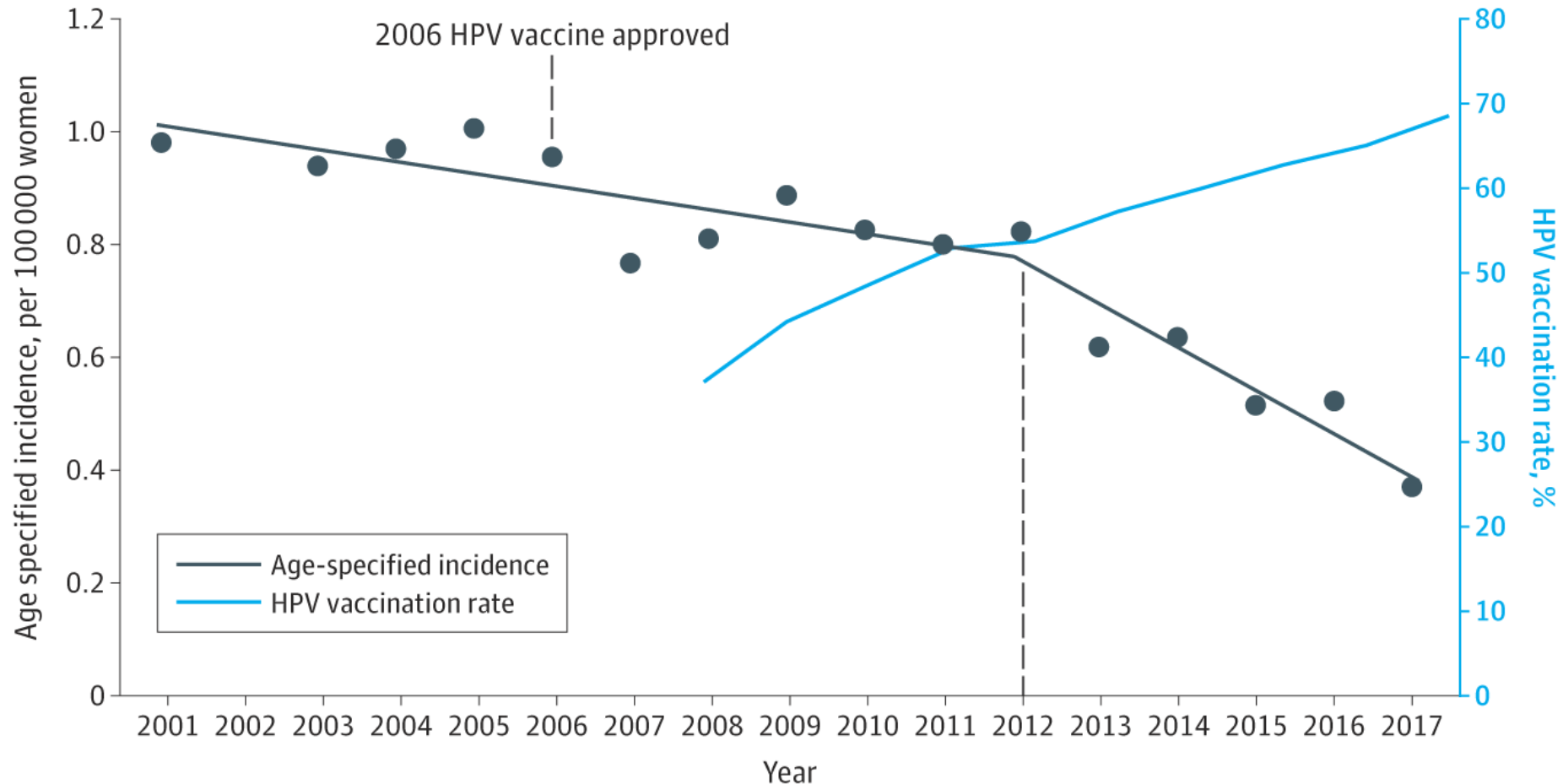
Protective efficacy of 3-dose hepatitis B vaccine among Alaska Natives



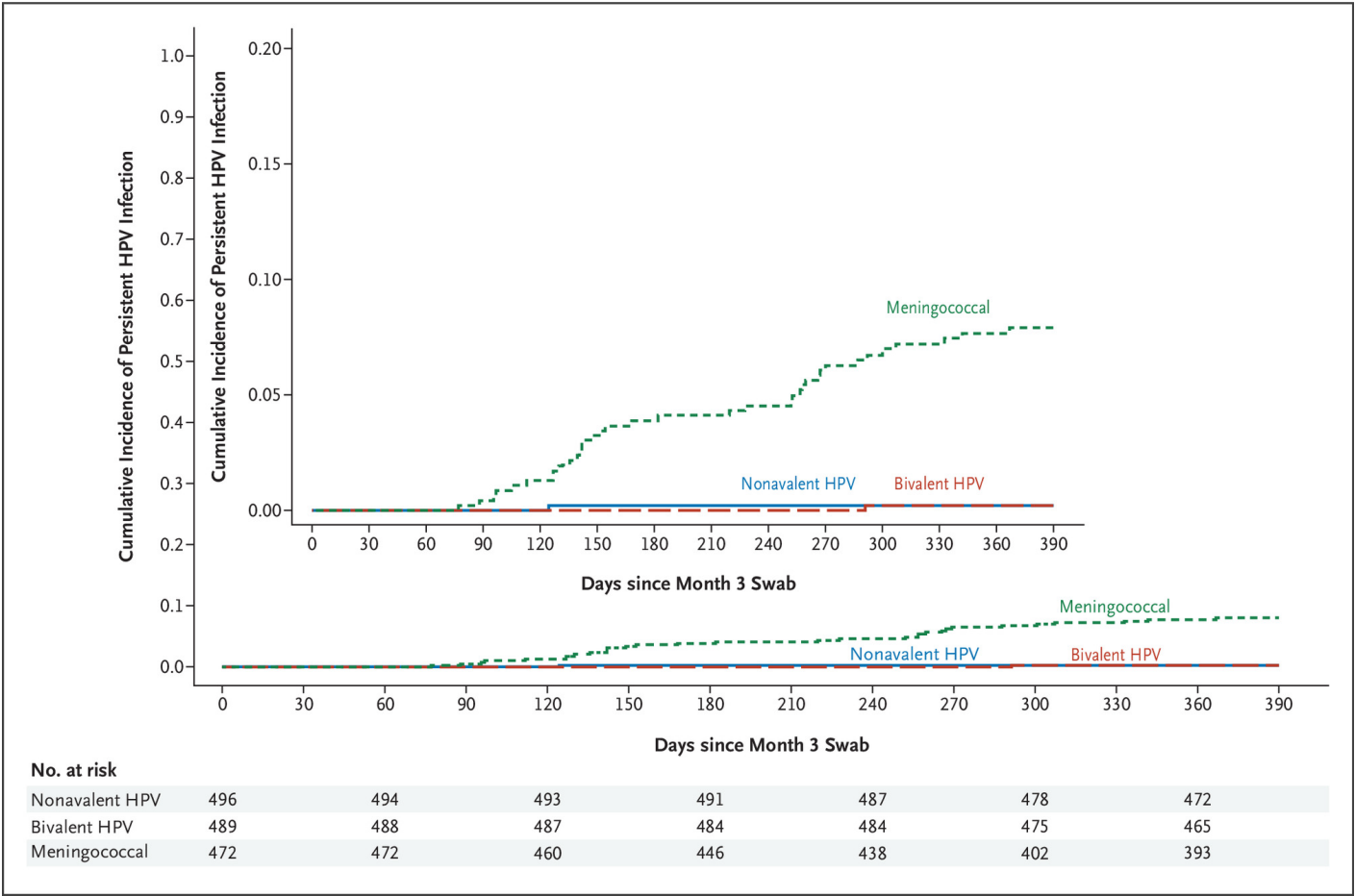
Human papillomavirus (HPV) vaccine

- **Schedule:** A 2- or 3-dose series, depending upon age and underlying conditions
- **Recommendations:**
 - All people through age 26 years
 - People ages 27-45 through shared decision-making

Increasing HPV vaccination is associated with declining cervical cancer incidence.



