Development of the U.S. Childhood Vaccine Schedule

With A Focus on Suggested Improvements

Aaron Siri

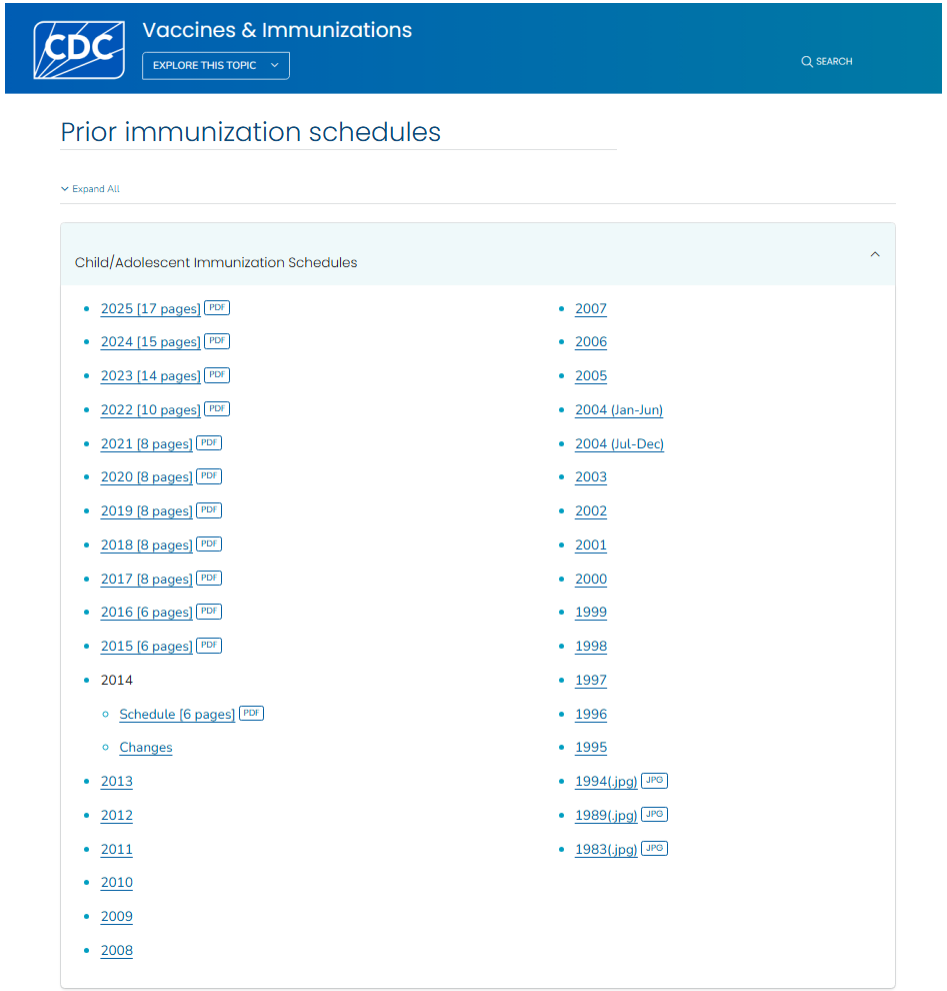
ACIP Meeting, December 5, 2025

Disclosures

Siri | Glimstad

Managing Partner of Siri & Glimstad LLP with 100+ professionals who handle civil rights, exemptions, immigration, employment, and injury claims related to vaccination. Author of *Vaccines, Amen: The Religion of Vaccines*.

Growth of U.S. Childhood Vaccine Schedule



1983 U.S. Vaccine Schedule

TABLE 1. Recommended schedule for active immunization of normal infants and children (See individual ACIP recommendations for details.)

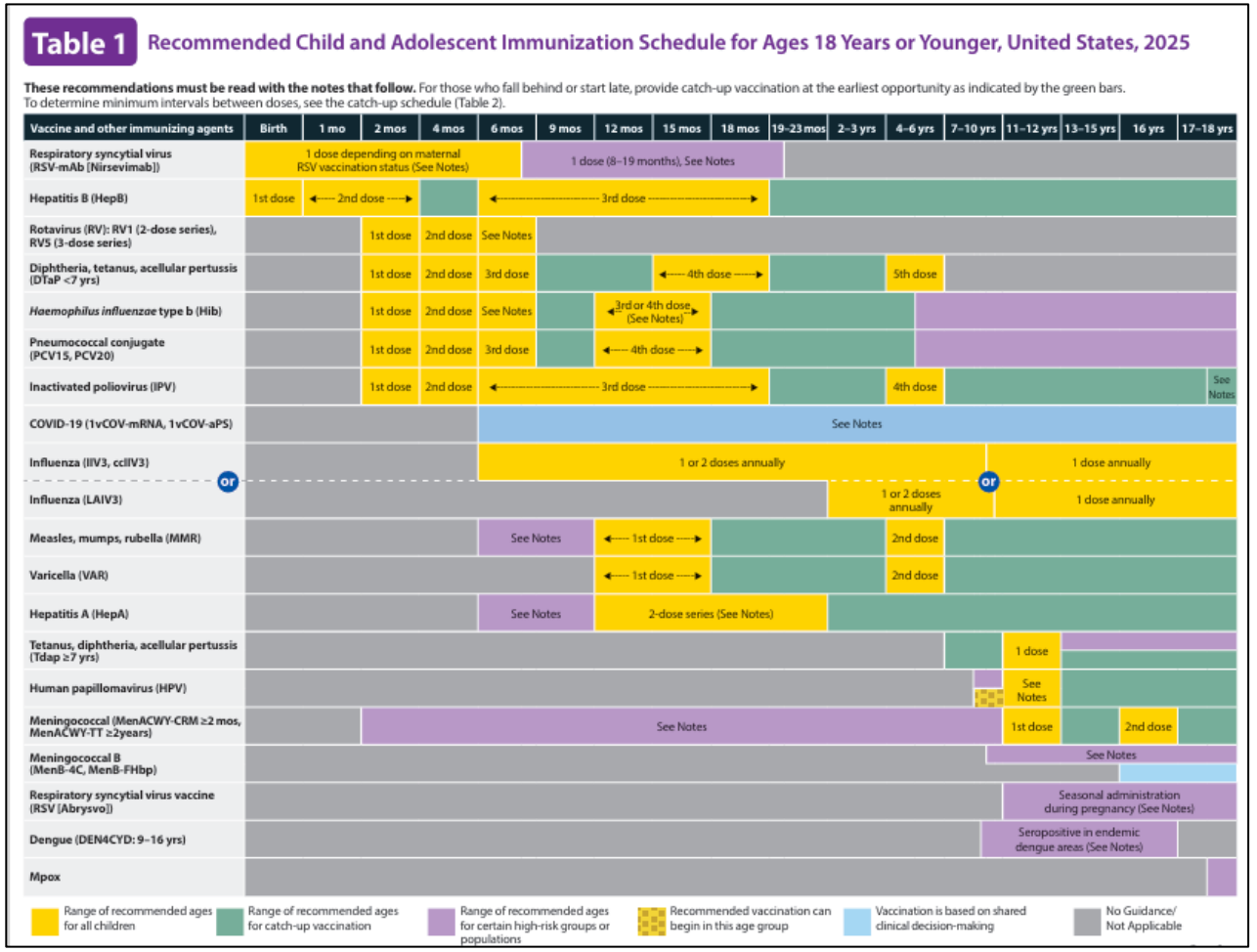
Recommended age*	Vaccine(s)†	Comments
2 mo.	DTP-1,§ OPV-1¶	Can be given earlier in areas of high endemicity
4 mo.	DTP-2, OPV-2	6-wks-2-mo. interval desired between OPV doses to avoid interference
6 mo.	DTP-3	An additional dose of OPV at this time is optional for use in areas with a high risk of polio exposure
15 mo.**	MMR††	
18 mo.**	DTP-4, OPV-3	Completion of primary series
4-6 yr.§§	DTP-5, OPV-4	Preferably at or before school entry
14-16. yr	Td¶¶	Repeat every 10 years throughout life

Source: https://www.cdc.gov/vaccines/hcp/imz-schedules/resources.html

2025 U.S. Vaccine Schedule

Vaccines and Other Immunizing Agents in the Child and Adolescent Immunization Schedule*

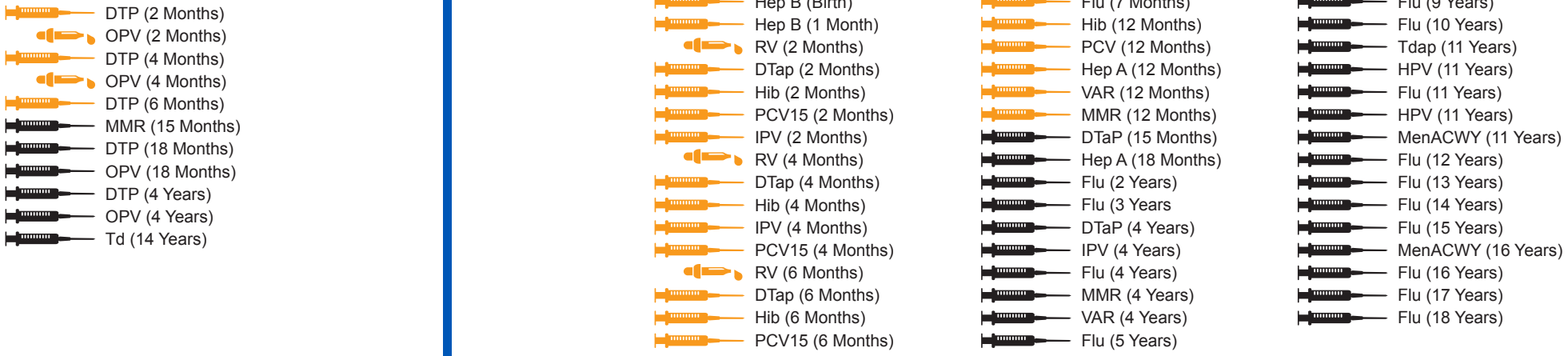
Monoclonal antibody	Abbreviation(s)	Trade name(s)
Respiratory syncytial virus monoclonal antibody (Nirsevimab)	RSV-mAb	Beyfortus
Vaccine	**Abbreviation(s)**	**Trade name(s)**
COVID-19 vaccine	1vCOV-mRNA	Comirnaty, mNexspike, Spikevax
	1vCOV-aPS	Nuvaxovid
Dengue vaccine	DEN4CYD	Dengvaxia
Diphtheria, tetanus, and acellular pertussis vaccine	DTaP	Daptacel Infanrix
Haemophilus influenzae type b vaccine	Hib (PRP-T) Hib (PRP-OMP)	ActHIB Hiberix PedvaxHIB
Hepatitis A vaccine	HepA	Havrix Vaqta
Hepatitis B vaccine	HepB	Engerix-B Recombivax HB
Human papillomavirus vaccine	HPV	Gardasil 9
Influenza vaccine (inactivated: egg-based)	IIV3	Multiple
Influenza vaccine (inactivated: cell-culture)	ccIIV3	Flucelvax
Influenza vaccine (live, attenuated)	LAIV3	FluMist
Measles, mumps, and rubella vaccine	MMR	M-M-R II Priorix
Meningococcal serogroups A, C, W, Y vaccine	MenACWY-CRM MenACWY-TT	Menveo MenQuadfi
Meningococcal serogroup B vaccine	MenB-4C MenB-FHbp	Bexsero Trumenba
Meningococcal serogroup A, B, C, W, Y vaccine	MenACWY-TT/ MenB-FHbp	Penbraya
Monkeypox vaccine	Mpox	Jynneos
Pneumococcal conjugate vaccine	PCV15 PCV20	Vaxneuvance Prevnar 20
Pneumococcal polysaccharide vaccine	PPSV23	Pneumovax 23
Poliovirus vaccine (inactivated)	IPV	Ipol
Respiratory syncytial virus vaccine	RSV	Abrysvo
Rotavirus vaccine	RV1 RV5	Rotarix RotaTeq
Tetanus, diphtheria, and acellular pertussis vaccine	Tdap	Adacel Boostrix
Tetanus and diphtheria vaccine	Td	Tenivac Tdvax
Varicella vaccine	VAR	Varivax
Combination vaccines *(use combination vaccines instead of separate injections when appropriate)*		
DTaP, hepatitis B, and inactivated poliovirus vaccine	DTaP-HepB-IPV	Pediarix
DTaP, inactivated poliovirus, and *Haemophilus influenzae* type b vaccine	DTaP-IPV/Hib	Pentacel
DTaP and inactivated poliovirus vaccine	DTaP-IPV	Kinrix Quadracel
DTaP, inactivated poliovirus, *Haemophilus influenzae* type b, and hepatitis B vaccine	DTaP-IPV-Hib-HepB	Vaxelis
Measles, mumps, rubella, and varicella vaccine	MMRV	ProQuad



Source: https://www.cdc.gov/vaccines/hcp/imz-schedules/downloads/child/0-18yrs-child-combined-schedule.pdf

1983 v. 2025 U.S. Childhood Vaccine Schedule

Routine Vaccines: In Utero to 18 Years

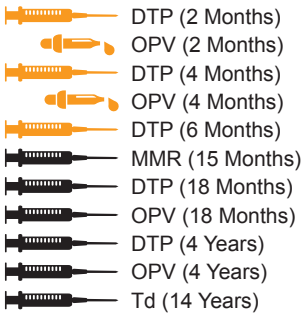


Vaccines given ≤ 12 months of age Vaccines given > 12 months of age

Reflects: stand-alone routine vaccines given at earliest recommended age; and 3-dose RV, 4-dose Hib, and 2-dose HPV series. Sources: https://www.cdc.gov/vaccines/hcp/imz-schedules/resources.html; https://www.cdc.gov/vaccines/hcp/imz-schedules/child-adolescent-age.html; https://www.cdc.gov/vaccines-pregnancy/hcp/vaccination-guidelines/index.html

1983 v. 2025 U.S. Childhood Vaccine Schedule

Routine + Shared Decision-Making Vaccines (Covid-19 and MenB)



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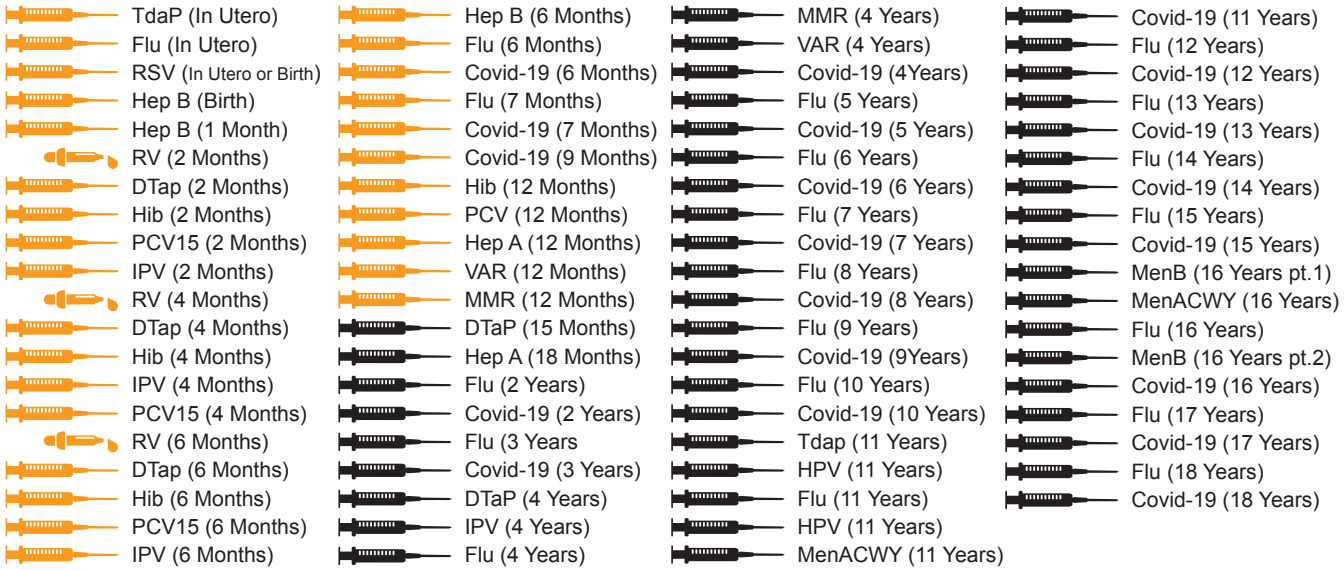


