Vaccine Confidence & Uptake

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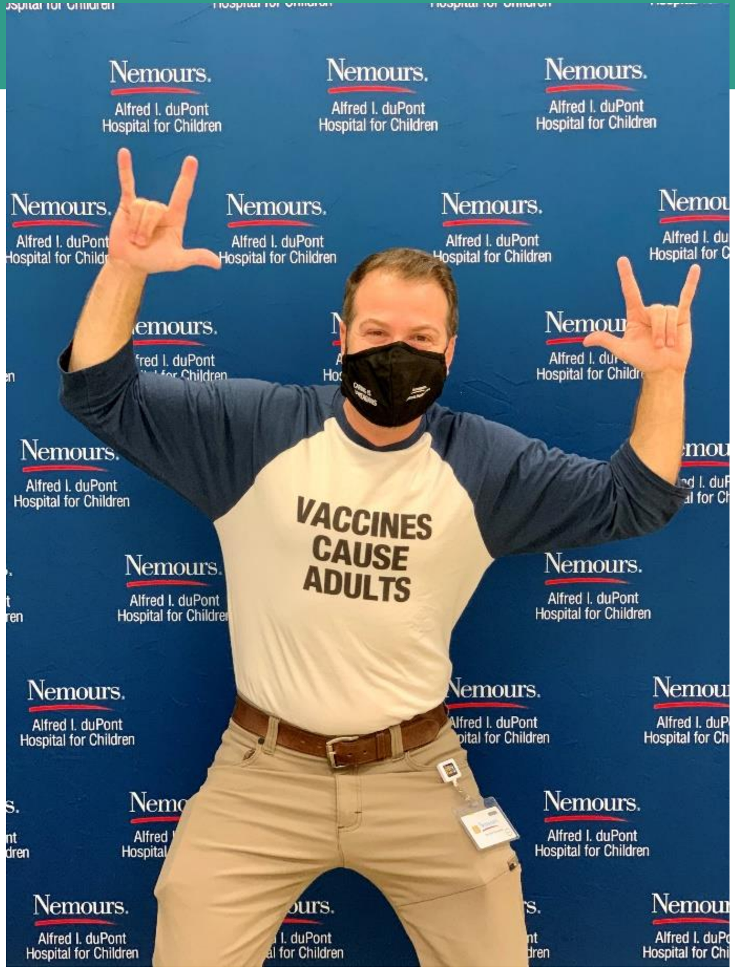
Disclosure

- I have no financial interest or other relationship with any manufacturer of any commercial products
- I am a passionate advocate for evidence-based medicine and vaccination!



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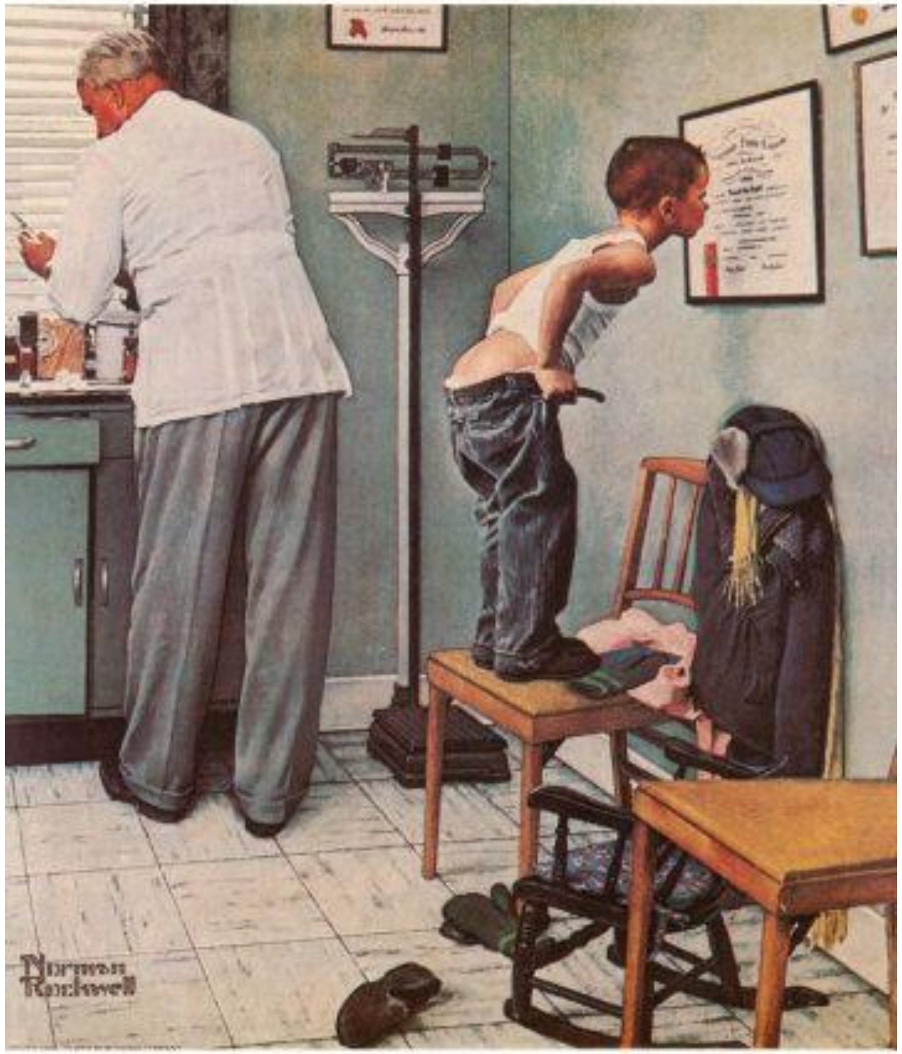
Objectives



- Discuss the history of vaccine hesitancy and trends in vaccine confidence
- Discuss evidence-based methods and interventions to increase immunization uptake
- Discuss public health measures to improve immunization uptake

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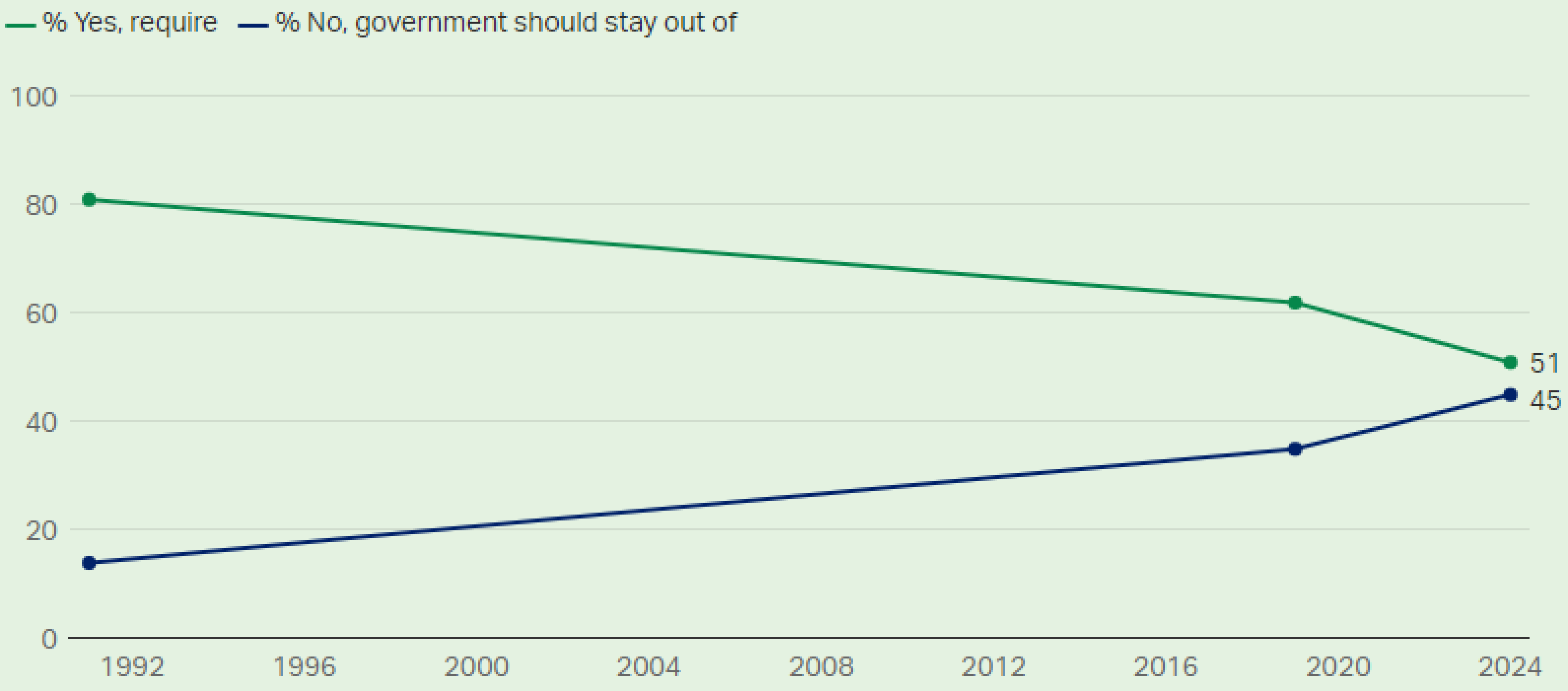
Slim Majority of Americans Favor Government Requirements for Vaccination Against Contagious Diseases

Do you think the government should require all parents to have their children vaccinated against contagious diseases such as measles, or do you think that's something the government should stay out of?



1991 results from survey conducted by Princeton Survey Research Associates for Troika Productions and Lifetime Television

Get the data • Download image

GALLUP

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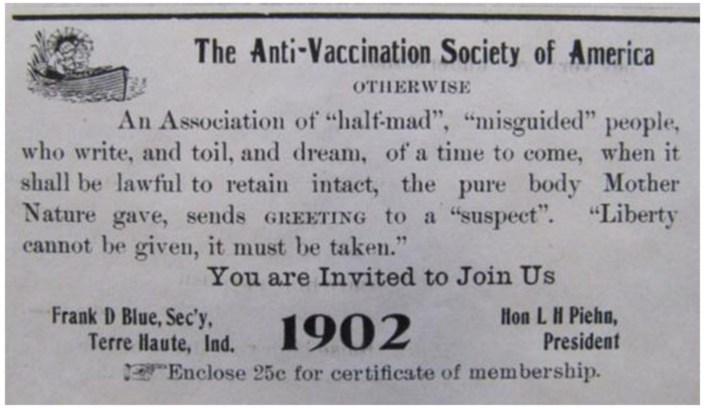
History

- Smallpox
  - Edward Jenner's smallpox vaccine led to Anti Vaccination League and Anti-Compulsary Vaccination League in England in 1800s
  - Turn of 19th century saw smallpox outbreaks in US leading to vaccination campaigns
    - Anti Vaccination Society of America founded in 1879
    - 1902: Cambridge, Mass mandated smallpox vaccination during an outbreak; Supreme Court ruled in favor of the city's mandate
    - Massachusetts is 1st state to require children to have smallpox vaccine to enter school in 1953
- Biologics Control Act of 1902
  - In 1901, two tragedies highlighted the need for better oversight of vaccination industry
    - In St Louis, 13 children died of tetanus-contaminated diphtheria antitoxin
    - In Camden NJ, 9 children died from tainted smallpox vaccine
  - Regulation of vaccine and antitoxin producers, requiring licensing and inspection of manufacturers



History

- Polio Vaccination Assistance Act, 1955
  - First federal involvement in immunization activities, allowing for congressional allocation of funds to the CDC to help states acquire and administer vaccines
- Cutter Incident
  - 1955: 200 people paralyzed and 10 deaths after contracting polio from the Salk polio vaccine that was not inactivated despite the manufacturers' adherence to government standards
    - Many lawsuits against vaccine manufacturers
- Vaccination Assistance Act, 1962
  - Allowed the CDC to support mass immunization campaigns and to initiate maintenance programs
- Federal Immunization Grant Program, 1963
  - Grants to states to provide funds to purchase vaccines and support immunization programs
- By 1963, twenty US states require several vaccines for school entry

