

# Update on Adult Immunizations

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# Disclosures

Dr. Martin has no relevant financial relationships to disclose.

The following activity planners have no relevant financial relationships to disclose

- Sheila Robertson and Miranda Armie from Forefront Collaborative

This presentation will not include any non-FDA approved or investigational uses of products or medical devices.



# Learning Objectives

Upon completion of this activity, you will be better able to

Describe recent updates to ACIP adult vaccine recommendations

Identify key barriers to vaccine administration in your practice

Formulate strategies to improve vaccination rates in your practice



# Jimmy Kimmel Speaks Out on Vaccines



THE WALL STREET JOURNAL. Monday, March 16, 2015

JOURNAL REPORT | ENCORE

HEALTH MATTERS | LAURA LANNING

## It's Time for Grown-Ups to Get Their Shots

Adults' vaccination needs have often been neglected. Now doctors are trying to correct that.

A NEW PUSH is on to get grown adults vaccinated against preventable diseases like pneumonia, hepatitis and shingles. Public health officials are working with physicians, health plans and employers alike to better educate adults about what shots they need and make sure they follow on those health departments are expanding the use of electronic reminders and text messages such as "Reminder or not?" that encourage timely and appropriate to administer recommended vaccines without a doctor's visit or prescription.

Behind that push is a growing concern about the immunization status of the adult, baby boom population, which shows low rates of compliance with preventive vaccines. Just over 60% of adults 65 and over were vaccinated against influenza in the 2012-2013 season. And that important health measure, which saves "one death for every 100,000," says the Centers for Disease Control and Prevention.

"Children are vaccinated on time, but we need to get the word out to healthcare providers to talk about vaccines with their adult patients," Dr. Ken Gips, an infectious disease specialist and senior adviser, says.

With the recent focus on the June 15 deadline to vaccinate children, experts say immunization status may not register that way only as they do with children, but that also may be a

**Not Just for Kids**  
Non-recommended immunizations in 2015 for adults by age. (Always consult with your health care professional.)

VACCINATION	75-89	50-69	65-69
Flu (Inactivated)	92.9%	88.5%	85.4%
Shingles (Zoster)	7.1%	11.5%	14.6%
Pneumococcal (PCV13)	23.1%	31.5%	35.4%
Pneumococcal (PPSV23)	23.1%	31.5%	35.4%
Hepatitis B	1.1%	1.5%	1.6%
Hepatitis A	1.1%	1.5%	1.6%

**Pharmaceutical role**  
Pharmaceuticals can be very helpful in expanding the vaccine by educating the public. Public health officials already are doing this, but they need to be helped by the pharmaceutical industry.

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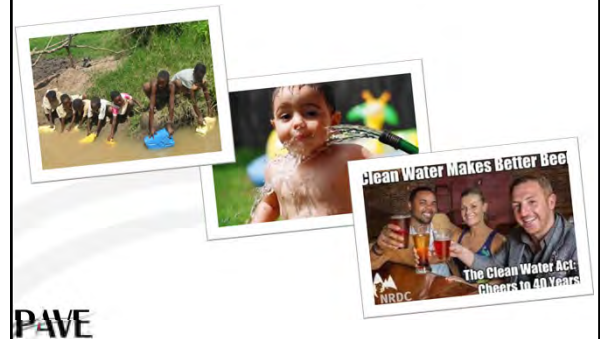
# What Is the #1 Public Health Improvement of the 20th Century?



## The #1 Public Health Improvement of the 20th Century



## The #1 Public Health Improvement of the 20th Century (cont.)



## What About Vaccines?



Impact of vaccines cannot be overstated



One of the greatest public health achievements of the 20th century

### Smallpox

- Eliminated from the world

### Polio

- 1954: 18,000 US cases
- 1979: last US case
- 2015: on the verge of elimination in most parts of world

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## Question 1

The first recorded use of vaccination was:

- The use of insufflation of smallpox scabs in China in 1000 AD
- George Washington orders variolation of US army troops in 1777
- By an English farmer named Benjamin Jesty in 1774
- By English physician Edward Jenner in 1796
- After germ theory was understood

## Origins of Smallpox Immunization

Smallpox immunization is over 1000 years old

- Some evidence of inoculation with infected matter before 200 BC in India or China

Variolation is inoculation with small amounts of a smallpox scab

- Originated in China approximately 1000 AD
- Widespread in China 1567-1572
- Written description by Yu Chang in 1643
- 1713 published account of variolation in London's *Philosophical Transactions of the Royal Society*