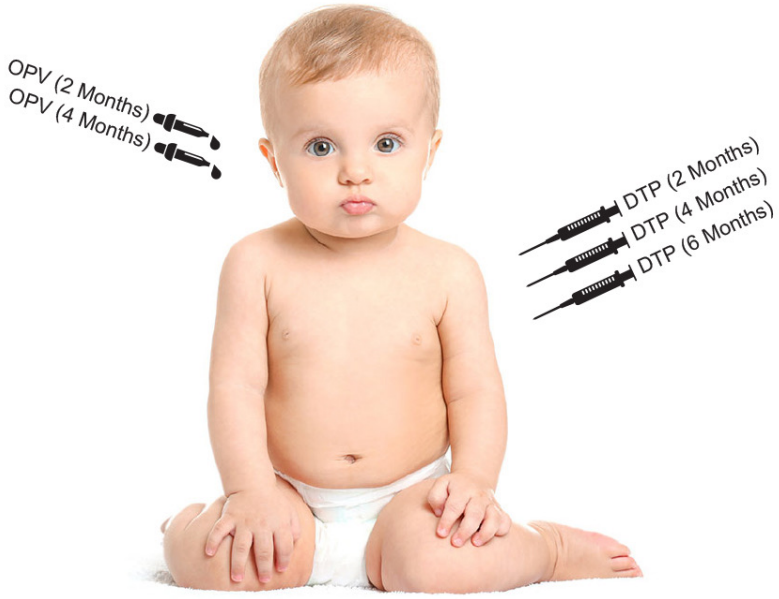
2025

Vaccines given ≤ 12 months of age Vaccines given > 12 months of age

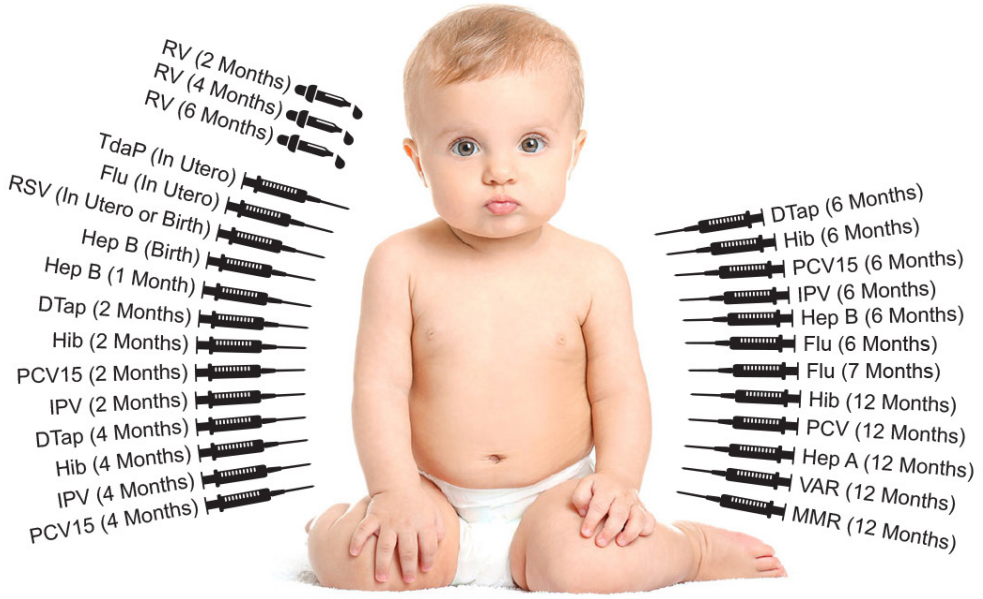
Reflects: stand-alone routine vaccines given at earliest recommended age; and 3-dose RV, 4-dose Hib, 2-dose HPV, and 3-dose Covid-19 series. Sources: https://www.cdc.gov/vaccines/hcp/imz-schedules/resources.html; https://www.cdc.gov/vaccines/hcp/imz-schedules/child-adolescent-age.html; https://www.cdc.gov/vaccines-pregnancy/hcp/vaccination-guidelines/index.html

1983 v. 2025 U.S. Vaccine Schedules

Routine Vaccines: In Utero To 12 Months



1983

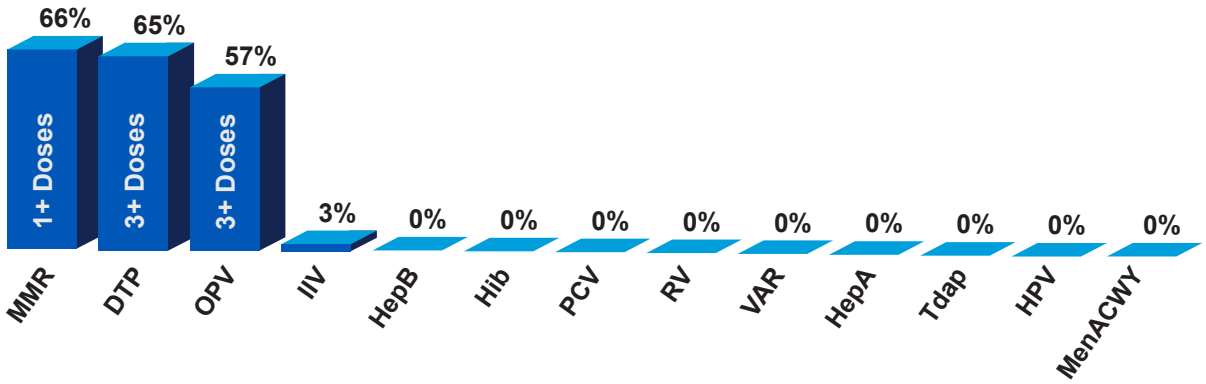


2025

Reflects stand-alone routine vaccines given at earliest recommended age; and 3-dose RV and 4-dose Hib series. Sources: https://www.cdc.gov/vaccines/hcp/imz-schedules/resources.html; https://www.cdc.gov/vaccines/hcp/imz-schedules/child-adolescent-age.html; https://www.cdc.gov/vaccines-pregnancy/hcp/vaccination-guidelines/index.html

2025 U.S. Vaccine Schedule

Routine Vaccine Coverage: United States 1983 v. 2020



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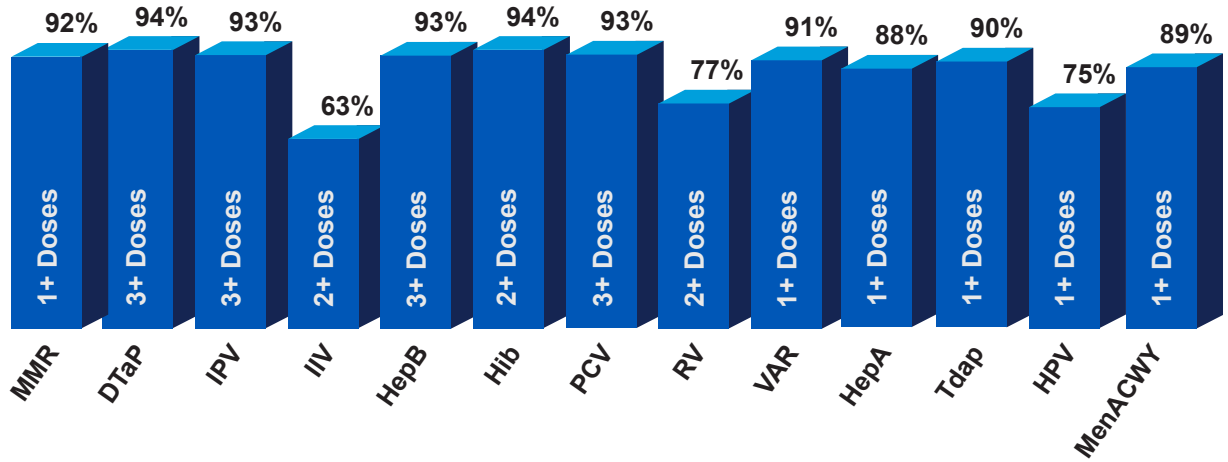


2000

All data reflects rates at approximately 2 years of age except for Tdap, HPV, and MenACWY which reflect the rate for ages 13 to 17. Sources: https://web.archive.org/web/20190618125412https:/www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/e/coverage-levels.pdf; 1983 IIV uptake is an estimate; https://www.cdc.gov/mmwr/volumes/73/wr/mm7338a3.htm; https://www.cdc.gov/mmwr/volumes/70/wr/mm7035a1.htm?s_cid=mm7035a1_w

Pre-Licensure Safety: U.S. Childhood Vaccine Schedule

Importance of Clinical Trials

Vaccine*	Year Licensed for Children	Year ACIP Recommended for Routine Use in Children [Earlier Non-Routine Use]	Days Between Licensure & Recommendation
DTP (various)	*	1966	*
M-M-R-II (Merck)	1978	1978	49 days
Menomune	1981	[1985]	[1264]
Recombivax HB (Merck)	1986	[1987] 1991	[331] 1948 days
Engerix-B (GSK)	1989	[1990] 1991	[192] 816 days
PedvaxHIB (Merck)	1989	1990	133 days
Ipol (Sanofi)	1990	[1994] 1997	[1691] 2580 days
ActHIB (Sanofi)	1993	1993	24 days
Varivax (Merck)	1995	1996	294 days
Havrix (GSK)	1995	[1996] 2006	[674] 4104 days
Vaqta (Merck)	1996	[1996] 2006	[273] 3703 days
Infanrix (GSK)	1997	1997	73 days
Prevnar 7	2000	2000	-1 days

Vaccine*	Year Licensed for Children	Year ACIP Recommended for Routine Use in Children [Earlier Non-Routine Use]	Days Between Licensure & Recommendation
Daptacel (Sanofi)	2002	2002	52 days
Boostrix (GSK)	2005	2005	24 days
Adacel (Sanofi)	2005	2005	20 days
Menactra (Sanofi)	2005	2005	27 days
Gardasil (Merck)	2006	2006	21 days
Hiberix (GSK)	2009	2009	30 days
Prevnar 13 (Pfizer)	2010	2010	0 days
Menveo (GSK)	2010	2010	19 days
Gardasil-9	2014	2015	78 days
MenQuadfi (Sanofi)	2020	2020	62 days
Vaxneuvance (Merck)	2022	2022	5 days
Priorix (GSK)	2022	2022	17 days
Prevnar 20 (Pfizer)	2023	2023	56 days

Current routine vaccine recommended for children.

Previously recommended for children and used as control to license currently recommended vaccine.

* Stand-alone vaccines for children, excluding influenza; IPOL date is an estimate; DTP date uncertain. Source of data: see accompanying memorandum.

Quality of Trials Crucial

Control	A placebo (defined by FDA as “inert substances”*) or another vaccine for same indication that was properly trialed prior to licensure.
Safety Review Period	To “provide complete safety data across all critical periods of growth and development,” as compared to trials for adults, “data on drug efficacy and safety in children may require an additional 6 years.” JAMA Pediatrics, author affiliations Office of Pediatric Therapeutics, FDA, and Duke Clinical Research Institute.†
Power	Enough participants to assess if benefits outweigh risks.
Randomized and Blinded	Critical to avoid bias.

Source: * https://www.fda.gov/media/130326/download † https://jamanetwork.com/journals/jamapediatrics/fullarticle/2714387

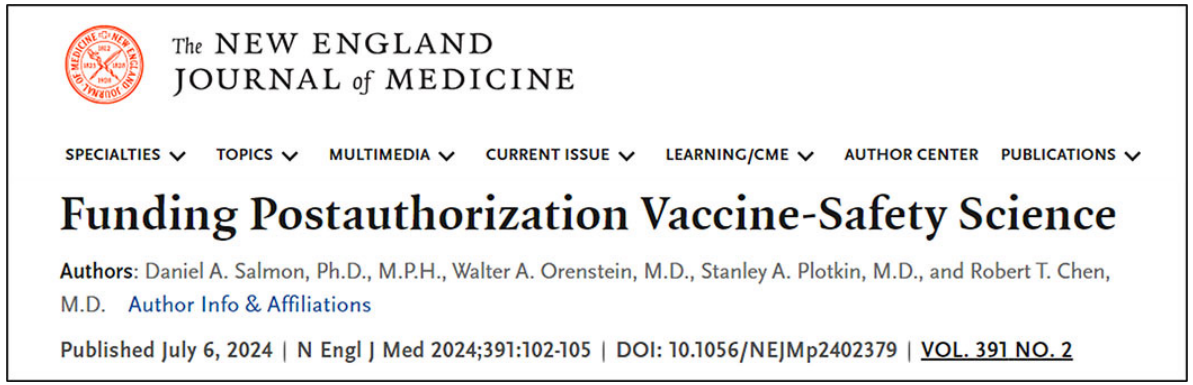
Drug Trials

Trials Relied Upon to License Pfizer's Top 4 Most Profitable Drugs*

DRUG	SAFETY REVIEW	CONTROL
Eliquis	7.4 Years	Placebo
Enbrel	6.6 Years	Placebo
Lipitor	4.9 Years	Placebo
Lyrica	2 Years	Placebo

* As of 2019. Sources: https://moneyinc.com/the-five-highest-selling-pfizer-drugs-of-all-time/; https://www.fda.gov/drugs/development-approval-process-drugs/drug-approvals-and-databases

Childhood Vaccine Trials



The NEW ENGLAND JOURNAL of MEDICINE

SPECIALTIES TOPICS MULTIMEDIA CURRENT ISSUE LEARNING/CME AUTHOR CENTER PUBLICATIONS

Funding Postauthorization Vaccine-Safety Science

Authors: Daniel A. Salmon, Ph.D., M.P.H., Walter A. Orenstein, M.D., Stanley A. Plotkin, M.D., and Robert T. Chen, M.D. Author Info & Affiliations

Published July 6, 2024 | N Engl J Med 2024;391:102-105 | DOI: 10.1056/NEJMp2402379 | VOL. 391 NO. 2

"[W]idespread vaccine hesitancy observed during the Covid-19 pandemic suggests that the public is no longer satisfied with the traditional safety goal of simply detecting and quantifying the associated risks after a vaccine has been authorized for use."

"Postauthorization studies are needed to fully characterize the safety profile of a new vaccine, since prelicensure clinical trials have limited sample sizes, follow-up durations, and population heterogeneity."

Source: https://www.nejm.org/doi/full/10.1056/NEJMp2402379

Controls
Routine Vaccines: Birth to 6 Months

Vaccine Type	Vaccine	Control	Placebo?
Hep B	Engerix-B (GSK)	No control	NO
	Recombivax HB (Merck)	No control	NO
DTaP	Infanrix (GSK)	DTP → No control	NO
	Daptacel (Sanofi)	DTP → No control	NO
Hib	ActHIB (Sanofi)	Hep B → No control	NO
	Hiberix (GSK)	ActHIB → Hep B → No Control	NO
	PedvaxHIB (Merck)	Lyophilized PedvaxHIB → Injection of lactose, aluminum adjuvant, and thimerosal	NO
PCV	Vaxneuvance (Merck)	Prevnar 13 → Prevnar 7 → Investigational vaccine	NO
	Prevnar 20 (Pfizer)	Prevnar 13 → Prevnar 7 → Investigational vaccine	NO
IPV	Ipol (Sanofi)	No control	NO
IIV	Various	No placebo control – see memorandum	NO

Lists stand-alone routine vaccines. Some DTP trials use other DTP vaccines as a control but none licensed based on placebo-controlled trial. See supporting memorandum for sources.

Controls
Routine Vaccines: 7+ Months of Age

Vaccine Type	Vaccine	Control	Placebo?
MMR	M-M-R-II (Merck)	No control	NO
	Priorix (GSK)	M-M-R-II → No control	NO
Varicellax	Varivax (Merck)	Injection of 45mg of neomycin per ml (465 subjects)	NO
Hep A	Havrix (GSK)	Engerix-B → No control	NO
	Vaqta (Merck)	Injection of AAHS and thimerosal	NO
Tdap	Boostrix (GSK)	Decavac → No control	NO
	Adacel (Sanofi)	Decavac → No control	NO
HPV	Gardisil-9 (Merck)	Gardasil or Placebo+Gardasil (3 doses) (306 subjects) → Injection of AAHS or Gardasil carrier solution (yeast protein...) (320 subjects)	NO
MenACWY	Menveo (GSK)	Menactra → Menomune → No control	NO
	MenQuadfi (Sanofi)	Menveo → Menactra → Menomune or Menactra → No control	NO

Lists stand-alone routine vaccines. See supporting memorandum for sources.

Safety Durations

Safety in childhood trials is typically reviewed for 6 months or less after injection—often only days or weeks.

Vaccine Type	Vaccine	Duration of Safety Review After Injection	
		Solicited Reactions	*Unsolicited Reactions*
Hep B	Recombivax HB (Merck)	5 days	5 days
	Engerix-B (GSK)	4 days	4 days
Hib	ActHIB (Sanofi)	3 days	30 days
	PedvaxHIB (Merck)	3 days	3 days
	Hiberix (GSK)	4 days	31 days
DTaP	Infanrix (GSK)	8 days	30 days
	Daptacel (Sanofi)	14 days	6 months
IPV	IPOL (Sanofi)	3 days	3 days
PCV	Vaxneuvance (Merck)	14 days	6 months
	Prevnar 20 (Pfizer)	7 days	6 months

Stand-alone routine infant vaccines. See supporting memorandum for sources.

Statistical Power

Example: First vaccine on the schedule, Hep B

Insufficient number of children in trials to assess if benefits outweigh risks.

RECOMBIVAX HB® Hepatitis B Vaccine (Recombinant)
Suspension for intramuscular injection
Initial U.S. Approval: 1986

ENGERIX-B [Hepatitis B Vaccine (Recombinant)] injectable suspension, for intramuscular use
Initial U.S. Approval: 1989

See supporting memorandum for discussion and sources.