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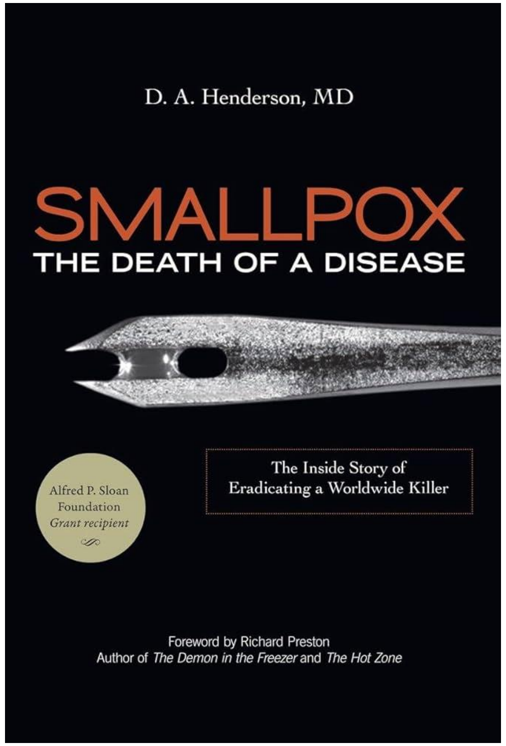
History

- Advisory Committee for Immunization Practices (ACIP)
  - Created in 1964 to review the recommended childhood immunization schedule and make recommendations going forward
- Global Smallpox Eradication Program launched by WHO in 1967
  - Last case of naturally acquired smallpox occurred in Somalia in 1977
- DPT
  - 1970s and 1980s: increase in lawsuits against vaccine manufacturers due to unsubstantiated concerns about neurologic damage due to DPT
    - By 1984, only one US company still manufactured DPT
- In 1988, World Health Assembly passed resolution to eradicate polio by 2000
  - 1991: last case of indigenous polio in Western Hemisphere (Peru)



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Schedule of Active Immunization for Infants and Children

Age		Preparation	
1½–2	mo.	D.P.T.*	Poliomyelitis vaccine†
3	mo.	D.P.T.	Poliomyelitis vaccine
4	mo.	D.P.T.	Poliomyelitis vaccine
10–12	mo.		Smallpox vaccine
12–18	mo.	D.P.T.	Poliomyelitis vaccine
3–4	yr.	D.P.T.	Poliomyelitis vaccine
5–6	yr.		Smallpox vaccine
8	yr.	D.T. (Adult type)	Poliomyelitis vaccine
12	yr.	D.T. (Adult type)	Poliomyelitis vaccine
16	yr.	D.T. (Adult type)	Poliomyelitis vaccine

* D.P.T. = Diphtheria, pertussis, tetanus.

† Poliomyelitis vaccine for primary immunization of infants may be given as a separate injection or in a commercially prepared quadruple vaccine with D.P.T.

tussis, and tetanus antigens and poliomyelitis vaccine.

There are few contraindications to poliomyelitis vaccination. It may be performed safely at any time of the year, even when poliomyelitis is prevalent. Reactions are extremely rare. The amount of penicillin present in most of the vac-

Table 1.—Recommended Schedule for Active Immunization and Tuberculin Testing of Normal Infants and Children[1]

Age	Immunization or Test
2-3 Months	DTP*, type 1 OPV or trivalent OPV
3-4 Months	DTP, type 3 OPV or trivalent OPV
4-5 Months	DTP, type 2 OPV or trivalent OPV
9-11 Months	Tuberculine test
12 Months	Measles vaccine
15-18 Months	DTP, trivalent OPV, smallpox
2 Years	Tuberculine test
3 Years	DTP, tuberculin test
4 Years	Tuberculin test
6 Years	TD-smallpox vaccine, tuberculin test Trivalent OPV
8 Years	Tuberculin
10 Years	Tuberculin
12 Years	TD, smallpox vaccine, tuberculin test
14 Years	Tuberculin
16 Years	Tuberculin

* DTP indicates diphtheria and tetanus toxoids and pertussis vaccine combined; OPV, oral poliovaccine—if trivalent OPV is used, interval should be six weeks or longer; TD, tetanus and diphtheria toxoids, adult type.

The recommended immunization schedule by the AAP in the 1966 Red Book. The first measles vaccine was approved in 1963.

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

[*]These recommended ages should not be construed as absolute, i.e. 2 mos. can be 6-10 weeks, etc.

[†]For all products used, consult manufacturer's package enclosure for instructions for storage, handling, and administration. Immunobiologics prepared by different manufacturers may vary, and those of the same manufacturer may change from time to time. The package insert should be followed for a specific product.

[§]DTP—Diphtheria and tetanus toxoids and pertussis vaccine.

[¶]OPV—Oral, attenuated poliovirus vaccine contains poliovirus types 1, 2, and 3.

[**]Simultaneous administration of MMR, DTP, and OPV is appropriate for patients whose compliance with medical care recommendations cannot be assured.

[††]MMR—Live measles, mumps, and rubella viruses in a combined vaccine (see text for discussion of single vaccines versus combination).

[§§]Up to the seventh birthday.

[¶¶]Td—Adult tetanus toxoid and diphtheria toxoid in combination, which contains the same dose of tetanus toxoid as DTP or DT and a reduced dose of diphtheria toxoid.

1983 childhood immunization schedule

TABLE 2. Recommended schedule for active immunization of normal infants and children[*]

Recommended age[†]	Vaccine(s)[§]	Comments
2 mos	DTP#1[¶], OPV#1[**]	OPV and DTP can be given earlier in areas of high endemicity
4 mos	DTP#2, OPV#2	6-wk to 2-mo interval desired between OPV doses
6 mos	DTP#3	An additional dose of OPV at this time is optional in areas with a high risk of poliovirus exposure
15 mos[††]	MMR[§§], DTP#4, OPV#3	Completion of primary series of DTP and OPV
18 mos	HbCV[¶¶]	Conjugate preferred over polysaccharide vaccine[***]
4–6 yrs	DTP#5[†††], OPV#4	At or before school entry
14–16 yrs	Td[§§§]	Repeat every 10 yrs throughout life

[*]See Table 3 for the recommended immunization schedules for infants and children up to their seventh birthday not immunized at the recommended times.

[†]These recommended ages should not be construed as absolute, e.g., 2 months can be 6–10 weeks. However, MMR should not be given to children <12 months of age. If exposure to measles disease is considered likely, then children 6 through 11 months old may be immunized with single-antigen measles vaccine. These children should be reimmunized with MMR when they are approximately 15 months of age.

[§]For all products used, consult the manufacturers' package enclosures for instructions regarding storage, handling, dosage, and administration. Immunobiologics prepared by different manufacturers can vary, and those of the same manufacturer can change from time to time. The package inserts are useful references for specific products, but they may not always be consistent with current ACIP and American Academy of Pediatrics immunization schedules.

[¶]DTP=Diphtheria and Tetanus Toxoids and Pertussis Vaccine, Adsorbed. DTP may be used up to the seventh birthday. The first dose can be given at 6 weeks of age and the second and third doses given 4–8 weeks after the preceding dose.

[**]OPV=Poliovirus Vaccine Live Oral, Trivalent: contains poliovirus types 1, 2, and 3.

[††]Provided at least 6 months have elapsed since DTP#3 or, if fewer than 3 doses of DTP have been received, at least 6 weeks since the last previous dose of DTP or OPV. MMR vaccine should not be delayed to allow simultaneous administration with DTP and OPV. Administering MMR at 15 months and DTP#4 and OPV#3 at 18 months continues to be an acceptable alternative.

[§§]MMR=Measles, Mumps, and Rubella Virus Vaccine, Live. Counties that report ≥5 cases of measles among preschool children during each of the last 5 years should implement a routine 2-dose measles vaccination schedule for preschoolers. The first dose should be administered at 9 months or the first health-care contact thereafter. Infants vaccinated before their first birthday should receive a second dose at about 15 months of age. Single-antigen measles vaccine should be used for children aged <1 year and MMR for children vaccinated on or after their first birthday. If resources do not allow a routine 2-dose schedule, an acceptable alternative is to lower the routine age for MMR vaccination to 12 months.

[¶¶]HbCV=Vaccine composed of Haemophilus influenzae b polysaccharide antigen conjugated to a protein carrier. Children <5 years of age previously vaccinated with polysaccharide vaccine between the ages of 18 and 23 months should be revaccinated with a single dose of conjugate vaccine if at least 2 months have elapsed since the receipt of the polysaccharide vaccine.

[***]If HbCV is not available, an acceptable alternative is to give Haemophilus influenzae b polysaccharide vaccine (HbPV) at age ≥24 months. Children at high risk for *Haemophilus influenzae* type b disease where conjugate vaccine is not available may be vaccinated with HbPV at 18 months of age and revaccinated at 24 months.

[†††]Up to the seventh birthday.

1989 childhood immunization schedule

History

- National Childhood Vaccine Injury Act (NCVIA), 1986
  - Vaccine Information Statements (VIS), NVICP, VAERS
- National Vaccine Injury Compensation Program (NVICP, started in 1988)
  - Intended to prevent liability suits from driving vaccine manufacturers from the market (no-fault system)
  - Funded by tax on each vaccine dose
  - Those claiming vaccine injury cannot sue the manufacturer without first filing a claim with NVICP
  - There is a table with known adverse events and a formula for claim reimbursement for the known event
- Vaccine Adverse Events Reporting System (VAERS, started in 1990)
  - Voluntary reporting system, anyone can make report
  - CDC then investigates the event
  - However, this is limited by under-reporting and reporter bias

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History

- National Immunization Program (NIP), 1993
  - CDC program to provide federal leadership to all local and state public health departments involved in immunization activities, including disease surveillance and IT
- Vaccines for Children Program (VFC), 1993 Omnibus Budget Reconciliation Act
  - Federally purchased vaccines for children in Medicaid, uninsured, and American Indian / Alaskan Native
- In 1995, the ACIP, AAP, and AAFP produced the first harmonized recommendations for routine childhood immunization
- By 1998, all but four US states had vaccine school entry requirements
- In 2000, measles was declared no longer endemic in the US
- In 2005, rubella was declared no longer endemic in the US

1994-2024 30TH ANNIVERSARY Vaccines for Children

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TABLE. Recommended Childhood Immunization Schedule United States—January, 1995*

Vaccine ▼ / Age ▶	Birth	2 mos	4 mos	6 mos	12 mos[5]	15 mos	18 mos	4 - 6 yrs	11-12 yrs	14-16 yrs
Hepatitis B[1]	HB-1									
		HB-2		HB-3						
Diphtheria, Tetanus, Pertussis[2]		DTP	DTP	DTP	DTP or DTaP at 15+ m			DTP or DTaP	Td	
H. influenzae type b[3]		Hib	Hib	Hib	Hib					
Polio		OPV	OPV	OPV				OPV		
Measles, Mumps, Rubella[4]					MMR			MMR or	MMR	

* Vaccines are listed under the routinely recommended ages. Shaded bars indicate range of acceptable ages for vaccinati
[1] Infants born to HBsAg-negative mothers should receive the second dose of Hepatitis B vaccine between 1 and 4 months of
at least 1 month has elapsed since receipt of the first dose. The third dose is recommended between 6 and 18 months of
Infants born to HBsAg-positive mothers should receive immunoprophylaxis for hepatitis B with 0.5 mL Hepatitis B Imn
(HBIG) within 12 hours of birth, and 0.5 mL of either Merck Sharpe & Dohme vaccine (Recombivax HB) or of SmithKline Be
(Engerix-B) at a separate site. In these infants, the second dose of vaccine is recommended at 1 month of age and the third do
of age. All pregnant women should be screened for HBsAg in an early prenatal visit.
[2] The fourth dose of DTP may be administered as early as 12 months of age, provided at least 6 months have elapse
Combined DTP-Hib products may be used when these two vaccines are to be administered simultaneously. DTaP (diphther
toxoids and acellular pertussis vaccine) is licensed for use for the 4th and/or 5th dose of DTP vaccine in children 15 months
and may be preferred for these doses in children in this age group.
[3] Three *H influenzae* type b conjugate vaccines are available for use in infants: HbOC [HibTITER] (Lederle Praxis); P
OmniHIB] (Pasteur Mérieux, distributed by SmithKline Beecham; Connaught); and PRP-OMP [PedvaxHIB] (Merck Sha
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 prim
conjugate vaccine series is completed, any licensed Hib conjugate vaccine may be used as a booster dose at age 12 to 15
[4] The second dose of MMR vaccine should be administered EITHER at 4 to 6 years of age OR at 11 to 12 years of age.
[5] Vaccines recommended in the second year of life (12 to 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
Academy of Family Physicians (AAFP).