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## 1000 AD Insufflation

Ground smallpox scab (variola) was insufflated into the nose in early China



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## Early Smallpox Variolation

### Turkey 1700s

- Recorded case fatality rate of 1-2%

English physicians added modern practices, such as bleeding and starvation, prior to variolation, and case fatality rate went to 12%

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## Vaccination: 1774

Vaccination involves inoculation with vaccinia virus

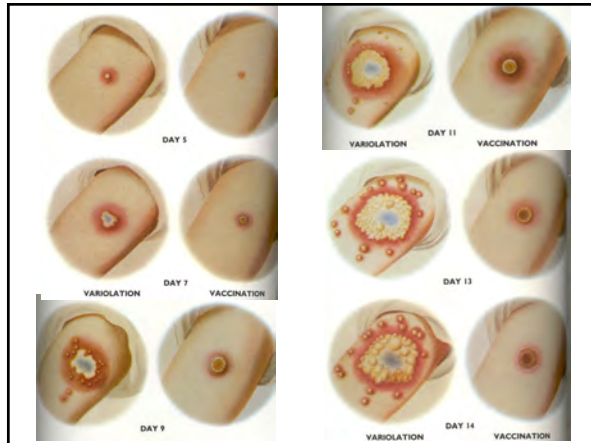
- Vacca is Latin for cow

### 1774: first-recorded vaccination

- Benjamin Jesty, farmer, smallpox survivor, and generally a smart man
- Feared for his family as smallpox raged in the area
- 2 dairymaids working his farm had cowpox and then nursed smallpox victims without getting the disease
- Took infected pus from the udder and inserted the pus into a scratch on his wife and sons



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## The Jesty Family Story

### The family did well medically

- Word got out and neighbors derided the family, expecting them to grow horns or worse
- Benjamin was “hooted at, reviled, and pelted whenever he attended markets in the neighborhood”

### 1797: the Jesty family moved

- Documentation suggests Benjamin continued to do vaccinations on people at his new home

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## Edward Jenner: 1796

### Father of smallpox vaccination

- Dedicated his life, money, and reputation to spreading the use of vaccination



### First vaccination developed in 1796

### Vaccinates 24 children

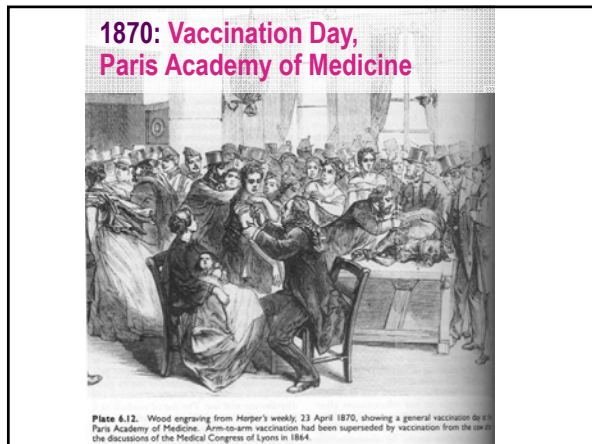
- After several months, exposes them to smallpox (variolation)
- Repeats exposure 5 years later

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## “The Cow Pock or the Wonderful Effects of the New Inoculation!”



Vide—the Publications of ye Anti-Vaccine Society / J. Gillray, 1802



## Adult Vaccinations

Influenza	Zoster	Meningococcal
Pneumococcal	Hepatitis A	Travel vaccinations
Varicella	Hepatitis B	Military-related vaccinations
HPV	Td/Tdap	

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## Adult Vaccination Schedule by Age

**Recommended Adult Immunization Schedule—United States - 2015**

Note: These recommendations must be read with the footnotes that follow containing number of doses, intervals between doses, and other important information.

Figure 1. Recommended adult immunization schedule, by vaccine and age group\*

Vaccine	18-24 years	25-34 years	35-44 years	45-54 years	55-64 years	≥ 65 years
Influenza <sup>1</sup>	1 dose annually					
Tetanus, diphtheria, acellular pertussis (Td/Tdap) <sup>2</sup>	Substitute 1 dose of Tdap for Td booster; then boost with Td every 10 yrs					
Varicella <sup>3</sup>	2 doses					
Hepatitis A (HepA) <sup>4</sup>	2 doses					
Hepatitis B (HepB) <sup>5</sup>	3 doses					
MM, mening, adults (MMV) <sup>6</sup>	1 or 2 doses					
Pneumococcal 13-valent conjugate (PCV13) <sup>7</sup>	1 dose					
Pneumococcal polysaccharide (PPSV23) <sup>8</sup>	1 or 2 doses					
Meningococcal <sup>9</sup>	1 or more doses					
Hepatitis A <sup>4</sup>	2 doses					
Hepatitis B <sup>5</sup>	3 doses					
Hepatitis B <sup>5</sup>	3 doses					
Human papillomavirus type 9 (HPV9) <sup>10</sup>	1 or 2 doses					

