Vax On/Vax off
Vaccine and Infectious Disease Update

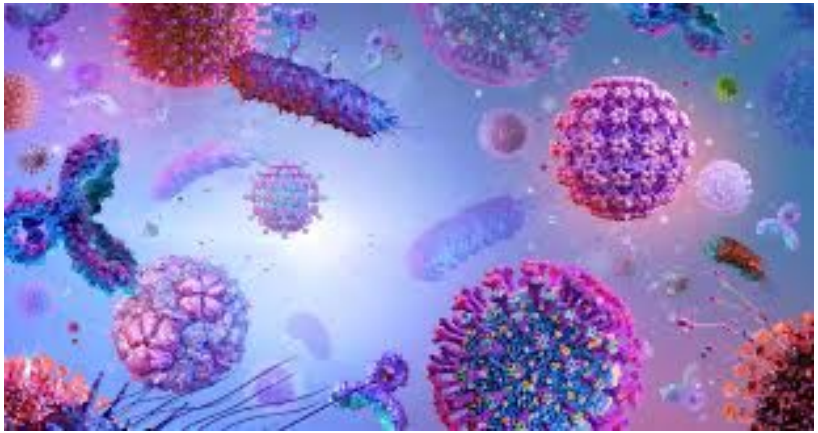
Rob Cruikshank MD

Learning Objectives

1. Implement infectious disease updates in practice.
2. Utilize new vaccines and vaccine indications in patient care.
3. Analyze and mitigate political influences on vaccine recommendations and uptake.

Infectious Disease Updates

1. DoxyPEP
2. Acute Rhinosinusitis
3. C. diff
4. H. Pylori



04/2023 DoxyPEP Study

The NEW ENGLAND JOURNAL of MEDICINE

200mg of Doxycycline within 72 hours of condomless sex

For MSM and trans women having high risk sex

Efficacy at preventing...	HIV-negative people	People living with HIV
Chlamydia	88%	74%
Gonorrhea	55%	57%
Syphilis*	87%	77%

Otolaryngology–Head and Neck Surgery

AMERICAN ACADEMY OF OTOLARYNGOLOGY-HEAD AND NECK SURGERY FOUNDATION®

Clinical Practice Guideline: Adult Sinusitis Update

Some terms and definitions:

“Rhinosinusitis” preferred over “sinusitus”

Rhinosinusitus defined as purulent nasal discharge, nasal obstruction, and facial pain

Acute - Up to 4 weeks Chronic- 12 weeks or more

ARS - presumed to be viral if less than 10 days and symptoms are not worsening

ABRS- presumed to be bacterial if symptoms for 10 or more days or double worsening

Complicated- extension outside of the nasal cavity and sinuses

ABRS Treatment

Symptomatic care with analgesics,intranasal steroids, and nasal saline irrigation

Observation for 3-5 days after diagnosis (maximum of 14 days of symptoms)

Unless: Complicated ABRS- orbital cellulitis, intracranial abscess, or meningitis

- High, persistent fevers (eg, fever >102°F for longer than 24 hours)
- Unreliable or uncertain follow-up
- Immunocompromised or multiple comorbidities
- Known anatomic abnormality

Symptomatic care with analgesics,intranasal steroids, and nasal saline irrigation

Treat with 5-7 days of Amoxicillin or Amoxicillin plus Clavulanate; Use Fluoroquinolone or Doxycycline if PCN allergic

Summary of the evidence…

Antibiotics shortened time to cure for only 5-11% of people[1]

NNT of 18 for one additional cure[2]

NNH of 8 for antibiotic-related adverse events.[2]

Serious complications requiring hospitalization only 1 in 32,000 adults[2]

Studies show that antibiotics were prescribed in 82% of rhinosinusitis visits.[2]

1 Antibiotics for Acute Rhinosinusitis in Adults. The Cochrane Database of Systematic Reviews. 2018. Lemiengre MB, van Driel ML, Merenstein D, et al.

2 Acute Rhinosinusitis: Rapid Evidence Review. American Family Physician. 2024. Butler FM, Hernandez DR.

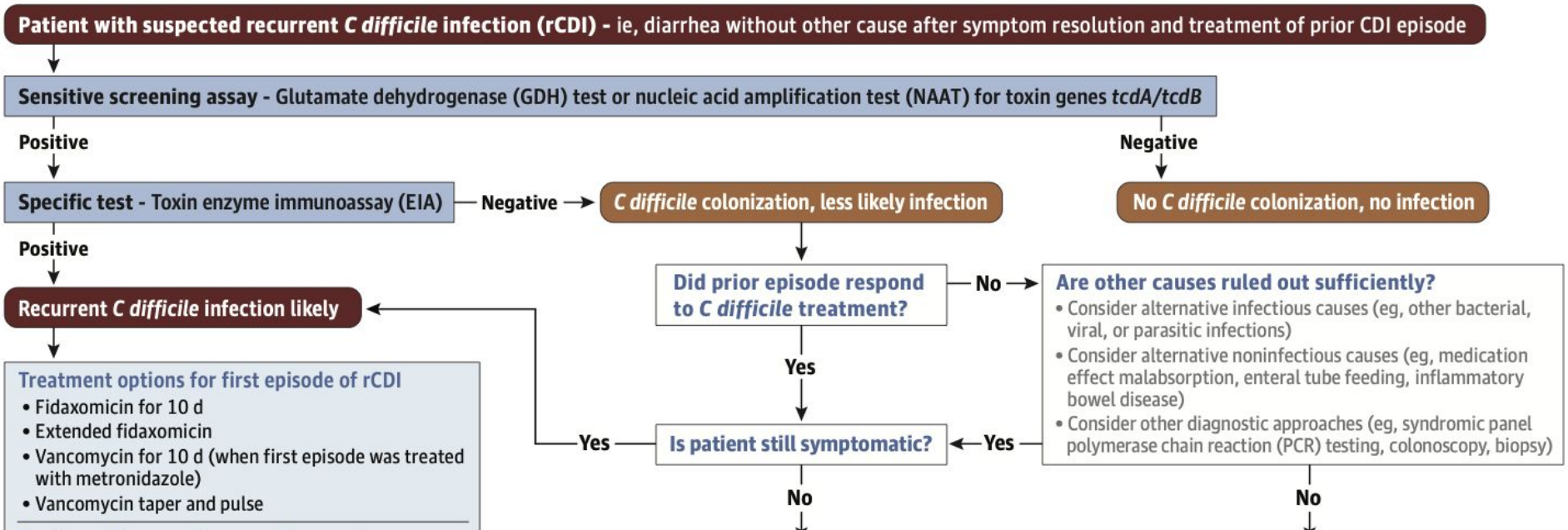
JAMA Insights

Recurrent *Clostridioides difficile* Infections

Joffrey van Prehn, MD, PhD[1,2]; Ed J. Kuijper, MD, PhD[1,2]; Erik R. Dubberke, MD, MSPH[2,3]

JAMA
Published Online: October 20, 2025
2025;334;(23):2128-2129.
doi:10.1001/jama.2025.18089

Figure. Diagnosis of Recurrent *Clostridioides difficile* Infection



C diff facts

Colonization 4-15% of healthy adults and up to 21% of hospitalized adults.[1]

13.4% of colonized patients become symptomatic. .[2]

87% of new cases had no prior colonization. [2]

21% of patients develop postinfectious IBS like symptoms.[3]

Antibiotics to eradicate the carrier state are generally not indicated.[4]

No retesting after treatment.