FIGURE 1. Recommended childhood immunization schedule* — United States, 1997

Vaccine	Age: Birth	1 Mo.	2 Mos.	4 Mos.	6 Mos.	12 Mos.	15 Mos.	18 Mos.	4–6 Yrs.	11–12 Yrs.	14–16 Yrs.
Hepatitis B[†]	Hep B-1										
		Hep B-2			Hep B-3					Hep B[§]	
Diphtheria and tetanus toxoids and acellular pertussis[¶]			DTaP or DTP	DTaP or DTP	DTaP or DTP		DTaP or DTP		DTaP or DTP	Td	
Haemophilus influenzae type b**			Hib	Hib	Hib	Hib					
Poliovirus[††]			Polio[*]	Polio		Polio			Polio		
Measles-mumps-rubella[§§]						MMR			MMR or	MMR	
Varicella virus[¶¶]						Var				Var	

- Range of Acceptable Ages for Vaccination
- "Catch-Up" Vaccination

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

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

RETRACTED

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 otitis media in another. All 12 children had intestinal abnormalities, ranging from lymphoid nodular hyperplasia to aphthoid ulceration. Histology showed patchy chronic inflammation in the colon in 11 children and reactive ileal lymphoid hyperplasia in seven, but no granulomas. Behavioural disorders included autism (nine), disintegrative psychosis (one), and possible postviral or vaccinal encephalitis (two). There were no focal neurological abnormalities and MRI and EEG tests were normal. Abnormal laboratory results were significantly raised urinary methylmalonic acid compared with age-matched controls ($p=0{\cdot}003$), low haemoglobin in four children, and a low serum IgA in four children.

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

Lancet 1998; **351:** 637–41

See Commentary page

Introduction

We saw several children who, after a period of apparent normality, lost acquired skills, including communication. They all had gastrointestinal symptoms, including abdominal pain, diarrhoea, and bloating and, in some cases, food intolerance. We describe the clinical findings, and gastrointestinal features of these children.

Patients and methods

12 children, consecutively referred to the department of paediatric gastroenterology with a history of a pervasive developmental disorder with loss of acquired skills and intestinal symptoms (diarrhoea, abdominal pain, bloating and food intolerance), were investigated. All children were admitted to the ward for 1 week, accompanied by their parents.

Clinical investigations

We took histories, including details of immunisations and exposure to infectious diseases, and assessed the children. In 11 cases the history was obtained by the senior clinician (JW-S). Neurological and psychiatric assessments were done by consultant staff (PH, MB) with HMS-4 criteria.[1] Developmental histories included a review of prospective developmental records from parents, health visitors, and general practitioners. Four children did not undergo psychiatric assessment in hospital; all had been assessed professionally elsewhere, so these assessments were used as the basis for their behavioural diagnosis.

After bowel preparation, ileocolonoscopy was performed by SHM or MAT under sedation with midazolam and pethidine. Paired frozen and formalin-fixed mucosal biopsy samples were taken from the terminal ileum; ascending, transverse, descending, and sigmoid colons, and from the rectum. The procedure was recorded by video or still images, and were compared with images of the previous seven consecutive paediatric colonoscopies (four normal colonoscopies and three on children with ulcerative colitis), in which the physician reported normal appearances in the terminal ileum. Barium follow-through radiography was possible in some cases.

Also under sedation, cerebral magnetic-resonance imaging (MRI), electroencephalography (EEG) including visual, brain stem auditory, and sensory evoked potentials (where compliance made these possible), and lumbar puncture were done.

Laboratory investigations

Thyroid function, serum long-chain fatty acids, and cerebrospinal-fluid lactate were measured to exclude known

FIGURE. Recommended childhood and adolescent immunization schedule, by vaccine and age — United States, 2006

Vaccine ▼ / Age ▶	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	24 months	4–6 years	11–12 years	13–14 years	15 years	16–18 years
Hepatitis B[1]	HepB	HepB		*HepB*[1]			HepB					HepB Series		
Diphtheria, Tetanus, Pertussis[2]			DTaP	DTaP	DTaP			DTaP		DTaP	Tdap		Tdap	
Haemophilus influenzae type b[3]			Hib	Hib	*Hib*[3]	Hib								
Inactivated Poliovirus			IPV	IPV			IPV			IPV				
Measles, Mumps, Rubella[4]						MMR				MMR			MMR	
Varicella[5]							Varicella					Varicella		
Meningococcal[6]								Vaccines within broken line are for selected populations	MPSV4		MCV4		MCV4 MCV4	
Pneumococcal[7]			PCV	PCV	PCV	PCV			PCV			PPV		
Influenza[8]						Influenza (yearly)						Influenza (yearly)		
Hepatitis A[9]							HepA series					HepA series		

This schedule indicates the recommended ages for routine administration of currently licensed childhood vaccines, as of December 1, 2005, for children through age 18 years. Any dose not administered at the recommended age should be administered at any subsequent visit, when indicated and feasible. ▬ Indicates age groups that warrant special effort to administer those vaccines not previously administered. Additional vaccines might be licensed and recommended during the year. Licensed combination vaccines may be used whenever any components of the combination are indicated and other components of the vaccine are not contraindicated and if approved by the Food and Drug Administration for that dose of the series. Providers should consult respective Advisory Committee on Immunization Practices (ACIP) statements for detailed recommendations. Clinically significant adverse events that follow vaccination should be reported through the Vaccine Adverse Event Reporting System (VAERS). Guidance about how to obtain and complete a VAERS form is available at http://www.vaers.hhs.gov or by telephone, 800-822-7967.

Range of recommended ages — Catch-up immunization — Assessment at age 11–12 years

2009: Influenza Pandemic, H1N1

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2015: Disneyland Measles Outbreak

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School Exemptions from Vaccination

- All states allow medical exemptions
- 45 states allow religious and/or personal belief exemptions
- West Virginia, California, Maine, New York, and now Connecticut do not allow religious or philosophical exemptions
  - Mississippi did not allow non-medical exemptions until court required the State to allow religious exemptions in 2023; WV defeated legislation this year
- Delaware allows medical and religious exemptions, but not personal belief exemptions, PA allows all
- Individuals with exemptions can be excluded from school during outbreaks

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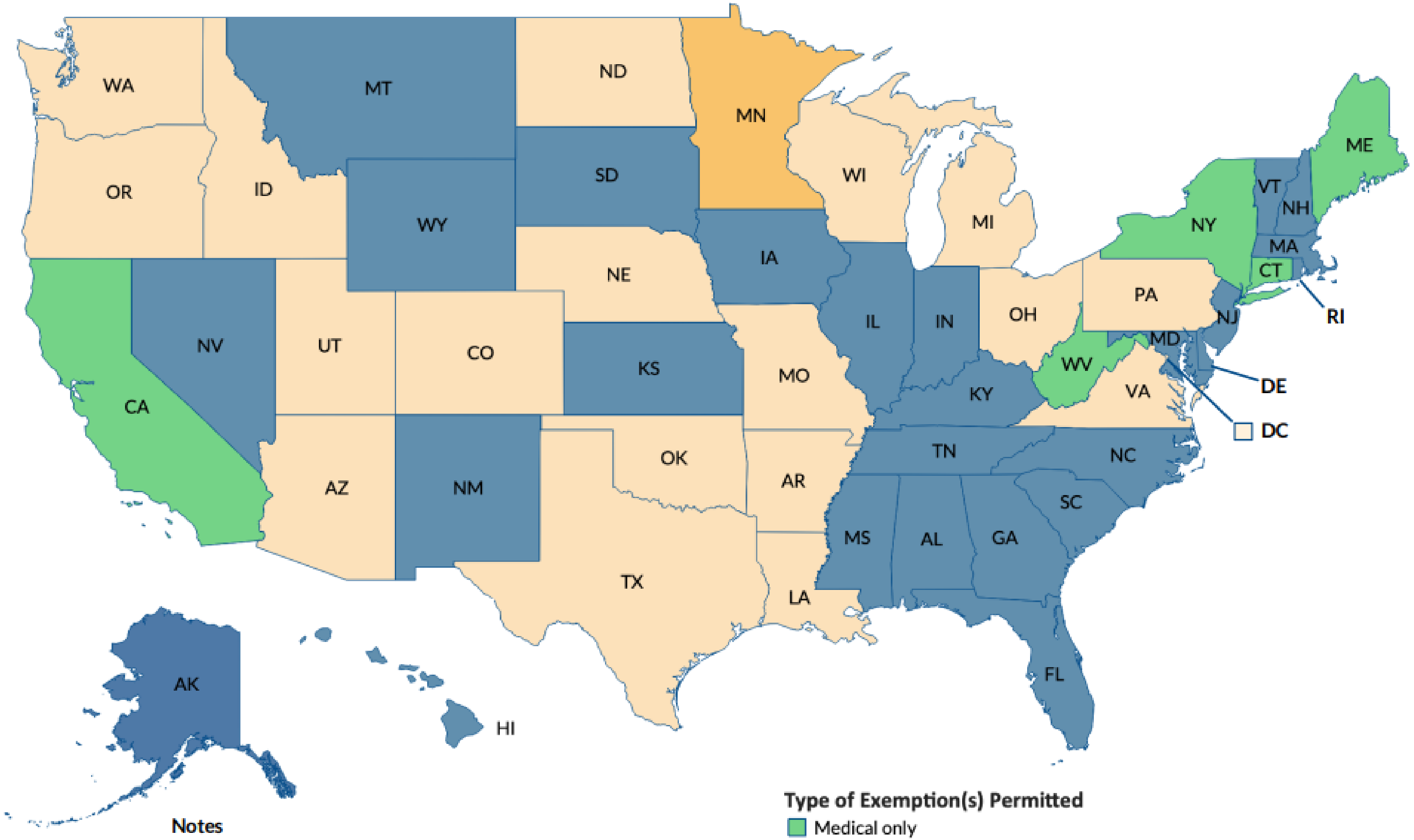
Exemptions Permitted for State Childcare and School (K–12) Immunization Requirements

May 2024



Notes

AZ: Religious exemption for childcare only, personal belief exemption for school (K-12) only

CO: Religious and personal belief exemptions combined under category of "nonmedical exemption"

DC and VA: Personal belief exemption for HPV only

MO and NE: Personal belief exemption for childcare only

WA: Personal belief exemption not allowed for MMR

Type of Exemption(s) Permitted

- Medical only
- Medical, religious
- Medical, personal belief
- Medical, religious, personal belief

Source: state immunization programs

For details, see data table: www.immunize.org/official-guidance/state-policies/vaccine-requirements/exemptions-child-school-2024

Immunize.org

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MEGAN MOLTENI SCIENCE 11.05.18 07:00 AM

HOW ANTIVAX PACS HELPED SHAPE MIDTERM BALLOTS

Weaponized Health Communication: Twitter Bots and Russian Trolls Amplify the Vaccine Debate

David A. Broniatowski, PhD, Amelia M. Jamison, MAA, MPH, SiHua Qi, SM, Lulwah AlKulaib, SM, Tao Chen, PhD, Adrian Benton, MS, Sandra C. Quinn, PhD, and Mark Dredze, PhD

Objectives. To understand how Twitter bots and trolls ("bots") promote online health content.