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## Special Populations for Vaccinations

- Pregnant Women**
- Patients With Immunodeficiency**
  - Primary immunodeficiency
  - HIV/AIDS
  - Those on biologic medications
- Patients With Asthma**
- Healthcare Providers**

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## Special Populations Vaccine Schedule

Figure 2. Vaccines that might be indicated for adults based on medical and other indications\*

Vaccine	Indication	18-24 years	25-34 years	35-44 years	45-54 years	55-64 years	≥ 65 years
Influenza <sup>1</sup>	Pregnancy	1 dose 3M annually					1 dose 3M annually
Tetanus, diphtheria, acellular pertussis (Td/Tdap) <sup>2</sup>	Chronic kidney disease (CKD)	Substitute 1 dose of Tdap for Td booster; then boost with Td every 10 yrs					
Varicella <sup>3</sup>	Chronic kidney disease (CKD)	2 doses					
Hepatitis A (HepA) <sup>4</sup>	Chronic kidney disease (CKD)	2 doses through age 24 yrs					
Hepatitis B (HepB) <sup>5</sup>	Chronic kidney disease (CKD)	3 doses through age 24 yrs					
MM, mening, adults (MMV) <sup>6</sup>	Chronic kidney disease (CKD)	1 or 2 doses					
Pneumococcal 13-valent conjugate (PCV13) <sup>7</sup>	Chronic kidney disease (CKD)	1 dose					
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Hepatitis A <sup>4</sup>	Chronic kidney disease (CKD)	2 doses					
Hepatitis B <sup>5</sup>	Chronic kidney disease (CKD)	3 doses					
Hepatitis B <sup>5</sup>	Chronic kidney disease (CKD)	3 doses					
Human papillomavirus type 9 (HPV9) <sup>10</sup>	Chronic kidney disease (CKD)	1 or 2 doses					

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## Adult Immunization Schedules

Published Annually

Approved by

- Advisory Committee on Immunization Practices
- American College of Physicians
- American Academy of Family Physicians
- American Congress of Obstetricians and Gynecologists

Found online at

- www.cdc.gov/vaccines
- www.aafp.org
- www.immunize.org

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http://www.cdc.gov/vaccines/hq/acip/recs/index.html

http://www.cdc.gov/vaccines/hq/acip/recs/vacc-specific/flu.html

http://www.cdc.gov/vaccines/hq/acip/recs/vacc-specific/flu.html

## Seasonal Influenza Vaccine

All persons age 6 months or older

**Composition**

- What strains are in the trivalent and quadrivalent vaccines?

**Available vaccine products and indications**

Appropriate use of live attenuated vs inactivated influenza vaccine

Influenza vaccination of persons with a history of an egg allergy

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## Available Influenza Vaccines: 2014

<p><b>Inactivated quadrivalent (IIV4)</b></p> <ul style="list-style-type: none"> <li>Fluarix, FluLaval, Fluzone</li> </ul> <p><b>Inactivated trivalent (IIV3)</b></p> <ul style="list-style-type: none"> <li>Afluria, Fluarix, FluLaval, Fluvirin, Fluzone, Fluzone Intradermal</li> </ul>	<p><b>Inactivated trivalent cell culture-based (ccIIV3)</b></p> <ul style="list-style-type: none"> <li>Flucelvax</li> </ul> <p><b>Inactivated trivalent, (IIV3), high dose</b></p> <ul style="list-style-type: none"> <li>Flublok</li> </ul> <p><b>Live attenuated, quadrivalent (LAIV4)</b></p> <ul style="list-style-type: none"> <li>FluMist Quadrivalent</li> </ul>
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http://www.cdc.gov/vaccines/hq/acip/recs/vacc-specific/pneumo.html

Morbidity and Mortality Weekly Report (MMWR)

Use of 13-Valent Pneumococcal Conjugate Vaccine and 23-Valent Pneumococcal Polysaccharide Vaccine Among Adults Aged ≥65 Years: Recommendations of the Advisory Committee on Immunization Practices (ACIP)

