

Vaccines - Truth vs Fiction

A Scientific Review of Vaccine Medicine

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Disclosures

Nothing to disclose

Goals

- Familiarize audience with history of vaccines - including impact of vaccine on morbidity and mortality
- Discuss evidence based vaccine recommendations
- Review potential alternative sources for vaccine guidance

Who has seen something like this?



What about this?



This?



Case

A 17-year-old high school senior presents to the emergency room with a 5 day history of cough, runny nose, watery red eye, and a blotchy rash.

Patient was all up-to-date on his childhood vaccines including his 11-year-old vaccines.

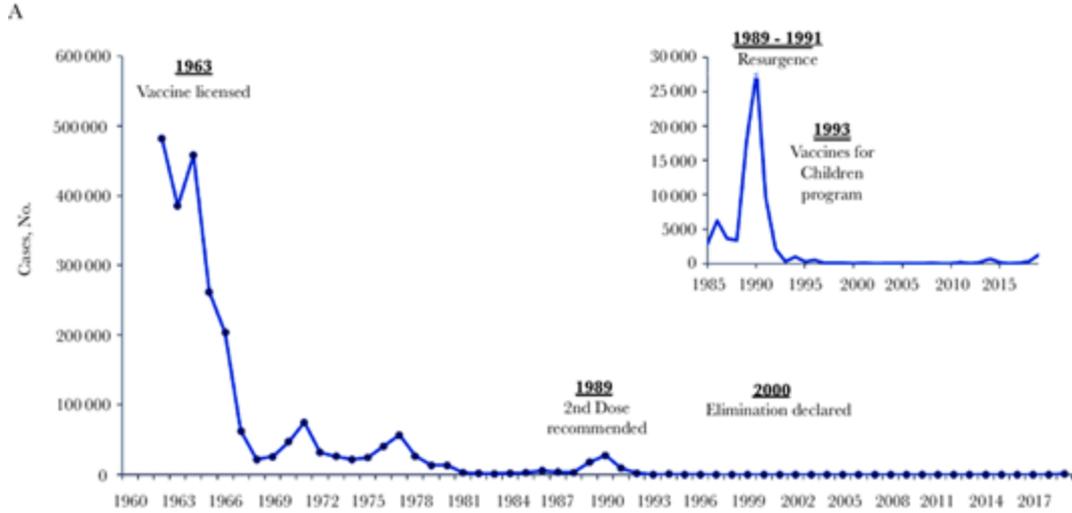
Recently returned from a trip to visit colleges and passed through SEATAC airport about 2 weeks ago

Who should I call and why question?



Do vaccines work?

US cases



Worldwide cases

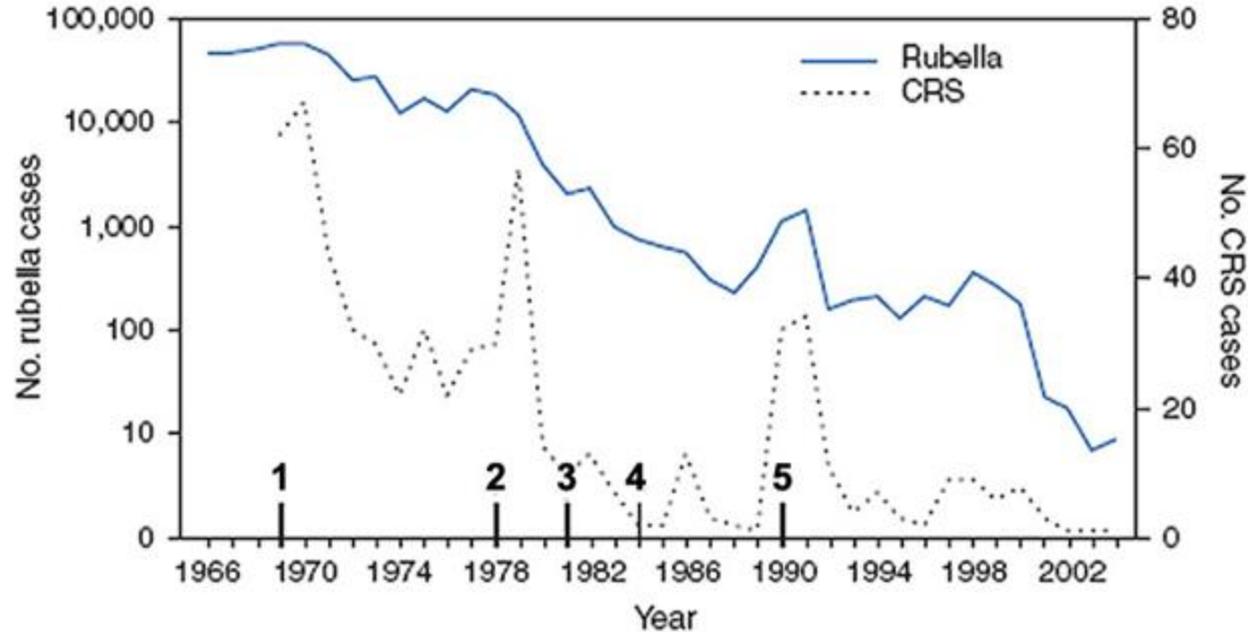


Gastañaduy, Paul & Goodson, James & Panagiotakopoulos, Lakshmi & Rota, Paul & Orenstein, Walter & Patel, Manisha. (2021). Measles in the 21st Century: Progress Toward Achieving and Sustaining Elimination. The Journal of infectious diseases. 224. S420-S428. 10.1093/infdis/jiaa793.

Rubella

Number of reported cases of rubella and congenital rubella syndrome (CRS), by year, and chronology of rubella vaccination recommendations by the Advisory Committee on Immunization Practices - United States 1966-2004.

- 1 - 1969 - First official recommendations are published for the use of rubella vaccine. Vaccination is recommended for children aged 1 year to puberty.
- 2 - 1978 - Recommendations for vaccination are expanded to include adolescents and certain adults, particularly females.
- 3 - 1981 - Recommendations place increased emphasis on vaccination of susceptible persons in training and educational settings.
- 4 - 1984 - Recommendations are published for vaccination of workers in daycare centres, schools, colleges, companies, government offices, and industrial sites. Providers encouraged to conduct prenatal testing and postpartum vaccination of susceptible women. Recommendations for vaccination are expanded to include susceptible persons who travel abroad.
- 5 - 1990 - Recommendations include implementation of a new 2-dose schedule for measles-mumps-rubella vaccine.



Routine vaccination of children prevents illnesses, hospitalizations, and deaths

Estimated number of illnesses, hospitalizations, and deaths prevented by routine childhood immunization against selected diseases in 30 cohorts of U.S. children born 1994–2023

Disease	Illnesses prevented	Hospitalizations prevented	Deaths prevented
Diphtheria	7,528,000	7,528,000	752,800
Tetanus	5,000	5,000	700
Pertussis	80,738,000	3,646,000	28,400
Haemophilus influenzae type b	536,000	495,000	20,300
Polio	1,847,000	786,000	21,900
Measles	104,984,000	13,172,000	85,000
Mumps	63,355,000	2,020,000	300
Rubella	54,225,000	199,000	400
Congenital rubella syndrome	17,000	26,000	1,900
Hepatitis B	6,061,000	940,000	90,100
Varicella	106,270,000	272,000	1,900
Hepatitis A	4,048,000	78,000	1,500
Pneumococcus-related diseases	47,804,000	1,969,000	123,200
Rotavirus	30,265,000	819,000	400
Total	507,683,000	31,955,000	1,128,800

Notes: Model is based on varicella vaccine for 1996–2023, hepatitis A vaccine for 2006–2023, pneumococcal conjugate vaccine for 2001–2023, and rotavirus vaccine for 2007–2023. Pneumococcus-related diseases include invasive pneumococcal disease, otitis media, and pneumonia.