Methods. We compared bots' to average users' rates of vaccine-relevant messages, which we collected online from July 2014 through September 2017. We estimated the likelihood that users were bots, comparing proportions of polarized and antivaccine tweets across user types. We conducted a content analysis of a Twitter hashtag associated with Russian troll activity.

Results. Compared with average users, Russian trolls ($\chi^2(1) = 102.0$; $P < .001$), sophisticated bots ($\chi^2(1) = 28.6$; $P < .001$), and "content polluters" ($\chi^2(1) = 7.0$; $P < .001$) tweeted about vaccination at higher rates. Whereas content polluters posted more antivaccine content ($\chi^2(1) = 11.18$; $P < .001$), Russian trolls amplified both sides. Unidentifiable accounts were more polarized ($\chi^2(1) = 12.1$; $P < .001$) and antivaccine ($\chi^2(1) = 35.9$; $P < .001$). Analysis of the Russian troll hashtag showed that its messages were more political and divisive.

Conclusions. Whereas bots that spread malware and unsolicited content disseminated antivaccine messages, Russian trolls promoted discord. Accounts masquerading as legitimate users create false equivalency, eroding public consensus on vaccination.

Public Health Implications. Directly confronting vaccine skeptics enables bots to legitimize the vaccine debate. More research is needed to determine how best to combat bot-driven content. (*Am J Public Health.* Published online ahead of print August 23, 2018: e1–e7. doi:10.2105/AJPH.2018.304567)

preventable diseases such as influenza and viral pneumonia[14] underscore the importance of combating online misinformation about vaccines.

Much health misinformation may be promulgated by "bots"[15]—accounts that automate content promotion—and "trolls"[16]—individuals who misrepresent their identities with the intention of promoting discord. One commonly used online disinformation strategy, amplification,[17] seeks to create impressions of false equivalence or consensus through the use of bots and trolls. We seek to understand what role, if any, they play in the promotion of content related to vaccination.

Efforts to document how unauthorized users—including bots and trolls—have influenced online discourse about vaccines have been limited. DARPA's (the US Defense Advanced Research Projects Agency) 2015 Bot Challenge charged researchers with identifying "influence bots" on Twitter in a stream of vaccine-related tweets. The teams

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Anti-vaccine movement 'a top threat to global health in 2019' says WHO

'Vaccine hesistancy' threatens to revervse progress on preventable diseases, UN health body warns

Chris Baynes • Thursday 17 January 2019 11:41 EST • Comments

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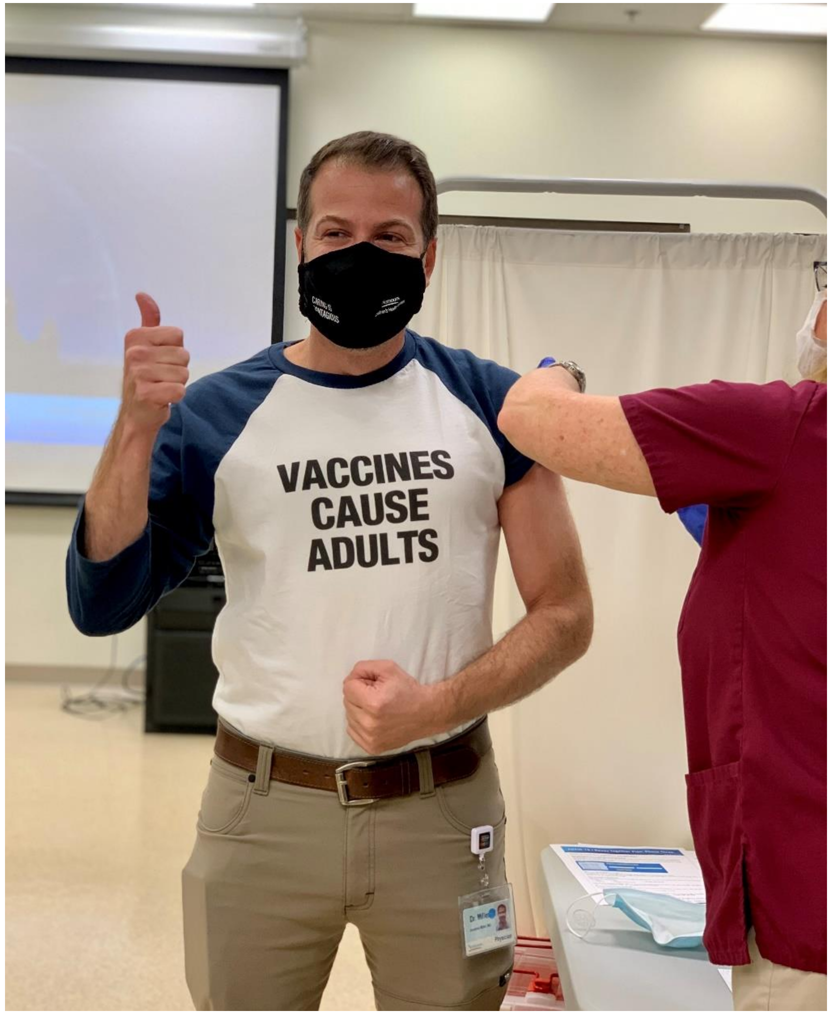
2020: COVID-19



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n; Getty

POLITICS

The Anti-Vax Movement's Radical Shift From Crunchy Granola Purists to Far-Right Crusaders

The transition is supercharged by Trump and the coronavirus.

KIERA BUTLER JUNE 18, 2020

People at a demonstration calling for medical freedom against forced childhood vaccinations at the Capitol, in Sacramento, Calif. | AP Photo

From anti-vax to anti-mask: School districts brace for parent resistance

By MACKENZIE MAYS | 07/02/2020 08:01 AM EDT

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Vaccines
the more you KNOW...
the more you NO!

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

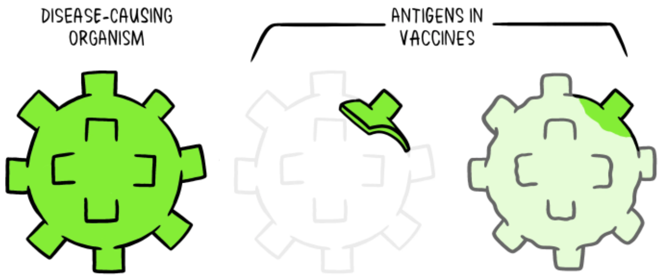
These recommendations must be read with the notes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars. To determine minimum intervals between doses, see the catch-up schedule (Table 2).

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 through 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)					1 or more doses of 2024–2025 vaccine (See Notes)												
Influenza (IIV3, ccIIV3)					1 or 2 doses annually								1 dose annually				
or													or				
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
- Recommended vaccination based on shared clinical decision-making
- No Guidance/ Not Applicable

Vaccine Antigen Counts Over Time

- 1960: Smallpox, Polio, Diphtheria, Tetanus, Pertussis
  - 3217 antigens
- 1980: MMR replaced Smallpox, DTP, Polio (OPV)
  - 3041 antigens
  - The complete vaccine schedule from birth to 18 years totaled 15,096 antigens
- Today: DTaP/Tdap, MMR, Varicella, IPV, Hib, PCV13, Hep A and B, MCV4, HPV9, Rota, Influenza
  - 177 antigens (16 vaccine preventable diseases)
  - The complete vaccine schedule from birth to 18 years totals 653 antigens (less than one dose of DTP, which was used until 1997)
  - Now we can add COVID-19!



The key ingredient in a vaccine is the antigen. It's either a tiny part of the disease-causing organism, or a weakened, non-dangerous version, so your body can learn the specific way to fight it without getting sick.

NEMOURS CHILDREN'S HEALTH

The COVID-19 Pandemic and Parental Attitudes Toward Routine Childhood Vaccines

David M. Higgins, MD, MPH,[a] Angela Moss, MS,[a] Sarah Blackwell, MPH,[b] Sean T. O'Leary, MD, MPH[a]

abstract

BACKGROUND AND OBJECTIVES: The coronavirus disease 2019 (COVID-19) pandemic may have impacted parental attitudes toward childhood vaccines. However, few data sources followed attitudes before and after onset of the pandemic. We used data from a parental survey to describe the effect of the pandemic on parental attitudes toward childhood vaccines.

METHODS: Data were analyzed from the Health eMoms survey which randomly sampled birthing parents in Colorado from 2018 to 2021 on several health topics including vaccine hesitancy. Population weighted multivariable regression was used to measure the association between overall vaccine hesitancy and 5 individual hesitancy questions and different COVID-19 pandemic periods: prepandemic (April 2018–February 2020); pandemic prevaccine (April 2020–December 2020); and pandemic postvaccine (January 2021–August 2021), adjusting for demographic factors.

RESULTS: Overall, 20.4% (726/3553) of respondents were vaccine hesitant. Vaccine hesitancy during pandemic time periods was not different from the prepandemic period (prevaccine adjusted odds ratio [aOR] = 0.82, 95% confidence interval [CI] = 0.65–1.04; postvaccine aOR = 1.07, 95% CI = 0.85–1.34). In analyses of individual hesitancy questions, parents were more likely to be unsure about trusting vaccine information in the pandemic postvaccine time period compared with the prepandemic period (aOR = 2.14; 95% CI = 1.55–2.96), and less likely to be unsure about their hesitancy toward childhood vaccines (aOR = 0.48; 95% CI = 0.27–0.84).

CONCLUSIONS: The COVID-19 pandemic was not associated with changes in parental vaccine hesitancy overall, although there were changes in trust about vaccine information and a polarization of vaccination attitudes.

Parental hesitancy about COVID-19, influenza, HPV, and other childhood vaccines

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ABSTRACT

Background: Some public health professionals have expressed concern that the COVID-19 pandemic has increased vaccine hesitancy about routine childhood vaccines; however, the differential prevalence of vaccine hesitancy about specific vaccines has not been measured.

Methods: Data from the National Immunization Survey-Child COVID-19 Module (NIS-CCM) were analyzed to assess the proportion of children ages 6 months–17 years who have a parent with hesitancy about: COVID-19, influenza, human papillomavirus (HPV) (for children $\geq$ 9 years) vaccines, and "all other childhood shots." Interviews from October 2022 through April 2023 were analyzed.

Results: The percentage of children with a vaccine-hesitant parent varied by vaccine. 55.9% of children had a parent hesitant about COVID-19 vaccine, 30.9% hesitant about influenza vaccine, 30.1% hesitant about HPV vaccine, and 12.2% had a parent hesitant about other vaccines such as measles, polio, and tetanus.

Conclusion: The study findings suggest that differential interventions and communications to parents be used to educate about COVID-19, influenza, HPV, and routine childhood vaccinations because the hesitancy levels differ widely.

Under-Immunized Children: A Vulnerable Population

- Caregivers are making inadvisable medical decisions (at least regarding immunization)
- Child has relative immuno-deficiency compared with peers
  - At risk for serious, life-threatening, *old-school* diseases (measles, pertussis, varicella) and severe preventable diseases such as meningitis and influenza
  - Protected by herd immunity only
- Child at higher risk for certain cancers
  - Cervical, anogenital, throat cancers due to HPV
  - Hepatocellular carcinoma due to Hepatitis B
- Decreased access to adequate medical care due to significant increase in pediatric providers dismissing these families
  - Leads to clustering in "vaccine friendly" practices
  - Families seek alternatives to modern medicine
  - Further erodes trust in the healthcare system

An Informed Approach to Vaccine Hesitancy and Uptake in Children

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ABSTRACT

The tremendous success of vaccination programs worldwide over the past two centuries has produced a paradoxical effect whereby a lack of exposure to the devastating consequences of vaccine-preventable diseases has created an environment in which fear of the side effects of vaccines can overshadow concerns about the impact of the diseases they are meant to prevent. As vaccine hesitancy grew over the past twenty years, states passed legislation, such as non-medical exemptions from vaccination, that have cultivated pockets of poor vaccine uptake allowing for the return of vaccine-preventable diseases such as measles and pertussis. The COVID-19 pandemic has further intensified mistrust of vaccines, impacting both the reasons for vaccine hesitancy and the attributes of vaccine hesitant parents. Because unimmunized children are at increased risk for vaccine-preventable diseases and associated cancers, as well as reduced access to adequate healthcare, they are a particularly vulnerable population warranting special protections and support. A comprehensive approach to combat vaccine hesitancy and promote uptake should include a focus on evidence-based initiatives at the legislative, practice, and provider levels. These strategies can substantively inform health policy, from upstream legislation strengthening school mandates and eliminating non-medical exemptions to downstream policies that impact provider conversations about immunization.