Even one dose of the HPV vaccine may be beneficial.

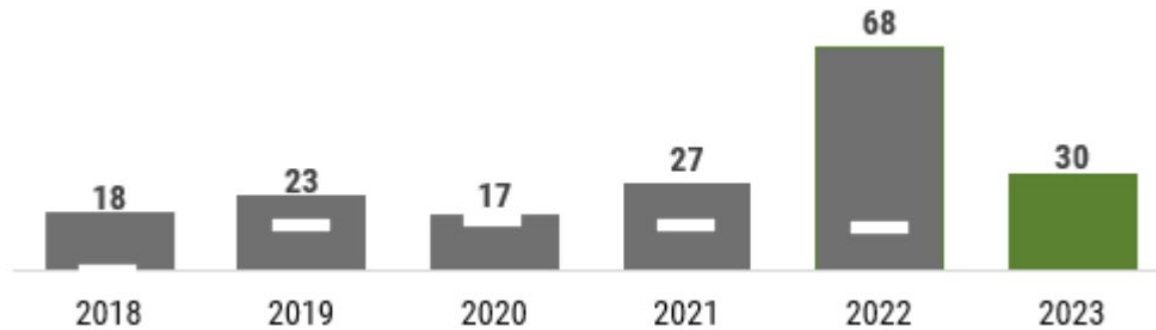


Meningococcal vaccine

- **Schedule:** 1 or 2 doses, depending upon the context and product used
- **Recommendations:**
 - For MenACWY
 - Certain forms of immunocompromise (asplenia, HIV, complement deficiency or inhibitor)
 - Travel or occupational exposure
 - College students or military recruits in shared housing
 - MSM in outbreak settings
 - For MenB
 - Adolescents and young adults ages 16-23, through shared decision-making
 - Certain forms of immunocompromise (asplenia, complement deficiency or inhibitor)
 - Occupational exposure (e.g., microbiologists)
 - Others (e.g. MSM) in outbreak settings

2022 outbreak in Florida

Meningococcal disease cases in Florida, by year



*The white bars indicate the total number of cases as of August for each year

- Outbreak involved serogroup C and predominantly affected gay, bisexual, and other MSM, some with HIV.
- About half of cases were among Hispanic/Latino men.
- Most affected individuals lived in Florida, but some had traveled to the state.

Vaccination was key to outbreak response.

- CDC encouraged MSM living in Florida to receive vaccination with the MenACWY vaccine.
- The vaccine was available free of charge at health department clinics.
- CDC also encouraged MSM to discuss vaccination with their clinicians if they intended to travel to Florida.
- **Reminder:** CDC recommends routine meningococcal vaccination for all people with HIV.

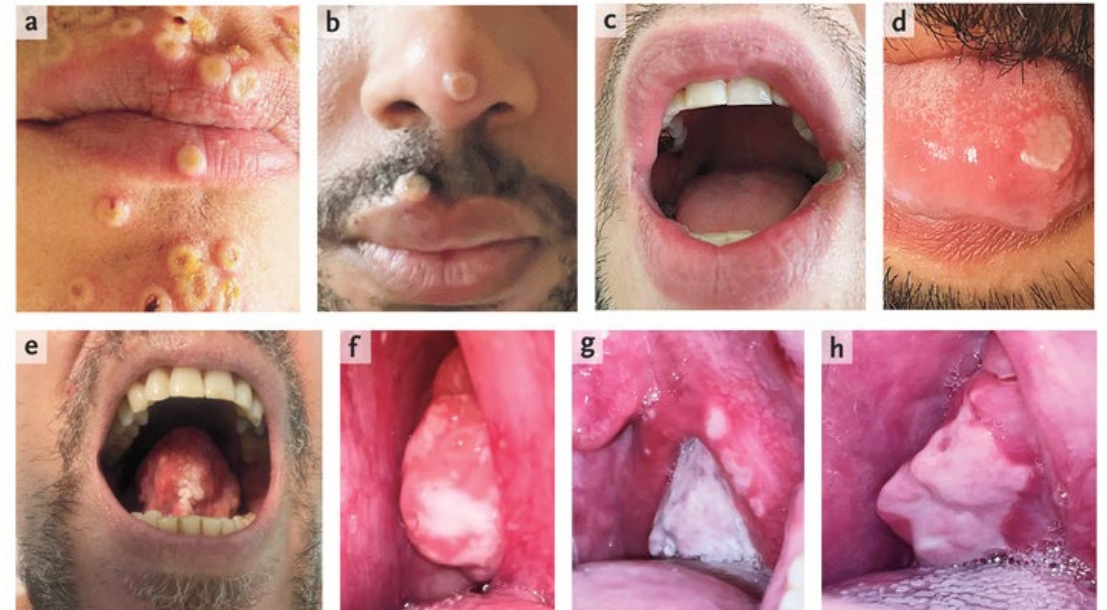


Mpox vaccine

- **Schedule:** 2-dose series
- **Recommendations (Massachusetts):**
 - People with known or suspected exposure to mpox
 - Gay, bisexual, and other MSM and transgender and non-binary people who, in the past 6 months, have had
 - An STI diagnosis
 - More than one sex partner
 - People who, in the past 6 months, have had
 - Sex at a commercial sex venue or large public event where mpox transmission was occurring
 - Sex in exchange for money or other items
 - People whose sex partners have any of the above characteristics
 - People who anticipate experiencing any of the above risks
 - Laboratory personnel who work with orthopoxviruses