Example: Hep B Vaccines

RECOMBIVAX HB® Hepatitis B Vaccine (Recombinant)
Suspension for intramuscular injection
Initial U.S. Approval: 1986

6 ADVERSE REACTIONS

In healthy infants and children (up to 10 years of age), the most frequently reported systemic adverse reactions (>1% injections), in decreasing order of frequency, were irritability, fever, diarrhea, fatigue/weakness, diminished appetite, and rhinitis. In healthy adults, injection site reactions and systemic adverse reactions were reported following 17% and 15% of the injections, respectively.

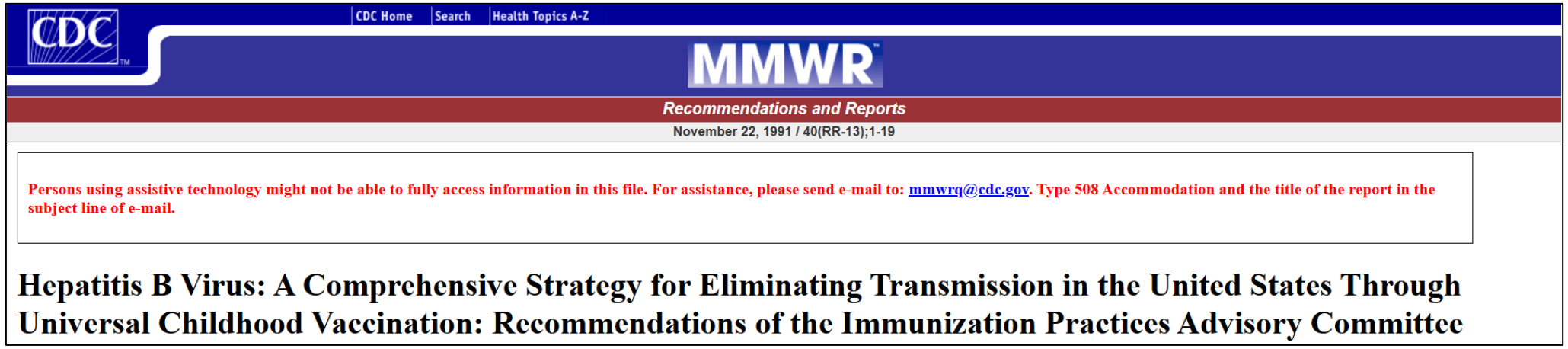
6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a vaccine cannot be directly compared to rates in the clinical trials of another vaccine and may not reflect the rates observed in practice.

In three clinical studies, 434 doses of RECOMBIVAX HB, 5 mcg, were administered to 147 healthy infants and children (up to 10 years of age) who were monitored for 5 days after each dose. Injection site reactions and systemic adverse reactions were reported following 0.2% and 10.4% of the injections, respectively. The most frequently reported systemic adverse reactions (>1% injections), in decreasing order of frequency, were irritability, fever (≥101°F oral equivalent), diarrhea, fatigue/weakness, diminished appetite, and rhinitis.

Sources: https://www.fda.gov/vaccines-blood-biologics/vaccines/recombivax-hb; https://www.fda.gov/vaccines-blood-biologics/vaccines/engerix-b

Example: Hep B Vaccines



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MMWR

Recommendations and Reports

November 22, 1991 / 40(RR-13);1-19

Persons using assistive technology might not be able to fully access information in this file. For assistance, please send e-mail to: mmwrq@cdc.gov. Type 508 Accommodation and the title of the report in the subject line of e-mail.

Hepatitis B Virus: A Comprehensive Strategy for Eliminating Transmission in the United States Through Universal Childhood Vaccination: Recommendations of the Immunization Practices Advisory Committee

Cited Articles Involving Children Receiving Recombivax, Engerix-B, or Other Recombinant DNA Vaccine

PMID	Safety Monitoring After Injection	Number of Children	Funding
2952812	7 days	122	Merck conducted and funded
2943814	5 days	79	IMerck conducted and funded
2528292	3 days	4,250	GSK funded

Source: https://www.cdc.gov/mmwr/preview/mmwrhtml/00033405.htm

Example: Hep B Vaccines

ACIP Presentation: September 18, 2025

Hepatitis B vaccines

- **Two single-antigen hepatitis B vaccines are FDA-approved for use from birth through adulthood; dosing varies by age group[1]**
  - Recombivax HB (1986)
  - Engerix-B (1989)
- **Safety**
  - The Institute of Medicine's Immunization Safety Review and the WHO's Global Advisory Committee on Vaccine Safety concluded that hepatitis B vaccine is both safe and effective.[1,2,3]

Institute of Medicine Findings

Adverse Event – Hep B Vaccine	The Evidence on Causation: Supports, Rejects, or Inadequate	Adverse Event – Hep B Vaccine	The Evidence on Causation: Supports, Rejects, or Inadequate
Anaphylaxis	Supports	Brachial Neuritis	Inadequate
Encephalitis	Inadequate	Erythema Nodosum	Inadequate
Encephalopathy	Inadequate	Systemic Lupus Erythematosus	Inadequate
Seizures	Inadequate	Vasculitis	Inadequate
Acute Disseminated Encephalomyelitis	Inadequate	Polyarteritis Nodosa	Inadequate
Transverse Myelitis	Inadequate	Psoriatic Arthritis	Inadequate
Optic Neuritis	Inadequate	Reactive Arthritis	Inadequate
Neuromyelitis Optica	Inadequate	Inadequate	Inadequate
Multiple Sclerosis Onset	Inadequate	Rheumatoid Arthiritis	Inadequate
Multiple Sclerosis Relapse	Inadequate	Juvenile Idiopathic Arthiritis	Inadequate
First Demyelinating Event	Inadequate	Type 1 Diabetes	Inadequate
Guillain-Barre Syndrome	Inadequate	Fibromyalgia	Inadequate
CIDP	Inadequate		

Source: https://www.cdc.gov/acip/downloads/slides-2025-09-18-19/02-langer-hep-b-508.pdf; https://www.nationalacademies.org/read/13164/chapter/2#2

Example: PCV Vaccines

First Licensed PCV Vaccine: PCV-7

Licensed: February 17, 2000

Control: "Investigational meningococcal group C conjugate vaccine"

Safety review: 30 days (emergency room), 60 days (hospitalizations), longer (select conditions)

TABLE 8 Percentage of Subjects* Reporting Systemic Events Within 2 Days Following Immunization With Prevnar® or Control† Vaccine Concurrently With DTaP Vaccine at 2, 4, 6, and 12-15 Months of Age[20,21]

Reaction	Dose 1		Dose 2		Dose 3		Dose 4 ‡	
	Prevnar ®	Control †	Prevnar ®	Control †	Prevnar ®	Control †	Prevnar ®	Control †
	N=710	N=711	N=559	N=508	N=461	N=414	N=224	N=230
Fever								
≥38.0°C	15.1	9.4§	23.9	10.8§	19.1	11.8§	21.0	17.0
>39.0°C	0.9	0.3	2.5	0.8§	1.7	0.7	1.3	1.7
Irritability	48.0	48.2	58.7	45.3§	51.2	44.8	44.2	42.6
Drowsiness	40.7	42.0	25.6	22.8	19.5	21.9	17.0	16.5
Restless Sleep	15.3	15.1	20.2	19.3	25.2	19.0§	20.2	19.1
Decreased Appetite	17.0	13.5	17.4	13.4	20.7	13.8§	20.5	23.1
Vomiting	14.6	14.5	16.8	14.4	10.4	11.6	4.9	4.8
Diarrhea	11.9	8.4§	10.2	9.3	8.3	9.4	11.6	9.2
Urticaria-like Rash	1.4	0.3§	1.3	1.4	0.4	0.5	0.5	1.7

* Approximately 75% of subjects received prophylactic or therapeutic antipyretics within 48 hours of each dose.
† Investigational meningococcal group C conjugate vaccine (MnCC).
‡ Most of these children had received DTP for the primary series. Thus, this is a 4th dose of a pertussis vaccine, but not of DTaP.
§ p<0.05 when Prevnar® compared to control group using a Chi-Square test.

Postlicensure Safety Surveillance for 7-Valent Pneumococcal Conjugate Vaccine

Robert P. Wise, MD, MPH; John Iskander, MD, MPH; R. Douglas Pratt, MD, MPH ; et al

Author Affiliations | Article Information

JAMA

Author Affiliations: Division of Epidemiology, Office of Biostatistics and Epidemiology (Drs Wise, Ball, and Braun), and Division of Vaccines and Related Products Applications, Office of Vaccines Research and Review (Dr Pratt), Center for Biologics Evaluation and Research, Food and Drug Administration, Rockville, Md; Immunization Safety Branch, Epidemiology and Surveillance Division, National Immunization Program, Centers for Disease Control and Prevention, Atlanta, Ga (Drs Iskander and Pless and Mr Campbell); and Immunization Safety Unit, Immunization and Respiratory Infections Division, Centre for Infectious Disease Prevention and Control Health Canada, Ottawa, Ontario (Dr Pless).

"Prior to licensure … the control group in the main study received another experimental vaccine, rather than a placebo. If both vaccines provoked similar adverse effects, little or no difference between the 2 groups might have been evident." Also noting the "limited sample sizes of trials."

ACIP Added to Schedule: February 16, 2000

Source: https://stacks.cdc.gov/view/cdc/76558; https://jamanetwork.com/journals/jama/fullarticle/199581

Example: PCV Vaccines

Second Licensed PCV Vaccine: PCV-13

Licensed: February 24, 2010

ACIP Added to Schedule: February 24, 2010

Serious Adverse Events in All Infant and Toddler Clinical Studies

Serious adverse events were collected throughout the study period for all 13 clinical trials. This reporting period is longer than the 30-day post-vaccination period used in some vaccine trials. The longer reporting period may have resulted in serious adverse events being reported in a higher percentage of subjects than for other vaccines. Serious adverse events reported following vaccination in infants and toddlers occurred in 8.2% among Prevnar 13 recipients and 7.2% among Prevnar recipients. Serious adverse events observed during different study periods for

- Death
- Life-threatening
- Hospitalization
- Disability or Permanent Damage
- Congenital Anomaly/Birth Defect
- Required Intervention to Prevent Permanent Impairment
- Require Medical or Surgical Intervention to Prevent an Outcome Above

Source: https://www.fda.gov/media/107657/download; https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5911a1.htm; https://www.fda.gov/safety/reporting-serious-problems-fda/what-serious-adverse-event

Example: PCV Vaccines

Third Licensed PCV Vaccine: PCV-15

Unsolicited Adverse Reactions in Children Receiving a 4-Dose Series
Across Studies 8-11 (excluding participants in Study 9 who received VAXNEUVANCE to complete a pneumococcal conjugate vaccine series initiated with Prevnar 13), injection-site urticaria within 14 days following each dose of VAXNEUVANCE occurred in up to 0.6% of children. Participants in these studies may have received either US-licensed or non-US licensed concomitant vaccines according to the local recommended schedule.

Serious Adverse Events in Children Receiving a 4-Dose Series
Among children who received VAXNEUVANCE (N=3,349) or Prevnar 13 (N=1,814) across Studies 8-11 (excluding participants in Study 9 who received VAXNEUVANCE to complete a pneumococcal conjugate vaccine series initiated with Prevnar 13), serious adverse events up to 6 months following vaccination with the 4-dose series were reported by 9.6% of VAXNEUVANCE recipients and by 8.9% of Prevnar 13 recipients. Participants in these studies may have received either US-licensed or non-US licensed concomitant vaccines according to the local recommended schedule.

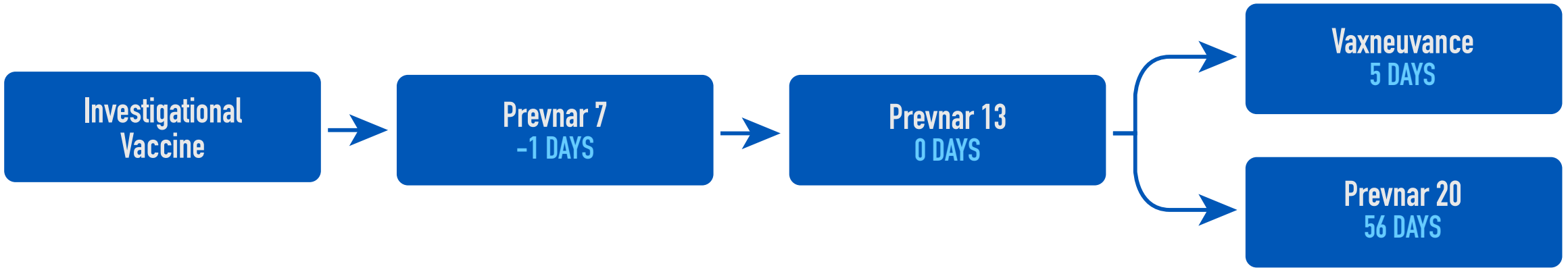
Up to 30 days following completion of Doses 1 through 3, serious adverse events were reported by 4.8% of VAXNEUVANCE recipients and by 5.0% of Prevnar 13 recipients. An adverse reaction of febrile seizure was reported in a 9 week old female (Study 11) one day after receiving VAXNEUVANCE (Dose 1) and recommended infant vaccines. Up to 30 days following Dose 4, serious adverse events were reported by 1.0% of VAXNEUVANCE recipients and by 0.7% of Prevnar 13 recipients.

There were no notable patterns or numerical imbalances between vaccination groups for specific categories of serious adverse events that would suggest a causal relationship to VAXNEUVANCE.

Source: https://www.fda.gov/media/150819/download

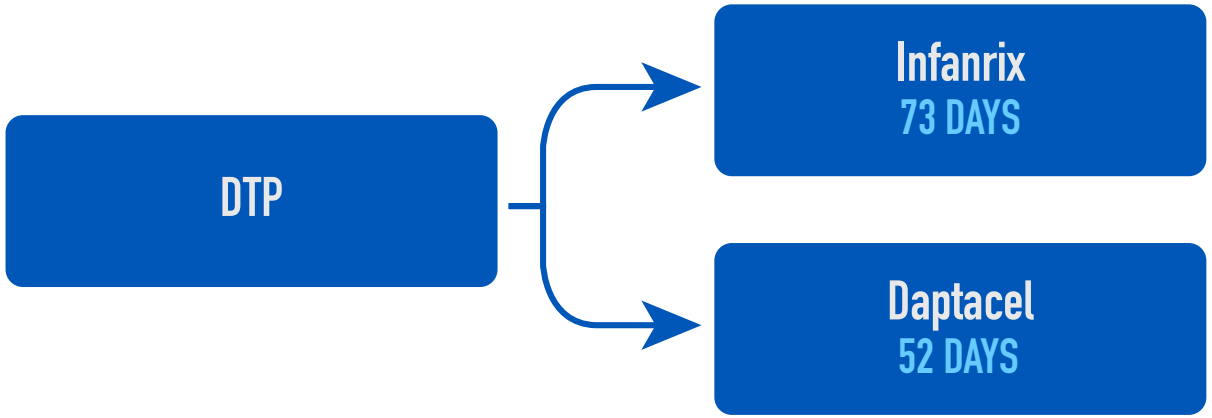
Example: PCV Vaccines Recap

Days in each box reflects period between licensure & ACIP addition to schedule



Final Example: DTaP Vaccines

Days in each box reflects period between licensure & ACIP addition to schedule



2014 SAGE Systematic Review

"The majority of studies indicated a deleterious effect of DTP on mortality."

Source: https://terrance.who.int/mediacentre/data/sage/SAGE_Docs_Ppt_Apr2014/9_session_non-specific_vaccine_effects/Apr2014_session9_epidemiologic_review.pdf

Final Example: DTaP Vaccines

Contents lists available at ScienceDirect

EBioMedicine

journal homepage: www.ebiomedicine.com

The Introduction of Diphtheria-Tetanus-Pertussis and Oral Polio Vaccine Among Young Infants in an Urban African Community: A Natural Experiment

Søren Wengel Mogensen [a,1], Andreas Andersen [b,1], Amabelia Rodrigues [a], Christine S Benn [b,c], Peter Aaby [a,b,*]

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Oral polio vaccine

ABSTRACT

Background: We examined the introduction of diphtheria-tetanus-pertussis (DTP) and oral polio vaccine (OPV) in an urban community in Guinea-Bissau in the early 1980s.
Methods: The child population had been followed with 3-monthly nutritional weighing sessions since 1978. From June 1981 DTP and OPV were offered from 3 months of age at these sessions. Due to the 3-monthly intervals between sessions, the children were allocated by birthday in a 'natural experiment' to receive vaccinations early or late between 3 and 5 months of age. We included children who were <6 months of age when vaccinations started and children born until the end of December 1983. We compared mortality between 3 and 5 months of age of DTP-vaccinated and not-yet-DTP-vaccinated children in Cox proportional hazard models.
Results: Among 3–5-month-old children, having received DTP (±OPV) was associated with a mortality hazard ratio (HR) of 5.00 (95% CI 1.53–16.3) compared with not-yet-DTP-vaccinated children. Differences in background factors did not explain the effect. The negative effect was particularly strong for children who had received DTP-only and no OPV (HR = 10.0 (2.61–38.6)). All-cause infant mortality after 3 months of age increased after the introduction of these vaccines (HR = 2.12 (1.07–4.19)).
Conclusion: DTP was associated with increased mortality; OPV may modify the effect of DTP.