Fidaxomicin has lower recurrence rates that oral vancomycin or metronidazole.

1. ACG Clinical Guidelines: Prevention, Diagnosis, and Treatment of Clostridioides Difficile Infections.
The American Journal of Gastroenterology. 2021. Kelly CR, Fischer M, Allegretti JR, et al.

2. Natural History of Clostridioides Difficile Colonization and Infection Following New Acquisition of Carriage in Healthcare Settings: A Prospective Cohort Study.
Clinical Infectious Diseases : An Official Publication of the Infectious Diseases Society of America. 2023. Curry SR, Hecker MT, O'Hagan J, et al.

3. Strategies to Prevent Clostridioides Difficile Infections in Acute-Care Hospitals: 2022 Update.
Infection Control and Hospital Epidemiology. 2023. Kociolek LK, Gerding DN, Carrico R, et al.

4. Strategies to Prevent Clostridioides Difficile Infections in Acute-Care Hospitals: 2022 Update.
Infection Control and Hospital Epidemiology. 2023. Kociolek LK, Gerding DN, Carrico R, et al.

H pylori ACG guideline timeline

2017 All infected persons should be treated and then retested[1]

2019 Bismuth quadruple therapy replaced clarithromycin-based triple therapy as the preferred first-line treatment. Clarithromycin resistance exceeding 15% in most North American regions[1]

2024 Vonoprazan-based regimens. Vonoprazan is s potassium-competitive acid blocker (PCAB) that is better than PPIs.[2]

1.Helicobacter pylori Infection.
The New England Journal of Medicine. 2019.Crowe SE.
2. ACG Clinical Guideline: Treatment of Helicobacter Pylori Infection.The American Journal of Gastroenterology. 2024.
Chey WD, Howden CW, Moss SF, et al.

ACG Clinical Practice Guideline

Treatment of *H. pylori* Infection in North America

	Treatment Naïve	Treatment-Experienced (Salvage)		Penicillin Allergy
Regimen		Empiric	Proven antibiotic sensitivity	
Optimized Bismuth Quadruple	☑☑☑	☑☑	☑☑	☑☑☑ *
Rifabutin Triple	☑☑	☑☑	☑☑	
Vonoprazan Dual	☑☑	?	?	
Vonoprazan Triple			☑☑	
Levofloxacin Triple			☑☑	

☑☑☑ Recommended ☑☑ Suggested ? May be considered when other treatments are not options

* When Bismuth Quadruple Therapy not an option, consider referral for formal penicillin allergy testing and/or desensitization

Chey et al. *Am J Gastroenterol.* 2024. doi:10.14309/ajg.0000000000002968

All icons above are from Microsoft Powerpoint.

AJG The American Journal of GASTROENTEROLOGY
OFFICIAL JOURNAL OF THE AMERICAN COLLEGE OF GASTROENTEROLOGY | ACG

Vaccine Update

1. RSV
2. Influenza
3. COVID
4. Meningitis

RSV monoclonal antibody

For infants <8 months from October to March if no maternal RSV vaccine

Ages 8-19 months with special conditions prior to 2nd RSV season

Protection last 4-5 months

Prevents 75% of severe RSV cases and hospitalizations

Nirsevimab July 2023

Closrovimab June 2025

RSV Vaccine

FDA Approval: Arexvy (GSK) and Abrysvo (Pfizer) in May 2023, and mResvia (Moderna) in May 2024.

75% reduction in hospitalization.

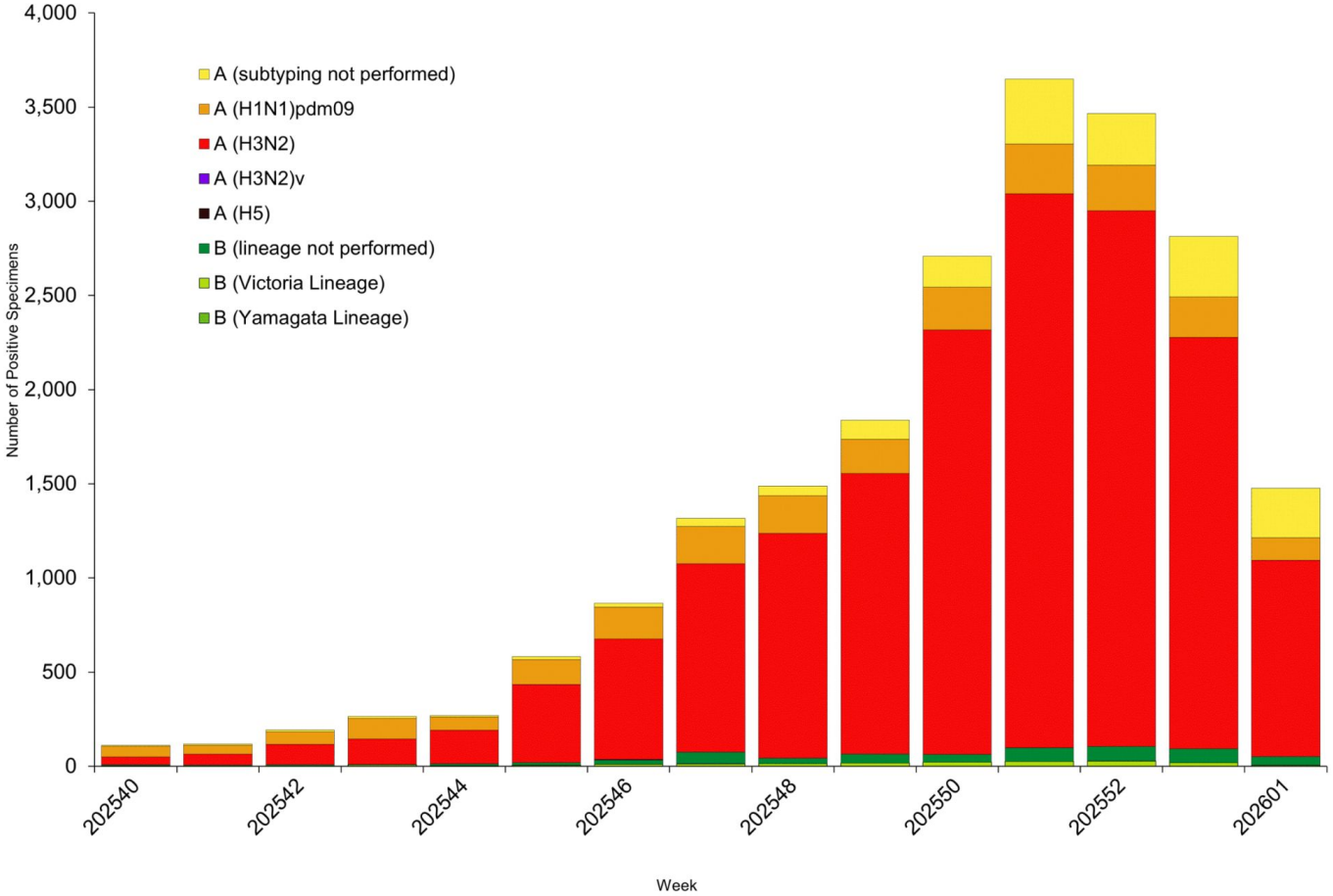
AAFP: One-time RSV vaccine for adults 75 and older, and for those 50–74 at increased risk.

CDC: Only for those with chronic illness, immune compromise, or nursing home residence

Pregnancy: Abrysvo between 32 and 36 weeks of gestation during RSV season (September–January)

No booster advised yet, but protection best in first 2 years. Consider fall dosing.