Source: Fangjun Zhou and others, "Health and Economic Benefits of Routine Childhood Immunizations in the Era of the Vaccines for Children Program – United States, 1994–2023," *Morbidity and Mortality Weekly Report* 73 (31) (2024): 682–685.

Table: Center for American Progress

Vaccine Schedule - 1995

**Recommended Childhood Immunization Schedule
United States - January 1995**

Vaccines are listed under the routinely recommended ages. Shaded bars indicate range of acceptable ages for vaccination.

Age Vaccine ▼	Birth	2 mos	4 mos	6 mos	12 ¹ mos	15 mos	18 mos	4 - 6 yrs	11-12 yrs	14-16 yrs
Hepatitis B ¹	Hep B-1	Hep B-2		Hep B-3						
Diphtheria, Tetanus, Pertussis ²		DTP	DTP	DTP	DTP or DTaP at 15+ m			DTP or DTaP	Td	
<i>H. influenzae</i> type b ³		Hib	Hib	Hib	Hib					
Polio		OPV	OPV	OPV				OPV		
Measles, Mumps, Rubella ⁴					MMR			MMR	or MMR	

¹ Infants born to HBsAg-negative mothers should receive the second dose of hepatitis B vaccine between 1 and 4 months of age, provided at least one month has elapsed since receipt of the first dose. The third dose is recommended between 6 and 18 months of age.

² Infants born to HBsAg-positive mothers should receive immunoprophylaxis for hepatitis B with 0.5 ml of Hepatitis B Immune Globulin (HBIG) within 12 hours of birth, and the appropriate dose of Hepatitis B vaccine at a separate site (Hepatitis B vaccine doses vary according to manufacturer and mother's HBsAg status, and package insert should be consulted for information on doses). In these infants, the second dose of vaccine is recommended at 3 months of age and the third dose at 6 months of age. All pregnant women should be screened for HBsAg in an early prenatal visit.

³ The fourth dose of DTP may be administered as early as 12 months of age, provided at least 6 months have elapsed since DTP3. Combined DTP-Hib products may be used when these two vaccines are to be administered simultaneously. DTPa (diphtheria and tetanus toxoids and acellular pertussis vaccine) is licensed for use for the 4th and/or 5th dose of DTP vaccine in children 14 months of age or older and may be preferred for these doses in children in this age group.

⁴ There are influenza type B conjugate vaccines available for use in infants: IMCOC (IMVITEK) (Lederle Princto); PRP-T (ActiBac, Onevax) (Passive Medical, distributed by Hoechst-Roussel Biochemie, Cinnaminson); and PRP-OMP (Polivax-Hib) (SmithKline Beecham). Children who have received PRP-OMP at 2 and 4 months of age do not require a dose at 6 months of age. After the primary infant Hib conjugate vaccine series is completed, any licensed Hib conjugate vaccine may be used as a booster dose at age 12-15 months.

* The second dose of MMR vaccine should be administered EITHER at 4-6 years of age OR at 11-12 years of age.

⁵ Vaccines recommended in the second year of life (12-15 months of age) may be given at either one or two visits.

Approved by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP)

Table 1 Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger, United States, 2025

These recommendations must be read with the notes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars. To determine minimum intervals between doses, see the catch-up schedule (Table 2).

Vaccine and other immunizing agents	Birth	1 mo	2 mos	4 mos	6 mos	9 mos	12 mos	15 mos	18 mos	19-23 mos	2-3 yrs	4-6 yrs	7-10 yrs	11-12 yrs	13-15 yrs	16 yrs	17-18 yrs	
Respiratory syncytial virus (RSV-mAb [Nirsevimab])	1 dose depending on maternal RSV vaccination status (See Notes)				1 dose (8-19 months), See Notes													
Hepatitis B (HepB)	1st dose	← 2nd dose →		← 3rd dose →														
Rotavirus (RV): RV1 (2-dose series), RV5 (3-dose series)	1st dose		2nd dose	See Notes														
Diphtheria, tetanus, acellular pertussis (DTaP <7 yrs)	1st dose		2nd dose	3rd dose	← 4th dose →			5th dose										
Haemophilus influenzae type b (Hib)	1st dose		2nd dose	See Notes		← 3rd or 4th dose (See Notes) →												
Pneumococcal conjugate (PCV15, PCV20)	1st dose		2nd dose	3rd dose	← 4th dose →													
Inactivated poliovirus (IPV)	1st dose		2nd dose	← 3rd dose →				4th dose									See Notes	
COVID-19 (1vCOV-mRNA, 1vCOV-aPS)	See Notes																	
Influenza (IV3, ccIV3)						1 or 2 doses annually							1 dose annually					
Influenza (LAIV3)											1 or 2 doses annually			1 dose annually				
Measles, mumps, rubella (MMR)					See Notes		← 1st dose →			2nd dose								
Varicella (VAR)							← 1st dose →			2nd dose								
Hepatitis A (HepA)					See Notes		2-dose series (See Notes)											
Tetanus, diphtheria, acellular pertussis (Tdap ≥7 yrs)													1 dose					
Human papillomavirus (HPV)														See Notes				
Meningococcal (MenACWY-CRM ≥2 mos, MenACWY-TT ≥2years)			See Notes												1st dose	2nd dose		
Meningococcal B (MenB-4C, MenB-FHbp)															See Notes			
Respiratory syncytial virus vaccine (RSV [Abrysvo])														Seasonal administration during pregnancy (See Notes)				
Dengue (DEN4CYD: 9-16 yrs)														Seropositive in endemic dengue areas (See Notes)				
Mpox																		

Range of recommended ages for all children
 Range of recommended ages for catch-up vaccination
 Range of recommended ages for certain high-risk groups or populations
 Recommended vaccination can begin in this age group
 Vaccination is based on shared clinical decision-making
 No Guidance/Not Applicable

Source CDC.gov

Table 1 Recommended Adult Immunization Schedule by Age Group, United States, 2025