1. Introduction

Individually randomized studies to measure impact on child survival of different vaccines were not conducted when the Expanded Program on Immunization (EPI) was introduced in low-income countries in the 1970s. The disease-protective effects were well documented, so the main issue was at which age to introduce the vaccine most effectively. (The Expanded Programme on Immun… sles vaccine (MV), surprisingly few stu… of vaccines and their impact on chil… 2003a; Holt et al., 1990; The Kasongo P… measles-vaccinated and measles-unva… showed a larger than expected reduct… al., 1981); this observation was subsequ… nity "trials" and before-after studies i… 1984, 1993, 2003a; Holt et al., 1990; … Hence, a vaccine may have non-specific…

to other infections (Aaby et al., 1995). WHO's Strategic Advisory Group of Experts on Immunization (SAGE) recently reviewed the potential NSEs of BCG, diphtheria-tetanus-pertussis (DTP) and MV and recommended further research (Higgins et al., 2014; Strategic Advisory Group of experts on Immunization, 2014).

Though protective against the target diseases, DTP may increase susceptibility to unrelated infections (Aaby et al., 2003b, 2004a, 2012)…

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E-mail address: p.aaby@bandim.org (P. Aaby)
[1] Joint first-authorship.

http://dx.doi.org/10.1016/j.ebiom.2017.01.041

5. Conclusions

DTP was associated with 5-fold higher mortality than being unvaccinated. No prospective study has shown beneficial survival effects of DTP. Unfortunately, DTP is the most widely used vaccine, and the pro-

Vaccination with the DPT vaccine the first 3-5 months of age was associated with a 10 fold higher mortality rate compared to unvaccinated infants.

able evidence suggests that DTP vaccine may kill more children from other causes than it saves from diphtheria, tetanus or pertussis. Though a vaccine protects children against the target disease it may simultaneously increase susceptibility to unrelated infections.

The recently published SAGE review called for rando… All currently available evidence suggests that DTP vaccine may kill more children from other causes than it saves from diphtheria, tetanus or pertussis.

lenged, the present study may remain the closest we will ever come to a RCT of the WHO DTP…

Table 3
Mortality rate and hazard rate (HR) for children from 3 months of age until first examination without vaccination or 6 months of age. Natural experiment.

Age group 3–5 months	Mortality rate (deaths/person-years)			HR (95% CI) for DTP vs unvaccinated
All Unvaccinated (N = 651)	4.5 (5/111.4)	DTP (±OPV) (N = 462)	17.4 (11/63.1)	5.00 (1.53–16.3)
		DTP only (N = 101)	35.2 (5/14.2)	10.0 (2.61–38.6)

Source: https://pubmed.ncbi.nlm.nih.gov/28188123/. See memorandum for discussion and additional sources.

Non-Routine Vaccines
Example: Dengue Vaccine

Clinical Trial:

- Safety Review: 6 Years for severe dengue
- Control: Placebo
- Size: 30,000+

Findings:

- Age <6: increased risk of severe harm and death from the vaccine
- Age ≥6 and never had dengue: increased risk of severe harm and death from the vaccine

Source: https://www.fda.gov/media/125481/download; https://www.fda.gov/media/124379/download

Drug Trials v. Vaccine Trials

Trials Relied Upon to License
Pfizer's Top 4 Most Profitable Drugs*

DRUG	SAFETY REVIEW	CONTROL
Eliquis	7.4 Years	Placebo
Enbrel	6.6 Years	Placebo
Lipitor	4.9 Years	Placebo
Lyrica	2 Years	Placebo

* As of 2019. Sources: https://moneyinc.com/the-five-highest-selling-pfizer-drugs-of-all-time/; https://www.fda.gov/vaccines-blood-biologics/vaccines/vaccines-licensed-use-united-states

Impact of Immunity on Market Forces

See supporting memorandum

Ethics Of Relying On Improperly Controlled Trials

"In some trials placebos were omitted on ethical grounds. This is illogical because studies destined to produce unreliable results should themselves be considered unethical."

British Medical Journal

Author affiliations: University of Oxford,
Oxford Radcliffe Hospital, Radcliffe Infirmary, and Geneva University Hospital

Source: https://pmc.ncbi.nlm.nih.gov/articles/PMC1113953/

Revisit ACIP Recommendations

Robust clinical trial data should support the safety of each recommendation.

Post-Licensure Safety: U.S. Childhood Vaccine Schedule

1991 IOM report:
Adverse Effects of Pertussis and Rubella Vaccines

Vaccine Type	The Evidence			
	Favors Rejecting a Causal Relationship	Favors Accepting or Convincingly Supports a Causal Relationship	Is Inadequate to Accept or Rejecta Causal Relationship	
Pertussis	1. Infantile spasms 2. Hypsarrythmia 3. Reye syndrome; 4. Sudden infant death syndrome	1. Acute encephalopathy 2. Shock and "unusual shock-like state" 3. Anaphylaxis 4. Protracted, inconsolable crying	1. Autism 2. Aseptic meningitis 3. Chronic neurologic damage 4. Erythema multiforme or other rash 5. Guillain-Barre syndrome	6. Hemolytic anemia 7. Juvenile diabetes 8. Learning disabilities and attention-deficit disorder 9. Peripheral mononeuropathy 10. Thrombocytopenia
Rubella		5. Chronic arthritis 6. Acute arthritis	11. Radiculoneuritis and other neuropathies 12. Thrombocytopenic purpura	

Source: https://www.nationalacademies.org/publications/1815

1994 IOM report:

Adverse Events Associated with Childhood Vaccines

Vaccine Type	The Evidence		
	Favors Rejecting a Causal Relationship	Favors Accepting or Convincingly Supports a Causal Relationship	Is Inadequate to Accept or Rejecta Causal Relationship
DT/Td/T	1. Encephalopathy 2. Infantile spasms (DT only) 3. Death from SIDS (DT only)	1. Guillain-Barre syndrome 2. Brachial neuritis 3. Anaphylaxis	1. Residual seizure disorder than infantile spasms 2. Demyelinating diseases of the central nervous system 3. Mononeuropathy 4. Arthritis 5. Erythema maltiforme
Measles		4. Anaphylaxis 5. Thrombocytopenia (MMR) 6. Anaphylaxis (MMR) 7. Death from measles vaccine-strain viral infection	6. Encephalopathy 7. Subacute sclerosing panencephalitis central nervous system 8. Residual seizure 9. Sensorineural deafness (MMR) 10. Optic neuritis 11. Transverse-myelitis 12. Guillain-Barre syndrome 13. Thrombocytopenia 14. Insulin-dependent diabetes mellitus
Mumps			15. Neuropathy 16. Residual seizure disorder 17. Encephalopathy 18. Aseptic meningitis 19. Sensorineural deafness (MMR) 20. Insulin-dependent diabetes mellitus 21. Sterility 22. Thrombocytopenia 23. Anaphylaxis
OPV/IPV		8. Guillain-Barre syndrome (OPV) 9. Poliomyelitis in recipient or contact (OPV) 10. Death from polio	24. Encephalopathy 25. Subacute sclerosing panencephalitis 26. Residual seizure 27. Sensorineural deafness (MMR) 28. Optic neuritis 29. Transverse-myelitis 30. Guillain-Barre syndrome 31. Thrombocytopenia 32. Insulin-dependent diabetes mellitus
Hepatitis B		11. Anaphylaxis	33. Guillain-Barre syndrome 34. Demyelinating diseases of the central nervous system 35. Arthritis 36. Death from SIDS
H. influenzae type (Hib)	4. Early onset H. influenzae disease (conjugate vaccines)	12. Early-onset H. influenzae b disease in children age 18 months or older who receive their first Hib immunization with unconjugated PRP vaccine	37. Guillain-Barre syndrome 38. Transverse myelitis 39. Thrombocytopenia 40. Anaphylaxis 41. Death from SIDS

"The lack of adequate data regarding many of the adverse events under study was of major concern to the committee.

Presentations at public meetings indicated that many parents and physicians share this concern."

Source: https://www.nationalacademies.org/publications/2138

2012 IOM report:
Adverse Effects of Vaccines: Evidence and Causality

Vaccine Type	The Evidence		
	Favors Rejecting a Causal Relationship	Favors Accepting or Convincingly Supports a Causal Relationship	Is Inadequate to Accept or Rejecta Causal Relationship
Hep B	0	1	26
DTaP/Tdap/TD/Td	1	1	24
Influenza	2	2	23
MMR	2	5	23
HPV	0	1	12
Varicella	0	5	10
Hep A	0	0	8
Meningococcal	0	1	8
Total	**5**	**16**	**134**

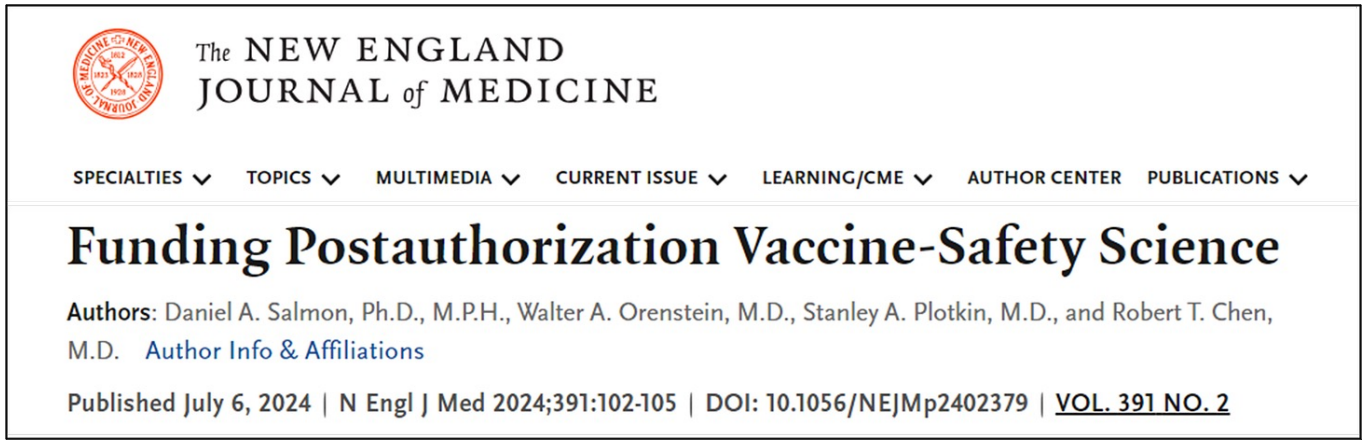
Source: https://www.nationalacademies.org/projects/PHPH-H-08-17-A/publication/13164

Combined Results of the IOM Reports

Vaccine Type	The Evidence		
	Favors Rejecting a Causal Relationship	Favors Accepting or Convincingly Supports a Causal Relationship	Is Inadequate to Accept or Rejecta Causal Relationship
MMR	2	11	43
DTaP/Tdap/TD/Td	8	8	39
Hep B	0	2	30
Influenza	2	2	23
HPV	0	1	12
Varicella	0	5	10
Hep A	0	0	9
Meningococcal	0	1	8
Hib	1	1	5
OPV/IPV	0	3	5
Total	**13**	**34**	**183**

Source: https://www.nationalacademies.org/publications/1815; https://www.nationalacademies.org/publications/2138; https://www.nationalacademies.org/projects/PHPH-H-08-17-A/publication/13164

Post-Licensure Vaccine Safety Funding Insufficient



The NEW ENGLAND JOURNAL of MEDICINE

SPECIALTIES TOPICS MULTIMEDIA CURRENT ISSUE LEARNING/CME AUTHOR CENTER PUBLICATIONS

Funding Postauthorization Vaccine-Safety Science

Authors: Daniel A. Salmon, Ph.D., M.P.H., Walter A. Orenstein, M.D., Stanley A. Plotkin, M.D., and Robert T. Chen, M.D. Author Info & Affiliations

Published July 6, 2024 | N Engl J Med 2024;391:102-105 | DOI: 10.1056/NEJMp2402379 | VOL. 391 NO. 2

"It is critical to examine adverse events following immunization (AEFIs) that have not been detected in clinical trials, to ascertain whether they are causally or coincidentally related to vaccination."

"Although the ACIP acknowledges the need, there are currently no resources earmarked for postauthorization safety studies beyond annual appropriations, which must be approved by Congress each year."

"[T]he budget for vaccine-safety monitoring at the CDC (which is responsible for the majority of U.S. federal efforts) has remained stagnant … at about $20 million per year" which is an "inadequate level of funding."

Source: https://www.nejm.org/doi/full/10.1056/NEJMp2402379

Injury Claimed To Have Been Most Thoroughly Studied

TITLE III—VACCINE COMPENSATION

National Childhood Vaccine Injury Act of 1986.
42 USC 201.

SEC. 301. SHORT TITLE.

This title may be cited as the "National Childhood Vaccine Injury Act of 1986".

SEC. 312. RELATED STUDIES.

42 USC 300aa-1 note.

(a) REVIEW OF PERTUSSIS VACCINES AND RELATED ILLNESSES AND CONDITIONS.—Not later than 3 years after the effective date of this title, the Secretary of Health and Human Services shall complete a review of all relevant medical and scientific information (including information obtained from the studies required under subsection (e)) on the nature, circumstances, and extent of the relationship, if any, between vaccines containing pertussis (including whole cell, extracts, and specific antigens) and the following illnesses and conditions:

(1) Hemolytic anemia.
(2) Hypsarrhythmia.
(3) Infantile spasms.
(4) Reye's syndrome.
(5) Peripheral mononeuropathy.
(6) Deaths classified as sudden infant death syndrome.
(7) Aseptic meningitis.
(8) Juvenile diabetes.
(9) Autism.
(10) Learning disabilities.
(11) Hyperactivity.

Source: https://www.congress.gov/99/statute/STATUTE-100/STATUTE-100-Pg3743.pdf

Injury Claimed To Have Been Most Thoroughly Studied

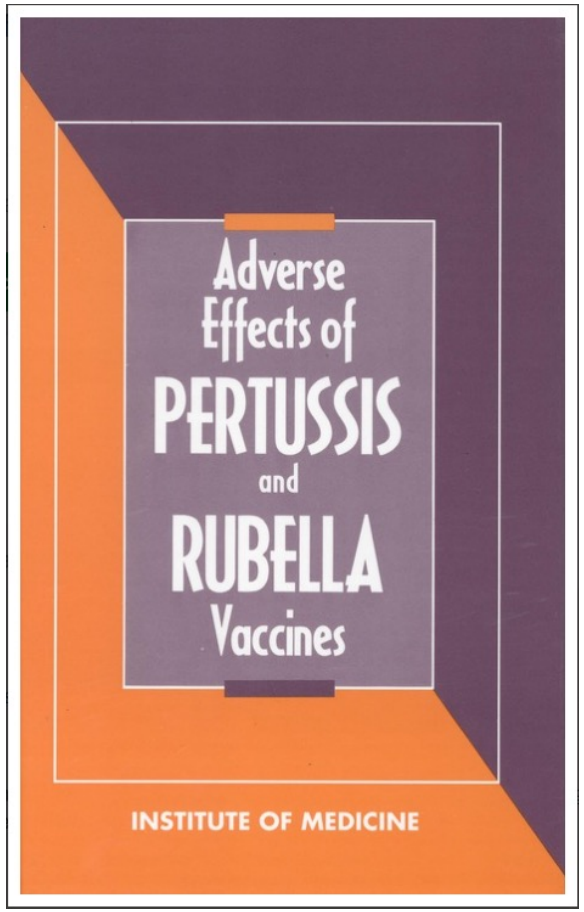


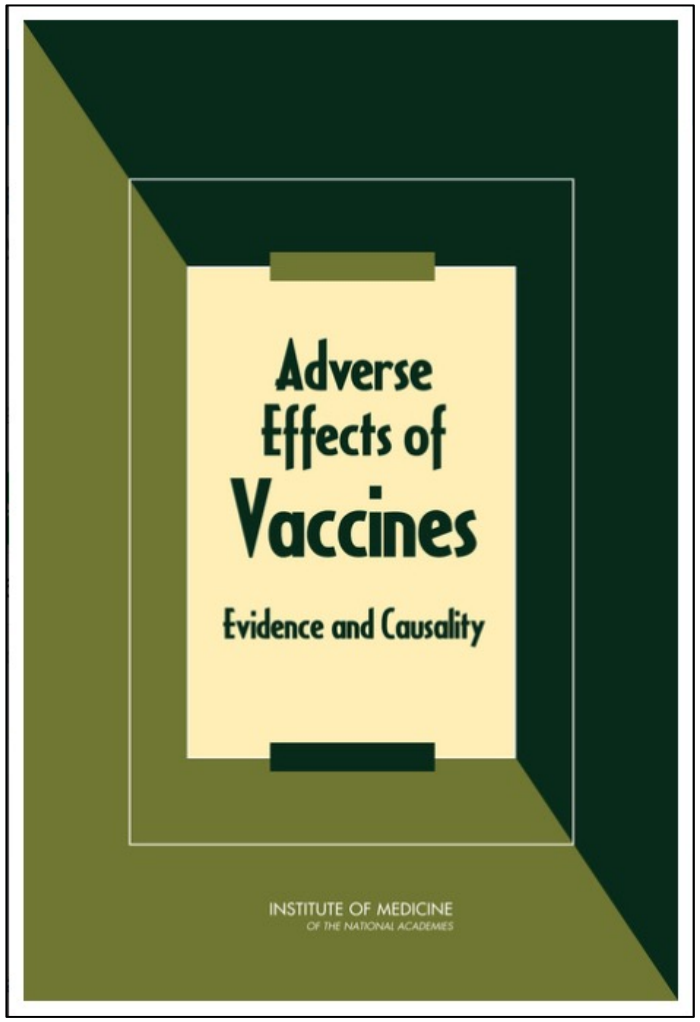
TABLE 1-2 Summary of Conclusions by Adverse Event for DPT[a] and RA 27/3 MMR[b] Vaccines

Conclusion	Adverse Events Reviewed: DPT Vaccine	Adverse Events Reviewed: RA 27/3 Rubella Vaccine
1. No evidence bearing on a causal relation[c]	Autism	
2. Evidence insufficient to indicate a causal relation[d]	Chronic neurologic damage Erythema multiforme or other rash Guillain-Barré syndrome Hemolytic anemia Juvenile diabetes Learning disabilities and attention-deficit disorder Peripheral mononeuropathy Thrombocytopenia	other neuropathies Thrombocytopenic purpura
3. Evidence does not indicate a causal relation[e]	Infantile spasms Hypsarrythmia Reye syndrome Sudden infant death syndrome	
4. Evidence is consistent with a causal relation[f]	Acute encephalopathy[g] Shock and "unusual shock-like state"	Chronic arthritis
5. Evidence indicates a causal relation[h]	Anaphylaxis Protracted, inconsolable crying	Acute arthritis

[c]No category of evidence was found bearing on a judgment about causation (all categories of evidence left blank in Table 1-1).