Influenza Positive Tests Reported to CDC by U.S. Public Health Laboratories, National Summary, 2025-2026 Season



Influenza virus types

Influenza A surface proteins

Hemagglutinin (HA or H)- binds to host cell sialic acid.

- 18 different H subtypes.
- Only H1, H2, and H3 in humans.

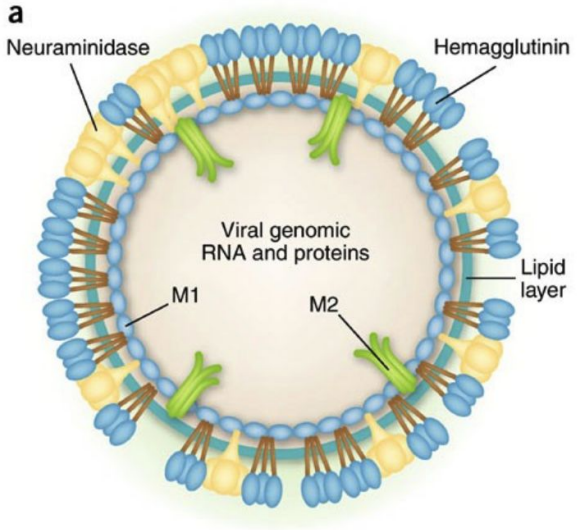
Neuraminidase (NA or N)- snips of sialic acid allowing viral spread

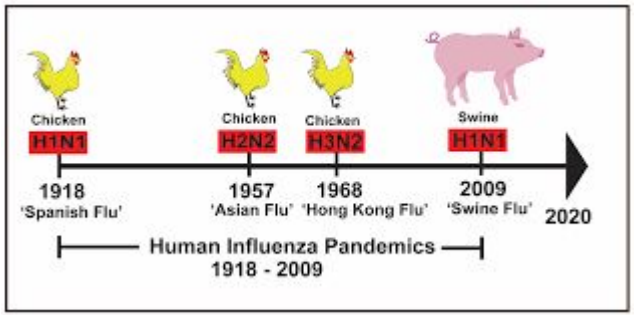
- 11 different N subtypes
- Only N1 and N2 in humans.

Flu A gene reassortment in birds and pigs cause novel strain pandemics.

Influenza B- only two lineages, Victoria and Yamagata.

Influenza B changes slowly. No Yamagata detected since 2020.





Influenza Vaccine

All US vaccines for the 2025/26 Flu season are trivalent (B/Yamagata removed)

Protects against influenza A H1N1 and H3N2 and influenza B/Victoria

High dose Flu vaccines for age >65; 4x the hemagglutinin of standard dose vaccine

- 9% fewer flu and pneumonia hospitalizations and 32% less lab confirmed hospitalizations than standard dose[1]
- More local reactions (mild to moderate)

Vaccinate all over age 6 months. Give 2 doses one month apart if child <8 has received less than 2 flu vaccinations.

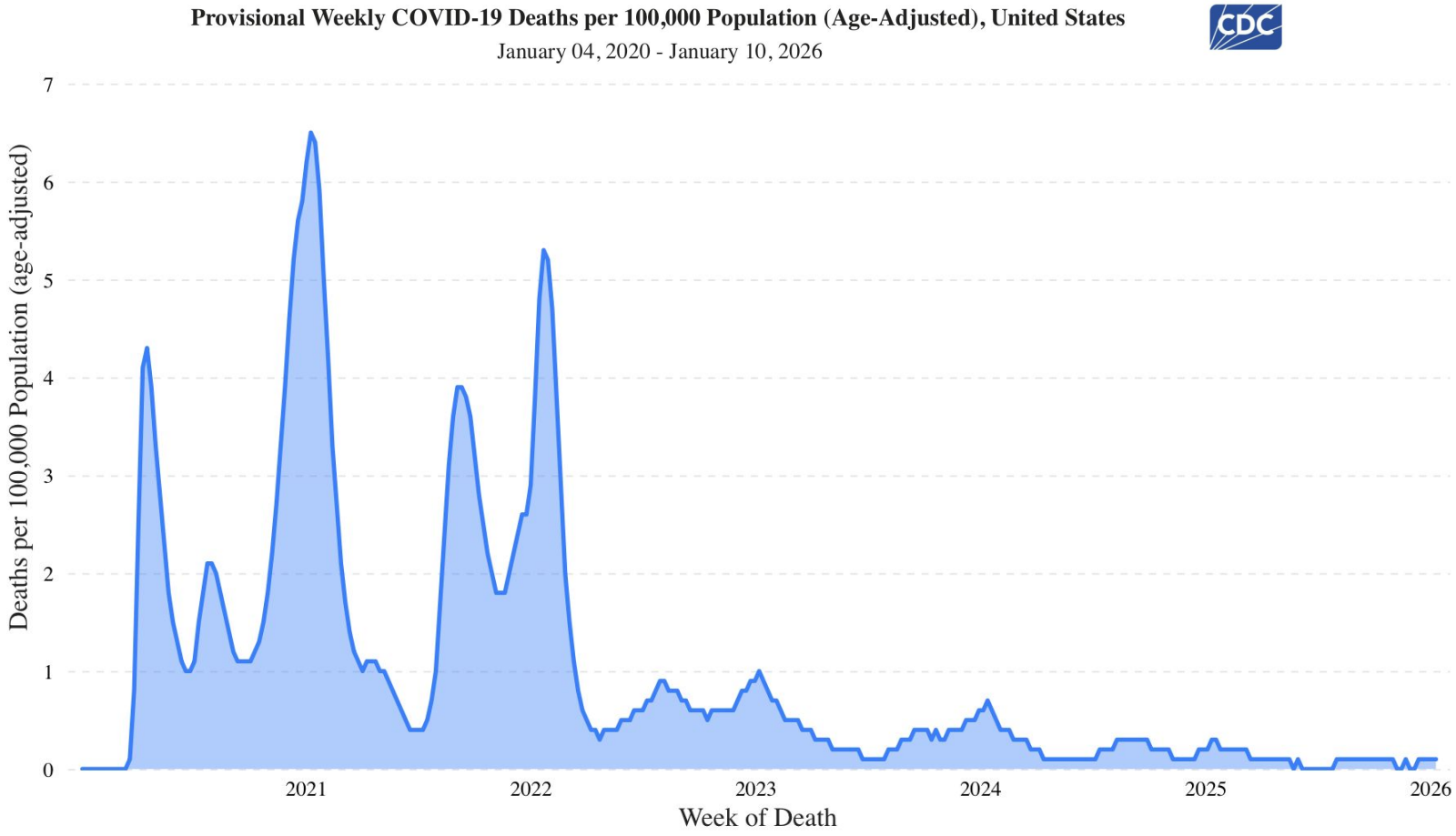
No contraindication for those with egg allergy.