September 19, 2014 / 63(37):822-825

Sara Tomasz, MD<sup>1,2</sup>, Nancy R. Bennett, MD<sup>1,2</sup>, Charles Stricker, PhD<sup>3</sup>, Ryan Gerke, MD<sup>4</sup>, Matthew R. Moore, MD<sup>5</sup>, Cynthia G. Whitney, MD<sup>6</sup>, Stephen Hadler, MD<sup>7</sup>, Tamara Pflughel, MD<sup>8</sup> (author affiliations at end of text)

On August 13, 2014, the Advisory Committee on Immunization Practices (ACIP) recommended routine use of 13-valent pneumococcal conjugate vaccine (PCV13) [Prevenar 13, Wyeth Pharmaceuticals, Inc., a subsidiary of Pfizer Inc.] among adults aged ≥65 years. PCV13 should be administered in series with the 23-valent pneumococcal polysaccharide vaccine (PPSV23) [Pneumovax23, Merck & Co., Inc.], the vaccine currently recommended for adults aged ≥65 years. PCV13 was approved by the Food and Drug Administration (FDA) in late 2011 for use among adults aged ≥50 years. In June 2014, the results of a randomized placebo-controlled trial evaluating efficacy of PCV13 for preventing community-acquired pneumonia among approximately 85,000 adults aged ≥65 years with no prior pneumococcal vaccination history (CAPITA trial) became available and were presented to ACIP (1). The evidence supporting PCV13 vaccination of adults was evaluated using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) framework and determined to be type 2 (moderate level of evidence); the recommendation was categorized as a Category A recommendation (2). This report reflects the new recommendations for PCV13 use, provides guidance for use of PCV13 and PPSV23 among adults aged ≥65 years, and summarizes the evidence considered by ACIP to make this recommendation.

**Epidemiology of Pneumococcal Disease Among Adults Aged ≥65 Years**

Invasive pneumococcal (pneumococci) remains a leading infectious cause of serious illness, including bacteremia, meningitis, and pneumonia, among older adults in the United States. Use of a 7-valent pneumococcal conjugate vaccine (PCV7) since 2000 and PCV13 since 2010 among children in the United States has reduced pneumococcal infections directly and indirectly among children, and indirectly among adults. By 2013, the incidence of invasive pneumococcal disease (IPD) caused by serotypes unique to PCV13 among adults aged ≥65 years had declined by approximately 50% compared with 2010, when PCV13 replaced PCV7 in the pediatric immunization schedule (3). However, in 2013 an estimated 13,500 cases of IPD occurred among adults aged ≥65 years (4). Approximately, 20%–25% of IPD cases and 10% of community-acquired pneumonia cases in adults aged ≥65 years are caused by PCV13 serotypes and are potentially preventable with the use of PCV13 in this population (3,4).

<http://www.cdc.gov/vaccines/hgp/acip-recs/vacc-specific/pneumo.html>

What are the new recommendations?

Both PCV13 and PPSV23 should be routinely administered in series to all adults aged ≥65 years. The recommendations for routine PCV13 use among adults aged ≥65 years will be reevaluated in 2018 and revised as needed. ACIP recommendations for routine use of PCV13 in adults aged ≥19 years with immunocompromising conditions, functional or anatomic asplenia, cerebrospinal fluid leak, or cochlear implants remain unchanged.

**Key. Sequential administration and recommended intervals for PCV13 and PPSV23 for adults aged ≥65 years – Advisory Committee on Immunization Practices, United States**

**PCV13=13-valent pneumococcal conjugate vaccine**  
**PPSV23=23-valent pneumococcal polysaccharide vaccine**

<http://www.cdc.gov/vaccines/hgp/acip-recs/vacc-specific/pneumo.html>

## US Rates of Vaccination Survey: 2007

Vaccine	18-49 Years Old	50-64 Years Old	≥65 Years Old
Influenza	37.3%	42.2%	68.8%
Pneumococcal		32.8%	65.6%
Zoster		0.8% (50-59 years old)	1.9% (≥60 years old)
Tetanus <10 years	57.2%	57.2%	44.1%
Hepatitis A	12.1%		5.4%

PAVE CDC National Immunization Survey accessed March 19, 2015 at: <http://www.cdc.gov/vaccines/imz-managers/coverage/nis-child/downloads/nis-adult-summer-2007.pdf>

## Healthcare Providers

Healthcare providers are a special vaccine population

Are your vaccinations up to date?

- Are you doing everything you can do to help take care of me?