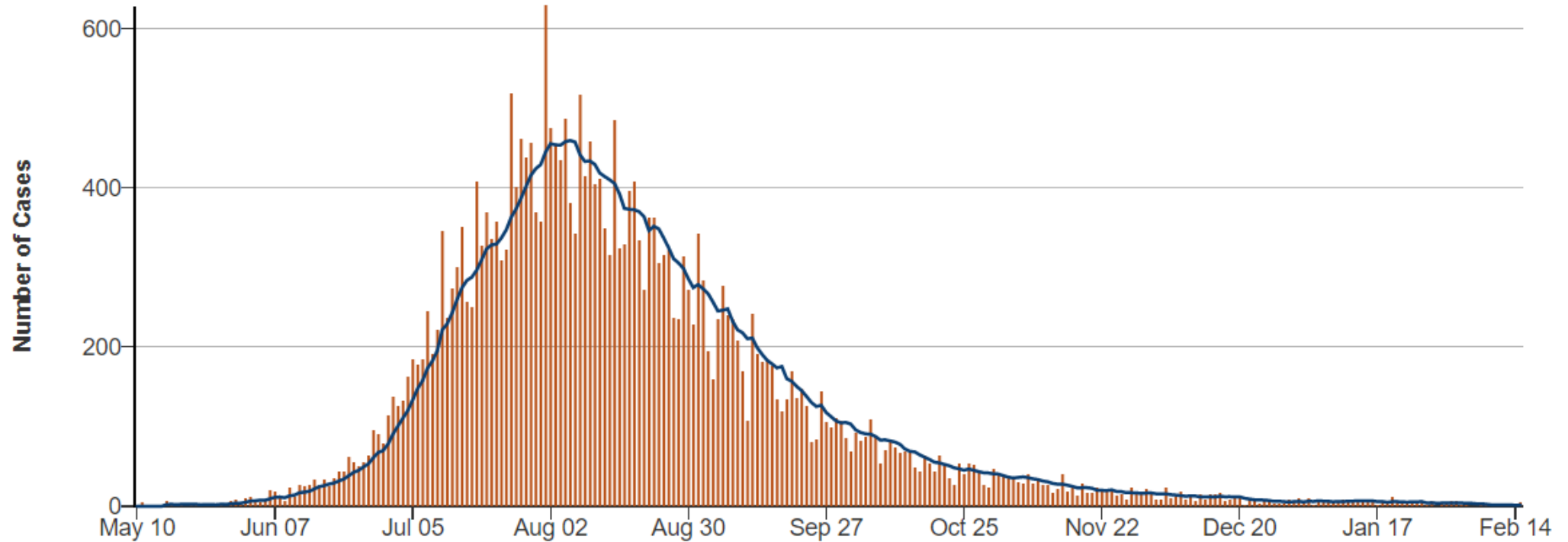
Clinical features of the recent global mpox outbreak

- Affected people > 90% men; > 90% gay, bisexual, or other MSM
- ~40% living with HIV
- Concurrent sexually transmitted infection (STI) in 29%
- Symptoms and signs:
 - Rash in any location in 97%
 - Fever in 66%
 - Anogenital rash in > 70%
 - Rectal pain in 40%
 - Proctitis in 15%