1. Effectiveness of High-Dose Influenza Vaccine Against Hospitalisations in Older Adults (FLUNITY-HD):Lancet. 2025. Johansen ND, Modin D, Pardo-Seco J, et al

Influenza vaccines available in the United States
Inactivated, standard dose (IIV3)
- Fluarix
- FluLaval
- Afluria
- Fluzone
Inactivated, cell culture-based, standard dose (ccIIV3)
- Flucelvax
Adjuvanted, inactivated, standard dose (aIIV3)
- Fluad - 65 years and older
Inactivated, high dose (HD-IIV3)
- Fluzone High-Dose - 65 years and older
Recombinant (RIV3)
- Flublok – 9 years and older
Live, attenuated (LAIV3)
- FluMist (intranasal) – 2 – 49 years

Flu mRNA vaccines coming…

- No egg-adaptive mutations
- Faster manufacturing
- Direct genetic matching
- Broader immune responses

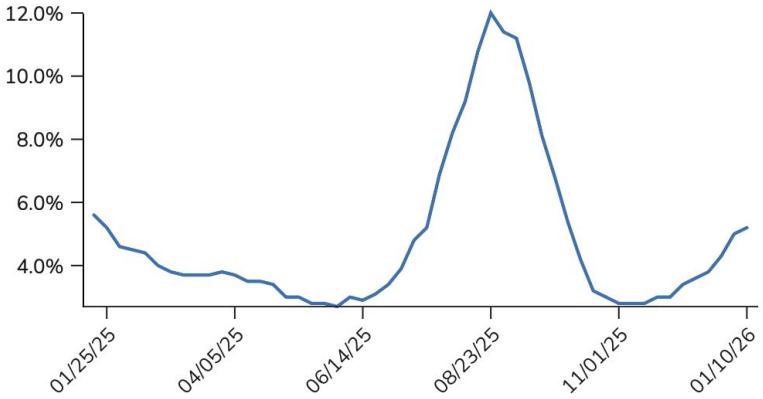

Provisional Weekly COVID-19 Deaths per 100,000 Population (Age-Adjusted), United States
January 04, 2020 - January 10, 2026
CDC
Deaths per 100,000 Population (age-adjusted)
0
1
2
3
4
5
6
7
2021
2022
2023
2024
2025
2026
Week of Death

COVID Early Indicators

% Test Positivity

5.2%

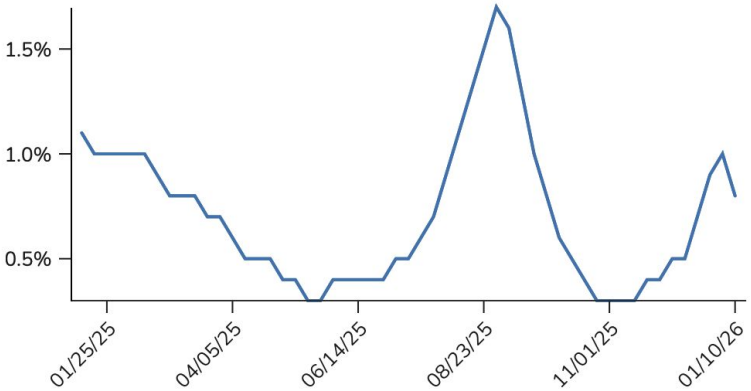
Week ending 2026-01-10
Previous Week 5.0%



% ED visits diagnosed as COVID-19

0.8%

Week ending 2026-01-10
Previous Week 1.0%



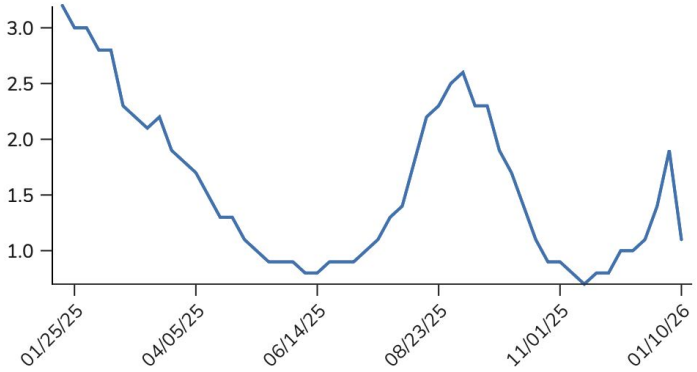
https://www.cdc.gov/covid/php/surveillance/index.html

COVID Severity Indicators

Hospitalization rate per 100,000 population

1.1

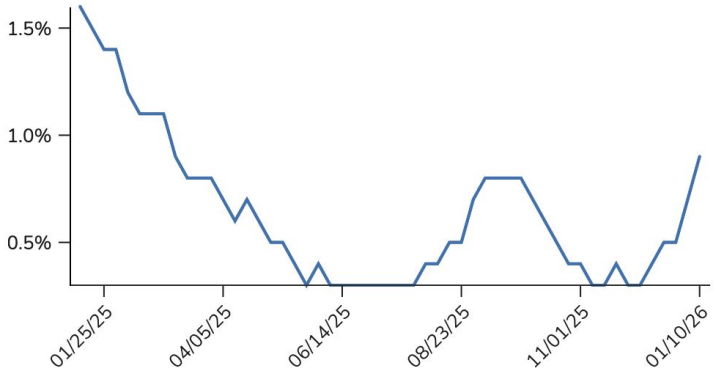
Week ending 2026-01-10
Previous week 1.9



% of All Deaths in U.S. Due to COVID-19

0.9%

Week ending 2026-01-10
Previous Week 0.7%

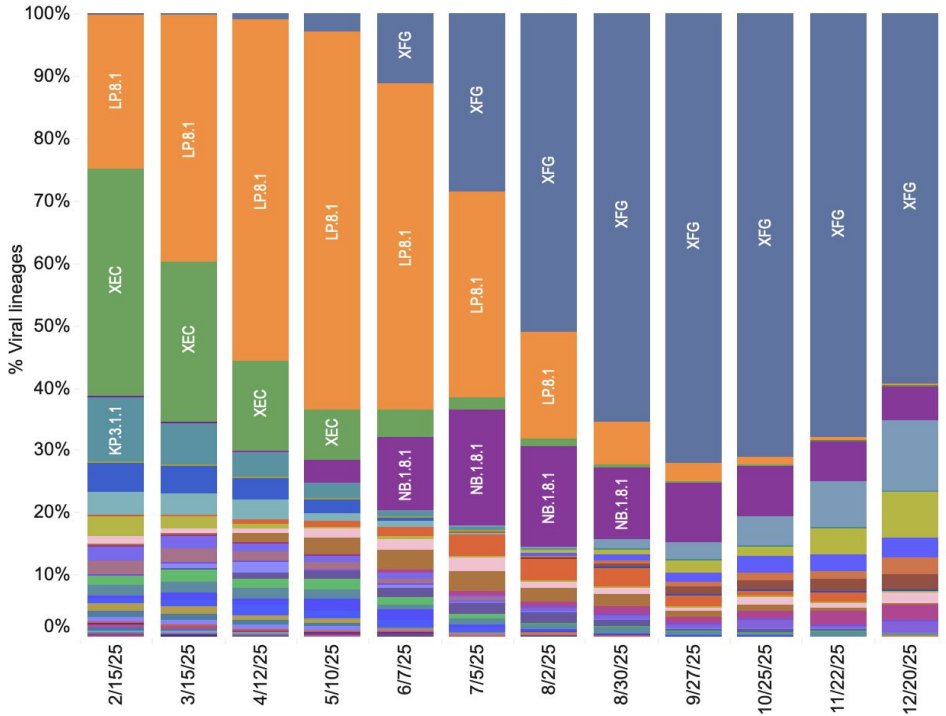


https://www.cdc.gov/covid/php/surveillance/index.html

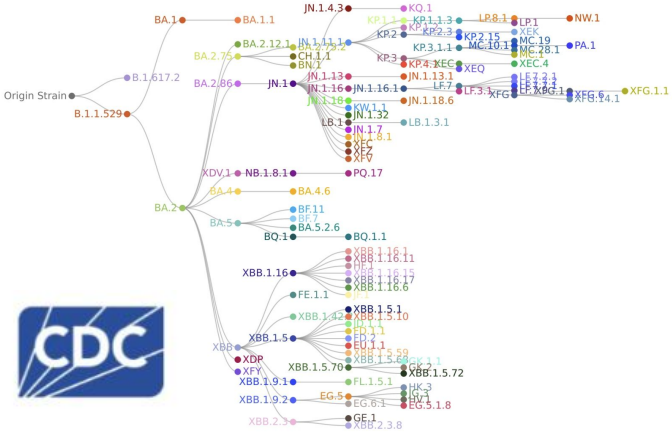
Empiric Proportions and Nowcast Estimates in United States for 4-Week Periods in 1/19/2025 – 1/17/2026