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
COVID-19	1 or more doses of 2024–2025 vaccine (See Notes)			2 or more doses of 2024–2025 vaccine (See Notes)
Influenza inactivated (iIV3, ccIV3) Influenza recombinant (RV3)	1 dose annually			1 dose annually (HD–iIV3, RV3, or aIV3 preferred)
Influenza inactivated (aIV3; HD–iIV3) Influenza recombinant (RV3)	Solid organ transplant (See Notes)			
Influenza live, attenuated (LAIV3)	1 dose annually			
Respiratory syncytial virus (RSV)	Seasonal administration during pregnancy (See Notes)		60 through 74 years (See Notes)	≥75 years
Tetanus, diphtheria, pertussis (Tdap or Td)	1 dose Tdap each pregnancy; 1 dose Td/Tdap for wound management (See Notes)			
	1 dose Tdap, then Td or Tdap booster every 10 years			
Measles, mumps, rubella (MMR)	1 or 2 doses depending on indication (if born in 1957 or later)			For health care personnel (See Notes)
Varicella (VAR)	2 doses (if born in 1980 or later)		2 doses	
Zoster recombinant (RZV)	2 doses for immunocompromising conditions (See Notes)		2 doses	
Human papillomavirus (HPV)	2 or 3 doses depending on age at initial vaccination or condition	27 through 45 years		
Pneumococcal (PCV15, PCV20, PCV21, PPSV23)				See Notes
				See Notes
Hepatitis A (HepA)	2, 3, or 4 doses depending on vaccine			
Hepatitis B (HepB)	2, 3, or 4 doses depending on vaccine or condition			
Meningococcal A, C, W, Y (MenACWY)	1 or 2 doses depending on indication (See Notes for booster recommendations)			
Meningococcal B (MenB)	19 through 23 years	2 or 3 doses depending on vaccine and indication (See Notes for booster recommendations)		
Haemophilus influenzae type b (Hib)	1 or 3 doses depending on indication			
Mpox	2 doses			
Inactivated poliovirus (IPV)	Complete 3-dose series if incompletely vaccinated. Self-report of previous doses acceptable (See Notes)			

Tdap -DTaP

- DTaP - for children under 7 - five injections (2-18 months) and again the 5th around 4-6 years old
- Proteins for diphtheria and pertussis lower in Tdap to prevent severe swelling
- Tdap - recommended as an adolescent then every 10 years (at least once as adult - can be Td or Tdap after)
- ALWAYS consider Tdap if around infants
- Pregnant women
- Dirty wounds (5 years)

Waning Immunity and Falling Vaccination Rates Fuel Pertussis Outbreaks

Whooping Cough Surges Nationwide Due To Falling Vaccination Rates, Fading Immunity, Health Officials Say

[KFF Health News](#) (11/20, Gounder) reports that “rates of pertussis, also known as whooping cough, are surging in Texas, Florida, California, Oregon, and other states and localities across the country.” The outbreaks are attributed to “falling vaccination rates, fading immunity, and delays in public health tracking systems, according to interviews with state and federal health officials. Babies too young to be fully vaccinated are most at risk.”

Commons side effects – Ts

- fever, swelling, fatigue, vomiting, pain
- NO association with GBS
- NO association with neurologic conditions
- Rare febrile seizures when DTaP with inactivated influenza

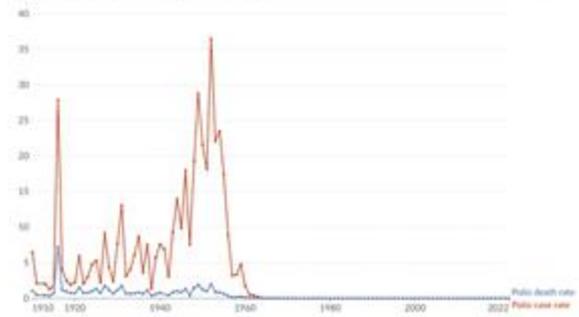
Polio

- 1950 - first early oral vaccine - not approved in US
- Salk vaccine 1955 - killed attenuated injectable
- Sabin live vaccine - 1961
- 1988 - Global eradication program
- 1994 - Declared eradicated from Western Hemisphere
- 4 doses in childhood
- Adults - catch up or one dose if travel to endemic area
- Wild polio - Afghanistan and Pakistan
- Vaccine derived



Polio case and death rates in the United States

The reported rates are per 100,000 US population and include both wild¹ and vaccine-derived poliovirus² infections that occurred indigenously and as imported cases.



Data source: Our World in Data based on US Public Health Service, US Center for Disease Control, and WHO
OurWorldinData.org (polio) CC BY

1. Wild poliovirus (WPV) Wild poliovirus refers to polio viruses that have come from the environment. There are three serotypes of wild poliovirus: wild poliovirus 1, 2 and 3. Two of the three serotypes have already been eradicated worldwide. The last case of wild poliovirus serotype 2 was seen in 1999 in India. It was declared globally eradicated by the WHO in 2015. The last case of wild poliovirus serotype 3 was seen in 2012 in Nigeria and declared eradicated in 2019. [Read more on our page on wild polio.](#)

2. Vaccine-derived poliovirus (VDPV) Vaccine-derived poliovirus refers to polio viruses that have come from Oral Polio Vaccines (OPV) in some circumstances. There are three serotypes of vaccine-derived poliovirus: vaccine-derived poliovirus 1, 2 and 3. These arise when the virus used in live oral poliovirus vaccines, in very low concentrations, under conditions that allow it to cause disease. If a population has low immunity to polio, because of low rates of vaccination, these vaccine-derived polioviruses can spread more easily and cause an outbreak. Since 2021, the world has a new serotype of the oral poliovirus vaccine called the "novel Oral Polio Vaccine" (nOPV) that is even genetically more similar to the poliovirus vaccine, and can prevent outbreaks of vaccine-derived poliovirus. Vaccine-derived polioviruses contrast with wild poliovirus. [Read more on our page on wild polio.](#)

Hepatitis A

- Recommended for all children 12-23 months of age
- Travel to endemic areas
- High risk groups due to occupation or other (liver disease, MSM, IVDU)
- Two shot series
- MINIMAL SIDE Effects

FIGURE

Rates of hepatitis A infection have declined steadily in all age groups³

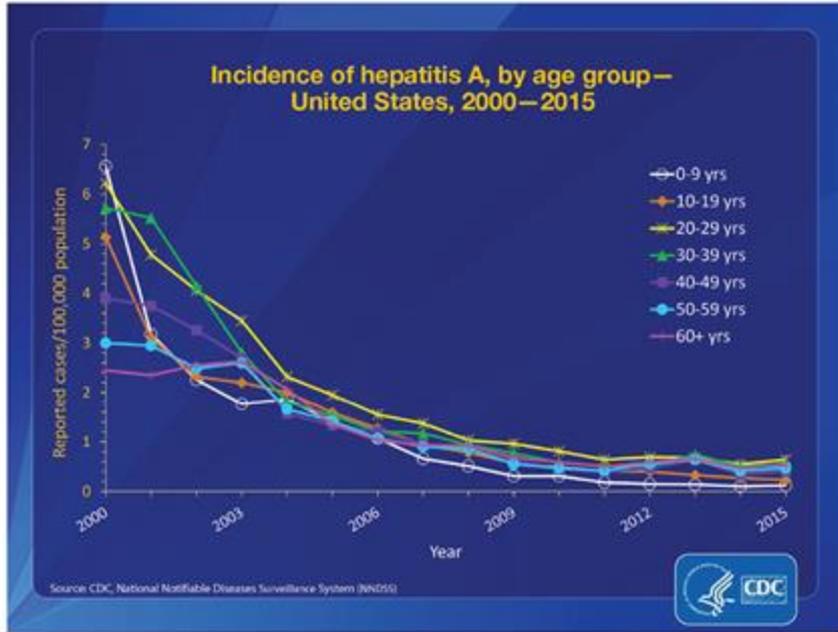
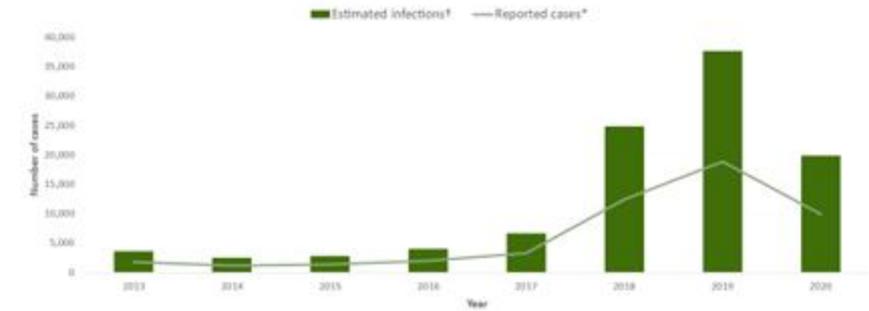


Figure 1.1 – Part 1 of 2
Number of reported cases* of hepatitis A virus infection and estimated infections†
United States, 2013–2020



* Reported confirmed cases. For the most definitions, see https://www.cdc.gov/nndss/conditions/hepatitis_a/index.html

† The number of estimated viral hepatitis infections was determined by multiplying the number of reported cases that met the classification criteria for a confirmed case by a factor that adjusted for underreporting and underdiagnosis. The 95% bootstrap confidence intervals for the estimated number of infections are displayed in the appendix.