Important that we break the chain of communicable disease, not be a common link

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## Question 2

My personal immunization status:

- I am certain all my immunizations are up to date (of course)
- I am uncertain as to my immunization status and will go check when I get home
- I am uncertain as to the risk-benefit of vaccines and unwilling to risk all those vaccinations
- I do not believe in vaccinations
- Do you not know how busy I am?

Vaccine 32 (2014) 4814–4822

Contents lists available at ScienceDirect

Vaccine

journal homepage: [www.elsevier.com/locate/vaccine](http://www.elsevier.com/locate/vaccine)

Review

Healthcare providers as sources of vaccine-preventable diseases

Emily Sydnor<sup>a,\*</sup>, Trish M. Perl<sup>b</sup>

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<sup>b</sup> Division of Infectious Diseases, Johns Hopkins University School of Medicine, Baltimore, MD 21205, United States

12 million people employed in healthcare  
 Vaccination remains mainstay of protection for HCPs and their patients  
 Vaccine-preventable diseases continue to pose serious risks for HCP and their patients

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### Question 3: Case Study

A 47-year-old physician requests documentation allowing him to "opt out" of his flu shot again this year because he is allergic to eggs.

Your response:

- A. Sign the paperwork that he hands you
- B. Tell him to make an appointment to see you to discuss his egg allergy and do flu vaccine skin testing
- C. Tell him to come to the office to get a graded flu challenge/vaccination
- D. Tell him he can safely get the flu vaccination without testing

**Choosing Wisely**  
An initiative of the ABIM Foundation

American Academy of Allergy, Asthma & Immunology

AAAAA American Academy of Allergy Asthma & Immunology

Five Things Physicians and Patients Should Question

**Don't routinely avoid influenza vaccination in patients with an egg allergy.**

### Common Myth: Egg Allergy and Vaccinations



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### Background: Vaccines Prepared With Eggs

Hen's egg embryos are used for enriched media to grow viruses used in the production of several vaccines

- MMR, rabies, yellow fever, and influenza vaccines

Typically involves the use of chick embryonic fibroblast cell cultures or extra embryonic fluid

Picograms or micrograms of egg protein may be introduced into the vaccines

Vaccines can also contain several other ingredients that may provoke an IgE mediated reaction

- Gelatin, neomycin

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### Comparison of Patients With Egg-Induced Anaphylaxis by Reaction to Influenza Vaccination

Clinical Factors	Tolerated Influenza Vaccine (%)	Reacted to Influenza Vaccine (%)
Number of patients	54 (96)	2 (4)
Male	40 (74)	2
Asthma	39 (72)	1 (50)
Number of influenza vaccine administrations	116 (97)	3 (3 of total)
Average egg SPT (mm [range])	8 (0-15)	8 (6-10)
Influenza vaccine SPT response (mm)		
0	81 (70)	1 (33)
1	4 (3)	0
2	12 (10)	0
≥3	13 (11)	2 (67)
Not done	6 (5)	0
<b>Influenza Vaccine Reactions</b>		
Localized	NA	3 (100)
Multisystem	NA	0

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SPT=skin prick test. Fung I and Spergel J. *J Allergy Clin Immunol*. 2012;129(4):1157-1159.

### Current Recommendations

Mild allergic reaction (hives)

- 30-minute observational period

Severe allergic reaction

- Recombinant flu vaccination
- Regular flu vaccination by physician with experience in managing severe allergic conditions

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CDC. Vaccination: Who Should Do It, Who Should Not and Who Should Take Precautions. Accessed March 18, 2015 at: <http://www.cdc.gov/flu/protect/whoshouldvax.htm#egg-allergy>.

## Safety of MMR Vaccine in Patients With an Egg Allergy

### Live, Attenuated Measles Vaccine

Its Administration to Children Allergic to Egg Protein

Peter B. Kamin, MD, Bernard T. Fein, MD, and Howard A. Britton, MD, San Antonio, Tex.

*JAMA* 1963: first report demonstrating safety of measles vaccine to children with an egg allergy<sup>1</sup>

*NEJM* 1985: definitive studies showing safety of MMR administration in a single dose to children with an egg allergy<sup>2</sup>



1. Kamin P, et al. *JAMA*. 1963;185(8):647-651.  
2. James J, et al. *NEJM*. 1985;332(19):1262-1266.

## Conclusions: Egg Allergy and Vaccinations

Influenza vaccine is safe to administer in a standard fashion for those with mild reactions

- Those with severe allergic reactions should be referred to specialist

\*MMR is safe for anyone with a history of egg allergy—no testing or allergy referral required

On the other hand

- Rabies and yellow fever are contraindicated
- Referral to allergist for testing or dose-graded challenge
- Adverse reactions to vaccines occur but are not always due to immunologic mechanism
- Other vaccine components can cause allergic reaction



\*CDC: Ask the Experts, Diseases and Vaccines. Accessed March 18, 2015 at: [http://www.immunize.org/asktheexperts/experts\\_mmr.asp](http://www.immunize.org/asktheexperts/experts_mmr.asp).