Empiric Proportions: Variant proportions based on reported genomic sequencing results

Model-based projected estimates of variant



PANGO Lineages



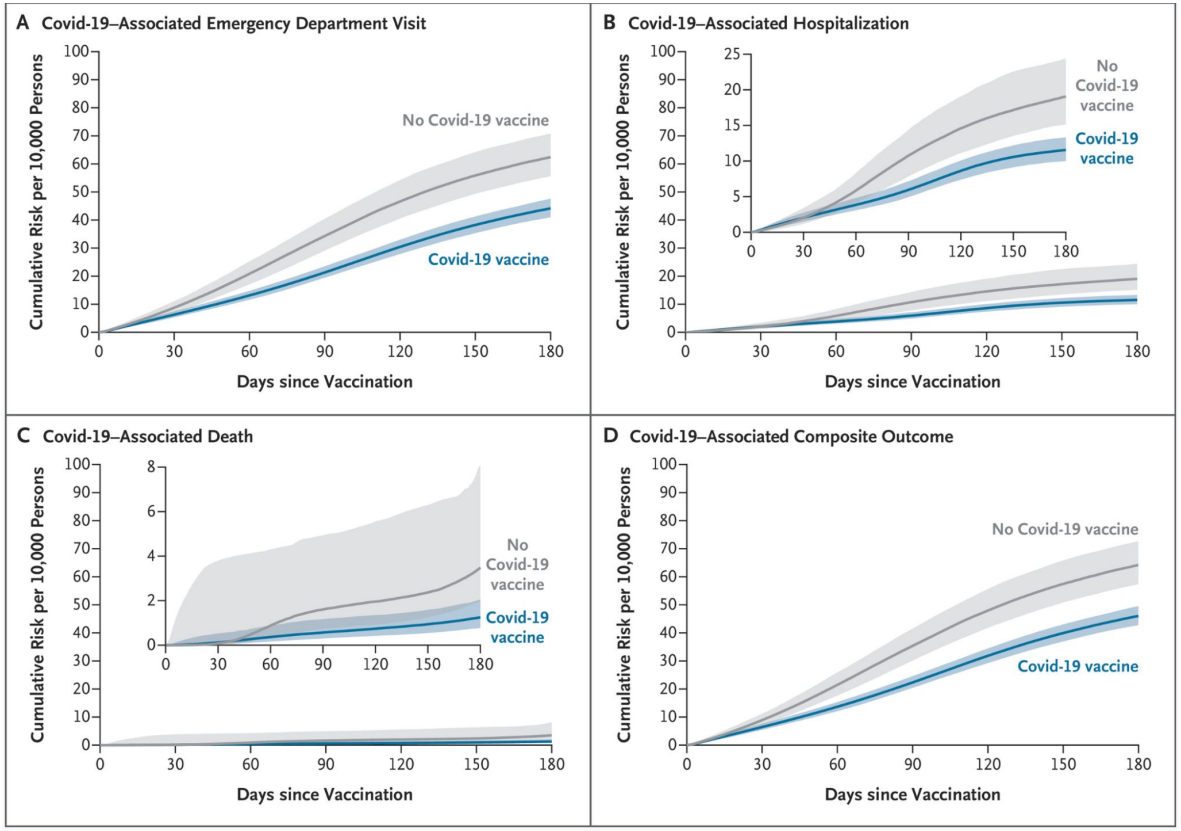
https://www.cdc.gov/covid/php/variants/variants-and-genomic-surveillance.html

Association of 2024–2025 Covid-19 Vaccine with Covid-19 Outcomes in U.S. Veterans

The NEW ENGLAND JOURNAL of MEDICINE

Authors: Miao Cai, Ph.D., Yan Xie, Ph.D., and Ziyad Al-Aly, M.D. Author Info & Affiliations

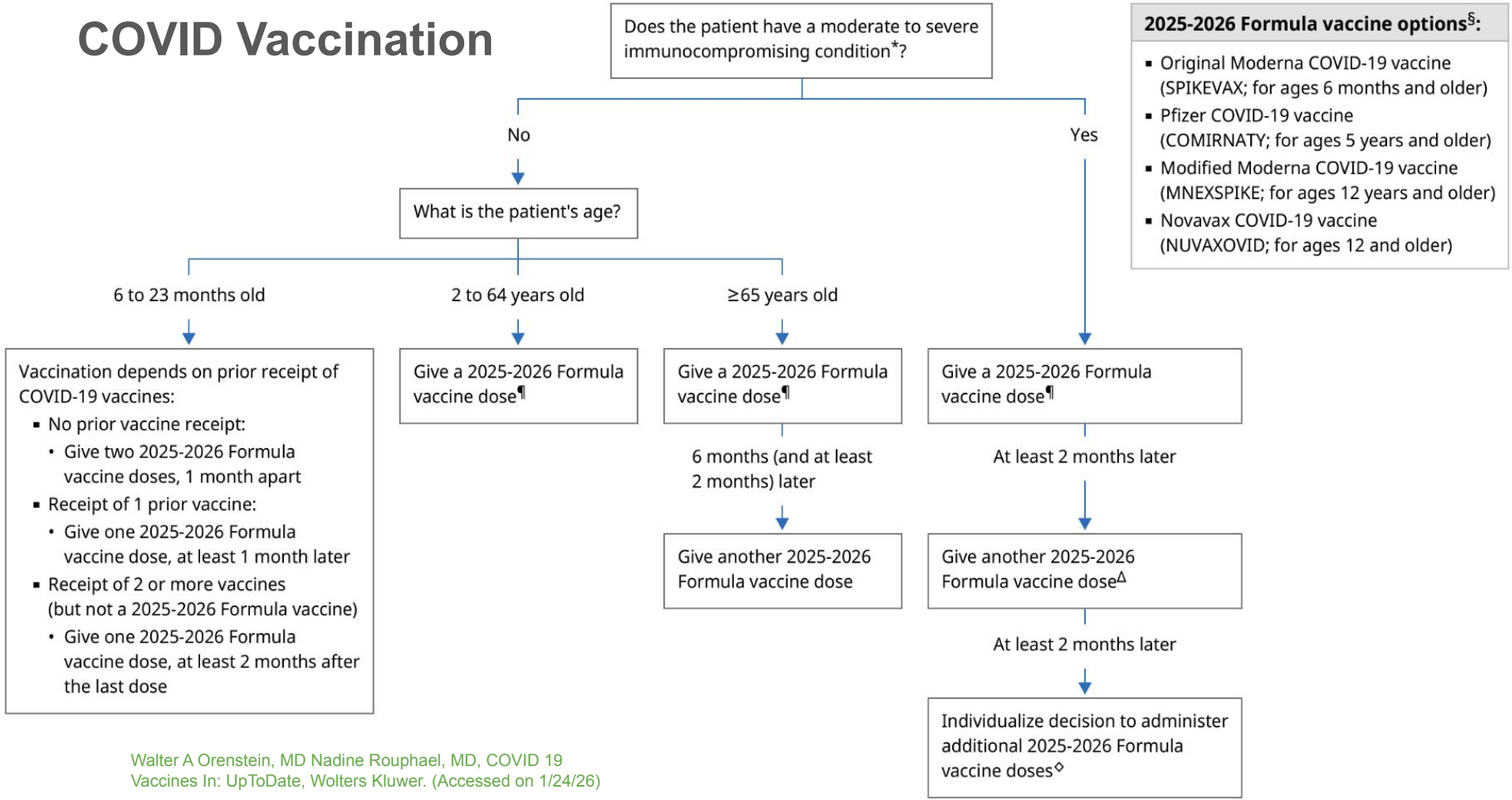
Published October 8, 2025 | N Engl J Med 2025;393:1612-1623 | DOI: 10.1056/NEJMoa2510226