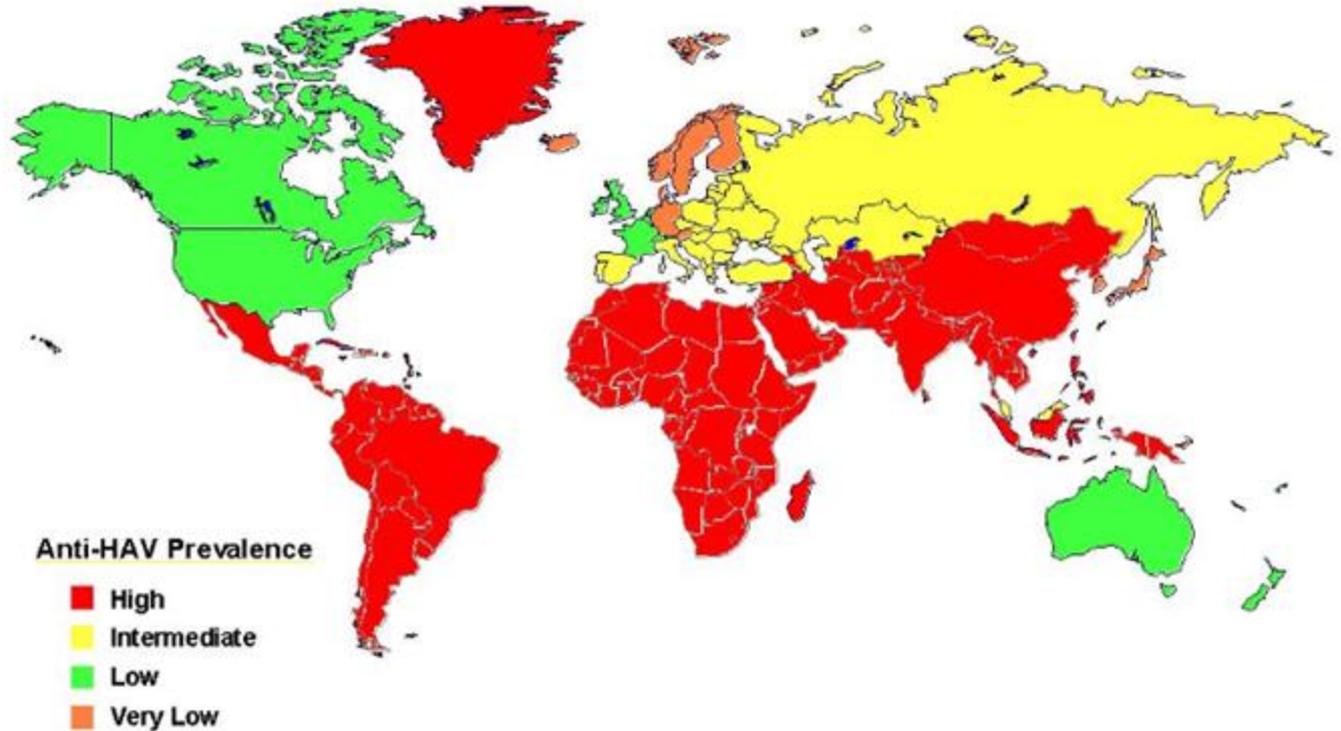
Source: CDC, National Notifiable Diseases Surveillance System

Reference: Krawiec RM, Liu L, Roberts A, et al. Estimating acute viral hepatitis infections from nationally reported cases. *Am J Public Health* 2014;104(8):1402-1407.

Appendix: See Data Supplemental Appendix 1 at https://www.cdc.gov/nndss/conditions/hepatitis_a/index.html

Published September 2022

Geographic Distribution of HAV Infection



RSV – adults

- First approved in May 2023 – one dose
- Adults older than 75 or aged 50–74 with chronic lung or heart issues or chronic immune issues
- Side effects: pain, fatigue, fever, headache, muscle or joint pain. GBS rare
- Efficacy: Decreases risk of severe PNA by 80%, prevent hospitalization (77–83% effective) and preventing ER visits (77–79%) – all in those over 60
- Significant durability issues (no recommendations for revaccination) – offers protection for two seasons

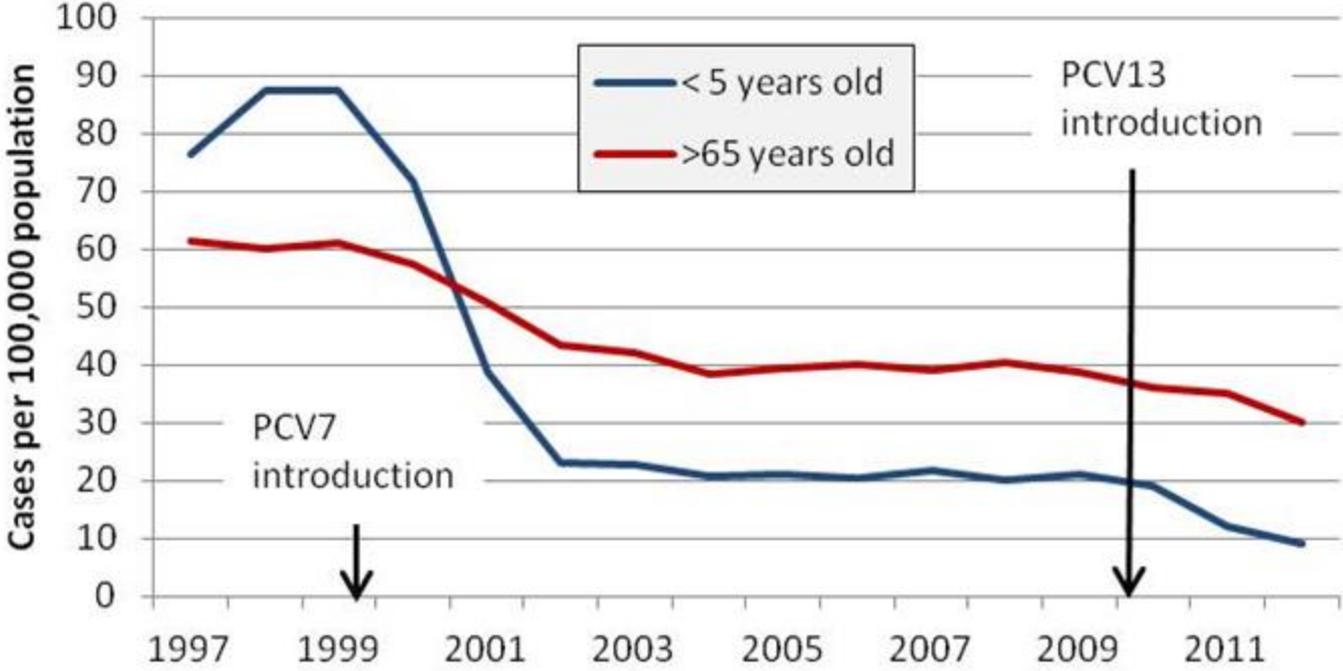
Meningitis

- Actually two different vaccines
- Quadrivalent (ACWY) - given to pre teens and then again before college - also asplenia . MSM, HIV.
- More the “community meningitis”
- Meningitis B - people with risk factors, outbreaks - 2 vaccines 8 weeks apart
- Side effects - soreness, HA, fever