NEMOURS CHILDREN'S HEALTH

What to do?

- Upstream
  - Population level
  - Public Health interventions
  - Government programs and legislation
- Midstream
  - Health system or practice-level
  - Policies and Protocols
  - Access Strategies
  - EMR changes
  - Quality Improvement
- Downstream
  - Provider-Level
  - Communication Strategies
  - Document refusal
    - Refusal to Vaccinate Form
  - Dismissal from practice
- Legal intervention?
  - Imposing care against the wishes of parents has not been successful with regard to vaccines
  - There is a legal right in US to refuse vaccinations; this is based on common and statutory law

Graphic adapted from de Beaumont Foundation and Trust for America's Health. (January 2019) "Social Determinants and Social Needs: Moving Beyond Midstream"

NEMOURS CHILDREN'S HEALTH

The Architecture of Provider-Parent Vaccine Discussions at Health Supervision Visits

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KEY WORDS

immunization, health communication, preventive health services

ABBREVIATIONS

CA—conversation analysis
NVHP—non–vaccine-hesitant parent
PACV—Parent Attitudes about Childhood Vaccine
VHP—vaccine-hesitant parent

Dr Opel conceptualized and designed the study, coordinated and supervised data collection, performed data analysis, drafted the initial manuscript, and revised the manuscript; Dr Heritage contributed to the study design, developed the coding scheme, and reviewed and revised the manuscript; Dr Taylor contributed to the study design, assisted in the coordination and supervision of data collection, supervised data analysis, and reviewed and revised the manuscript; Dr Mangione-Smith contributed to the study design, supervised data collection, and reviewed and revised the manuscript; Ms Salas conducted qualitative data analysis and reviewed and revised the manuscript; Ms Nguyen conducted and coordinated data collection, assisted in drafting portions of the initial manuscript, and reviewed and revised the manuscript; Dr Zhou contributed to the study design, assisted in data analysis, and reviewed and revised the manuscript; Dr Robinson contributed to the study design, developed the coding scheme, performed data analyses, and reviewed and revised the manuscript; and all authors approved the final manuscript as submitted.

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(Continued on last page)

WHAT'S KNOWN ON THIS SUBJECT: An increasing number of parents have concerns about childhood vaccines. Parents consistently cite their child's provider as influential in their vaccine decision-making. Little is known about how providers communicate with parents about vaccines and which communication strategies are important.

WHAT THIS STUDY ADDS: How providers initiate the vaccine recommendation at health supervision visits appears to be an important determinant of parent resistance. Also, when providers pursue their original vaccine recommendations in the face of parental resistance, many parents subsequently agree to vaccination.

abstract

NIH FREE

OBJECTIVE: To characterize provider-parent vaccine communication and determine the influence of specific provider communication practices on parent resistance to vaccine recommendations.

METHODS: We conducted a cross-sectional observational study in which we videotaped provider-parent vaccine discussions during health supervision visits. Parents of children aged 1 to 19 months old were screened by using the Parent Attitudes about Childhood Vaccines survey. We oversampled vaccine-hesitant parents (VHPs), defined as a score ≥50. We developed a coding scheme of 15 communication practices and applied it to all visits. We used multivariate logistic regression to explore the association between provider communication practices and parent resistance to vaccines, controlling for parental hesitancy status and demographic and visit characteristics.

RESULTS: We analyzed 111 vaccine discussions involving 16 providers from 9 practices; 50% included VHPs. Most providers (74%) initiated vaccine recommendations with presumptive (eg, "Well, we have to do some shots") rather than participatory (eg, "What do you want to do about shots?") formats. Among parents who voiced resistance to provider initiation (41%), significantly more were VHPs than non-VHPs. Parents had significantly higher odds of resisting vaccine recommendations if the provider used a participatory rather than a presumptive initiation format (adjusted odds ratio: 17.5; 95% confidence interval: 1.2–253.5). When parents resisted, 50% of providers pursued their original recommendations (eg, "He really needs these shots"), and 47% of initially resistant parents subsequently accepted recommendations when they did.

CONCLUSIONS: How providers initiate and pursue vaccine recommendations is associated with parental vaccine acceptance. *Pediatrics* 2013;132:1037–1046

NEMOURS CHILDREN'S HEALTH

Communicating With Vaccine-Hesitant Parents: A Narrative Review

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Abstract

Although vaccines are considered one of the most effective medical interventions to prevent vaccine preventable disease and associated morbidity and mortality, a number of recent outbreaks are threatening the gains made by vaccines. Vaccine hesitancy is a key driver of vaccine refusal and has been associated with vaccine preventable outbreaks. While parents seek information from many sources to inform their vaccine decision-making process, they continue to view their child's pediatric provider as a trusted source of vaccine information. The communication that occurs between a provider and parent with regards to vaccination is critical in reducing concerns and nudging parents toward vaccine acceptance. However, vaccine-hesitant parents raise issues in this encounter that many providers feel ill-equipped to answer, due to lack of training on evidence-based communication strategies. We focus on promising approaches related to patient-provider communication within the context of vaccination. We found empirical evidence that the use of a presumptive format to recommend vaccines, motivational interviewing, and tailoring information to increase message salience are approaches that can positively affect vaccine acceptance. As providers continue to serve as important influencers in the vaccine decision-making process, it is evident that there is a need to continue to identify evidence-based, and practically implementable approaches to mitigate parental vaccine hesitancy. Providers play a key role in improving coverage rates, and therefore it is paramount to seek ways to improve how providers communicate about vaccines.

Keywords: communication; patient-provider interaction; vaccine hesitancy

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NEMOURS CHILDREN'S HEALTH

Evidence-Based Communication Strategies

- Presumptive Approach
  - “Zuri is due for her vaccines today” versus “What do you think about doing vaccines today?”
- Motivational Interviewing
  - Not paternalistic
  - Technique to guide conversations in non-confrontational manner to lead patients and caregivers to their own decisions to follow vaccine recommendations
- Persistence
  - Persistence after initial resistance
  - Persistence over time

Table. Motivational interviewing components with definitions and sample comments or questions that illustrate each component

Components	Definition	Sample Question/Comment
Partnership	We avoid being the “expert,” assuming the role of a partner and validating concerns. We work “for” and “with” patients and parents; we don’t lecture “to” or “at” them. After hearing parental concerns, we ask permission to share information with them.	“It makes sense that you’re worried about vaccine safety. All parents want to keep their children safe. Could I share a few things I’ve learned about vaccine safety with you?”
Acceptance	We affirm the absolute value of our patients or parents, accepting them as fellow humans. We highlight their autonomy to make decisions, although we are free to disagree with them.	“I strongly recommend this vaccine, but the choice is yours. Thank you for continuing to have this hard conversation with me. I’m happy to continue talking with you at our next visit.”
Compassion	We seek the good and well-being of others. We recommend vaccines because we believe they help others, not out of self-interest.	“I want you to consider the measles vaccine because I care about your child’s health. I also think it’s really important in order to protect babies who are too young to get the measles vaccine.”
Evocation	Positive ideas about and reasons for vaccination come from the patient or parent, not us. We reflect on patient or parental ideas and demonstrate how they align with the benefits of vaccination.	“You’ve shared a lot of worries with me. Would you tell me more about what’s important to you? [...] I hear protecting your child is important to you. May I share how vaccines would work to protect your child?”

ARTICLE

Dismissing the Family Who Refuses Vaccines

A Study of Pediatrician Attitudes

Erin A. Flanagan-Klygis, MD; Lisa Sharp, PhD; Joel E. Frader, MD

Background: Parent refusal or deliberate delay of their child's vaccinations poses a challenge for pediatricians. Some pediatricians may choose to dismiss these families from their practice.

Objectives: To describe pediatricians' responses to scenarios of vaccine refusal, identify reasons pediatricians cite for both parent refusal and family dismissal, and illustrate pediatrician attitudes about well-established vs newer recommended vaccines.

Design/Methods: We conducted a nationwide survey mailed to 1004 randomly selected American Academy of Pediatrics (Elk Grove Village, Ill) members.

Results: Fifty-four percent faced total vaccine refusal during a 12-month period. Pediatricians cited safety concerns as a top reason for parent refusal. Thirty-nine percent said they would dismiss a family for refusing all vaccinations. Twenty-eight percent said they would dismiss a family for refusing select vaccines. Pediatrician dismissers were not significantly different from nondismissers with respect to age, sex, and number of years in practice. Pediatrician dismissers were more likely than nondismissers to view traditional vaccines (diphtheria and tetanus toxoids and acellular pertussis; inactivated poliovirus; *Haemophilus influenzae* type b; measles, mumps, and rubella) as "extremely important," but they were no more likely to view newer vaccines (7-valent pneumococcal conjugate, varicella-zoster virus, hepatitis B) as "extremely important."

Conclusions: Pediatricians commonly face vaccine refusal that they perceive to be due to parent safety concerns. In response, many pediatricians say they would discontinue care for families refusing some or all vaccines. This willingness to dismiss refusing families is inconsistent with an apparent ambivalence about newer, yet recommended, vaccines. The practice of family dismissal needs further study to examine its actual impact on vaccination rates, access to care, and doctor-patient relations.

Arch Pediatr Adolesc Med. 2005;159:929-934

NEMOURS
CHILDREN'S HEALTH

Vaccine Delays, Refusals, and Patient Dismissals: A Survey of Pediatricians

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abstract

BACKGROUND: Parental noncompliance with the American Academy of Pediatrics and Centers for Disease Control and Prevention immunization schedule is an increasing public health concern. We examined the frequency of requests for vaccine delays and refusals and the impact on US pediatricians' behavior.

METHODS: Using national American Academy of Pediatrics Periodic Surveys from 2006 and 2013, we describe pediatrician perceptions of prevalence of (1) vaccine refusals and delays, (2) parental reasons for refusals and/or delays, and (3) physician dismissals. Questions about vaccine delays were asked only in 2013. We examined the frequency, reasons for, and management of both vaccine refusals and delays by using bivariate and multivariable analyses, which were controlled for practice characteristics, demographics, and survey year.

RESULTS: The proportion of pediatricians reporting parental vaccine refusals increased from 74.5% in 2006 to 87.0% in 2013 ($P < .001$). Pediatricians perceive that parents are increasingly refusing vaccinations because parents believe they are unnecessary (63.4% in 2006 vs 73.1% in 2013; $P = .002$). A total of 75.0% of pediatricians reported that parents delay vaccines because of concern about discomfort, and 72.5% indicated that they delay because of concern for immune system burden. In 2006, 6.1% of pediatricians reported "always" dismissing patients for continued vaccine refusal, and by 2013 that percentage increased to 11.7% ($P = .004$).

CONCLUSIONS: Pediatricians reported increased vaccine refusal between 2006 and 2013. They perceive that vaccine-refusing parents increasingly believe that immunizations are unnecessary. Pediatricians continue to provide vaccine education but are also dismissing patients at higher rates.

NEMOURS CHILDREN'S HEALTH

FREE

JAMA. 2020 Sep 15;324(11):1105–1107. doi: 10.1001/jama.2020.10658

Policies Among US Pediatricians for Dismissing Patients for Delaying or Refusing Vaccination

Sean T O'Leary [1,✉], Jessica R Cataldi [1], Megan C Lindley [2], Brenda L Beaty [1], Laura P Hurley [3], Lori A Crane [4], Allison Kempe [1]

Among physicians who reported they ever (rarely, sometimes, or often/always) dismiss families for refusing vaccines in the primary series (n = 154), 18% reported that those parents often/always change their mind and agree to vaccination when presented with the policy (48% sometimes, 29% rarely, and 5% never).