- 29.3% fewer ED visits
- 39% less hospitalization
- 64% fewer deaths
- All statistically significant

https://www.nejm.org/doi/pdf/10.1056/NEJMoa2510226

COVID Vaccination



Walter A Orenstein, MD Nadine Rouphael, MD, COVID 19 Vaccines In: UpToDate, Wolters Kluwer. (Accessed on 1/24/26)

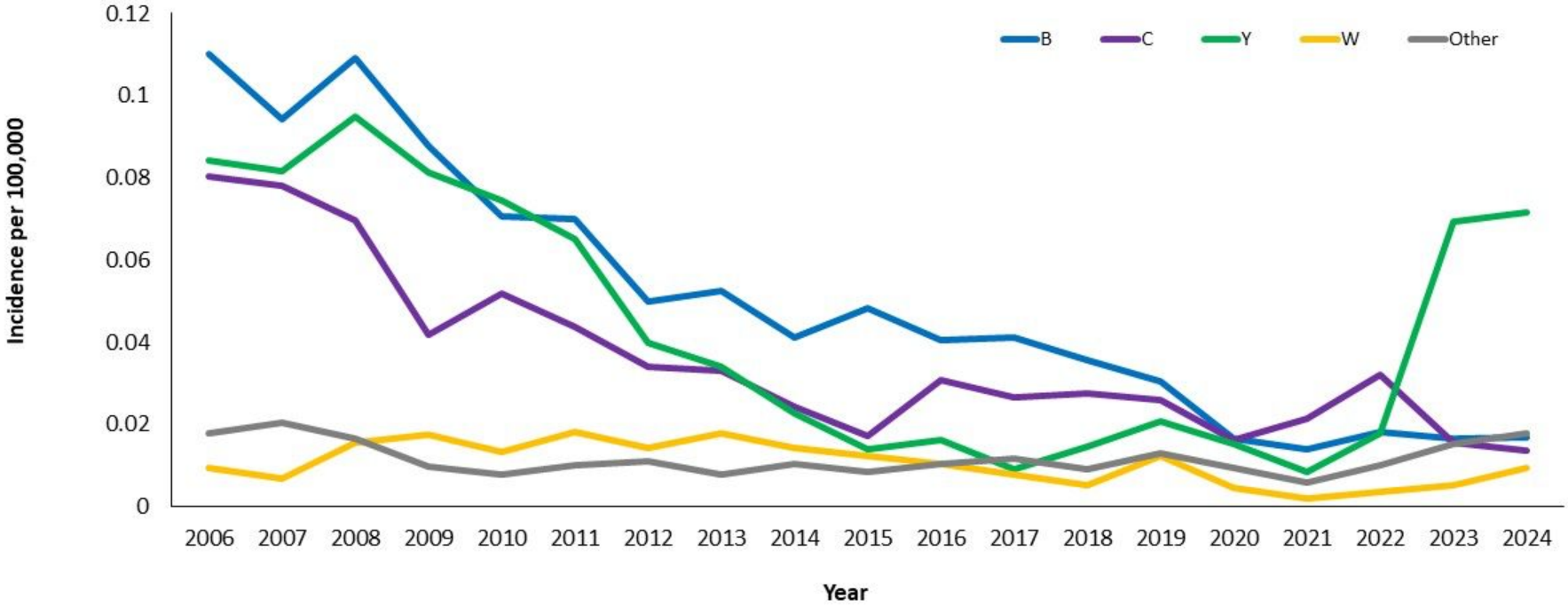
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

FOR IMMEDIATE RELEASE
September 19, 2025

ACIP Recommends COVID-19 Immunization Based on Individual Decision-making

- Applies to all 6 months and older
- Under age 65, risk-benefit most favorable if at risk for severe COVID-19
- Allows for coverage through all payment mechanisms
- Shared clinical-decision references providers, including physicians, nurses, and pharmacists – i.e., should discuss with healthcare provider
- Different from FDA approval language

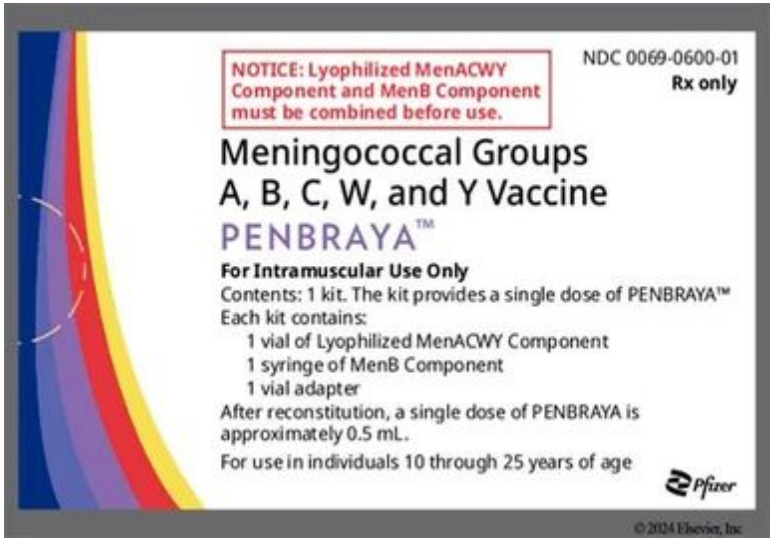
Trends in Meningococcal Disease Incidence by Serogroup – United States, 2006–2024*



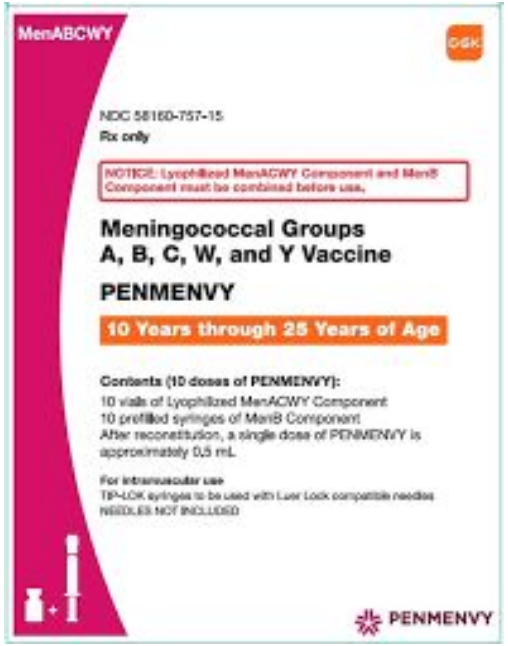
Source: NNDSS data with additional serogroup data from Active Bacterial Core surveillance (ABCs), state health departments, and isolates received and tested by the Bacterial Meningitis Laboratory at CDC

*2024 data are preliminary

Two Pentavalent ABCWY Meningitis Vaccines Available



Penbraya approved October 2023. Tetanus toxoid conjugate vaccine component (MenACWY-TT) and Trumenba (MenB-FHbp)



Penmenvy approved February 2025. Menveo conjugate vaccine component (MenACWY CRM197) and Bexsero (MenACWY-CRM)

Meningitis ACWY

MenACWY vaccines are **capsular polysaccharide-protein conjugate vaccines** that link the bacterial capsule from each serogroup to carrier proteins

Capsule provides protection from desiccation during transmission and aids in the evasion of host immune mechanisms.