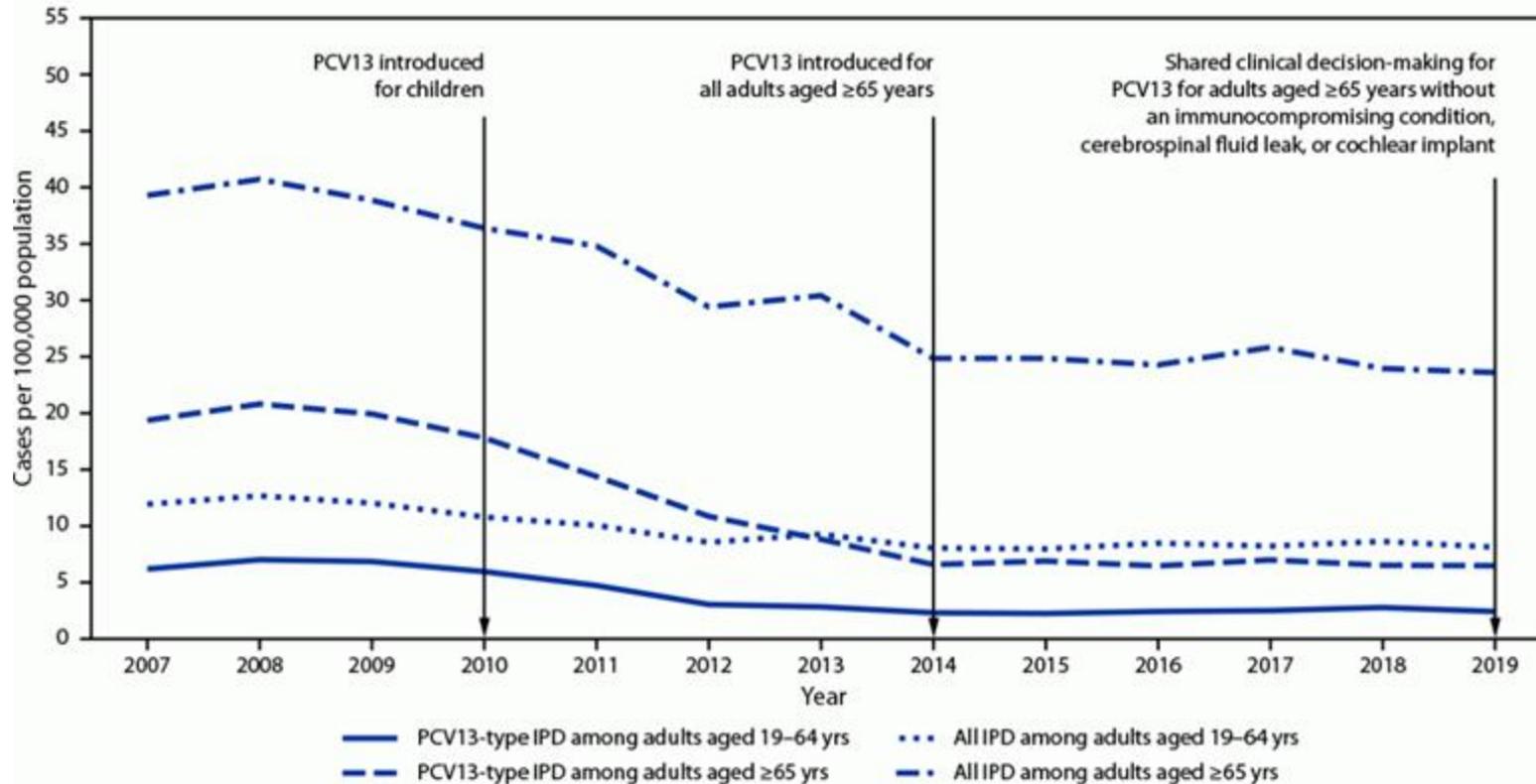
Pneumococcal

- VERY COMpLex - multiple conjugated and polysaccharide vaccines (PCV 20, 21, 15) and (PSV23)
- Children under 5
- Adults 50 year and old
- Children and adults with medical conditions (including CSF leaks, cochlear implants)
- Side effects - fever, headaches, chills, fatigue

Prevalence of Invasive Pneumococcal Disease in U.S. Before and After PCV7 and PCV13 Vaccine Introductions



- ["CDC – ABCs: Surveillance Reports main page – Active Bacterial Core surveillance"](#). 19 July 2021. Archived from the original on 1 December 2020. Retrieved 10 September 2017.