Offices in community/hospital-based clinic/health maintenance organization settings were less likely than private practices to have a dismissal policy (risk ratio, 0.28 [95% CI, 0.14-0.49]) as were practices in the Midwest (risk ratio, 0.66 [95% CI, 0.47-0.91]; referent to the South) (**Table 2**).

Practices and Office Policies for Addressing Vaccine Refusal (N = 303)

	No. (%)[a]						
	Physician				Office policy		
Variable	Often/always	Sometimes	Rarely	Never	Yes	No	Don't know
Require parents to sign a form if they refuse vaccination	168 (57)	47 (16)	23 (8)	56 (19)	184 (66)	87 (31)	9 (3)
Dismiss families from your practice if they refuse vaccines in the primary series for their child	109 (37)	28 (9)	17 (6)	141 (48)	141 (51)	135 (49)	2 (1)
Not accept new patients who do not agree to give their child all vaccines according to the recommended vaccination schedule	100 (34)	23 (8)	22 (7)	150 (51)	129 (46)	148 (52)	5 (2)
Not accept new patients who do not agree to give their child some vaccines according to the recommended vaccination schedule	84 (29)	42 (14)	26 (9)	141 (48)	124 (44)	150 (54)	6 (2)
Agree to "spread out" vaccines in the primary series	58 (20)	123 (42)	80 (27)	33 (11)	102 (37)	168 (60)	8 (3)
Not accept new patients who insist on spreading out vaccines	32 (11)	31 (11)	40 (14)	192 (65)	84 (30)	191 (68)	6 (2)
Dismiss new patients who insist on spreading out vaccines	22 (8)	20 (7)	41 (14)	207 (71)	77 (28)	191 (69)	7 (3)
Dismiss families from your practice if they choose to "spread out" vaccines in the primary series for their child	18 (6)	21 (7)	46 (16)	209 (71)	78 (28)	196 (70)	5 (2)
Refer patients to other practitioners within your practice who will allow them to deviate from the recommended vaccination schedule	2 (1)	4 (1)	18 (6)	267 (92)	64 (23)	204 (73)	10 (4)
Refer patients to specific practitioners outside your practice who will allow them to deviate from the recommended vaccination schedule	9 (3)	21 (7)	22 (7)	242 (82)	55 (20)	212 (77)	9 (3)
Parents sign a contract that their children must be up to date by a certain age, but the parents may spread out the vaccines	14 (5)	20 (7)	17 (6)	243 (83)	52 (19)	213 (76)	14 (5)

[a] Some percentages may not add up to 100% because of rounding. Missing data for physician practices ranged from 2% to 4% and for office policies from 6% to 9%.

Approach to Hesitant Families

- Establish rapport, trust, therapeutic alliance
- Listen carefully and respectfully to the parents' concerns
  - Elicit the reasons for their concerns about vaccines
- Educate the family about what is and is not known about the risks and benefits of immunization
  - Correct misperceptions and misinformation
  - Compare the risks of the vaccine with the risk of being unimmunized
  - Provide resources
  - Share real life stories
- Work with the family
  - If they have concern about a specific vaccine or giving many vaccines at once, despite your best efforts, consider giving less shots at once
- Don't give up: *Play the Long Game*
  - Continue to discuss immunization at future visits; with time and trust, many families change their minds

NEMOURS CHILDREN'S HEALTH

Culturally-Sensitive Approach for COVID-19 Vaccine

- Not “one size fits all”
- Learnings from our community
  - Target parents AND youth
  - Tailor messaging to community concerns and motivators
  - Lean on trusted local resources
  - Leverage pediatric clinics
- Consider the impact of the vaccine on the patient, their close contacts and relatives, and on society
- Share supportive stories that other patients in this community have said about COVID and the vaccine
- Emphasize the benefits
- Inform about known risks / side effects, and validate their legit concerns
- Encourage them to get the vaccine NOW. Timing matters.
- Provide a STRONG RECOMMENDATION. Your advice is meaningful.

Community Partnership to Co-Develop an Intervention to Promote Equitable Uptake of the COVID-19 Vaccine Among Pediatric Populations

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ABSTRACT

Objective: To describe the process of engaging community, caregiver, and youth partners in codeveloping an intervention to promote equitable uptake of the COVID-19 vaccine in non-Hispanic Black (Black) and Hispanic youth who experience higher rates of COVID-19 transmission, morbidity, and mortality but were less likely to receive the COVID-19 vaccine. **Methods**: A team of 11 Black and Hispanic community partners was assembled to codevelop intervention strategies with our interdisciplinary research team. We used a mixed-methods crowdsourcing approach with Black and Hispanic youth (n=15) and caregivers of Black and Hispanic youth (n=20) who had not yet been vaccinated against COVID-19, recruited from primary care clinics, to elicit perspectives on the acceptability of these intervention strategies. **Results**: We codeveloped five strategies: (1) community-tailored handouts and posters, (2) videos featuring local youth, (3) family-centered language to offer vaccines in the primary care clinic, (4) communication-skills training for primary care providers, and (5) use of community health workers to counsel families about the vaccine. The majority (56-96.9%) of youth and caregivers rated each of these strategies as acceptable, especially because they addressed common concerns and facilitated shared decision-making. **Conclusions**: Engaging community and family partners led to the co-development of culturally- and locally-tailored strategies to promote dialogue and shared decision-making about the COVID-19 vaccine. This process can be used to codevelop interventions to address other forms of public health disparities. **Policy Implications:** Intervention strategies that promote dialogues with trusted healthcare providers and support shared decision-making are acceptable strategies to promote COVID-19 vaccine uptake among youth from historically underserved communities. Stakeholder-engaged methods may also help in the development of interventions to address other forms of health disparities.

NEMOURS CHILDREN'S HEALTH

Health System or Practice-Level

- Protocol or Policy for Under-Immunized Patients
  - When sick, these patients should be masked and brought directly to exam room (or triaged in parking lot)
  - Require regular well visits, no walk-in visits
  - Refusal to Vaccinate Form?
  - Maintain registry of under-immunized patients to notify in the event of a regional outbreak (i.e. MMR)
- Access Strategies
  - Vaccinate at all opportunities
  - Reminder and Recall
- EMR Improvements
  - Immunization Information Systems
    - Registries to identify Gaps in Care
  - Standing orders
- Quality Improvement initiatives to improve vaccination coverage
  - Focus on disparities and inequities

NEMOURS CHILDREN'S HEALTH

Elimination of Nonmedical Immunization Exemptions in California and School-Entry Vaccine Status

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abstract

BACKGROUND AND OBJECTIVES: California implemented Senate Bill 277 (SB277) in 2016, becoming the first state in nearly 30 years to eliminate nonmedical exemptions from immunization requirements for schoolchildren. Our objectives were to determine (1) the impacts of SB277 on the percentage of kindergarteners entering school not up-to-date on vaccinations and (2) if geographic patterns of vaccine refusal persisted after the implementation of the new law.

METHODS: At the state level, we analyzed the magnitude and composition of the population of kindergarteners not up-to-date on vaccinations before and after the implementation of SB277. We assessed correlations between previous geographic patterns of nonmedical exemptions and patterns of the remaining entry mechanisms for kindergarteners not up-to-date after the law's implementation.

RESULTS: In the first year after SB277 was implemented, the percentage of kindergartners entering school not up-to-date on vaccinations decreased from 7.15% to 4.42%. The conditional entrance rate fell from 4.43% to 1.91%, accounting for much of this decrease. Other entry mechanisms for students not up-to-date, including medical exemptions and exemptions for independent study or homeschooled students, largely replaced the decrease in the personal belief exemption rate from 2.37% to 0.56%. In the second year, the percentage of kindergartners not up-to-date increased by 0.45%, despite additional reductions in conditional entrants and personal belief exemptions. The correlational analysis revealed that previous geographic patterns of vaccine refusal persisted after the law's implementation.

CONCLUSIONS: Although the percentage of incoming kindergarteners up-to-date on vaccinations in California increased after the implementation of SB277, we found evidence for a replacement effect.

Original Investigation | Public Health

School Vaccine Coverage and Medical Exemption Uptake After the New York State Repeal of Nonmedical Vaccination Exemptions

John W. Correira, BS; Rhiannon Kamstra, MSc; Nanqing Zhu, MSc; Margaret K. Doll, PhD, MPH

Abstract

IMPORTANCE Although New York State (NYS) recently adopted legislation eliminating nonmedical vaccination exemption options from school-entry requirements, the implications of the law for school vaccine coverage and medical vaccine exemption uptake have not been examined.

OBJECTIVE To evaluate the implications of the repeal of school-entry nonmedical vaccination exemptions for vaccine coverage and medical exemption uptake at NYS schools outside of New York City (NYC).

DESIGN, SETTING, AND PARTICIPANTS This cohort study had an interrupted time-series design and used generalized estimating equation models to examine longitudinal school immunization compliance data from the 2012 to 2013 through 2021 to 2022 school years. The cohort comprised NYS public and nonpublic schools, excluding NYC schools, with any students enrolled in kindergarten to 12th grade. Eligible schools had enrollment and immunization data before and after the implementation of the Senate Bill 2994A legislation. Data analyses were conducted in July 2023.

EXPOSURE Senate Bill 2994A was passed in June 2019, eliminating school-entry nonmedical vaccination exemptions. Since compliance with the law was evaluated for most students during the next school year, the 2019 to 2020 school year was considered to be the law's effective date.

MAIN OUTCOMES AND MEASURES The primary outcomes were school vaccine coverage (defined as the percentage of students at each school who completed grade-appropriate requirements for all required vaccines) and medical exemption uptake (defined as the percentage of students at each school who received a medical exemption).

RESULTS Among the 3821 eligible schools, 3632 (95.1%) were included in the analysis, representing 2794 (96.9% of eligible) public schools and 838 (89.2% of eligible) nonpublic schools. The implementation of Senate Bill 2994A was associated with absolute increases in mean vaccine coverage of 5.5% (95% CI, 4.5%-6.6%) among nonpublic schools and 0.9% (95% CI, 0.7%-1.1%) among public schools, with additional annual increases in vaccine coverage observed through the 2021 to 2022 school year. The law's implementation was also associated with a 0.1% (95% CI, 0.0%-0.1%) mean absolute decrease in medical vaccination exemption uptake at both public and nonpublic schools, and small but significant mean annual decreases in medical vaccination exemptions (0.02%; 95% CI, 0.01%-0.03%) through the end of the study period.

CONCLUSIONS AND RELEVANCE Results of this cohort study suggested that repeal of school-entry nonmedical vaccination exemptions was associated with increased vaccine coverage at NYS schools outside of NYC. Coverage gains were not replaced by increases in medical vaccination exemptions.

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Key Points

Question Was the New York State (NYS) law repealing nonmedical vaccination exemption options from school-entry requirements (Senate Bill 2994A) associated with an increase in vaccine coverage in NYS schools outside of New York City?

Findings In this cohort study of 3632 schools, Senate Bill 2994A was associated with an increase in mean vaccine coverage at NYS schools. Small but significant decreases in medical exemptions were also observed.

Meaning Findings of this study suggest that state legislation eliminating nonmedical vaccination exemptions from school-entry requirements can be effective in increasing school vaccine coverage without replacement by medical vaccination exemptions.

+ Supplemental content

Author affiliations and article information are listed at the end of this article.

Policy Approaches for Increasing Adolescent HPV Vaccination Coverage: A Systematic Review

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Jennifer Heisler-MacKinnon, MPH,[a,b] Rebecca Carlson, MLS, AHIP,[d,e] Greeshma James, MPH,[f]
Brigid K. Grabert, PhD, JD, MPH[g]

abstract

CONTEXT: US jurisdictions have enacted a wide range of policies to address low human papillomavirus (HPV) vaccination coverage among adolescents, but it is unclear which policies are effective.

OBJECTIVE: To systematically review the impact of governmental policies on adolescent HPV vaccination coverage.

DATA SOURCES: PubMed, Embase, and Scopus databases.