Source: https://doi.org/10.17226/1815

Injury Claimed To Have Been Most Thoroughly Studied



AUTISM

Epidemiologic Evidence

The committee reviewed one study to evaluate the risk of autism after the administration of DTaP vaccine. This one study (Geier and Geier, 2004) was not considered in the weight of epidemiologic evidence because it provided data from a passive surveillance system and lacked an unvaccinated comparison population.

Weight of Epidemiologic Evidence

The epidemiologic evidence is insufficient or absent to assess an association between diphtheria toxoid–, tetanus toxoid–, or acellular pertussis–containing vaccine and autism.

Mechanistic Evidence

The committee did not identify literature reporting clinical, diagnostic, or experimental evidence of autism after the administration of vaccines containing diphtheria toxoid, tetanus toxoid, and acellular pertussis antigens alone or in combination.

Weight of Mechanistic Evidence

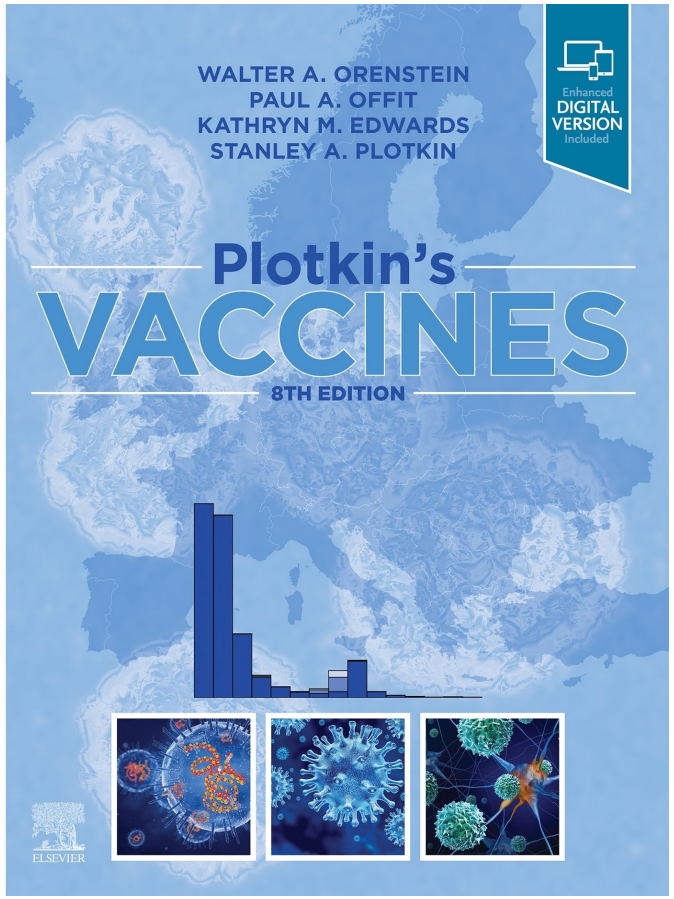
The committee assesses the mechanistic evidence regarding an association between diphtheria toxoid–, tetanus toxoid–, or acellular pertussis–containing vaccine and autism as lacking.

Causality Conclusion

Conclusion 10.6: The evidence is inadequate to accept or reject a causal relationship between diphtheria toxoid–, tetanus toxoid–, or acellular pertussis–containing vaccine and autism.

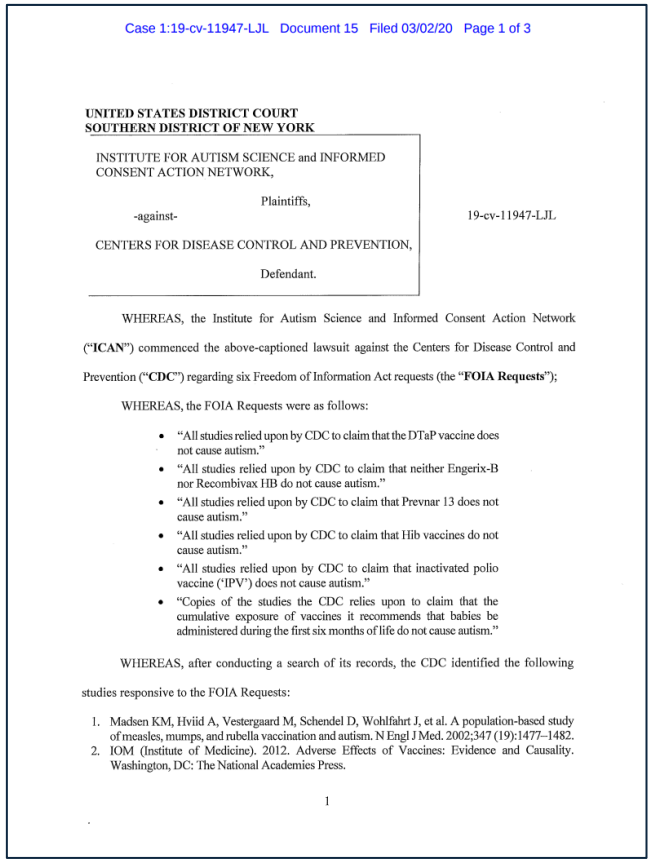
Source: https://doi.org/10.17226/13164

Injury Claimed To Have Been Most Thoroughly Studied



See accompanying memorandum for source and discussion.

Injury claimed to have been most thoroughly studied



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UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

INSTITUTE FOR AUTISM SCIENCE and INFORMED CONSENT ACTION NETWORK,

Plaintiffs,

-against-

CENTERS FOR DISEASE CONTROL AND PREVENTION,

Defendant.

19-cv-11947-LJL

WHEREAS, the Institute for Autism Science and Informed Consent Action Network ("**ICAN**") commenced the above-captioned lawsuit against the Centers for Disease Control and Prevention ("**CDC**") regarding six Freedom of Information Act requests (the "**FOIA Requests**");

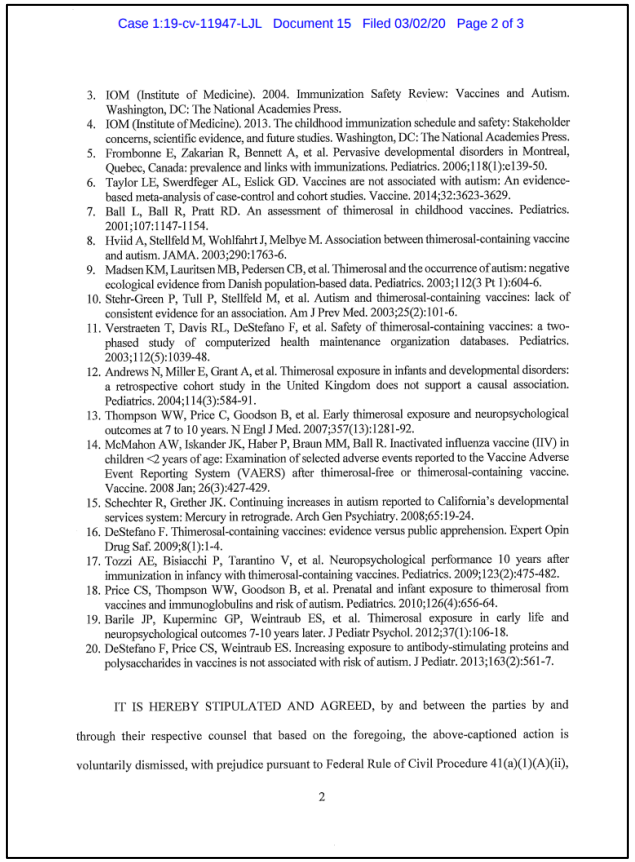
WHEREAS, the FOIA Requests were as follows:

- "All studies relied upon by CDC to claim that the DTaP vaccine does not cause autism."
- "All studies relied upon by CDC to claim that neither Engerix-B nor Recombivax HB do not cause autism."
- "All studies relied upon by CDC to claim that Prevnar 13 does not cause autism."
- "All studies relied upon by CDC to claim that Hib vaccines do not cause autism."
- "All studies relied upon by CDC to claim that inactivated polio vaccine ('IPV') does not cause autism."
- "Copies of the studies the CDC relies upon to claim that the cumulative exposure of vaccines it recommends that babies be administered during the first six months of life do not cause autism."

WHEREAS, after conducting a search of its records, the CDC identified the following studies responsive to the FOIA Requests:

1. Madsen KM, Hviid A, Vestergaard M, Schendel D, Wohlfahrt J, et al. A population-based study of measles, mumps, and rubella vaccination and autism. N Engl J Med. 2002;347 (19):1477–1482.
2. IOM (Institute of Medicine). 2012. Adverse Effects of Vaccines: Evidence and Causality. Washington, DC: The National Academies Press.

1



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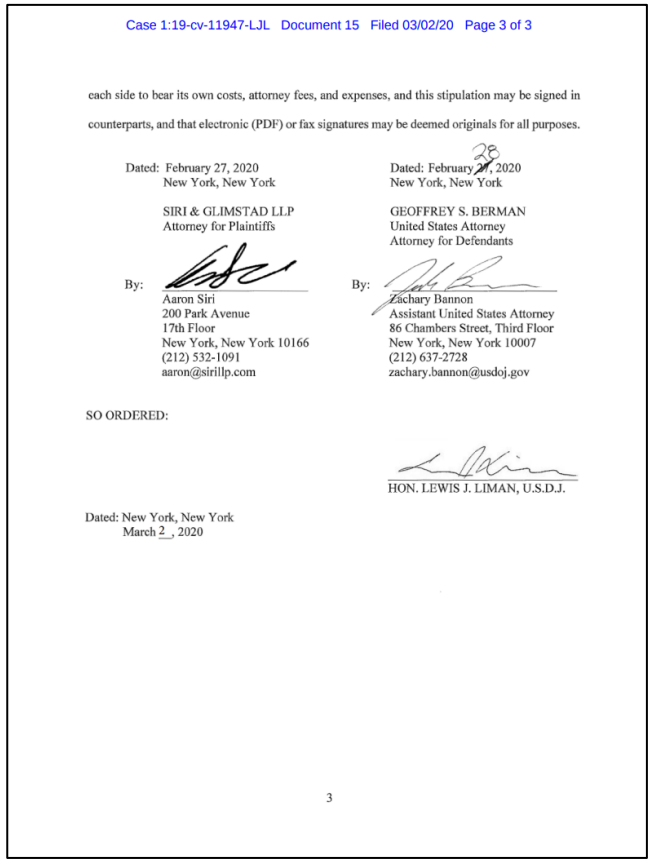
3. IOM (Institute of Medicine). 2004. Immunization Safety Review: Vaccines and Autism. Washington, DC: The National Academies Press.
4. IOM (Institute of Medicine). 2013. The childhood immunization schedule and safety: Stakeholder concerns, scientific evidence, and future studies. Washington, DC: The National Academies Press.
5. Frombonne E, Zakarian R, Bennett A, et al. Pervasive developmental disorders in Montreal, Quebec, Canada: prevalence and links with immunizations. Pediatrics. 2006;118(1):e139-50.
6. Taylor LE, Swerdfeger AL, Eslick GD. Vaccines are not associated with autism: An evidence-based meta-analysis of case-control and cohort studies. Vaccine. 2014;32:3623-3629.
7. Ball L, Ball R, Pratt RD. An assessment of thimerosal in childhood vaccines. Pediatrics. 2001;107:1147-1154.
8. Hviid A, Stellfeld M, Wohlfahrt J, Melbye M. Association between thimerosal-containing vaccine and autism. JAMA. 2003;290:1763-6.
9. Madsen KM, Lauritsen MB, Pedersen CB, et al. Thimerosal and the occurrence of autism: negative ecological evidence from Danish population-based data. Pediatrics. 2003;112(3 Pt 1):604-6.
10. Stehr-Green P, Tull P, Stellfeld M, et al. Autism and thimerosal-containing vaccines: lack of consistent evidence for an association. Am J Prev Med. 2003;25(2):101-6.
11. Verstraeten T, Davis RL, DeStefano F, et al. Safety of thimerosal-containing vaccines: a two-phased study of computerized health maintenance organization databases. Pediatrics. 2003;112(5):1039-48.
12. Andrews N, Miller E, Grant A, et al. Thimerosal exposure in infants and developmental disorders: a retrospective cohort study in the United Kingdom does not support a causal association. Pediatrics. 2004;114(3):584-91.
13. Thompson WW, Price C, Goodson B, et al. Early thimerosal exposure and neuropsychological outcomes at 7 to 10 years. N Engl J Med. 2007;357(13):1281-92.
14. McMahon AW, Iskander JK, Haber P, Braun MM, Ball R. Inactivated influenza vaccine (IIV) in children <2 years of age: Examination of selected adverse events reported to the Vaccine Adverse Event Reporting System (VAERS) after thimerosal-free or thimerosal-containing vaccine. Vaccine. 2008 Jan; 26(3):427-429.
15. Schechter R, Grether JK. Continuing increases in autism reported to California's developmental services system: Mercury in retrograde. Arch Gen Psychiatry. 2008;65:19-24.
16. DeStefano F. Thimerosal-containing vaccines: evidence versus public apprehension. Expert Opin Drug Saf. 2009;8(1):1-4.
17. Tozzi AE, Bisiacchi P, Tarantino V, et al. Neuropsychological performance 10 years after immunization in infancy with thimerosal-containing vaccines. Pediatrics. 2009;123(2):475-482.
18. Price CS, Thompson WW, Goodson B, et al. Prenatal and infant exposure to thimerosal from vaccines and immunoglobulins and risk of autism. Pediatrics. 2010;126(4):656-64.
19. Barile JP, Kuperminc GP, Weintraub ES, et al. Thimerosal exposure in early life and neuropsychological outcomes 7-10 years later. J Pediatr Psychol. 2012;37(1):106-18.
20. DeStefano F, Price CS, Weintraub ES. Increasing exposure to antibody-stimulating proteins and polysaccharides in vaccines is not associated with risk of autism. J Pediatr. 2013;163(2):561-7.

IT IS HEREBY STIPULATED AND AGREED, by and between the parties by and through their respective counsel that based on the foregoing, the above-captioned action is voluntarily dismissed, with prejudice pursuant to Federal Rule of Civil Procedure 41(a)(1)(A)(ii),

2



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each side to bear its own costs, attorney fees, and expenses, and this stipulation may be signed in counterparts, and that electronic (PDF) or fax signatures may be deemed originals for all purposes.

Dated: February 27, 2020
New York, New York

SIRI & GLIMSTAD LLP
Attorney for Plaintiffs

By:
Aaron Siri
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Dated: February 28, 2020
New York, New York

GEOFFREY S. BERMAN
United States Attorney
Attorney for Defendants

By:
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New York, New York 10007
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zachary.bannon@usdoj.gov

SO ORDERED:

HON. LEWIS J. LIMAN, U.S.D.J.