Routine vaccination at age 11-12 years with booster at age 16 years

Meningitis B vaccines

Target Men B surface proteins, not the polysaccharide capsule.

The MenB capsule mimics human cells, making it poorly immunogenic and potentially auto immunogenic.

Trumenba and Bexsero have different targets, 2 doses 6 months apart, and aren't interchangeable.

Vaccination at ages 16-23 years (preferably 16-18) based on shared clinical decision-making; age 10 if high risk.

Living in college dorms, fraternities, or sororities has 3.5x higher risk, but still low (0.17 per 100,000)[1]

Antibody wanes 1-2 years after primary series completion.

1. MMWR. Recommendations and Reports. 2020. Mbaeyi SA, Bozio CH, Duffy J, et al.

Vaccine Policy Update

02/2025 RFK Jr appointed HHS secretary

Operating Divisions of HHS

- CDC
- FDA
- CMS
- NIH
- And others..

About CDC

EXPLORE THIS TOPIC

CDC priorities

For Everyone

SEPT. 17, 2025

- “President Trump and HHS Secretary Kennedy are committed to restoring trust, transparency, and credibility to CDC. CDC is committed to those goals and is likewise committed to ensuring that its leadership and all decisions are public facing and more accountable.”

Vaccine Hesitancy

Three key themes:

- Infringement of personal liberty/individual rights.
- Distrust of medical science and government authority.
- Religious objections.

COVID 19 Vaccine resistance

- Various government entities, employers, and educational institutions implemented vaccine requirements.
- Opposition was widespread, driven by concerns over the rapid development of the vaccine, mistrust of authority, and political polarization. It resulted in protests, legal challenges, and high levels of vaccine hesitancy.

How federal vaccine guidelines are made

Process:

1. FDA Approval: The Food and Drug Administration (FDA) first licenses a vaccine for safety and effectiveness.
2. ACIP Review 3x year: ACIP reviews the data and votes on recommendations for its public use.
3. CDC Adoption: The CDC Director reviews and, if adopted, publishes these recommendations in the Morbidity and Mortality Weekly Report (MMWR).

CDC’s Advisory Committe on Immunizations (ACIP)

Members of the Advisory Committee on Immunization Practices meet at the Centers for Disease Control and Prevention headquarters in Atlanta in June.

Ben Hendren/Bloomberg/Getty Images

The ACIP meets three times a year at CDC headquarters in Atlanta to review vaccine data and vote on recommendations.

CDC director Susan Monarez fired and replaced

Former Director of the Centers for Disease Control and Prevention, Susan Monarez, testifies before the Senate Committee on Health, Education, Labor, and Pensions Wednesday in Washington, DC.

Kevin Dietsch/Getty Images

Jim O'Neill is the new acting director of the CDC. Here, HHS Secretary Robert F. Kennedy Jr. swears him in as deputy secretary of HHS on June 9. O'Neill will serve in both roles.

Amy Rossetti/Department of Health and Human Services via AP

"He just wanted blanket approval," Monarez told members of the Senate Committee on Health, Education, Labor and Pensions on Wednesday. "Even under pressure, I could not replace evidence with ideology."

ACIP bans Thimerosal preservative in flu shots in July 2025

Thimerosal is a mercury-based preservative introduced to flu doses in the 1930s to address bacterial contamination. Thimerosal has ethylmercury, not methylmercury, which is excreted more rapidly from the body and less likely to cause harm.

Only multi-dose vials of flu vaccine contained the preservative, amounting to only 4% of flu vaccine in 2024. Numerous studies have demonstrated no causal relationship between thimerosal exposure and Autism.

9/25 ACIP votes to split MMRV shot

Febrile seizures two times more likely with first dose of the MMRV (Proquad) vaccine as compared to those given MMR and Varicella as separate vaccines at the same time.

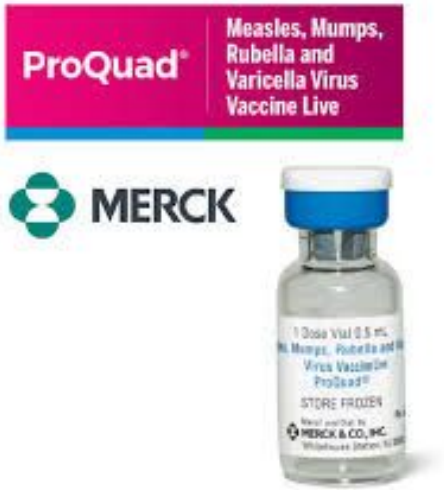
One additional febrile seizure per 2,300 infants given MMRV.

Seizure happens 5-12 days after vaccination.

Not seen in the 4 year old age group.

Personal or family history of febrile seizures is largest risk factor.

CDC removes VFC (medicaid) coverage for first MMRV vaccine.



10/25 Individual-based decision-making for COVID-19 vaccine

- CDC recommends a 2025-2026 COVID-19 vaccine for people ages 6 months and older based on individual-based decision-making.
- The COVID-19 vaccine helps protect you from severe illness, hospitalization, and death.
- It is especially important to get your 2025–2026 COVID-19 vaccine if you are ages 65 and older, are at high risk for severe COVID-19, or have never received a COVID-19 vaccine.

The vaccine was previously recommended annually for all people over 6 months of age.