STUDY SELECTION: Eligible studies, published from 2009 to 2022, evaluated the impact of governmental policies on HPV vaccination coverage among adolescents ages 9 to 18.

DATA EXTRACTION: Two investigators independently extracted data on study sample, study design and quality, policy characteristics, and HPV vaccination outcomes. We summarized findings by policy type: school-entry requirements (SERs), federally-funded policies related to the Vaccines for Children program and Medicaid, educational requirements, and others.

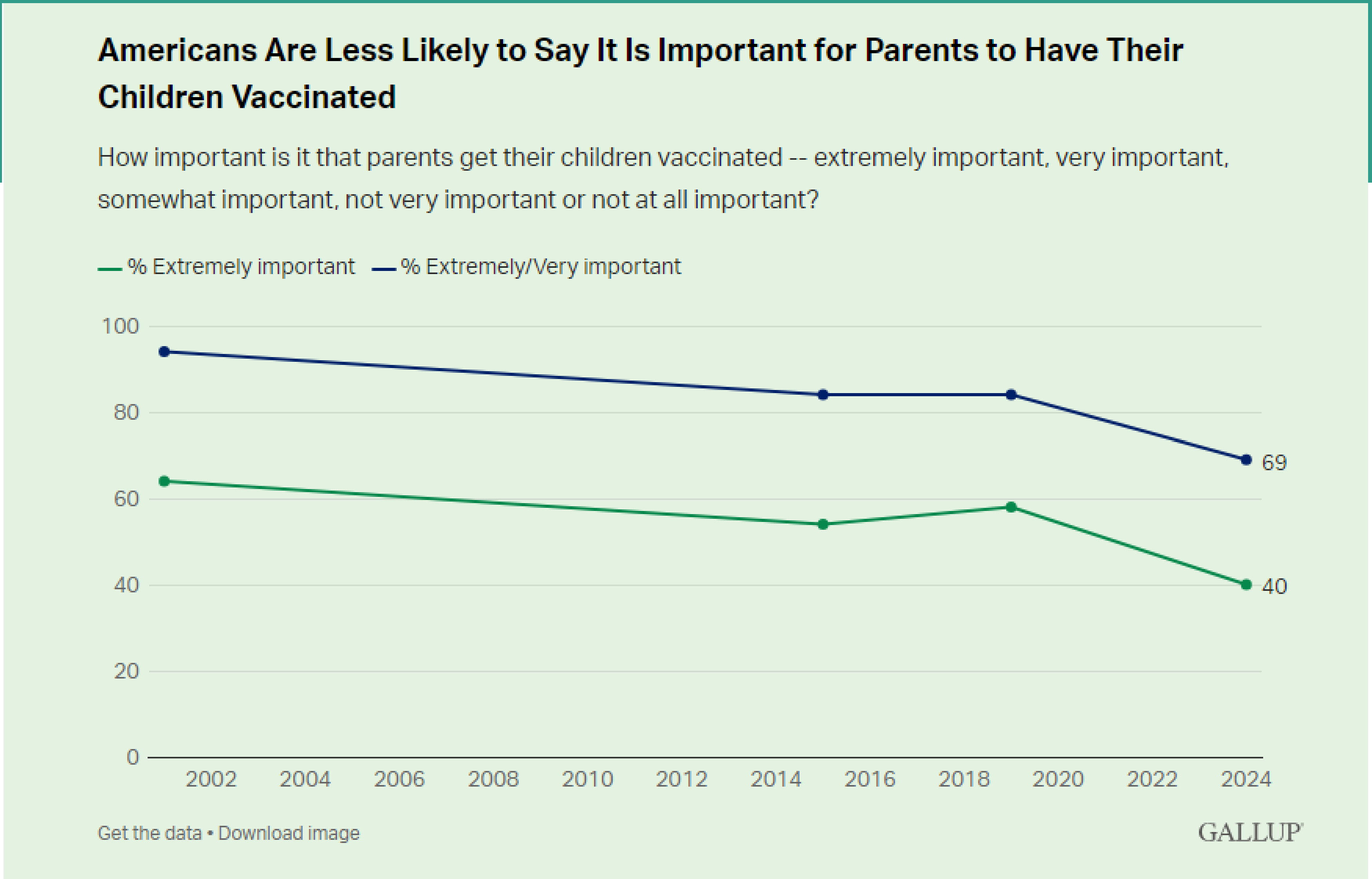
RESULTS: Our search yielded 36 eligible studies. A majority of studies evaluating HPV vaccine SERs found positive associations between SERs and HPV vaccination coverage (8 of 14), particularly for SERs in Rhode Island and Washington, DC. All studies evaluating SERs for other adolescent vaccines observed positive spillover effects for HPV vaccination (7 of 7). Federally-funded policies related to Vaccines for Children and Medicaid were consistently associated with higher HPV vaccination coverage (7 of 9). Relatively few studies found associations between educational requirements and HPV vaccination coverage (2 of 8).

LIMITATIONS: Studies used limited vaccination data sources and non- or quasi-experimental designs. Some studies had no or poorly matched comparison groups.

CONCLUSIONS: Our findings suggest promise for SERs and federally-funded policies, but not educational requirements, for increasing HPV vaccination coverage among adolescents.

Gallup Poll: July 2024

From 2001 to 2024, there was an increase in Americans saying childhood vaccination was not at all important from 1% to 7%

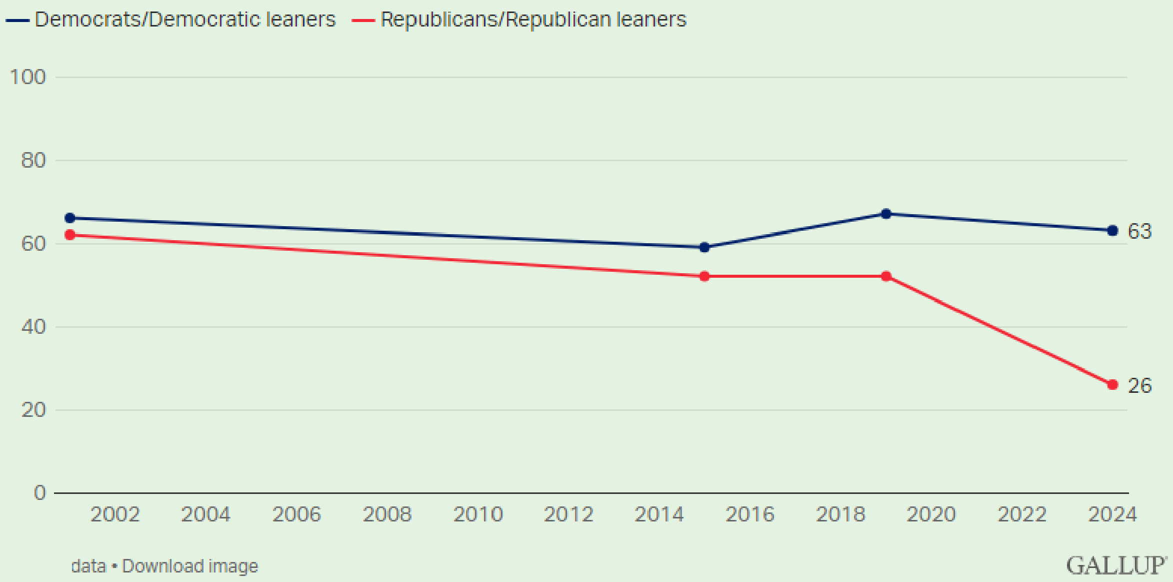


https://news.gallup.com/poll/648308/far-fewer-regard-childhood-vaccinations-important.aspx

Republicans and Republican-Leaning Independents Account for the Decline in Perceived Importance of Childhood Vaccinations

How important is it that parents get their children vaccinated -- extremely important, very important, somewhat important, not very important or not at all important?

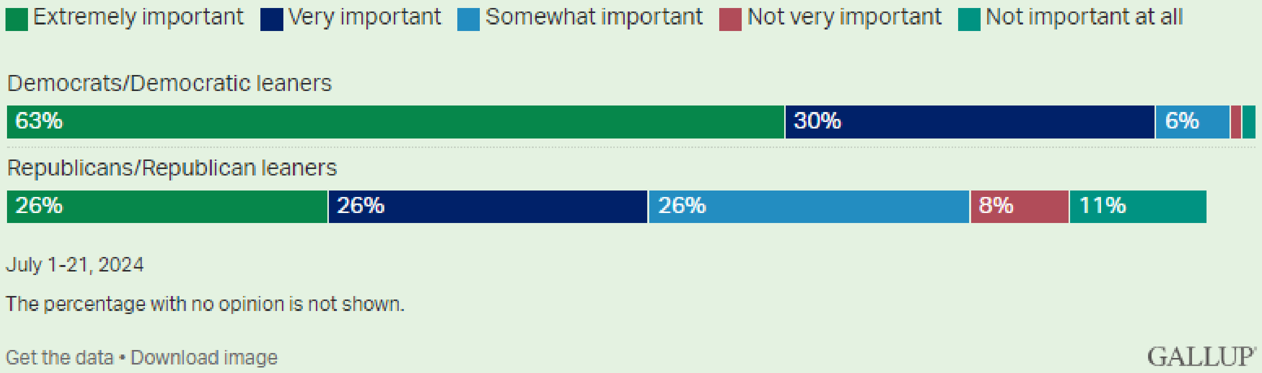
% Extremely important



93% of Democrats say it is extremely or very important to get their children vaccinated compared to 52% of Republicans

Importance of Parents Having Their Children Vaccinated, by Political Party Identification and Leaning

How important is it that parents get their children vaccinated -- extremely important, very important, somewhat important, not very important or not at all important?



July 1-21, 2024

The percentage with no opinion is not shown.