## Question 4: Asthma and Influenza Vaccine

19-year-old patient with asthma presents to your office. He has had 2 exacerbations in the last year requiring prednisone. He is concerned that receiving the influenza vaccine will make him sick and cause him to have an asthma exacerbation.

How do you advise him?

- Do not take the flu vaccine this year because his last exacerbation was within 3 months
- Annual flu vaccinations have been proven to decrease asthma exacerbations
- Explain that vaccination is the best recommendation to prevent him from contracting influenza, and data have shown that the vaccine is not linked to asthma flares
- Flu vaccination covers all possible strains of the flu

## Patients With Asthma and the Influenza Vaccine

### CDC Recommends Vaccination

Patients with asthma who have influenza are at higher risk for complications and increased healthcare costs

Multiple studies have shown no increase in asthma exacerbations in the 2 weeks following vaccination

No clear benefit in preventing influenza-related asthma exacerbations



Matthew Greenhawt. Influenza vaccination in asthmatic patients. *JACI*. 2014;133(4):1233-1234.

## Question 5

Vaccine hesitancy:

- Is used to describe people who hesitate to get their vaccinations regardless of cause
- Is used to describe people who need additional boosters due to slow response to antigen
- Is groundless
- Is due to ungrounded fears of autism secondary to any vaccination

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journal homepage: [www.elsevier.com/locate/socscimed](http://www.elsevier.com/locate/socscimed)

ELSEVIER

Review

Attitudes to vaccination: A critical review

Ohid Yaqub<sup>a,\*</sup>, Sophie Castle-Clarke<sup>b</sup>, Nick Sevdalis<sup>c</sup>, Joanna Chataway<sup>d</sup>

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<sup>d</sup>Development Policy and Practice, Open University, Clarendon Building, Milton Keynes MK7 6AA, UK

European data published 2009-2012

38 studies, from 15 countries

Mistrust cited more often than information deficit

1. Fear of adverse events/vaccine safety
2. Perceived low risk of contracting illness
3. Fear of needles/pain

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## Comparison of Annual and Current Reported Morbidity, Vaccine-Preventable Diseases, and Vaccine Adverse Events in the United States

Disease	20th Century Annual Morbidity*	2000†	2010‡	% Reduction (2010)
Diphtheria	175,885	4	0	100
Measles	503,282	81	63	>99
Mumps	152,209	323	2612	98
Pertussis	147,271	6755	27,538	86
Polio (wild)	16,316	0	0	100
Rubella	47,745	152	5	>99
Congenital rubella syndrome	823	7	0	100
Tetanus	1314	26	26	96
Invasive Hib disease	20,000	167	240	99
<b>Total</b>	<b>1,064,845</b>	<b>7515</b>	<b>30,484</b>	<b>97.4</b>
Vaccine adverse events	0	13,497‡	~28,000‡	††

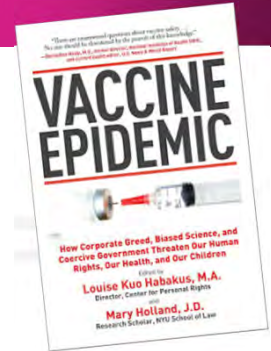
Hib=Haemophilus influenzae bacteria.  
 \*Maximum cases reported in prevaccine era and year. †Provisional. ‡Adverse events after vaccines against diseases shown on table=92%. ††Estimated because no national reporting existed in the prevaccine era.  
 Adapted from original by Dr. Robert Chen.  
 1. <http://www.cdc.gov/mmwr/preview/mmwrhtml/su6004a.htm>. 2. Unpublished CDC data.



## The True Epidemic

The incidence of vaccine adverse events is approximately equal to the incidence of disease

~28,000 adverse events from over 220 million doses of vaccine per year are distributed in the United States



## Vaccines in the Public Mind

Vaccines are victims of their own success

As incidence and fear of disease go down, fear of vaccine side effects become increasingly disconcerting

### Concerns

Too many routine vaccines

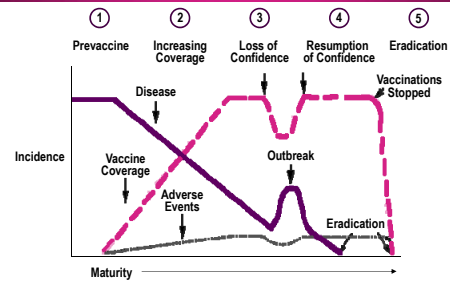
Too many shots at the same time

Too many side effects  
 > Vaccine risk > disease risk

"What's in those vaccines?"