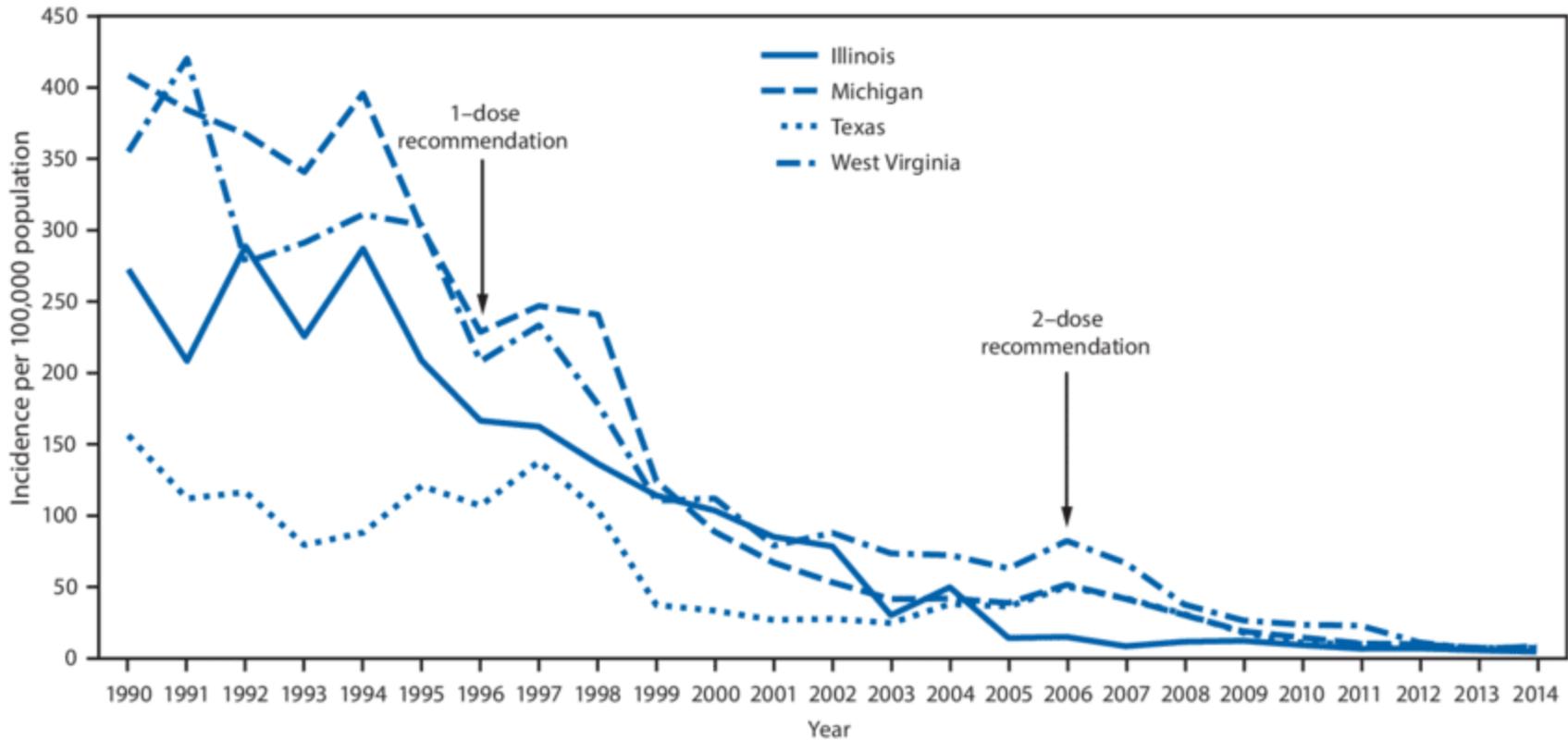
Kobayashi M, Farrar JL, Gierke R, et al. Use of 15-Valent Pneumococcal Conjugate Vaccine and 20-Valent Pneumococcal Conjugate Vaccine Among U.S. Adults: Updated Recommendations of the Advisory Committee on Immunization Practices — United States, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:109–117. DOI: <http://dx.doi.org/10.15585/mmwr.mm7104a1>

Asplenia

- Increased risk of encapsulated organisms
- Vaccines
 - Pneumococcal (PCV 20/21, PSC 23 → PCV 13 boost) - PCV 20/21 is a one and done - others may need boosting based on history
 - Meningitis Quad (ACWY) and Meningitis B - both two shots series - boost B at one year and then every 2-3 years after and boost Quad every 5 years
 - Single dose of HiB
 - Annual influenza

Chicken Pox

- Kids - one dose at 12-15 months and second dose at 4-6 years
- Catch up
 - Old children (7-12) - 3 months apart
 - 13 plus - 28 days apart
- Live vaccine - don't give in pregnancy, breastfeeding, immune issues (cancer, meds, advance HIV)
- 90% effective
- Side effects - sore arm, feveres, mild rash at injection sire



Lopez, Adriana & Zhang, John & Marin, Mona. (2016). Epidemiology of Varicella During the 2-Dose Varicella Vaccination Program - United States, 2005-2014. MMWR. Morbidity and mortality weekly report. 65. 902-905. 10.15585/mmwr.mm6534a4.

Shingles vaccines

- Shingrix - recombinant vaccine for adults 50 or older (or 18 and older with risks for severe disease)
- Two shot serie 2-6 months apart
- Don't need to show shingles immunity
- Greater than 90% efficacious - very high in those less than 70 (97%)
- Pain, fatigue, fever, aches

Hepatitis B

- Worldwide over 350 million infected with hep B with 1/3 of world's
- population having a marker of exposure (HBc abs)
- Transmitted through exposure to infected blood and body fluids
- Hep B vaccine
 - Infants - 90% effective at preventing perinatal transmission when given at birth, 98% effective if full series given - VERY effective at preventing chronic Hep B
 - Approx - 95 % of infants develop immunity
 - Immunity last at least 30 years
 - Adults 5-15% may not respond due to age, besity, chronic conditions, smoking
- Side effects: headache, injection site swelling, fevers, fatigue, fussy. Rare allergic reactions and chest pain (1 in 1.1 million doses)

Table

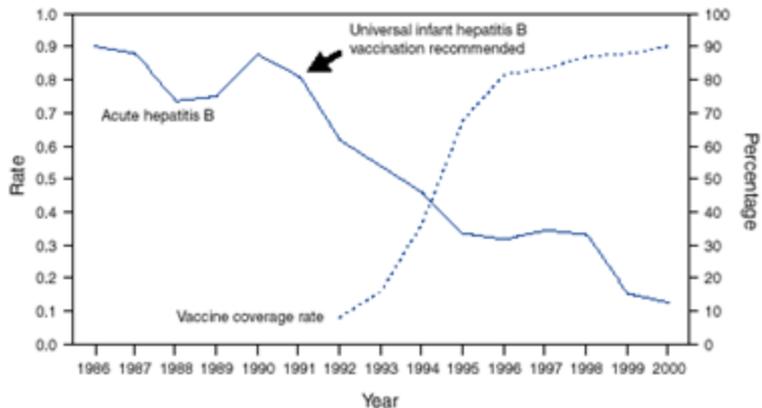
TABLE. Chronology of Advisory Committee on Immunization Practices recommendations for hepatitis B immunization — United States, 1982–2002

June 25, 1982	First official recommendations are published for the use of hepatitis B vaccine. Vaccination is recommended for groups known to be at high risk* for hepatitis B virus (HBV) infection.
June 1, 1984	Recommendation that all infants born to hepatitis B surface antigen (HBsAg)-positive mothers receive post-exposure immunoprophylaxis with both hepatitis B vaccine and hepatitis B immune globulin (HBIG) and that pregnant women in high-risk groups be tested for HBsAg during the prenatal period.
June 7, 1985	Recommendation that heterosexual persons with multiple sexual partners and international travelers who plan to spend >6 months in areas where HBV infection is endemic be vaccinated.
June 10, 1988	Recommendation that all pregnant women be tested routinely for HBsAg during the prenatal period.
February 9, 1990	Recommendation that public safety workers who have contact with blood or blood-contaminated body fluids and family members of adoptees from countries in which HBV infection is endemic be vaccinated.
November 22, 1991	Recommendation that all U.S. infants receive hepatitis B vaccination.
August 4, 1995	Recommendation that all children aged 11–12 years who have not been vaccinated previously receive pre-exposure vaccination.
January 22, 1999	Recommendation that all children aged 0–18 years who have not been vaccinated previously be vaccinated.
January 18, 2002	Preference established for administering the first dose of hepatitis B vaccine series at birth.

*Health-care providers, clients, and staff of institutions for the developmentally disabled, hemodialysis patients, men who have sex with men, injection-drug users, recipients of clotting factors for bleeding disorders, household and sexual contacts of persons with chronic HBV infection, populations with high rates of HBV infection (e.g., Alaska Natives, Pacific Islanders, and immigrants and refugees from countries in which HBV is endemic), and inmates of long-term correctional facilities.

Source: Achievement in Public Health: Hepatitis B Vaccination – United State , 1982-202: MMWR 51(25); 549-552, 563. June 28,2002

FIGURE. Rate* of reported acute hepatitis B among children aged 1–9 years and percentage of children aged 19–35 months who received hepatitis B vaccine, by year — United States, 1986–2000



* Per 100,000 children aged 1–9 years.