11/2025 FDA Director proposes overhaul of vaccine approval

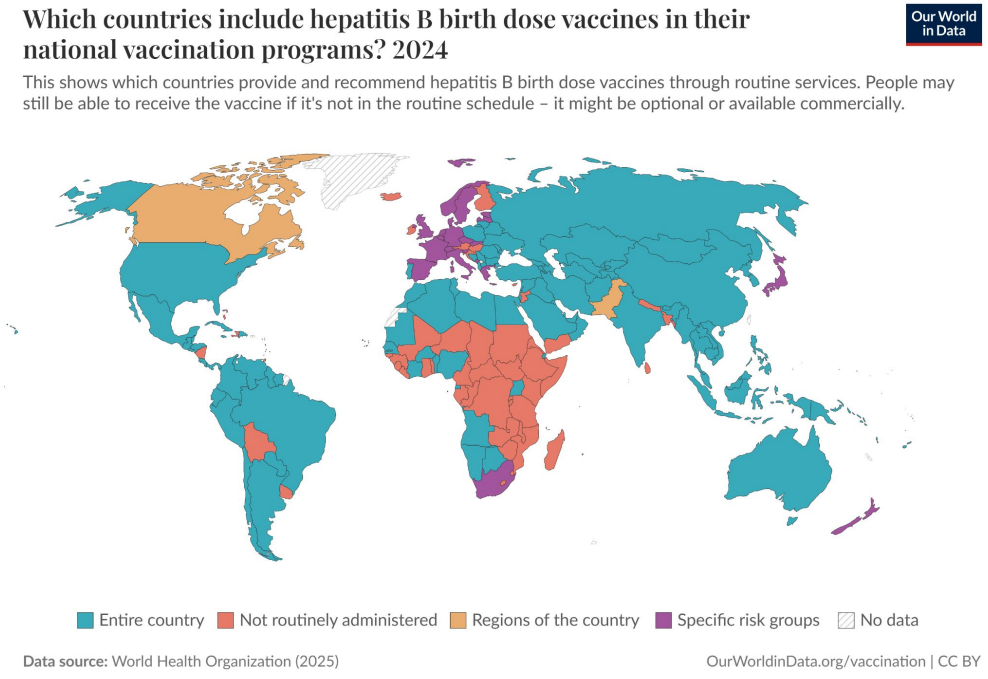
- Stricter Approval Standards: requiring more pre-market RCT's with more focus on clinical endpoints (mortality vs antibodies)
- Stricter process for vaccines for COVID, Flu, Pneumococcus vaccine, and vaccines for pregnant women
- Questioned the safety of administering multiple vaccines at the same time and indicated a need for studies on the effects of doing so
- Proposed changes have been criticized as they would drastically slow the vaccine approval process and weren't based on verified science

Vinay Prasad M.D., M.P.H.

12/25 Removed mandated birth dose of Hepatitis B vaccine

The CDC and its Advisory Committee on Immunization Practices (ACIP) cited the following reasons for this change:

- Allows Shared Clinical Decision-Making for infants born to mothers who test negative for hepatitis B
- Increased Prenatal Screening Reliability
- Perceived Low Risk for Infants as transmission is through blood or sex
- Alignment with International Practices



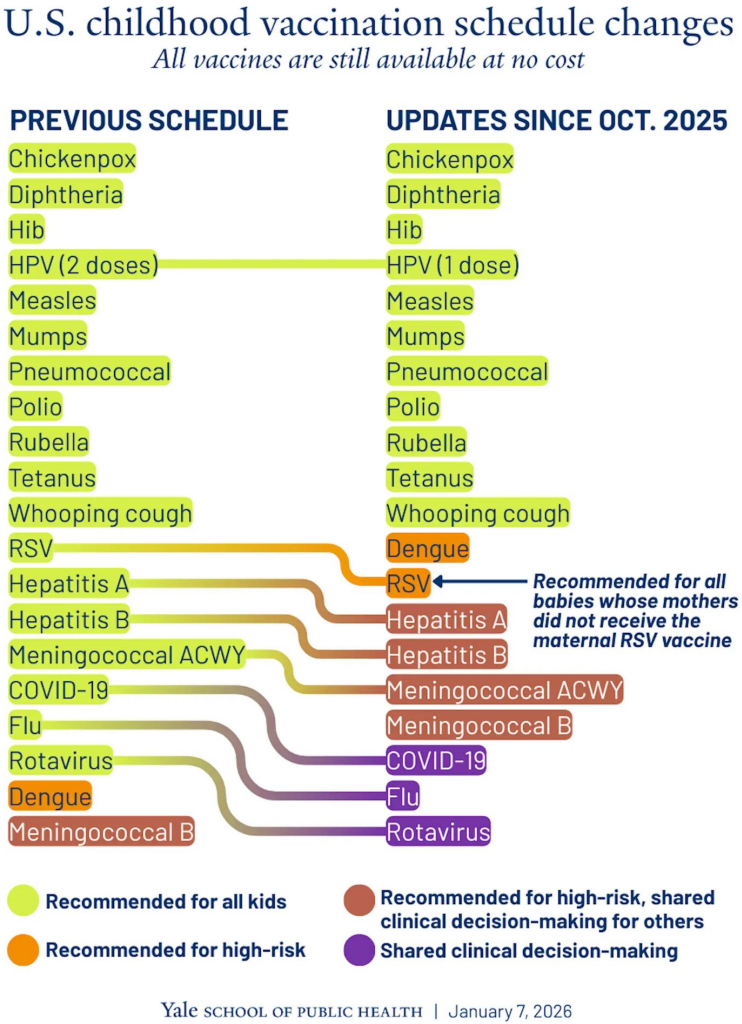
Arguments for continuing birth dose of Hepatitis B vaccine

- 18% of pregnant women are not screened for hepatitis B
- 90% effective at preventing perinatal transmission from an infected mother.
- 90% of infants infected with hepatitis B during their first year of life will develop chronic, lifelong infection.
- Chronic infection in childhood leads to a 25% risk of premature death from liver cirrhosis or liver cancer later in life.
- Since the 1991 recommendation for universal birth dose vaccination, cases of acute hepatitis B in children and teenagers dropped by 99%.

01/2026 Pediatric vaccine schedule revised

Number of recommended vaccines reduced from 17 to 11.

COVID-19, flu, rotavirus, Hepatitis A, Hepatitis B, and meningococcal vaccines to "shared clinical decision-making"



IMMUNIZATIONS RECOMMENDED FOR ALL CHILDREN

Vaccine and other immunizing agents	Birth	1 mo	2 mos	4 mos	6 mos	7 mos	8 mos	12 mos
Diphtheria, tetanus, acellular pertussis (DTaP < 7 yrs)			1st dose	2nd dose	3rd dose			
Tetanus, diphtheria, acellular pertussis (Tdap ≥ 7 yrs)								
Haemophilus influenzae type b (Hib)			1st dose	2nd dose	3rd dose			3rd/4th
Pneumococcal conjugate (PCV15, PCV20)			1st dose	2nd dose	3rd dose			4th d
Inactivated poliovirus (IPV < 18 yrs)			1st dose	2nd dose	3rd dose			
Measles, mumps, rubella (MMR)								1st d
Varicella (VAR)								1st d
Human papillomavirus (HPV)								

Back to top

IMMUNIZATIONS RECOMMENDED FOR CERTAIN HIGH-RISK GROUPS OR POPULATIONS

Vaccine and other immunizing agents	Birth	1 mo	2 mos	4 mos	6 mos	7 mos	8 mos	12 mos
Respiratory syncytial virus (RSV-mAb)[1]	1 dose							
Respiratory syncytial virus (RSV-mAb)[2]	1 dose							
Hepatitis B (HepB)[3]	1st dose		2nd dose		3rd dose			
Dengue[4]								
Meningococcal ACWY[5]								
Meningococcal B[6]								
Hepatitis A (HepA)[7]								

IMMUNIZATIONS BASED ON SHARED CLINICAL DECISION-MAKING

Vaccine and other immunizing agents	Birth	1 mo	2 mos	4 mos	6 mos	7 mos
Rotavirus (RV): RV1 (2-dose series), RV5 (3-dose series)			1st dose	2nd dose	3rd dose	
COVID-19 (1vCOV-mRNA, 1vCOV-aPS)						
Influenza (IIV3, ccIIV3)						
OR						
Influenza (LAIV3)						
Hepatitis A (HepA)						
Hepatitis B (HepB)*			1st dose	2nd dose		
Meningococcal ACWY						
Meningococcal B						

Managing vaccine hesitancy

Presumptive vaccine recommendation using AAFP/AAP vaccine recommendations, not CDC.

Employing motivational interviewing techniques

Providing tailored education that addresses specific concerns

Insurance coverage for all vaccines remains in place

Local Advocacy