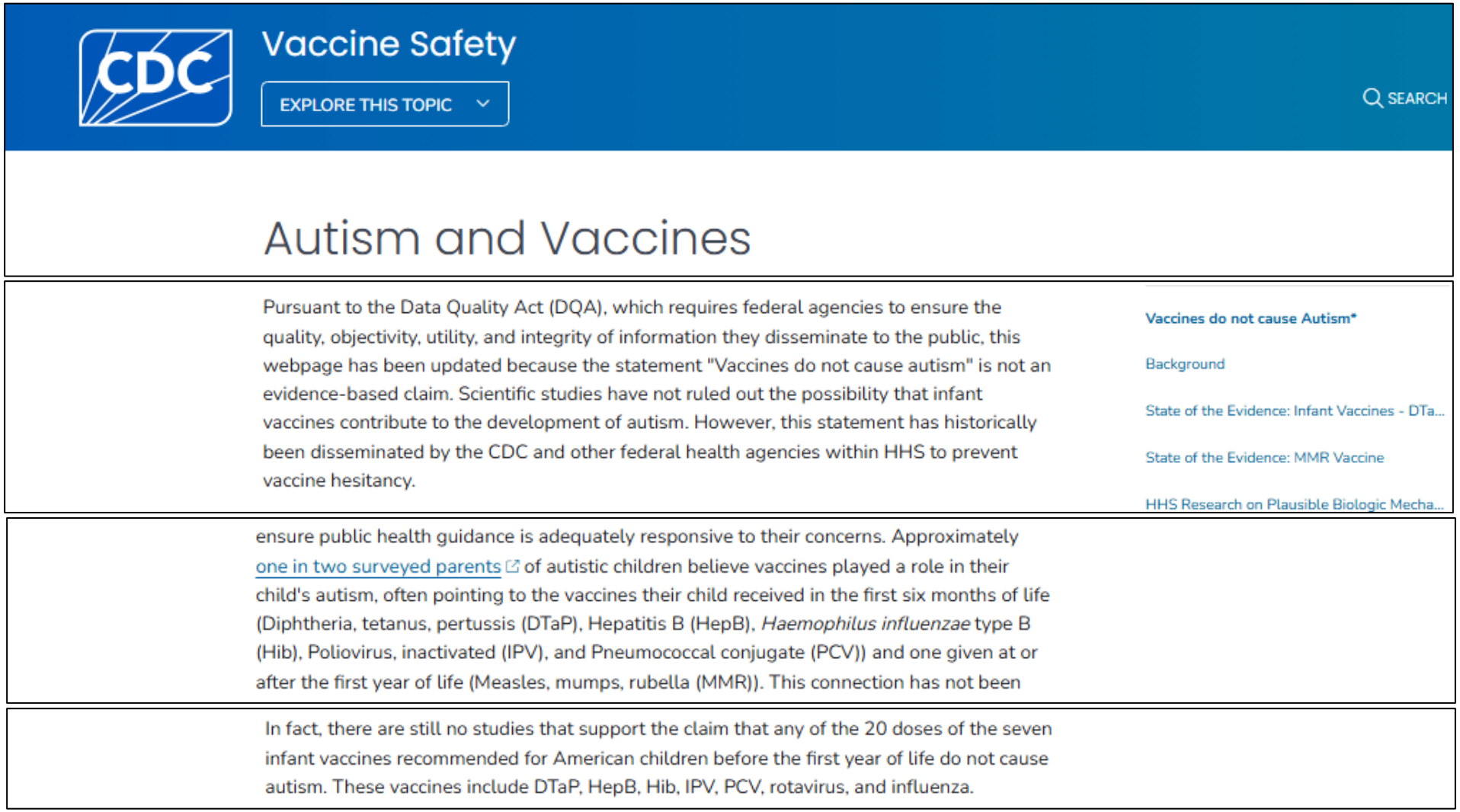
Dated: New York, New York
March 2, 2020

3

18 involving thimerosal and/or MMR
1 involving antigen (not vaccine) exposure
1 involving MMR, thimerosal, and DTaP

Source: https://ecf.nysd.uscourts.gov/doc1/127126484251

Injury claimed to have been most thoroughly studied



Vaccine Safety

EXPLORE THIS TOPIC

SEARCH

Autism and Vaccines

Pursuant to the Data Quality Act (DQA), which requires federal agencies to ensure the quality, objectivity, utility, and integrity of information they disseminate to the public, this webpage has been updated because the statement "Vaccines do not cause autism" is not an evidence-based claim. Scientific studies have not ruled out the possibility that infant vaccines contribute to the development of autism. However, this statement has historically been disseminated by the CDC and other federal health agencies within HHS to prevent vaccine hesitancy.

Vaccines do not cause Autism*

Background

State of the Evidence: Infant Vaccines - DTa...

State of the Evidence: MMR Vaccine

HHS Research on Plausible Biologic Mecha...

ensure public health guidance is adequately responsive to their concerns. Approximately one in two surveyed parents of autistic children believe vaccines played a role in their child's autism, often pointing to the vaccines their child received in the first six months of life (Diphtheria, tetanus, pertussis (DTaP), Hepatitis B (HepB), *Haemophilus influenzae* type B (Hib), Poliovirus, inactivated (IPV), and Pneumococcal conjugate (PCV)) and one given at or after the first year of life (Measles, mumps, rubella (MMR)). This connection has not been

In fact, there are still no studies that support the claim that any of the 20 doses of the seven infant vaccines recommended for American children before the first year of life do not cause autism. These vaccines include DTaP, HepB, Hib, IPV, PCV, rotavirus, and influenza.

Source: https://www.cdc.gov/vaccine-safety/about/autism.html

Adverse Reactions Manufacturers Have a Basis to Believe Are Causally Related

Federal Law: 21 C.F.R. §201.57

Package inserts for vaccines should include "*only* those adverse events for which there is some basis to believe there is a *causal relationship* between the drug and the occurrence of the adverse event."

FDA: *Guidance for Industry: Adverse Reaction Section for Labeling for Drugs and Biological Products – Content and Format*:

"For purposes of prescription drug labeling and this guidance, an *adverse reaction* … does not include all adverse events observed during use of a drug, *only* those for which there is some basis to believe there is a *causal relationship* between the drug and the occurrence of the adverse event."

Source: https://www.fda.gov/media/72139/download

Importance of Unexposed Group

CDC Manual for the Surveillance of Vaccine-Preventable Diseases

"Because … there is a lack of an unvaccinated group for comparison in VAERS…, reports to VAERS are useful for generating hypotheses, but studies with vaccinated and unvaccinated subjects are necessary to confirm any hypotheses."

* * *

Studies finding safety concerns that lack an unexposed group are often discarded. *Example: DTaP and autism study.*

Sources: https://www.cdc.gov/surv-manual/php/table-of-contents/chapter-21-vaers.html

2013 IOM Vaccine Schedule Safety Review

The Childhood Immunization Schedule and Safety

"[N]o study … compared the differences in health outcomes … between entirely unimmunized populations of children and fully immunized children. Experts who addressed the committee pointed not to a body of evidence that had been overlooked but rather to the fact that existing research has not been designed to test the entire immunization schedule. …

[Also,] studies designed to examine the long-term effects of the cumulative number of vaccines or other aspects of the immunization schedule have not been conducted."

The IOM committee explained "there is no evidence that the schedule is not safe."

Source: https://www.ncbi.nlm.nih.gov/books/NBK206948/

Unvaccinated Children in the U.S.

Age(s)	Unvaccinated (no vaccines) est.
2 Years of Age	45,300
2-17 Years of Age	658,000

* National Immunization Survey-Child estimates 1.2% of 2-year-olds in the U.S. are unvaccinated. Based on exemption rate data for school age children, at least 1% appear to remain unvaccinated. https://www.cdc.gov/mmwr/volumes/73/wr/pdfs/mm7341a3-H.pdf; https://www.cdc.gov/schoolvaxview/data/index.html

CDC Surveillance Systems

CDC	Study Vaccinated v. Unvaccinated Populations	Note
VSD	NO	Estimated to include >20,000 unvaccinated children. Deidentified data not shared with public.
VAERS	NO	CDC has refused to automate capture and submission of VAERS reports.
V-Safe	NO	Automated but fails to list reactions of interest.
CISA	NO	Not useful for assessing safety at a population level.

"The current safety surveillance systems such as the VSD … already have extensive systems in place to assess short-term outcomes … [despite the fact] the childhood immunization schedule is essentially a long-term exposure, occurring over 18 to 24 months, [and hence] long-term adverse events may be more biologically plausible than short-term events." – **CDC***

See supporting memorandum for sources and discussion. * https://www.cdc.gov/vaccine-safety/media/pdfs/white-paper-safety-508.pdf

Studies With Unvaccinated Groups

Data comparing vaccinated and unvaccinated children show a consistent pattern of vaccinated children having multiple times the rate of various chronic health issues. Sampling:

Study Link	Author Affiliations	Findings
https://pmc.ncbi.nlm.nih.gov/articles/PMC7268563/	Simpson University (CA) and Institute of Medical and Scientific Inquiry (NM)	Vaccination before 1 year of age was associated with increased odds of developmental delays (OR = 2.18, 95% CI 1.47–3.24), asthma (OR = 4.49, 95% CI 2.04–9.88) and ear infections (OR = 2.13, 95% CI 1.63–2.78).
https://doi.org/10.1080/02772240701806501	State University of New York at Stony Brook	The odds of receiving early intervention or special education services were 8.63 times as great (OR=8.63, 95% CI 3.24–22.98) for vaccinated boys as for unvaccinated boys after adjustment for confounders.
https://pubmed.ncbi.nlm.nih.gov/21058170/	State University of New York at Stony Brook	Male neonates vaccinated with the hepatitis B vaccine had a 3 times risk (OR=3.002, 95% CI 1.109-8.126) for parental report of autism diagnosis compared to boys not vaccinated as neonates during that same time period.
https://www.oatext.com/pdf/JTS-3-187.pdf	Jackson State University (MS)	Vaccination associated with neurodevelopmental disorders (NDD) in children born at term (OR 2.7, 95% CI: 1.2, 6.0). Vaccination and preterm birth had 5.4 times risk (95% CI: 2.5, 11.9) compared to vaccinated but non-preterm children, and 14.5 times risk (95% CI: 5.4, 38.7) compared to neither preterm nor vaccinated.
https://www.oatext.com/pdf/JTS-3-186.pdf	Jackson State University (MS)	Vaccinated children compared to unvaccinated more likely to be been diagnosed with: allergic rhinitis (10.4% vs. 0.4%, p <0.001), other allergies (22.2% vs. 6.9%, p <0.001), eczema/ atopic dermatitis (9.5% vs. 3.6%, p = 0.035), a learning disability (5.7% vs. 1.2%, p = 0.003), ADHD (4.7% vs. 1.0%, p =0.013), ASD (4.7% vs. 1.0%, p = 0.013), any neurodevelopmental disorder (10.5% vs. 3.1%, p<0.001) and any chronic illness (44.0% vs. 25.0%, p <0.001).
https://pubmed.ncbi.nlm.nih.gov/15805992/	Vanderbilt University (TN)	In multiple regression analyses there were significant (P < .0005) and dose-dependent negative relationships between vaccination refusal and self-reported asthma or hay fever only in children with no family history of the condition and, for asthma, in children with no exposure to antibiotics during infancy.

Examples of Generally Unreliable Studies

- Comparing vaccinated children with vaccinated children
- Using risk windows post-vaccination

Rise in Chronic Diseases

Year(s)	Percent of Children with a Chronic Disease
Early 1980s	<10%
Present	>40%

Most of the disease contributing to the increase are related to some form of immune system deregulation, including asthma, allergies, ADHD, etc., as discussed in the accompanying memorandum. Many are also disclosed in Section 6.2 of one or more vaccine package inserts.

Source: https://pubmed.ncbi.nlm.nih.gov/3944229/ (https://perma.cc/NGA9-93KW) ("According to data from the National Health Interview Survey (NHIS) [1979-1981] over two million children under 17 years (3.8%) are afflicted by chronic conditions that cause some limitation of activity."); https://pmc.ncbi.nlm.nih.gov/articles/PMC1646496/ (https://perma.cc/KN4A-94TV) ("Data from the National Health Interview Survey indicate that the prevalence of activity-limiting chronic conditions among children under age 17 years doubled between 1960 and 1981, from 1.8 to 3.8 per cent."); https://pubmed.ncbi.nlm.nih.gov/9551003/ (https://perma.cc/JTZ5-JBNK) (Among "children younger than 18 years who were included in the 1992-1994 National Health Interview Survey … [a] significant proportion of children, estimated at 6.5% of all US children, experienced some degree of disability."); https://www.cdc.gov/chronic-disease/about/index.html (https://perma.cc/N4GT-38L2) ("Chronic diseases are defined broadly as conditions that last 1 year or more and require ongoing medical attention or limit activities of daily living or both.").

Aluminum Adjuvants

Contents lists available at ScienceDirect

Journal of Trace Elements in Medicine and Biology

journal homepage: www.elsevier.com/locate/jtemb

The measurement and full statistical analysis including Bayesian methods of the aluminium content of infant vaccines

Emma Shardlow [a], Caroline Linhart [a], Sameerah Connor [b], Erin Softely [b], Christopher Exley [a,*]

[a] The Birchall Centre, Lennard-Jones Laboratories, Keele University, Staffordshire, United Kingdom
[b] Life Sciences, The Huxley Building, Keele University, Staffordshire, United Kingdom

Finding: Six vaccines (Pentacel, Havrix, Adacel, Pedvax, Prevnar 13, Vaqta) contained a statistically significant greater quantity and four vaccines (Infanrix, Kinrix, Pediarix, and Synflorix) contained a statistically significant lower quantity of aluminum adjuvant than listed on the product's label.

Source: https://pubmed.ncbi.nlm.nih.gov/33887692/. See memorandum for additional sources.

Post-Licensure Safety

- When robust clinical trial data is not possible to obtain, robust post-licensure safety data should support recommendations.
- Condition recommendations on sponsors providing any requested follow-up safety data.
- Revisit recommendations regularly.

Efficacy in Preventing Transmission: U.S. Childhood Vaccine Schedule

Transmission

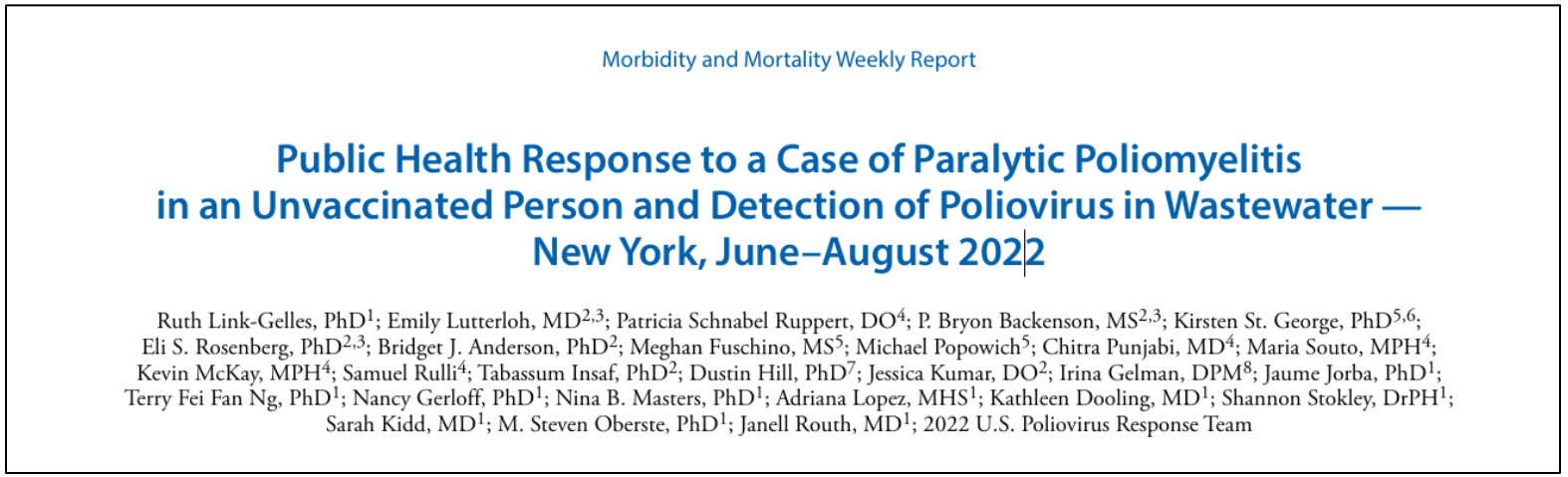
Live-Attenuated Vaccines

Some live-attenuated vaccines, such as Varivax for varicella, generally prevent transmission of the target pathogen in most recipients for an extended duration post-vaccination.

Source: see accompanying memorandum.

Transmission

Polio



Morbidity and Mortality Weekly Report

Public Health Response to a Case of Paralytic Poliomyelitis in an Unvaccinated Person and Detection of Poliovirus in Wastewater — New York, June–August 2022

Ruth Link-Gelles, PhD[1]; Emily Lutterloh, MD[2,3]; Patricia Schnabel Ruppert, DO[4]; P. Bryon Backenson, MS[2,3]; Kirsten St. George, PhD[5,6]; Eli S. Rosenberg, PhD[2,3]; Bridget J. Anderson, PhD[2]; Meghan Fuschino, MS[5]; Michael Popowich[5]; Chitra Punjabi, MD[4]; Maria Souto, MPH[4]; Kevin McKay, MPH[4]; Samuel Rulli[4]; Tabassum Insaf, PhD[2]; Dustin Hill, PhD[7]; Jessica Kumar, DO[2]; Irina Gelman, DPM[8]; Jaume Jorba, PhD[1]; Terry Fei Fan Ng, PhD[1]; Nancy Gerloff, PhD[1]; Nina B. Masters, PhD[1]; Adriana Lopez, MHS[1]; Kathleen Dooling, MD[1]; Shannon Stokley, DrPH[1]; Sarah Kidd, MD[1]; M. Steven Oberste, PhD[1]; Janell Routh, MD[1]; 2022 U.S. Poliovirus Response Team

“IPV does not prevent intestinal infection and therefore does not prevent poliovirus transmission”

Source: https://www.cdc.gov/mmwr/volumes/71/wr/mm7133e2.htm

Transmission

Polio

Inactivated Poliovirus Vaccine

Inactivated poliovirus vaccine (IPV) protects people against all three types of poliovirus. IPV does not contain live virus and cannot cause disease. It protects people from polio disease but does not stop transmission of the virus.