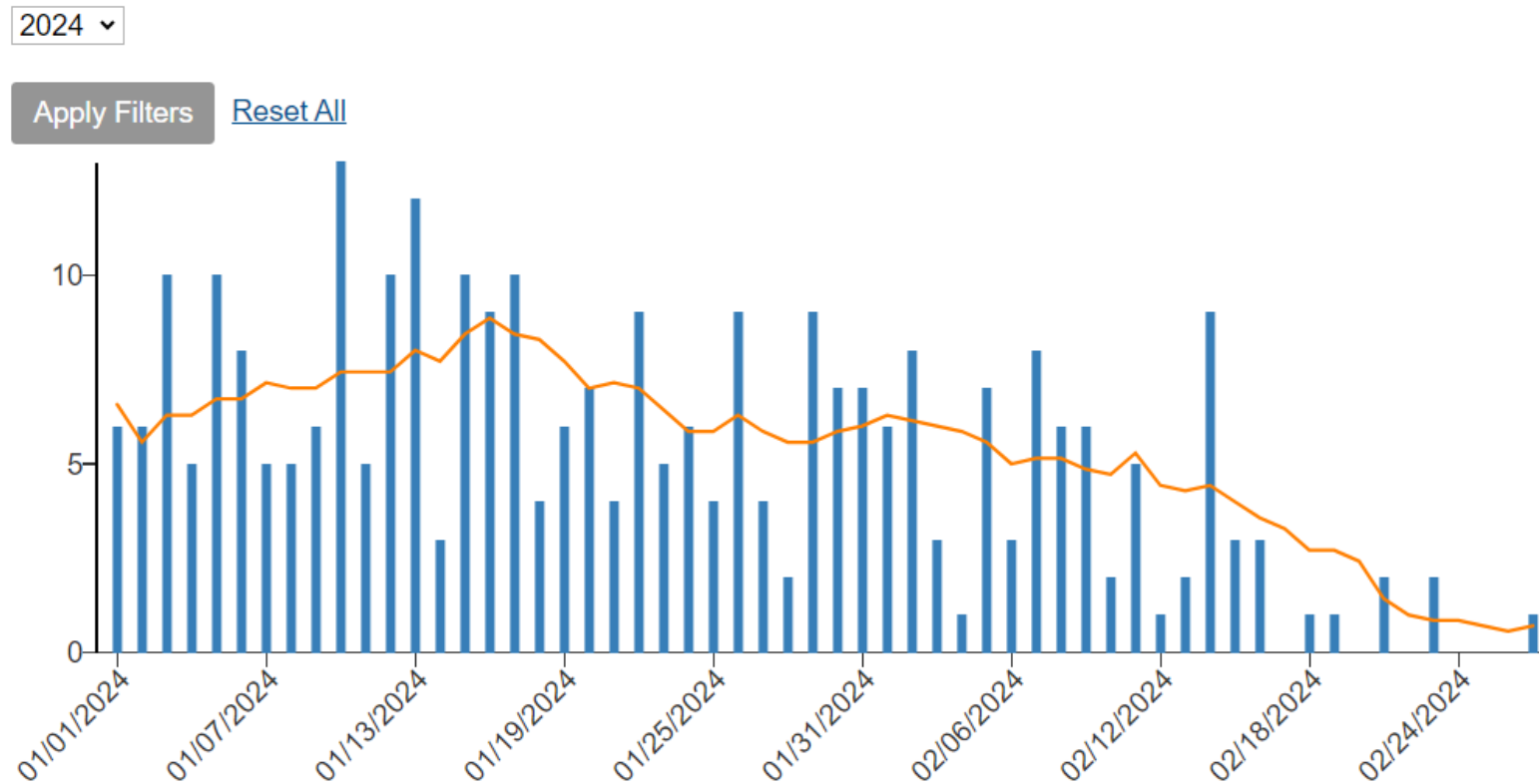


Trends of mpox cases reported to CDC during the 2022 outbreak by date*

Daily Mpox Cases and 7 Day Daily Average



Mpox has not disappeared



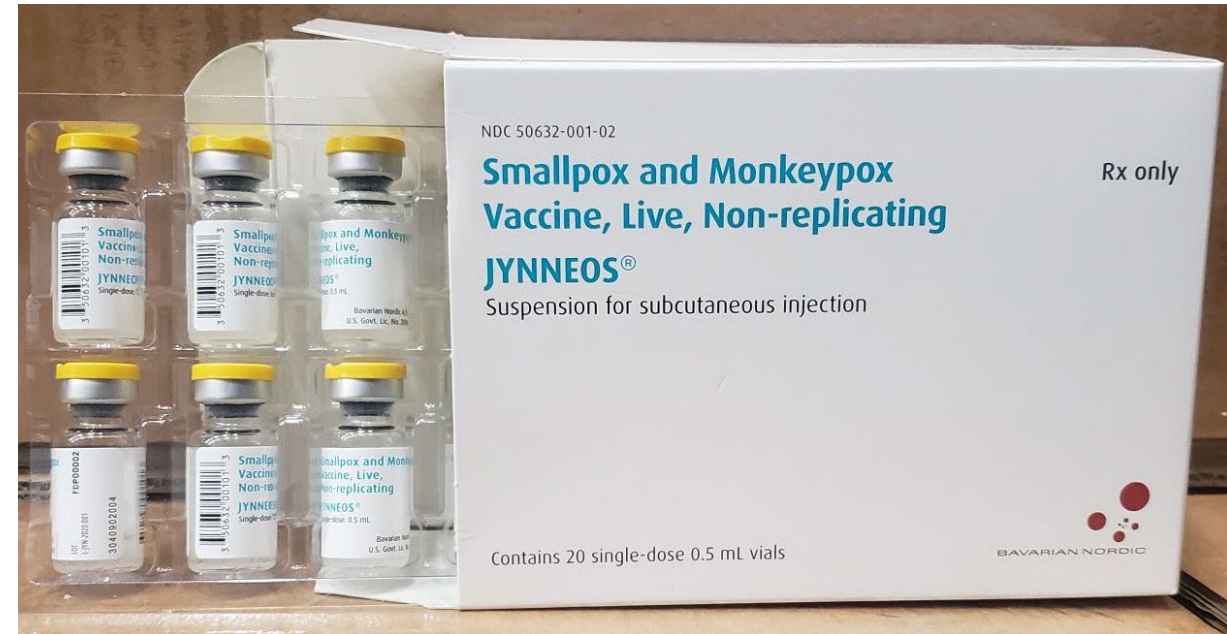
True or false: The MVA-BN mpox vaccine is contraindicated for immunocompromised people.

A. True

B. False

The MVA-BN vaccine

- Replication-deficient *Vaccinia* virus
- Licensed as a series of two subcutaneous injections, 4 weeks apart
- The only contraindication is severe allergy to a vaccine component (ciprofloxacin, gentamicin, egg).
- Side effects include injection site reactions; serious side effects are rare.
- The vaccine is safe in people with HIV and immunogenic in people with CD4 counts > 100.

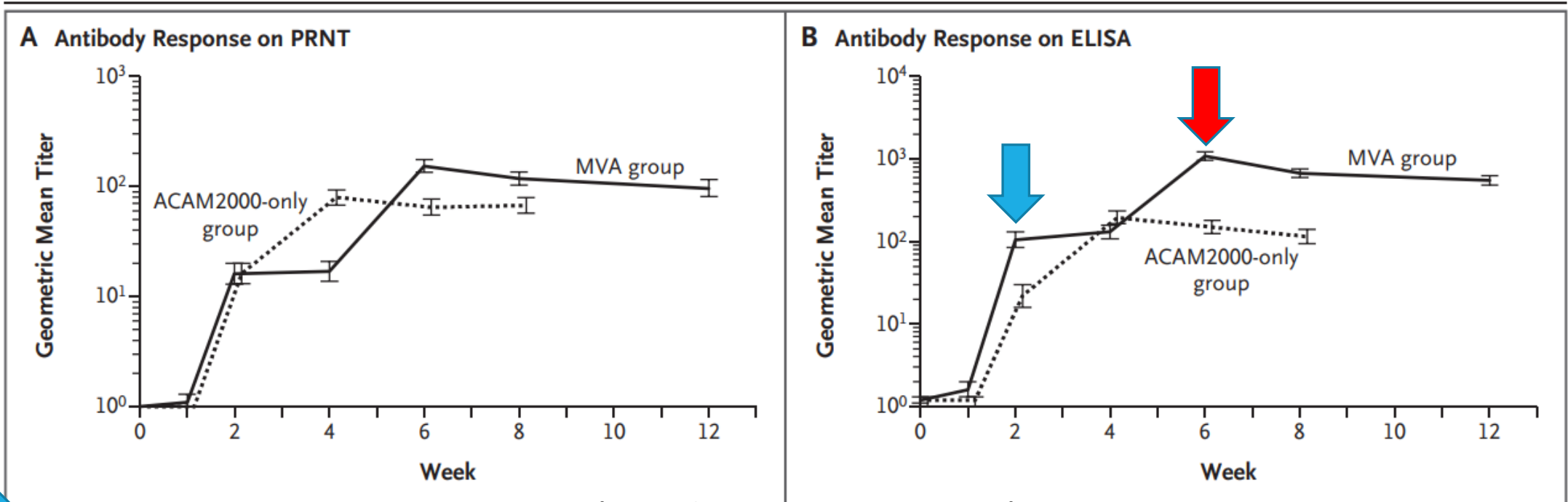


ACAM2000 versus MVA-BN

TABLE 3. Contraindication to administration of ACAM2000 and JYNNEOS to recipients or their household contacts with certain conditions — United States, 2022

Clinical characteristic	Contraindication to receipt of ACAM2000			Contraindication to receipt of JYNNEOS
	Vaccine recipient with condition		Household contact with condition*	
	Primary vaccination	Revaccination		
History or presence of atopic dermatitis	Y	Y	Y	—
Other active exfoliative skin conditions [†]	Y	Y	Y	—
Immunosuppression [§]	Y	Y	Y	—
Pregnancy [¶]	Y	Y	Y	—
Age <1 year**	Y	Y	Y	—
Breastfeeding ^{††}	Y	Y	—	—
Serious vaccine component allergy	Y	Y	—	Y
Known underlying heart disease (e.g., coronary artery disease or cardiomyopathy)	Y	Y	—	—
≥3 known major cardiac risk factors ^{§§}	Y	—	—	—

Antibody response with MVA-BN are non-inferior to those with ACAM2000.



- Antibody titers at 2 weeks (ie, after a single dose) are similar between MVA-BN and ACAM2000.
- Peak antibody titers are achieved at 6 weeks (ie, 2 weeks after the second dose).

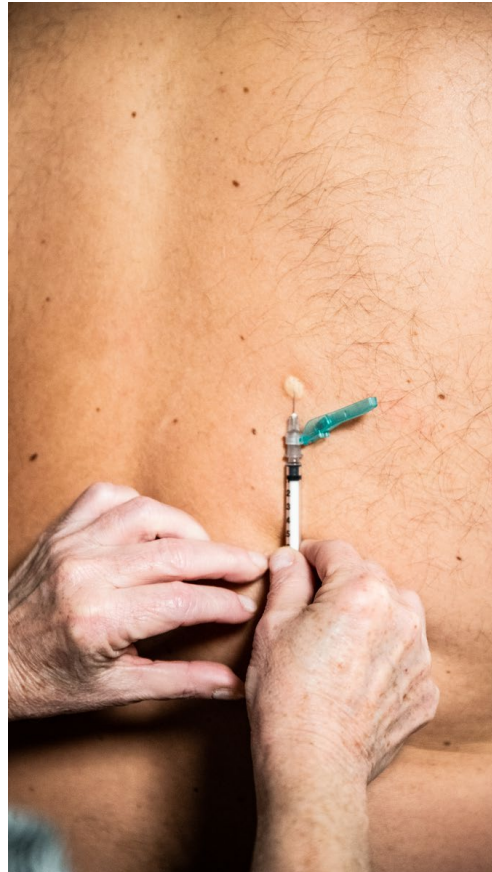
Rationale for intradermal dosing

- Antibody responses to intradermal dosing are non-inferior to those of subcutaneous dosing.
- Intradermal administration requires 1/5th of the subcutaneous dose.
- The preferred approach for those ≥ 18 years with no history of keloids