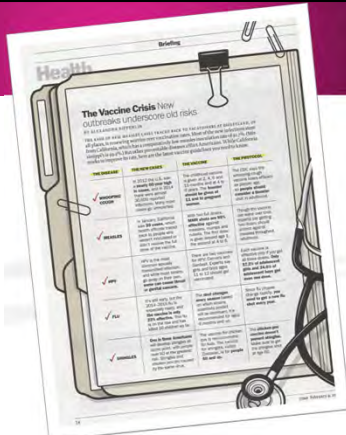


## Evolution of Immunization Program and Prominence of Vaccine Safety



Adapted from Chen RT et al. Vaccine. 1994;12(6):542-550.

Time:  
2/6/2015



## Uncle Sam Wants to Vaccinate YOU!



**Consumer Reports, August 2001**

**VACCINES**  
An issue of trust  
Misinformation and government foot-dragging are fanning fears.

**T**his is the season of the shots, when parents scramble for appointments to bring their kids around doctors to get them all injected. The annual ritual is becoming something that evokes fear in growing numbers of parents who feel they're confronting a terrible, often unnecessary, risk to their children's health.

... Ninety percent of pediatricians and 60 percent of family doctors recently surveyed by the University of Michigan researchers said they would not give their own child more than one optional immunization. A study by California found that unimmunized children were 22 times more likely to contract measles and 4 times more likely to contract chickenpox (including shingles) than vaccinated children.

... The middle age parents, who are typically in the right thing," says Bruce Gellin, M.D., a preventive medicine specialist at Vanderbilt University and vaccine director of the National Network for Immunization Information, an independent source of scientifically verified vaccine information.

**JUST A TINY PINCH** Dr. Peter Michel Calzavara of St. Kitts, N.Y., gives Celia Gomez her polio and DTaP (diphtheria, tetanus, pertussis) boosters. Vaccines have saved Celia and her friends at Quality Time Nursery School, Kannock, N.C. (left), the risk of 11 serious childhood diseases.

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**Unintended Dilemma**

**Fear of Shot Consequences** ←

**Fear of Disease Consequences** →

What is my personal risk for an adverse reaction?

Is the risk of disease real for me?

**Patient**

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**Barriers to Vaccine Delivery**

**Patient's lack of knowledge**

- ▶ Need for and effectiveness of the vaccine
- ▶ Timing: what is due when
- ▶ We need to provide reminders

**Providers lack of recommendation**

- ▶ Our patients want to know what we think
- ▶ We need to ask about vaccine status and bring patients up to date

**Lack of accessibility**

- ▶ Be prepared to provide vaccination during routine visits for other reasons and Hospitalizations

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Preventive Medicine 68 (2011) 224-234

Contents lists available at ScienceDirect

**Preventive Medicine**

Journal homepage: [www.elsevier.com/locate/yomed](http://www.elsevier.com/locate/yomed)

Review

Factors affecting the uptake of vaccination by the elderly in Western society

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**Six Main Themes**

1. Attitudes and beliefs regarding vaccination in general
2. Perceived risk and severity
3. Vaccine characteristics (perceived effectiveness)
4. **Advice and information**
  - ▶ Healthcare workers, relatives, other
5. General health-related behaviors
6. **Accessibility and affordability**

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**We Must Rephrase Our Risk Communication**

People view risk differently

We need to be able to discuss risks and benefits in a rational way

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**Pharmacovigilance**

Despite the prominent benefits of vaccines, they are not without risk

- ▶ Benefits far outweigh risks in most cases
- ▶ Ongoing evaluation of
  - ▶ Risks and side effects
  - ▶ Vaccine safety, supply, and need
- ▶ Ongoing public outcry regarding vaccine safety

Constantly strive to improve vaccine safety

- ▶ Reduction in thimerosal in vaccines

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## The Legacy of Polio

WHATSOEVER HAPPENED TO POLIO?