Source: https://www.cdc.gov/orr/polioviruscontainment/diseaseandvirus.htm

Transmission

Pertussis

PNAS

SEE COMMENTARY

Acellular pertussis vaccines protect against disease but fail to prevent infection and transmission in a nonhuman primate model

Jason M. Warfel, Lindsey I. Zimmerman, and Tod J. Merkel[1]

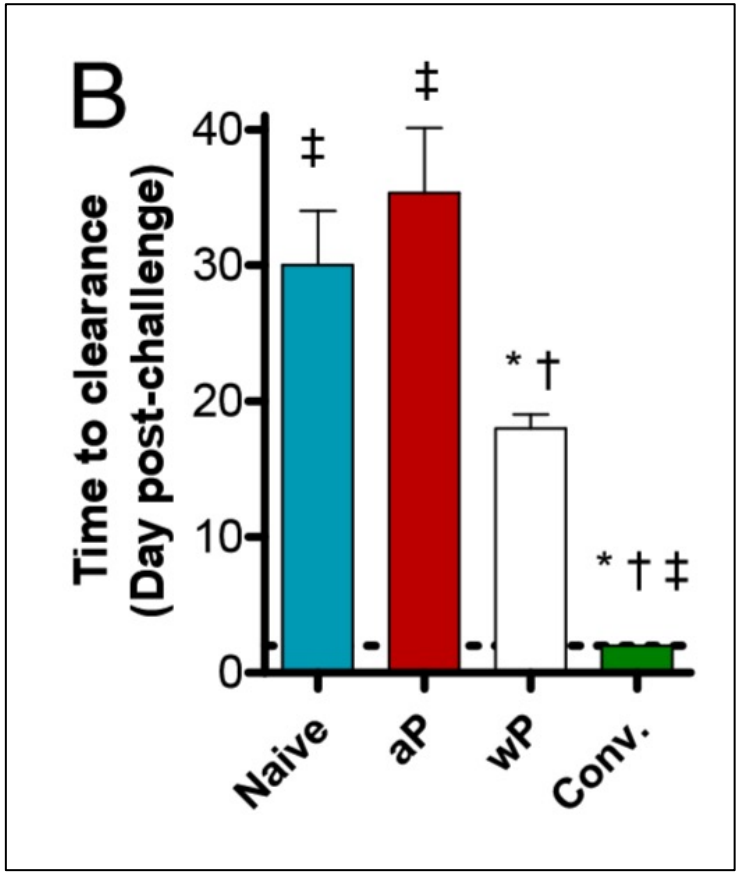
Division of Bacterial, Parasitic and Allergenic Products, Center for Biologics Evaluation and Research, US Food and Drug Administration, Bethesda, MD, 20892

Edited by Rino Rappuoli, Novartis Vaccines and Diagnostics Srl, Siena, Italy, and approved October 22, 2013 (received for review August 5, 2013)

Pertussis is a highly contagious
bacterial pathogen *Bordetella*
United States have been rising
42,000 cases in 2012. Although pertussis resurgence is not completely understood, we hypothesize that current acellular pertussis (aP) vaccines fail to prevent colonization and transmission. To test our hypothesis, infant baboons were vaccinated at 2, 4, and 6 mo of age with aP or whole-cell pertussis (wP) vaccines and challenged with *B. pertussis* at 7 mo. Infection was followed by quantifying colonization in nasopharyngeal washes and monitoring leukocytosis and symptoms. Baboons vaccinated with aP were protected from severe pertussis-associated symptoms but not from colonization, did not clear the infection faster than naïve animals, and readily transmitted *B. pertussis* to unvaccinated contacts. Vaccination with wP induced a more rapid clearance compared with naïve and aP-vaccinated animals. By comparison, previously infected animals were not colonized upon secondary infection. Although all vaccinated and previously infected animals had robust serum anti-

Center for Biologics Evaluation and Research, US Food and Drug Administration,

produce the human disease (16). To address this gap, we recently developed a nonhuman primate model of pertussis using baboons (*Papio anubis*) and found the disease is very similar to severe clinical pertussis. Upon challenge, baboons experience 2 wk of heavy respiratory colonization and leukocytosis peaking between 30,000–80,000 cells/mL, similar to the range in pertussis-infected infants (1, 17). In addition, baboons experience a paroxysmal cough illness characterized by repeated fits of 5–10 coughs. The coughing fits last on average >2 wk in the baboon, although this is less than some severely infected children, where the cough can last up to 12 wk (1, 17). We also characterized airborne transmission of *B. pertussis* from infected to naïve animals, which is the route of transmission postulated to occur between humans (18). Because this is the only model of pertussis to reproduce the cough illness and transmission of the human disease, we believe it provides the



Source: https://pubmed.ncbi.nlm.nih.gov/24277828/

frontiers in Immunology

REVIEW
published: 03 July 2019
doi: 10.3389/fimmu.2019.01344

Check for updates

Pertussis Prevention: Reasons for Resurgence, and Differences in the Current Acellular Pertussis Vaccines

Susanna Esposito[1], Paola Stefanelli[2], Norman K. Fry[3], Giorgio Fedele[2], Qiushui He[4,5], Pauline Paterson[6], Tina Tan[7], Markus Knuf[8,9], Carlos Rodrigo[10,11], Catherine Weil Olivier[12], Katie L. Flanagan[13,14,15], Ivan Hung[16], Iria Lutsar[17], Kathryn Edwards[18], Miguel O'Ryan[19] and Nicola Principi[20] for the World Association of Infectious Diseases and Immunological Disorders (WAidid) and the Vaccine Study Group of the European Society of Clinical Microbiology and Infectious Diseases (EVASG)*

OPEN ACCESS

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Pertussis is an acute respiratory disease caused by *Bordetella pertussis*. Due to its frequency and severity, prevention of pertussis has been considered an important public health issue for many years. The development of the whole-cell pertussis vaccine (wPV) and its introduction into the pediatric immunization schedule was associated with a marked reduction in pertussis cases in the vaccinated cohort. However, due to the frequency of local and systemic adverse events after immunization with wPV, work on a less reactive vaccine was undertaken based on isolated *B. pertussis* components that induced protective immune responses with fewer local and systemic reactions. These component vaccines were termed acellular vaccines and contained one or more pertussis antigens, including pertussis toxin (PT), filamentous haemagglutinin (FHA), pertactin (PRN), and fimbrial proteins 2 (FIM2) and 3 (FIM3). Preparations containing up to five components were developed, and several efficacy trials clearly demonstrated that the aPVs were able to confer comparable short-term protection than the most effective wPVs with fewer local and systemic reactions. There has been a resurgence of pertussis

Transmission

Pertussis

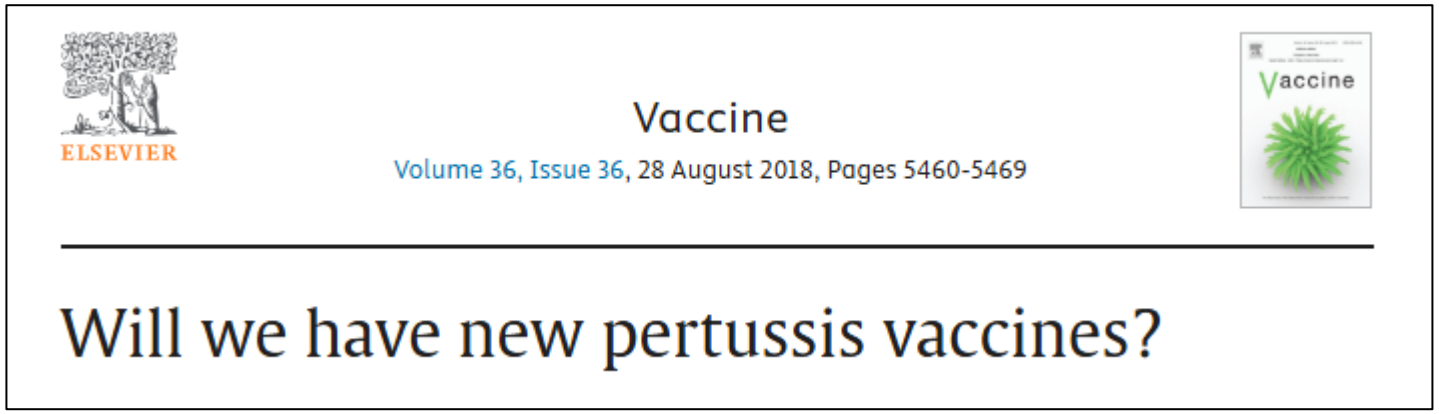
"Natural infection [with pertussis] evokes both mucosal and systemic immune responses, while aPVs [acellular pertussis vaccines] include only a systemic immune response. … Mucosal immunity is essential to prevent colonization and transmission of B. pertussis organism. Consequently, preventive measures such as aPVs that do not induce a valid mucosal response can prevent disease but cannot avoid infection and transmission. …

aPV pertussis vaccines do not prevent colonization. Consequently, they do not reduce the circulation of B. pertussis and do not exert any herd immunity effect."

Source: https://pubmed.ncbi.nlm.nih.gov/31333640/

Transmission

Pertussis

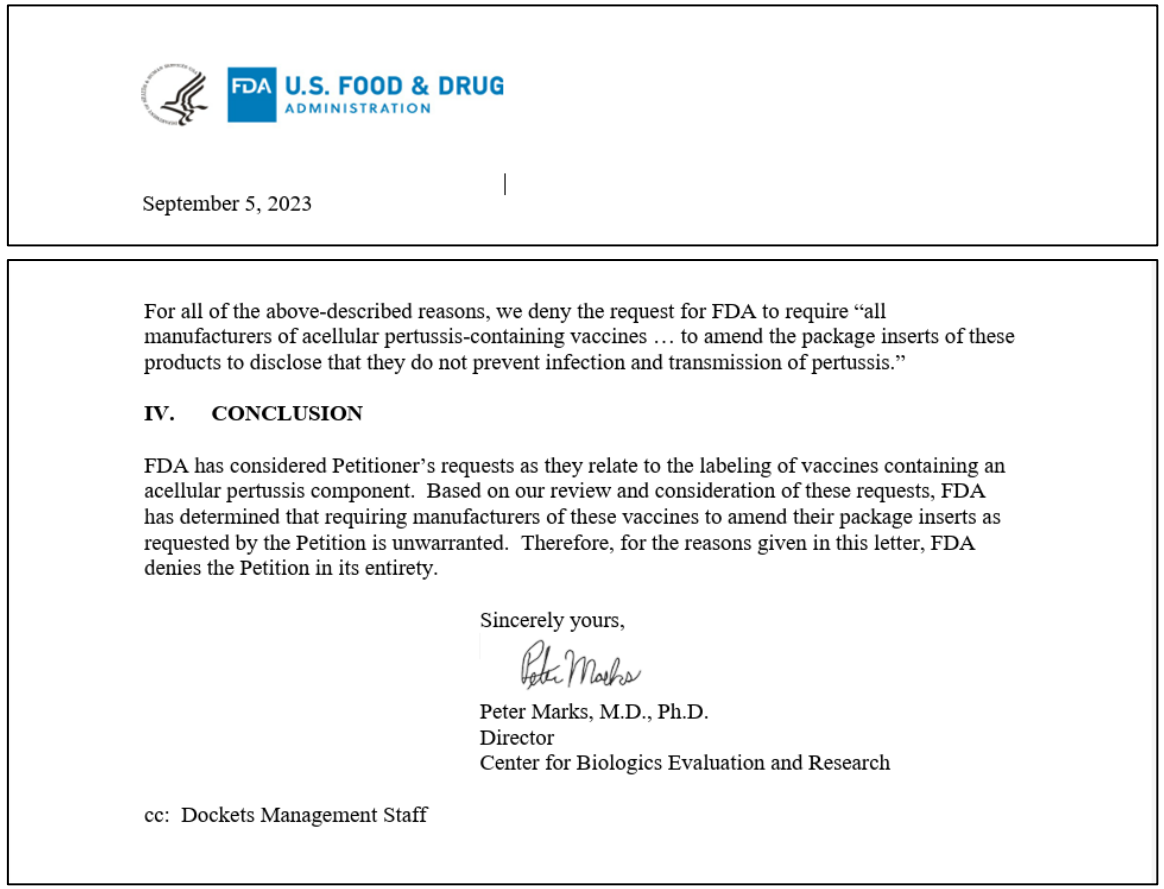


"That vaccination does not prevent B. pertussis infection in humans, nor the circulation of the organism in human populations in any important manner, comes from the observation that the inter-epidemic intervals have not changed in a major way since the implementation of mass vaccination."

Source: https://pubmed.ncbi.nlm.nih.gov/29180031/

Transmission

Pertussis



U.S. FOOD & DRUG ADMINISTRATION

September 5, 2023

For all of the above-described reasons, we deny the request for FDA to require "all manufacturers of acellular pertussis-containing vaccines … to amend the package inserts of these products to disclose that they do not prevent infection and transmission of pertussis."

IV. CONCLUSION

FDA has considered Petitioner's requests as they relate to the labeling of vaccines containing an acellular pertussis component. Based on our review and consideration of these requests, FDA has determined that requiring manufacturers of these vaccines to amend their package inserts as requested by the Petition is unwarranted. Therefore, for the reasons given in this letter, FDA denies the Petition in its entirety.

Sincerely yours,

Peter Marks, M.D., Ph.D.
Director
Center for Biologics Evaluation and Research

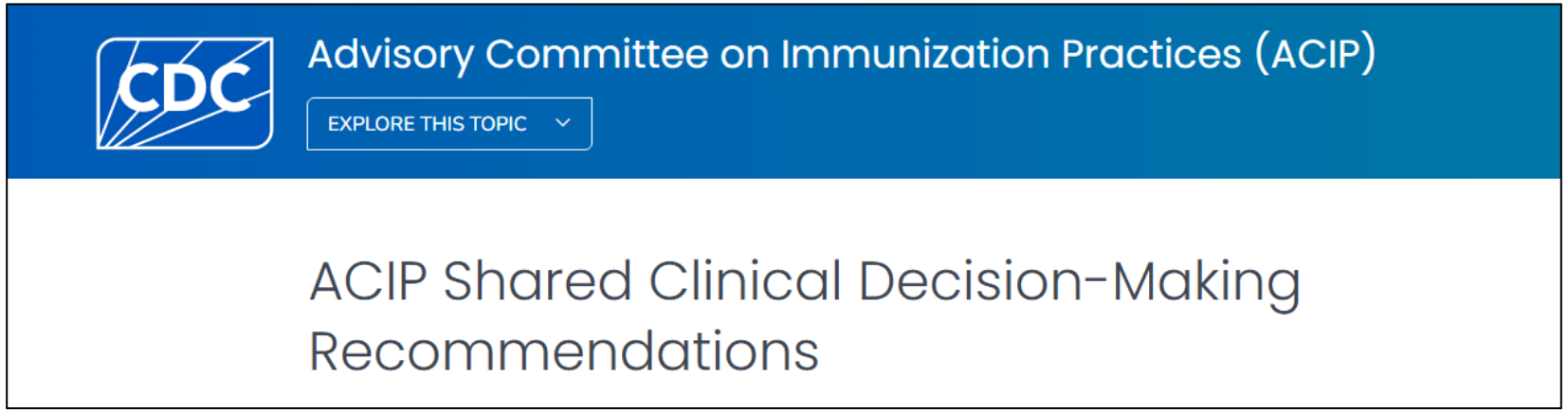
cc: Dockets Management Staff

"FDA's licensure standards for vaccines do not require demonstration of the prevention of infection or transmission. … [T]he pertussis vaccines that FDA has licensed are for prevention of pertussis disease not infection with *B. pertussis*."

FDA is also not "convinced that there is a any widespread misconception about this."

Source: https://pubmed.ncbi.nlm.nih.gov/31333640/

Transmission



"Unlike routine, catch-up, and risk-based recommendations … ACIP makes shared clinical decision-making recommendations when individuals may benefit from vaccination, but broad vaccination of people in that group is unlikely to have population-level impacts."