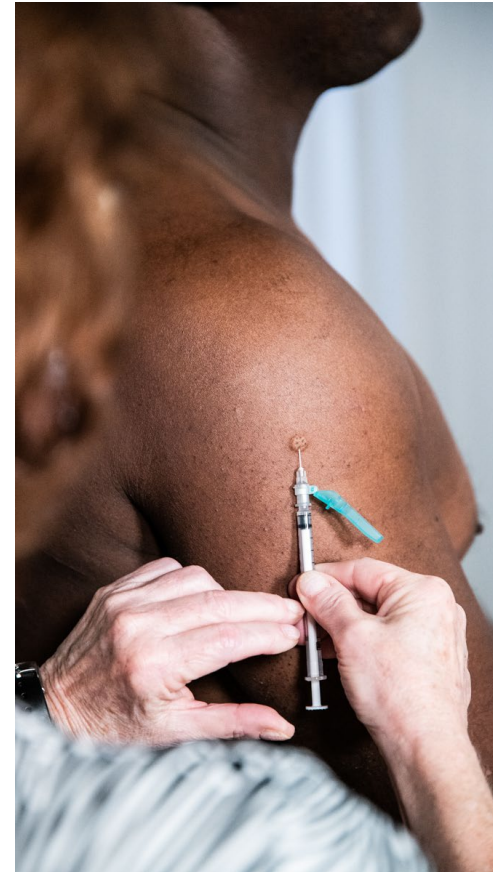


Alternative sites for intradermal vaccination

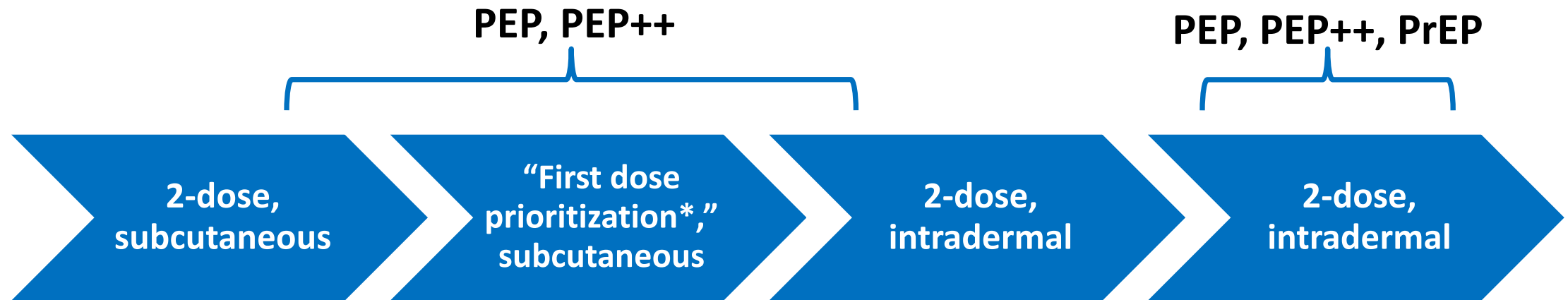
**Upper back below
scapula**



Deltoid



The vaccine approach changed rapidly during outbreak response.



*Implemented in many areas; not recommended by CDC

The vaccine is effective, and two doses are better than one.

Rosenberg ES, MMWR, 2023

TABLE 2. JYNNEOS vaccination history and estimated vaccine effectiveness among case-patients with mpox and control patients with sexually transmitted infections — New York,* July 24, 2022–October 31, 2022

Vaccination status	Mpox case-patients (n = 252)	All STI controls (n = 255)	
	No. (%)	No. (%)	VE (95% CI)
Unvaccinated	230 (91.3)	204 (80.0)	Ref
0–13 days after first dose	10 (4.0)	9 (3.5)	–36.2 (<–100 to 56.3)
≥14 days after first dose	10 (4.0)	23 (9.0)	68.1 (24.9 to 86.5)
≥0 days after second dose	2 (0.8)	19 (7.5)	88.5 (44.1 to 97.6)
≥14 days after first dose or ≥0 days after second dose	12 (4.8)	42 (16.5)	75.7 (48.5 to 88.5)

Abbreviations: Mpox = monkeypox; Ref = referent group; STI = sexually transmitted infection; VE = vaccine effectiveness.

* Outside of New York City.

Vaccination reduces the odds of hospitalization, even if infection occurs.

TABLE 2. Mpox hospitalizations, by JYNNEOS vaccination status (N = 4,611) — California, May 12, 2022–May 18, 2023

JYNNEOS vaccination status	Hospitalization status, no. (%)		Total, no.	OR (95% CI)
	Hospitalized n = 250	Not hospitalized n = 4,361		
Received 1 dose*	4 (1.7)	226 (98.3)	230	0.27 (0.08–0.65)
Received 2 doses†	1 (1.3)	78 (98.7)	79	0.20 (0.01–0.90)
Received PEP§	12 (2.6)	445 (97.4)	457	0.42 (0.22–0.72)
Unvaccinated¶	233 (6.1)	3,612 (93.9)	3,845	Ref

Prior smallpox vaccination reduced the likelihood of mpox among military personnel.

- 2.6 million military personnel received smallpox vaccination between 2002 and 2017
- Case-control study among military personnel with medically-evaluated mpox symptoms to assess vaccine effectiveness (odds ratio of previous vaccination and positive test)
- 1,014 subjects, of whom 293 tested positive for mpox
- Median time from vaccination to mpox diagnosis was 13 years

Table 1. Risk of Human Mpox Diagnosis, According to Subgroup.