MPOX

- Two types vaccines available - the replicative vaccinia forms (not available to public) and JYNNEOS vaccine (modified vaccinia Ankara [MVA] vaccine, Bavarian Nordic) -non replicative
- In conjunction with MPOX clade II outbreak - JYNNEOS approved to prevent MPOX in 2018 to be administered subcutaneously in a two-dose series (0.5 ml per dose, 4 weeks apart). On August 9, 2022, in order to increase the supply of vaccine available for use, an emergency use authorization (EUA) was issued for intradermal administration of the vaccine in a two-dose series (0.1 ml per dose, 4 weeks apart). Came in originally packaged single use 0.5ml vials
- No real intervention other than support for MPOX (tecovirimat not shown to be effective for less than severe disease)
- Side effects: injection site pain, swelling, fatigue, headache - ID injections more pronounced and longer lasting

Effectiveness of JYNNEOS

ORIGINAL ARTICLE

f X in M

Vaccine Effectiveness of JYNNEOS against Mpox Disease in the United States

Authors: Nicholas P. Deputy, Ph.D., Joseph Deckert, Ph.D., Anna N. Chard, Ph.D., Neil Sandberg, M.S., Danielle L. Moulia, M.P.H., Eric Barkley, B.S., Alexandra F. Dalton, Ph.D., , and Leora R. Feldstein, Ph.D.  [Author Info & Affiliations](#)

Published May 18, 2023 | *N Engl J Med* 2023;388:2434-2443 | DOI: 10.1056/NEJMoa2215201 | **VOL. 388 NO. 26**

Subpopulation	Case Patients	Control Patients	Vaccine Effectiveness (95% CI)	
			Unadjusted	Adjusted*
	number		percent	
Men only†				
Unvaccinated, reference group	1792	6075		
Partially vaccinated	136	983	54.5 (45.0–62.5)	35.9 (21.6–47.6)
Fully vaccinated	25	335	72.3 (65.3–85.2)	64.8 (45.2–77.3)
Men only, 18–49 yr of age and without ACAM2000 vaccination†				
Unvaccinated, reference group	1561	4632		
Partially vaccinated	119	787	56.9 (46.7–65.2)	35.5 (19.1–48.6)
Fully vaccinated	23	247	73.4 (58.3–83.0)	58.7 (33.9–74.3)
Not immunocompromised				
Unvaccinated, reference group	1151	5368		
Partially vaccinated	102	932	47.0 (33.2–58.0)	40.8 (24.8–53.4)
Fully vaccinated	14	312	80.6 (65.5–89.1)	76.3 (57.7–86.8)

* Adjustment was for age group (18 to 35, 36 to 49, and ≥50 years), race or ethnic group (non-Hispanic White, non-Hispanic Black, and other non-Hispanic), Social Vulnerability Index quartile (quartile 1 to 4, or unknown), and the presence or absence of an immunocompromising condition.

† This category includes patients whose gender identity was male.

Estimated Vaccine Effectiveness against Diagnosed Mpox among Persons Seeking Health Care, According to Subpopulations of Interest, August 15 through November 19, 2022.

Separate study looking at risk:

- 43 U.S. jurisdictions - men 18 to 49
- Incidence of mpox disease was 7.4 times and 9.6 times as high among unvaccinated men as among those who received a first or second vaccine dose at least 14 days earlier, respectively;

Payne AB, Ray LC, Cole MM, et al. Reduced risk for mpox after receipt of 1 or 2 doses of JYNNEOS vaccine compared with risk among unvaccinated persons — 43 U.S. jurisdictions, July 31–October 1, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:1560-1564.

Influenza

- Recommended in 6 months and older - both inactivated, high dose and live form - avoid nasal spray (live form) in pregnancy, immunocompromised (recommended age 2-49)
- Efficacy - last years was about 70% effective in preventing hospitalization in children and adolescents and between 40 and 60% effective in adults
- Side effects: Soreness, muscle aches, headache
- GBS: Risk is 1-2 /mil. doses (risk for infection can be as high as 17/mil. inf.)
- Eggs - most people can safely receive vaccine but should assess risk (and there are egg free recombinant forms)

Current Flu status

- H3N2 variant
- subline K circulating in Japan, UK and Canada
- Not the exact strain in this seasons vaccine
- May offer some but less protection

H5N5



MMR

- Combined vaccine - dosed between 12 and 15 months and again at 4-6 years
- Efficacy
 - Measles - 2 dose 96 % effective (one dose 93% effective)
 - Mumps - 2 doses 86 % effective
 - Rubella - 2 doses 89% effective
 - Immunity wanes (about 0.04% per year) **
- Side effects: Fever, swollen glands, rash, arm pain - rare - febrile seizure, thrombocytopenia
- LIVE VACCINE - no pregnant women, immunocompromised patients or previous allergic reaction

** Long-term waning of vaccine-induced immunity to measles in England: a mathematical modelling study
Robert, Alexis et al.
The Lancet Public Health, Volume 9, Issue 10, e766 - e775

Early reports

Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

A J Wakefield, S H Murch, A Anthony, J Linell, D M Casson, M Malik, M Berelowitz, A P Dhillon, M A Thomson, P Harvey, A Valentine, S E Davies, J A Walker-Smith

Summary

Background We investigated a consecutive series of children with chronic enterocolitis and regressive developmental disorder.

Methods 12 children (mean age 6 years [range 3–10], 11 boys) were referred to a paediatric gastroenterology unit with a history of normal development followed by loss of acquired skills, including language, together with diarrhoea and abdominal pain. Children underwent gastroenterological, neurological, and developmental assessment and review of developmental records. Ileocolonoscopy and biopsy sampling, magnetic-resonance imaging (MRI), electroencephalography (EEG), and lumbar puncture were done under sedation. Barium follow-through radiography was done where possible. Biochemical, haematological, and immunological profiles were examined.

Findings Onset of behavioural symptoms was associated, by the parents, with measles, mumps, and rubella vaccination in eight of the 12 children, with measles infection in one child, and EBV infection in another. All 12 children had intestinal abnormalities, ranging from lymphoid nodular hyperplasia to aphthous ulceration. Histology showed patchy chronic inflammation in the colon in 11 children and reactive ileal lymphoid hyperplasia in seven, but no granulomas. Developmental disorders included autism (one), disintegrative psychosis (one), and possible prodromal or residual encephalitis (two). There were no clear neurological abnormalities and EEG and EEG tests were normal. Abnormal laboratory results were significantly raised urinary methylmalonic acid compared with age-matched controls (24/100), low haemoglobin in four children, and a low serum IgA in four children.

Interpretation We identified an association between ileal disease and developmental regression in a group of previously normal children, which was generally associated in time with possible environmental triggers.

Lancet 2006, 368: 637–41
See Commentary page 611

Information School Studies Group, University Department of Medicine and Haematology (A Anthony), St Anthony's, 1 Christon Ave, A P Dhillon (senior), S E Davies (senior), J Linell, D M Casson, M Malik, M Berelowitz, A P Dhillon, M A Thomson, P Harvey, A Valentine, S E Davies, J A Walker-Smith, and S H Murch) are thanked for their assistance. Neurology (P Harvey) report, and Radiology (A Valentine) report, Royal Free Hospital and School of Medicine, London WC1E 6BU, UK

Correspondence to Dr A J Wakefield.