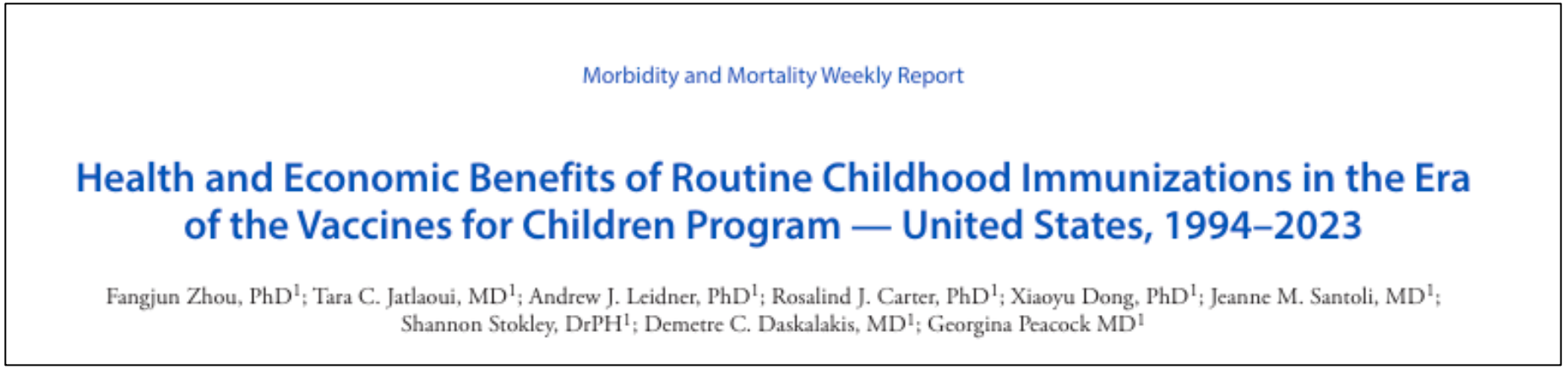
Source: https://www.cdc.gov/acip/vaccine-recommendations/shared-clinical-decision-making.html

Efficacy in Preventing Mortality: U.S. Childhood Vaccine Schedule

Benefits

Vaccines are intended to prevent symptoms if the vaccinee is infected with the target pathogen, thereby potentially preventing disease and mortality.

Claimed Benefits



Morbidity and Mortality Weekly Report

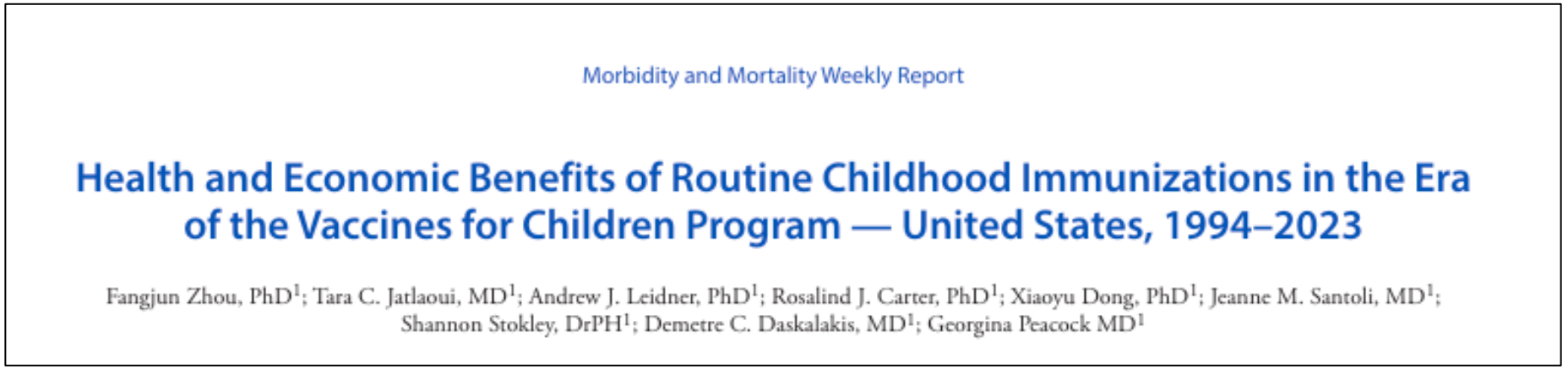
Health and Economic Benefits of Routine Childhood Immunizations in the Era of the Vaccines for Children Program — United States, 1994–2023

Fangjun Zhou, PhD[1]; Tara C. Jatlaoui, MD[1]; Andrew J. Leidner, PhD[1]; Rosalind J. Carter, PhD[1]; Xiaoyu Dong, PhD[1]; Jeanne M. Santoli, MD[1]; Shannon Stokley, DrPH[1]; Demetre C. Daskalakis, MD[1]; Georgina Peacock MD[1]

"Among children born during 1994–2023, routine childhood vaccinations will have prevented approximately 508 million cases of illness, 32 million hospitalizations, and 1,129,000 deaths"

Source: https://www.cdc.gov/mmwr/volumes/73/wr/mm7331a2.htm

Claimed Benefits: Mortality



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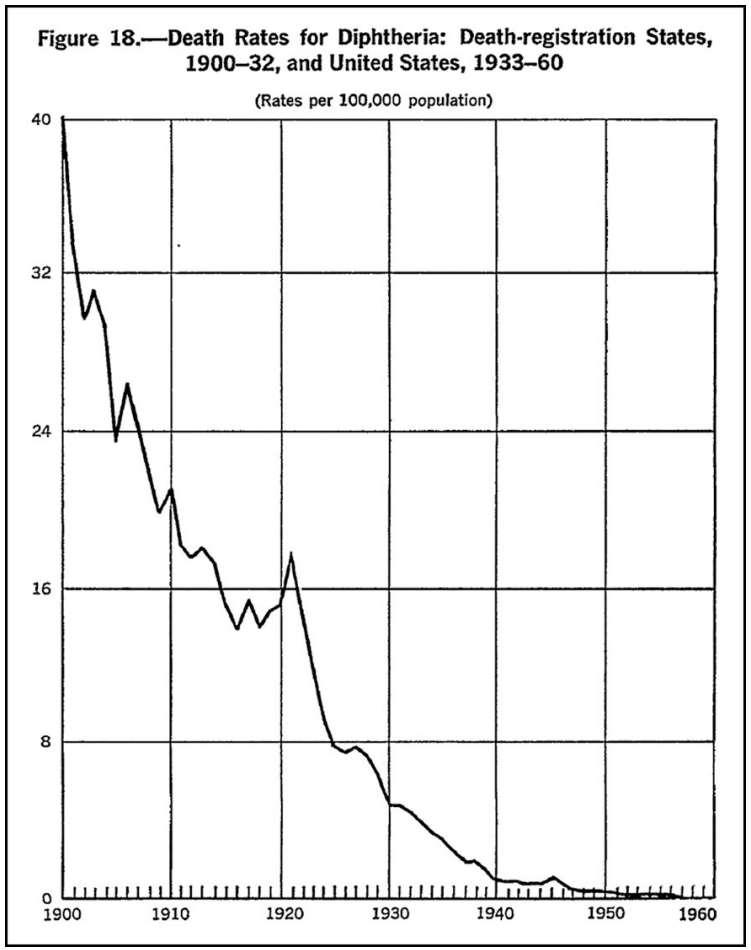
- Ignores all confounders, explaining “factors other than immunization (e.g., hygiene…) might have contributed to lower disease risks in recent decades, and reductions resulting from these contributions have not been incorporated into the model”
- No confidence intervals
- Data is unreliable
- Clearance process versus peer-review

Source: https://www.cdc.gov/mmwr/preview/mmwrhtml/su6004a2.htm

Claimed Benefits: Mortality

U.S. Public Health Service Report

2023 MMWR Report:
Claims **25,000** diphtheria deaths prevented each year between 1994 and 2023, totaling 750,000 of the 1.1 million lives.



CDC Mortality Data:
634 diphtheria deaths in 1948

Disease	% Mortality Decline Between 1900 and 1940	% Mortality Decline Between 1900 and 1949
Diphtheria	97.3%	97.8%

Source: https://stacks.cdc.gov/view/cdc/6200; https://www.cdc.gov/nchs/data/vsus/VSUS_1948_2.pdf

Claimed Benefits: Mortality

MMWR Report: Claims **3,003** Hepatitis B deaths prevented each year between 1994 and 2023 (totaling 90,100 of the 1.1 million lives).

CDC Pink Book: There were **294** deaths from Hepatitis B in 1980, the year before the first Hep B vaccine was introduced in 1981.

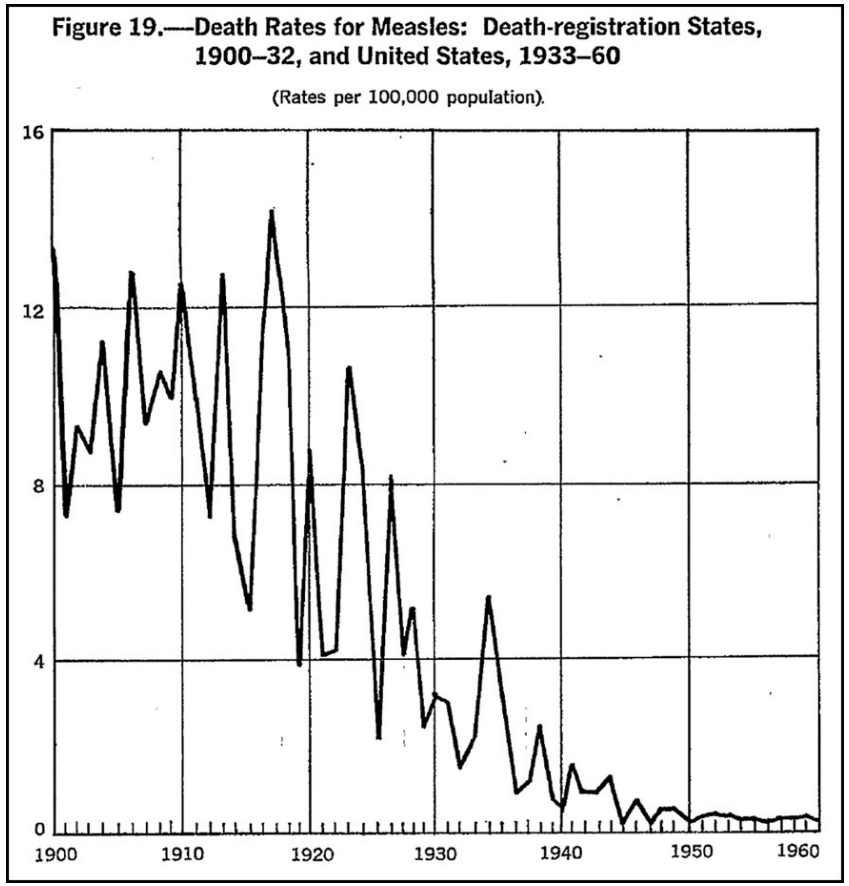
Source: https://web.archive.org/web/20190615081539/https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/e/reported-cases.pdf

Claimed Benefits: Mortality

2023 MMWR Report:
claims **2,833** measles deaths prevented each year between 1994 and 2023 (totaling 85,000 of the 1.1 million lives)

CDC Mortality Data:
407 measles deaths in 1962 after an over 98% decline in mortality between 1900 and 1962

U.S. Public Health Service Report



Source: https://stacks.cdc.gov/view/cdc/6200; https://web.archive.org/web/20190615081539/https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/e/reported-cases.pdf

Claimed Benefit: Mortality

Studies on non-specific effects
on mortality in children:
live v. non-live vaccines and
developed v. developing countries

Claimed Benefit: Mortality

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Association of measles and mumps with cardiovascular disease: The Japan Collaborative Cohort (JACC) study

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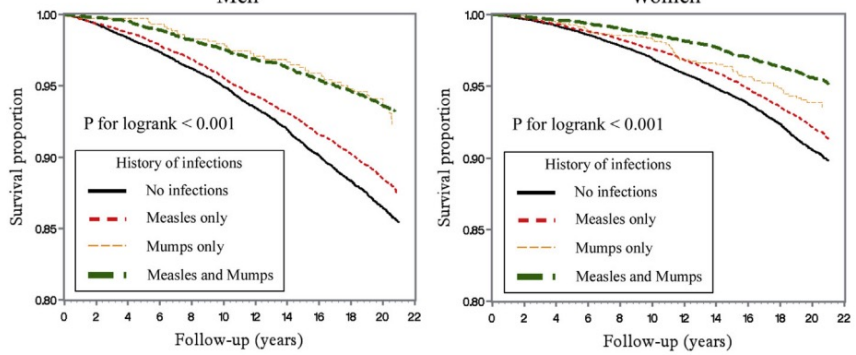


Fig. 1. Kaplan-Meire survival curves of mortality from total cardivascular disease according to the history of infections among men and women.

Table 2
Age-adjusted and multivariable hazard ratios (HR) and 95% Confidential Intervals (CI) for Cause-specific mortality according to history of measles or mumps.

History of measles or mumps	Men				Women			
	None	Measles only	Mumps only	Measles and mumps	None	Measles only	Mumps only	Measles and mumps
No. at risk	21,245	14,671	730	7043	24,950	21,202	1256	12,739
Person-years	326,940	236,327	11,802	116,443	411,090	358,358	19,963	209,207
Total cardiovascular disease, n	2243	1383	38	365	1913	1378	57	439
Age-adjusted HR (95% CI)	1.00	0.92 (0.86–0.99)	0.76 (0.55–1.04)	0.80 (0.71–0.89)	1.00	0.97 (0.91–1.05)	0.98 (0.75–1.27)	0.83 (0.75–0.92)
Multivariable HR (95% CI)[a]	1.00	0.92 (0.86–0.99)	0.75 (0.55–1.04)	0.81 (0.72–0.91)	1.00	0.98 (0.91–1.06)	1.01 (0.78–1.32)	0.83 (0.75–0.93)
+ history of CVD[b]	1.00	0.92 (0.85–0.99)	0.75 (0.54–1.04)	0.80 (0.71–0.90)	1.00	0.97 (0.90–1.05)	0.97 (0.75–1.27)	0.83 (0.74–0.92)

Source: https://pubmed.ncbi.nlm.nih.gov/26122188/

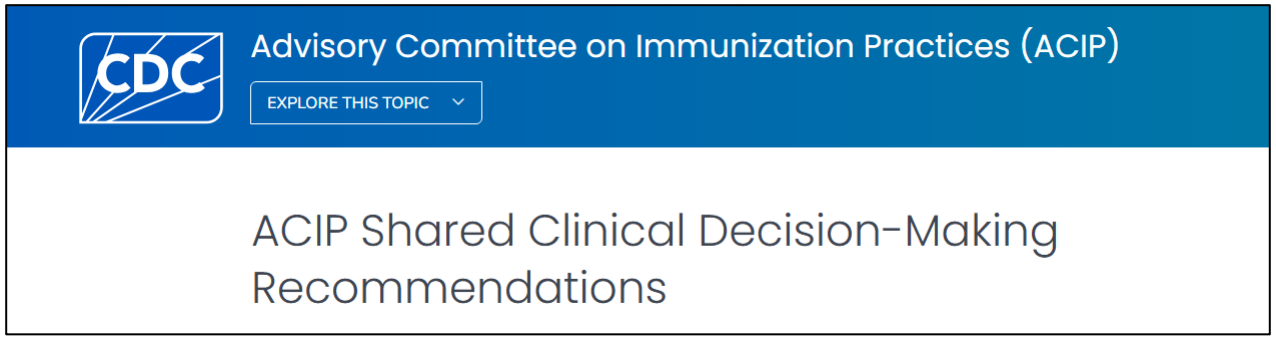
Claimed Benefit: Mortality

Disease	Year Vaccine Licensed	Number of Deaths in Year Prior to Licensure
Diphtheria	1949 (DTP)	634
Pertussis		1,146
Tetanus		506
Polio	1955	1,368
Measles	1963	408
Mumps	1967	43
Rubella	1969	24
Hepatitis B	1981	294
Hib	1990	34
Hepatitis A	1995	97
Varicella	1995	124
Pneumococcal	2000	200
Meningococcal	2005	8
Rotavirus	2006	20

Pneumococcal deaths are during childhood. Mortality data for: **diphtheria, pertussis, and tetanus** (https://www.cdc.gov/nchs/data/vsus/ VSUS_1948_2.pdf, p.440, https://perma.cc/N2PN-5UPU); **polio, measles, mumps, rubella, hepatitis B, hepatitis A,** and **varicella** (https://web.archive.org/web/20190615081539/https:// www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/e/reported-cases.pdf, https://per-ma.cc/7GPK-32AC); **Hib** (There was an ineffective vaccine introduced in 1985 and withdrawn. After a Hib vaccine considered effective for infants was first licensed in late 1990, the CDC in 1991 for the first time recommended a Hib vaccine for infants, and by 1992 vaccine uptake was only 28%. There were 17 deaths in 1991 from Hib, so to be conservative, this death number was doubled to 34 for the chart. See discussion regarding Hib vaccine in this chapter for sup-porting citations.); **pneumococcal** ("Before routine use of pneumococcal conjugate vaccine in 2000, the burden of pneumococcal disease among children younger than age 5 years was … 200 deaths from invasive pneumococcal disease." Hence, this CDC estimate was used even though it appears inflated based on other data. https://www.cdc.gov/pinkbook/hcp/table-of-contents/ chapter-17-pneumococcal-disease.html, https://perma.cc/6YQT-F4CA); and **rotavirus** and **meningococcal** (CDC listing, "Deaths per year in the United States prior to recommended vaccines," for these diseases on slide 7: https://web.archive.org/web/20240518044830/https:// www.cdc.gov/vaccines/acip/meetings/downloads/slides-2022-05-19/01-COVID-Daley-508. pdf, https://perma.cc/VV9F-C77B).

Informed Consent & Considerations

Informed Consent



"Unlike routine, catch-up, and risk-based recommendations, … shared clinical decision-making recommendations are individually based and informed by a decision process between the health care provider and the patient or parent/guardian."

Source: https://www.cdc.gov/acip/vaccine-recommendations/shared-clinical-decision-making.html

Items to Consider

- Revisit prior recommendations made without robust data.

- Require robust trial and, when possible, post-licensure safety data.

- Liaison members should respect right of informed consent.