Get the data • Download image

GALLUP

The gap between parties increased from 4% in 2001 to 37% in 2024

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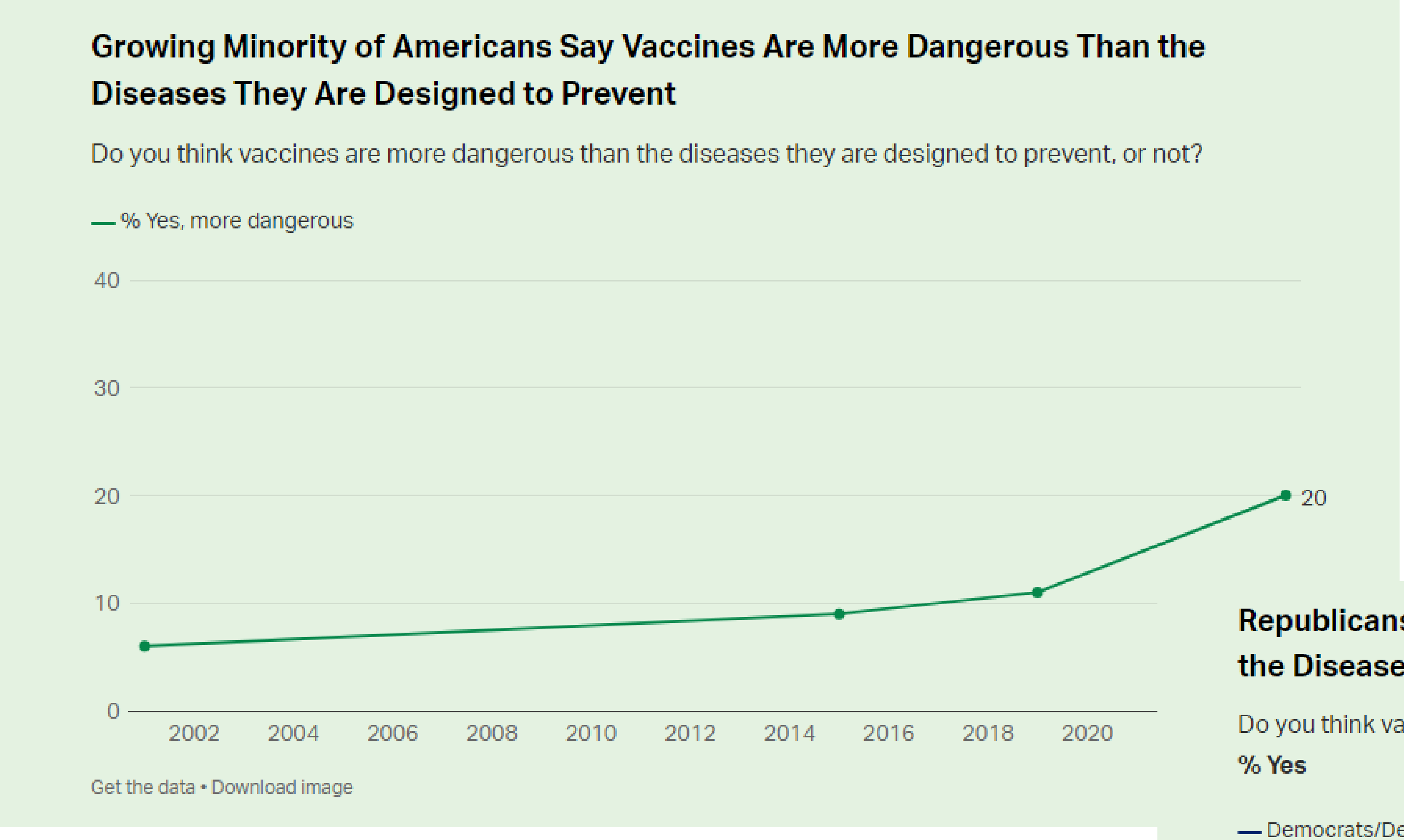
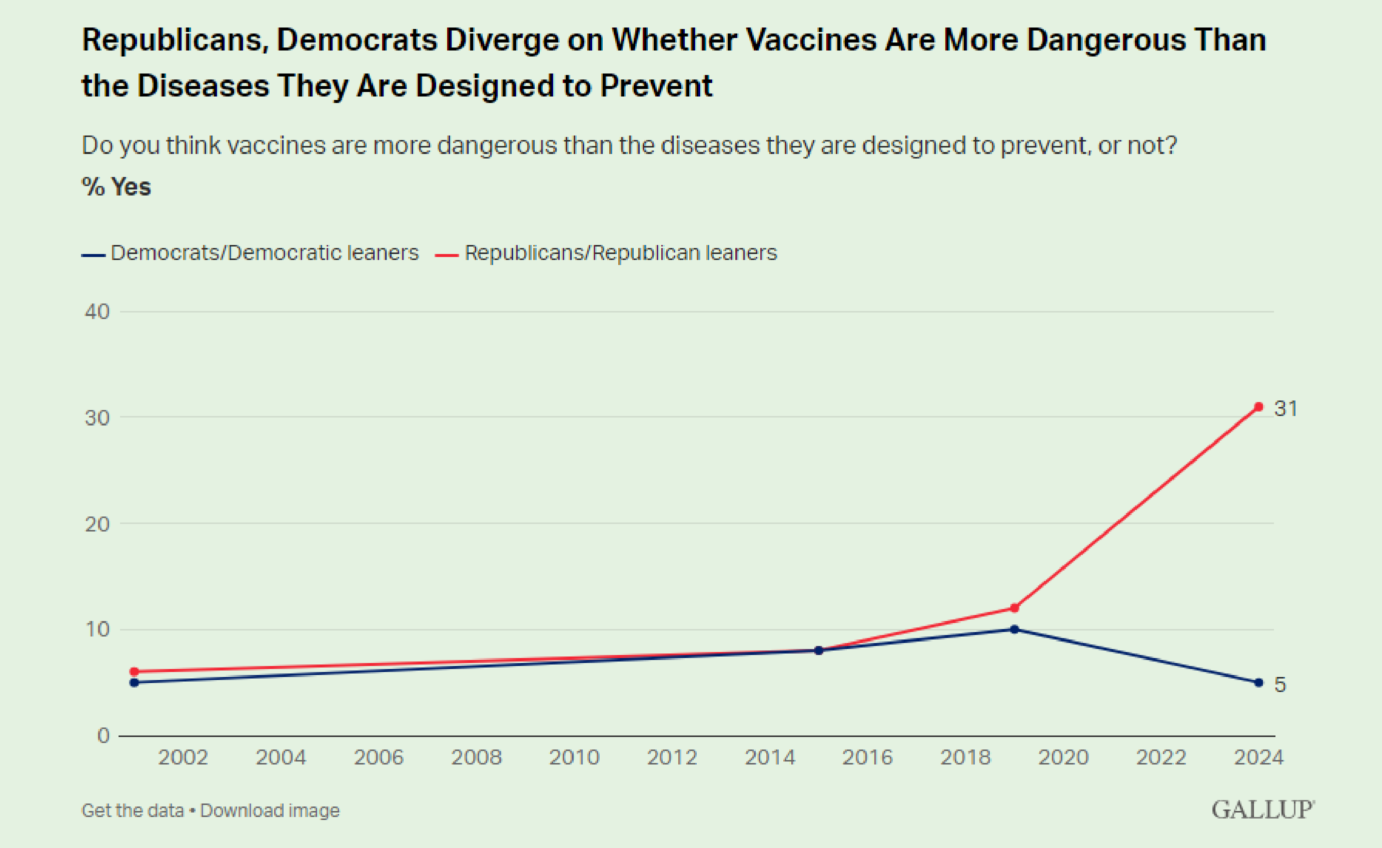
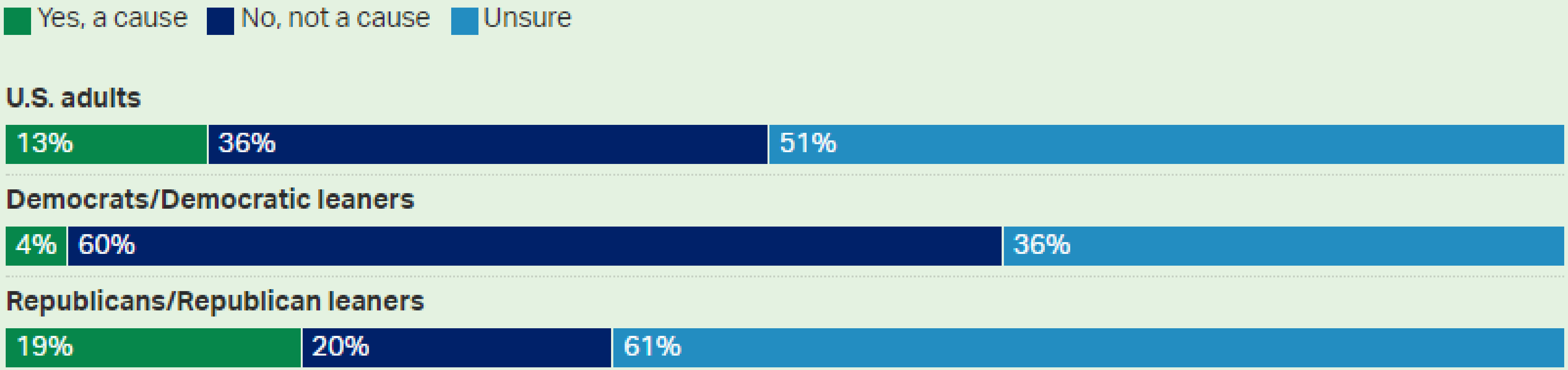


Currently, 31% of Republicans think vaccines are more dangerous than the diseases they are designed to prevent compared with 5% of Democrats



Americans' Opinions on Whether Certain Vaccines Cause Autism in Children

From what you have read or heard, do you personally think certain vaccines do -- or do not -- cause autism in children, or are you unsure?



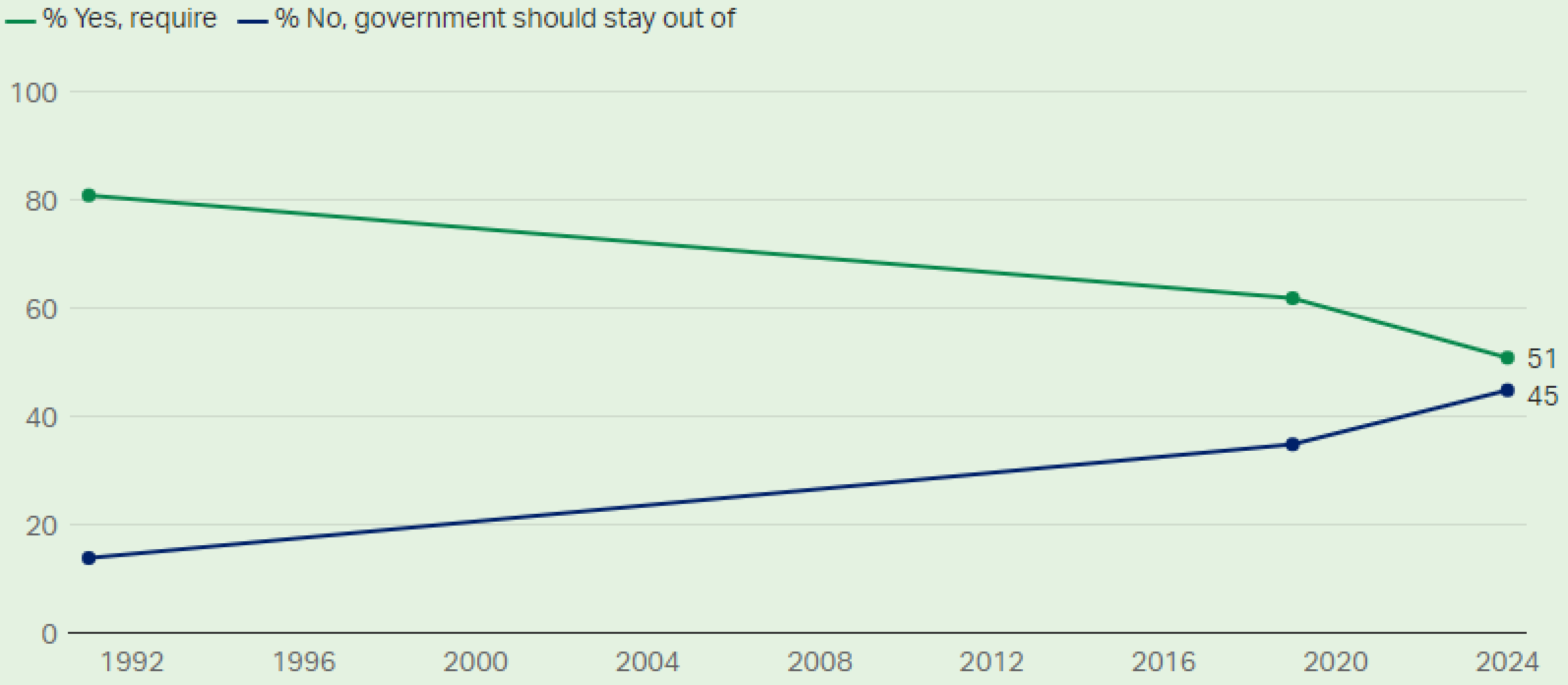
July 1-21, 2024

The percentage with no opinion is not shown.

Get the data • Download image

Slim Majority of Americans Favor Government Requirements for Vaccination Against Contagious Diseases

Do you think the government should require all parents to have their children vaccinated against contagious diseases such as measles, or do you think that's something the government should stay out of?



1991 results from survey conducted by Princeton Survey Research Associates for Troika Productions and Lifetime Television

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GALLUP

Democrats:
72% favored government requirements in 2019
69% now

Republicans:
53% in 2019
36% now

Majority (60%) of Republicans now oppose government vaccine requirements

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Upstream Approach

- State Level (advocacy!)
  - Eliminate non-medical exemptions
  - Add vaccines to school requirements (i.e. HPV)
- Federal
  - VFC funding
  - Medicaid expansion

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Summary

- Vaccine Hesitancy is a pendulum, has gotten worse over past quarter century
- Evidence-based techniques to improve uptake include Upstream, Midstream, and Downstream approaches
- We have an opportunity in Delaware to add HPV vaccine to school entry requirements, eliminate non-medical exemptions

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Thank You!

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