THE AMERICAN EPIDEMIC

- HOW POLIO CHANGED US
- THE VIRUS AND VACCINE
- POLIO TODAY

ACTIVITIES

TIMELINE

HISTORICAL PHOTOS

RESOURCES

VISITOR INFO

### How Polio Changed Us

#### What Legacy Did Polio Leave?

- Disability Rights
- Social Effects
- Scientific and Medical Legacy

#### What Did a Dime Do?

- March of Dimes
- Franklin D. Roosevelt

#### What Role Did Technology Play?

- The Medical World
- Rehabilitation
- Assistive Devices
- The Iron Lung and Other Equipment

Smithsonian National Museum of American History  
History Center

## Let's Review: Polio

Virus identified as cause: 1908

US epidemic: 1916

FDR contracts at age 39: 1921

Iron lung developed: 1929

THE MAN IN THE IRON LUNG

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## Polio Vaccines Introduced

IPV

- Injectable inactivated polio vaccine
- Jonas Salk developed in 1953

OPV

- Oral polio vaccine, live attenuated vaccine
- Albert Sabin develops in 1957
- Easier to give

1955-1957: incidence of polio in US falls by 85-90%

1979: last case of wild polio virus in US, last case of smallpox in the world

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## The Fight to End Polio

99%

Polio is 99% of the way to being eradicated!

2.5 billion Children immunized globally by Rotary and its partners since 1988—that is an average of 3.3 children a second!

1.2 million Rotary members worldwide are united in the fight to end polio.

\$0.60 60 cents (62¢ as of Feb. 16, 2012) is the cost of protecting one child from polio.

\$40-50 billion The estimated amount of money polio eradication will save the world over the next 20 years.

3 countries have never stopped polio: India, Afghanistan, Pakistan

5 The majority of children that contract this crippling disease are under the age of 5.

44% The percent of people globally who were surprised that polio still exists, and is a serious problem, according to a recent Rotary survey.

1% To reach the final 1% of children is the most difficult because polio still exists in some of the most challenging parts of Africa and South Asia.

Learn more about the fight and how you can help at [www.endpolio.org](http://www.endpolio.org).

Accessed March 19, 2015 at: <http://www.endpolio.org>

## There Is Still Danger That Polio Can Return

The U.N. confirmed cases of polio in Syria, October 2013

Afghanistan

Pakistan

Nigeria

Legend:

- Polio eliminated since 1988
- Polio eliminated since 2012
- Polio remains endemic

Source: [www.polioeradication.org](http://www.polioeradication.org)

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## Poliomyelitis: Vaccine Policy Changes in the United States

Oral poliovirus vaccine (OPV)

1961-1989: 9 cases of vaccine-associated paralytic poliomyelitis (VAPP) per year

1990-1999: 59 cases of VAPP

Last imported case of VAPP: 1993

Last case of VAPP: 1997

1999-2000: Last case of indigenous acquired wild poliovirus

Policy change from OPV to inactivated poliovirus vaccine (IPV) followed by OPV: 1999

Exclusive IPV schedule adopted: 2000

1961 1970 1993 1997 1999 2000

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Alexander LN, et al. JAMA. 2004;292(14):1696-1701.

## Vaccine Adverse Event Reporting System (VAERS)

Jointly operated by the FDA and the CDC since 1990

### Passive surveillance

- Voluntarily submitted reports of events
- Requires cautious interpretation
- “Temporal association” and “causal role” are often difficult to judge
- Important clues and patterns may emerge from reports

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## Question 6

Who can report adverse events to VAERS?

- A. Any healthcare provider who has knowledge of an adverse event
- B. Doctors
- C. Patients who are affected by vaccine adverse events
- D. Anyone

The screenshot shows the VAERS website interface. It includes a search bar at the top, a main heading 'VAERS Vaccine Adverse Event Reporting System', and several informational sections. One section asks 'Have you or your child had a vaccine reaction?' and lists steps for reporting. Another section asks 'What the National Vaccine Injury Compensation Program is for' and provides details about the program. There are also links to 'VAERS: An Overview' and 'VAERS: Submitting the VAERS Form'.

PAVE <https://vaers.hhs.gov/index>

## VAERS Database

Indexes reported events with standardized coding terms

Trained nurses review each submitted report and assign codes



Must remember that no special training is needed to submit to VAERS, may be submitted by a patient

- Follow-up is important, but not always provided

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## Summary

In spite of their proven efficacy, vaccines continue to be **distrusted** and **underutilized**

Clinical guidelines are available for administration of adult vaccinations, but are not always followed

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## Summary (cont.)

Healthcare providers need to work together

Help patients understand the need  
Dispel common misconceptions regarding vaccination

Help make it easy to get vaccinations  
Increase the poor rates of adult vaccinations

Take every opportunity to vaccinate adults

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