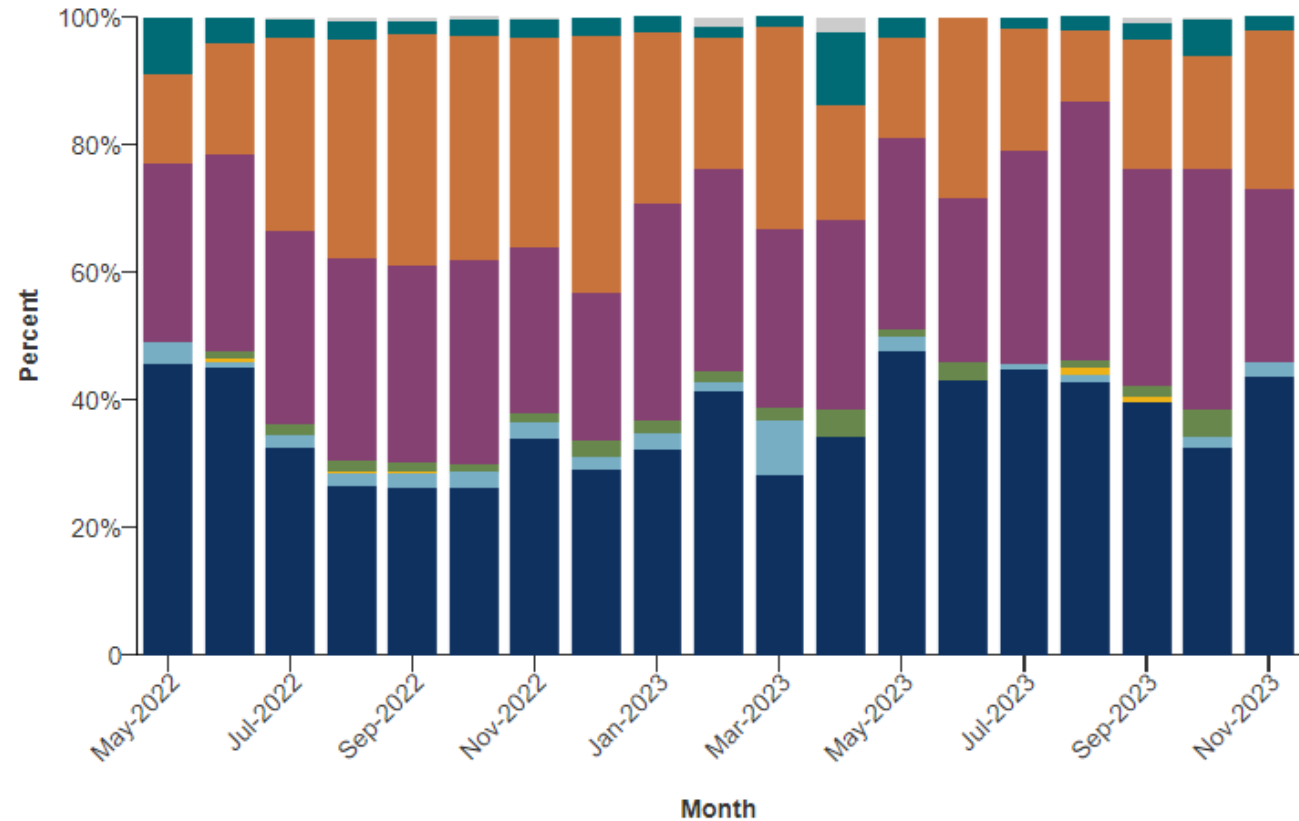
Variable	Odds Ratio (95% CI)	
	Unadjusted	Adjusted*
Vaccine type		
ACAM2000	0.44 (0.26–0.70)	0.25 (0.15–0.42)
Dryvax	0.39 (0.19–0.75)	0.28 (0.13–0.58)
Age group		
35–44 yr	0.96 (0.67–1.37)	0.84 (0.55–1.28)
45–64 yr	0.50 (0.36–0.70)	0.34 (0.23–0.49)
≥65 yr	0.05 (0.02–0.11)	0.04 (0.01–0.08)
Race or ethnic group†		
Black	1.73 (1.26–2.40)	1.29 (0.90–1.87)
Hispanic	1.24 (0.83–1.85)	1.00 (0.64–1.55)
Other or unknown	1.34 (0.74–2.36)	0.90 (0.46–1.66)
Male sex	7.39 (3.28–21.18)	6.83 (2.95–19.89)
HIV diagnosis	2.89 (2.15–3.89)	2.34 (1.65–3.35)

* The logistic regression model was adjusted for age, race, sex, and HIV status.

† Race or ethnic group was reported by the participants. White race was used as the reference group in this analysis.

Vaccine
administration by
race and ethnicity
does not match
case distributions.

Proportion of All Cases by Race and Ethnicity by Month



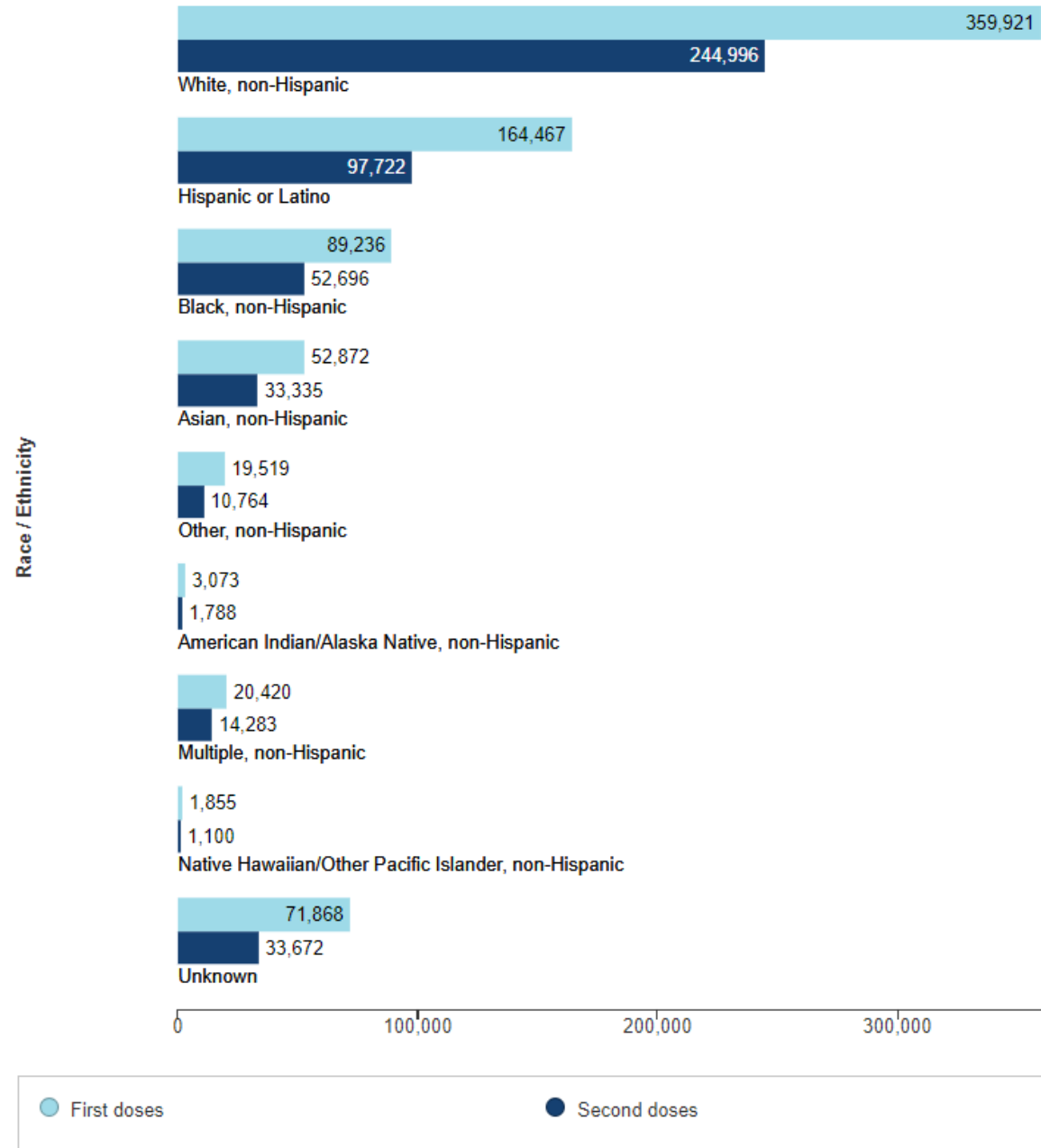
- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latino
- Multiple Races
- Native Hawaiian or Other Pacific Islander
- Other Race
- White