THE LANCET

The Lancet, [Volume 351, Issue 9103](#), Pages 637 - 641, 28 February 1998
doi:10.1016/S0140-6736(97)11096-0

This article was retracted

RETRACTED: Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

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We investigated a consecutive series of children with chronic enterocolitis and regressive developmental disorder.

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12 children (mean age 6 years [range 3–10], 11 boys) were referred to a paediatric gastroenterology unit with a history of normal development followed by loss of acquired skills, including language, together with diarrhoea and abdominal pain. Children underwent gastroenterological, neurological, and developmental assessment and review of developmental records. Ileocolonoscopy and biopsy sampling, magnetic-resonance imaging (MRI), electroencephalography (EEG), and lumbar puncture were done under sedation. Barium follow-through radiography was done where possible. Biochemical, haematological, and immunological profiles were examined.

RETRACTED

1998 study - retracted in 2010 - study based on fraudulent data
Called “the most damaging medical hoax of the 20th century”
(Flaherty et al Annals of Pharmacotherapy)

ORIGINAL ARTICLE



A Population-Based Study of Measles, Mumps, and Rubella Vaccination and Autism

Authors: Kreesten Meldgaard Madsen, M.D., Anders Hviid, M.Sc., Mogens Vestergaard, M.D., Diana Schendel, Ph.D., Jan Wohlfahrt, M.Sc., Poul Thorsen, M.D., Jørn Olsen, M.D., and Mads Melbye, M.D. [Author Info & Affiliations](#)

Published November 7, 2002 | N Engl J Med 2002;347:1477-1482 | DOI: 10.1056/NEJMoa021134

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- Over ½ million childrens records in Denmark reviewed form Jan 91 – Dec 98
- Slightly more than 80% vaccinated
- No differences in the rate of autism or other disease spectrum in the vaccinated vs unvaccinated groups

COVID

- mRNA vaccines
- safe
- recommendations.....
- lots of data on safety
- Adolescent males - this is where you should have a discussion

[nature](#) > [articles](#) > [article](#)

Article | [Open access](#) | Published: 22 October 2025

SARS-CoV-2 mRNA vaccines sensitize tumours to immune checkpoint blockade

[Adam J. Grippin](#) , [Christiano Marconi](#), [Sage Copling](#), [Nan Li](#), [Chen Braun](#), [Cole Woody](#), [Elliana Young](#), [Priti Gupta](#), [Min Wang](#), [Annette Wu](#), [Seong Dong Jeong](#), [Dhruvkumar Soni](#), [Frances Weidert](#), [Chao Xie](#), [Eden Goldenberg](#), [Andrew Kim](#), [Chong Zhao](#), [Anna DeVries](#), [Paul Castillo](#), [Rishabh Lohray](#), [Michael K. Rooney](#), [Benjamin R. Schrank](#), [Yifan Wang](#), [Yifan Ma](#), [D3CODE Team](#), ... [Steven H. Lin](#)  [+ Show authors](#)

[Nature](#) **647**, 488–497 (2025) | [Cite this article](#)



Autism and Vaccines

QUESTIONS AND CONCERNS | PAGE 2 OF 9 | ALL PAGES ▾

For Everyone
NOV. 10, 2025

KEY POINTS

- The claim "vaccines do not cause autism" is not an evidence-based claim because studies have not ruled out the possibility that infant vaccines cause autism.
- Studies supporting a link have been ignored by health authorities.
- HHS has launched a comprehensive assessment of the causes of autism, including investigations on plausible biologic mechanisms and potential causal links.

WRONG:

Also - correlation is not causation

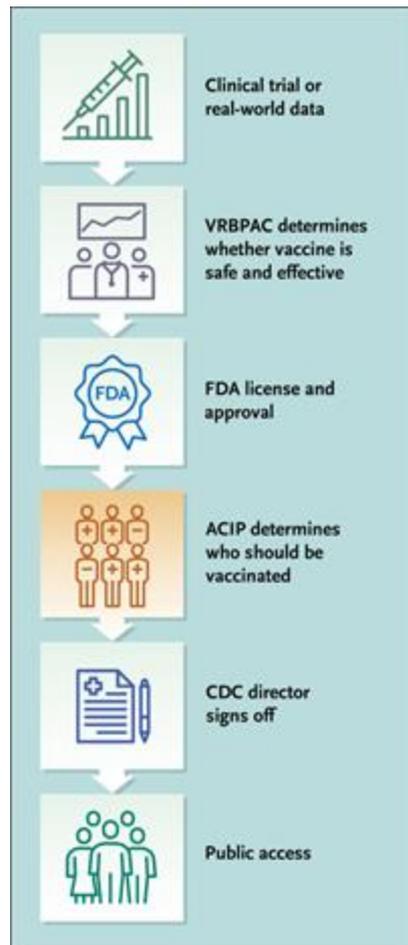
ACIP restructure

- For over 60 years comprised of a diverse group of nonpartisan specialists that advised the CDC on vaccine policy
- June 2025 - all 17 members of ACIP were dismissed via email
- Previous rigorous conflict of interest methods and rigorous science evidence
- Replaced with inexperienced and biased panel that has engendered fundamental distressed of process
- Significant concern of coverage - especially with federal programs (VA, Vaccine for Children Program)
- Note : AAP does not endorse the current CDC recommendations

Box 1 Liaison Organizations of the Advisory Committee on Immunization Practices*

American Academy of Family Physicians (AAFP)
American Academy of Pediatrics (AAP)
American Academy of Physician Associates (AAPA)
American College Health Association (ACHA)
American College of Nurse Midwives (ACNM)
American College of Obstetricians and Gynecologists (ACOG)
American College of Physicians (ACP)
American Geriatrics Society (AGS)
America's Health Insurance Plans (AHIP)
American Immunization Registry Association (AIRA)
American Medical Association (AMA)
American Nurses Association (ANA)
American Osteopathic Association (AOA)
American Pharmacists Association (APhA)
Association for Prevention Teaching and Research (APTR)
Association of Immunization Managers (AIM)
Association of State and Territorial Health Officials (ASTHO)
Biotechnology Innovation Organization (BIO)
Canadian National Advisory Committee on Immunization (NACI)
Council of State and Territorial Epidemiologists (CSTE)
Infectious Diseases Society of America (IDSA)
International Society for Travel Medicine (ISTM)
National Association of County and City Health Officials (NACCHO)
National Association of Pediatric Nurse Practitioners (NAPNAP)
National Foundation for Infectious Diseases (NFID)
National Medical Association (NMA)
Pediatric Infectious Diseases Society (PIDS)
Pharmaceutical Research and Manufacturers of America (PhRMA)
Society for Adolescent Health and Medicine (SAHM)
Society for Healthcare Epidemiology of America (SHEA)

*Source: <https://www.cdc.gov/acip/membership/index.html>.



Where can I go?

- American Academy of Pediatrics
- American College of Obstetricians and Gynecologists
- AMA
- [Vaccineinformation.org](https://www.vaccineinformation.org) (Immunization.org)

Conclusions

- Vaccines has overwhelming evidence for being safe and effective
- Medical misinformation can significantly impact perception of the life saving impact of vaccines
- Very few parents (or even grandparents) have seen the devastating effects of a pre-vaccine era
- Although controlled - these pathogens are still out there

Thank you