<https://www.cdc.gov/poxvirus/mpox/response/2022/demographics.html>

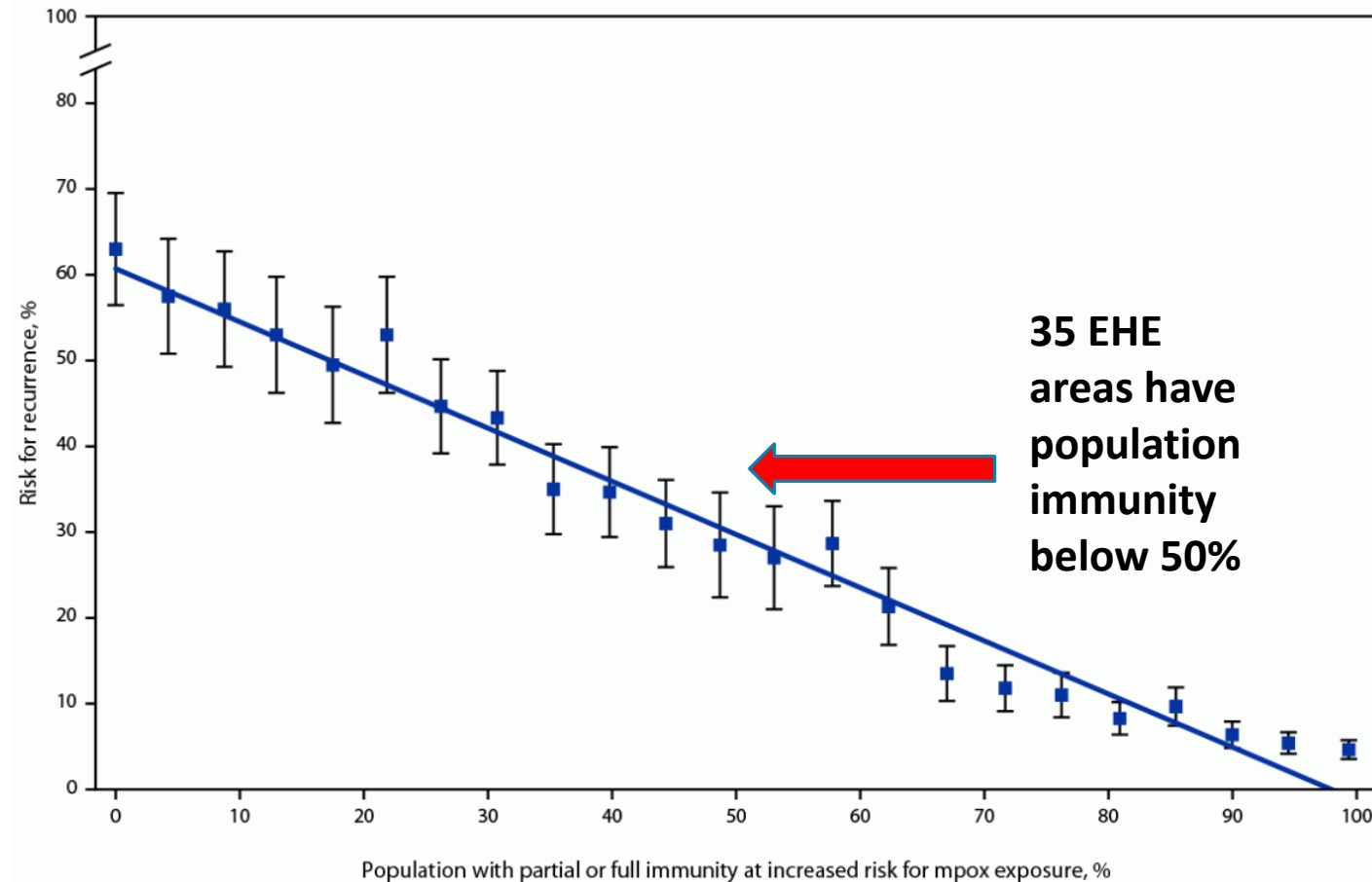
Vaccine
administration by
race and ethnicity
does not match
case distributions.

https://www.cdc.gov/poxvirus/mpox/response/2022/vaccines_data.html

JYNNEOS Vaccine Doses Administered, by Race/Ethnicity



The risk of mpox outbreaks depends upon immunity (and most of the US is at risk).



Implementation

1. Elicit a sexual history

Men who have sex with men

Sex in exchange for money or other items

Sex outside of a mutually monogamous relationship

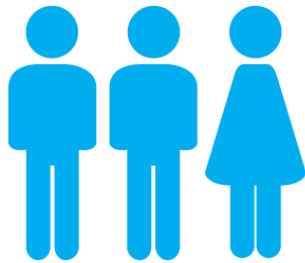
Sex at a commercial sex venue or a large public event where mpox transmission occurs

Seeking testing or treatment for sexually transmitted infections

Sex partners with increased likelihood of mpox

Tips for eliciting a sexual history

1. Explain why the information is important, but consider not singling out the sexual history as uniquely sensitive.
2. Avoid assumptions about sexual orientation, partner number, condom use, partner gender and anatomy.



Partners



Practices



**Past History
of STDs**



**Protection
from STDs**



**Pregnancy
Plans**

2. Minimize the impact of stigma on vaccine access and uptake.

When an individual at risk requests vaccine, they will not be asked which of these criteria applies. It is sufficient to say that they consider themselves to be at risk for mpox.



www.mass.gov/info-details/mpox-vaccination#eligibility-
www.statnews.com/2022/08/04/with-monkeypox-vaccine-in-high-demand-nih-to-test-approaches-to-stretch-supplies/

3. Routinely assess for vaccine indications at healthcare encounters for other purposes.

Relevant Vaccination History:

Hepatitis A	☐ Completed series	☐ Partial	☐ Unsure	☐ No	☐ History of infection
Hepatitis B	☐ Completed series	☐ Partial	☐ Unsure	☐ No	☐ History of infection
HPV	☐ Completed series	☐ Partial	☐ Unsure	☐ No	
Mpox	☐ Completed series	☐ Partial	☐ Unsure	☐ No	☐ History of infection

Sexual History:

Date of last contact:

Gender of partner: ☐ Male ☐ Female ☐ Trans/other
Condoms ☐ yes ☐ no

Date of prior contact with different person:

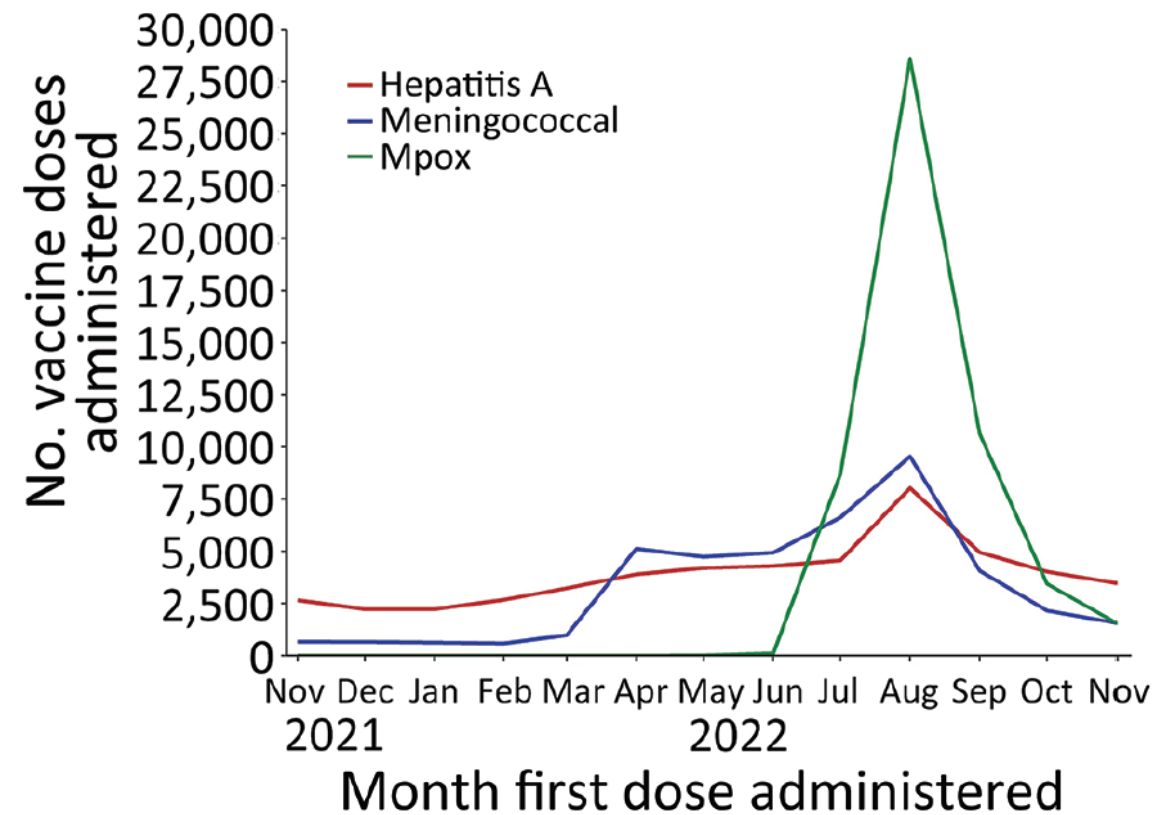
Gender of partner ☐ Male ☐ Female ☐ Trans/other
Condoms ☐ yes ☐ no

Sites of contact: ☐ Mouth ☐ Penis ☐ Vagina Rectum - ☐ receptive ☐ insertive

Overall condom use comments:

Number of sexual partners in last year:

4. Bundle syndemic vaccines and other interventions.



5. Provide vaccines in non-traditional locations.



What's on the horizon?

An effective vaccine against which STI is available now?

- A. Herpes simplex virus
- B. HIV
- C. Gonorrhea
- D. Chlamydia
- E. Syphilis
- F. None of the above

Group B OMV meningococcal vaccine may prevent gonorrhea.

Mass vaccination against meningococcal group B infection in New Zealand from 2004-2008 (81% coverage of people < 20 years)

Case control study of people ages 15-30 in sexual health clinics

- Cases = Confirmed gonorrhea
- Controls = Confirmed chlamydia
- Exposure = Group B OMV meningococcal vaccination

Vaccine effectiveness against gonorrhea = 31% (95% CI 21-39)

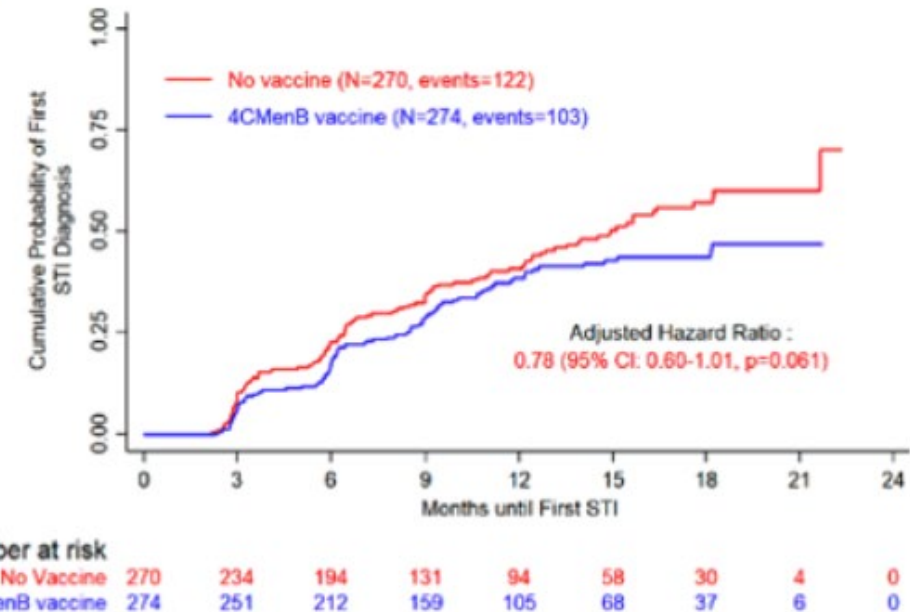
But a recent
randomized
trial was
disappointing.

4CMenB Vaccine Time to First GC infection

No interaction between Doxy PEP
and 4CMenB vaccine ($p=0.82$)

225 subjects infected
122 in No Vaccine arm
(incidence: 77.1/100 PY),
103 in 4CMenB vaccine arm
(incidence: 58.3/100 PY)

Interim analysis:
49 subjects infected, aHR: 0.49
(95%CI: 0.27 - 0.88)



GC infections were considered from M3 visit (1 month after 2nd vaccine dose) and multi-sites infection = 1 single event

Additional studies of the meningococcal vaccine for gonorrhea are ongoing.

RECRUITING ⓘ

Safety and Efficacy Study of Meningococcal Group B Vaccine rMenB+OMV NZ (Bexsero) to Prevent Gonococcal Infection

ClinicalTrials.gov ID ⓘ NCT04350138

Sponsor ⓘ National Institute of Allergy and Infectious Diseases (NIAID)

Information provided by ⓘ National Institute of Allergy and Infectious Diseases (NIAID) (Responsible Party)

Last Update Posted ⓘ 2024-03-29



+ Expand all content

— Collapse all content

Study Details

Researcher View

No Results Posted

Record History

Summary

- Five currently available vaccines have sexual health-related indications and benefits: HAV, HBV, HPV, mpox, and meningococcal.
- Steps to improve access to and uptake of vaccines include eliciting a sexual history, minimizing the effects of sexual stigma on access, routinely assessing vaccine history at health care visits for other purposes, bundling vaccines for syndemic conditions, and offering vaccines at non-traditional sites.
- A gonococcal vaccine may be on the horizon; vaccines for other STIs are not yet available.