

Back to the future-what have we learned from the past?

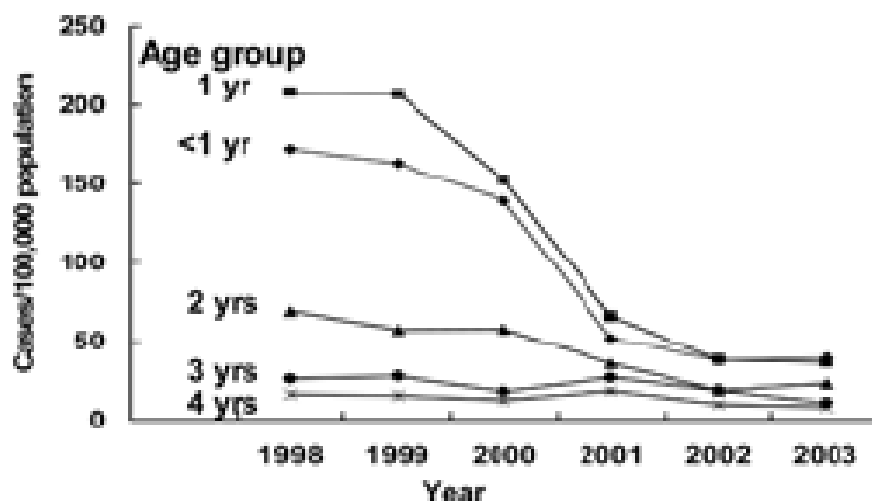
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Vaccines are good!

Invasive Pneumococcal Disease by Age and Year—Children <5 Years, 1998-2003*



*2003 data are preliminary.

Source: Active Bacterial Core Surveillance/EIP Network

- Vaccination is the top public health achievement of the 20th century
- Most vaccines have had this magnitude of effect
- Vaccines protect both directly in individuals and indirectly through community protection

Major
influences on
vaccine
delivery over
the last 25
years

Outbreaks of vaccine preventable
disease

New vaccines

Vaccine hesitancy

Maternal immunization

COVID



Outbreaks of disease

The current era begins in 1989

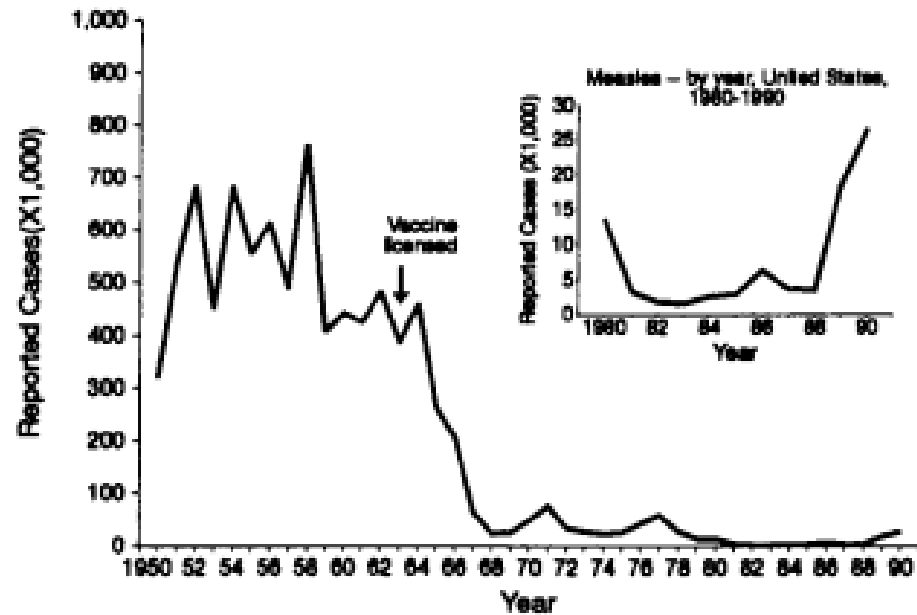


FIG. 1. Reported measles cases in the United States from 1960 through 1990. Reprinted from reference 24 with permission.

TABLE 2. Incidence of reported measles cases by age group in the United States, 1980 to 1988, 1989, and 1990^a

Age group (yr)	Incidence of measles cases ^b		
	1980-1988 ^c	1989	1990
<1	5.6	50.5	119.3
1-4	4.7	31.7	59.3
5-9	1.8	9.7	14.9
10-14	3.5	13.1	13.4
15-19	4.5	24.8	17.4
20-24	1.0	8.5	13.3
≥25	0.1	1.0	2.3
Total	1.4	7.3	11.2

^a Reprinted from reference 9 with permission.

^b Cases per 100,000 population. Rates calculated for all reported patients of known age (18,107 [99.5%] in 1989, 27,678 [99.6%] in 1990), and an extrapolated proportion of patients of unknown age, using census estimates.

^c Median rate, 1980 to 1988.

What was the major reason there was a measles outbreak in 1989-1990?



- A. Importation of measles cases from other countries
- B. Parents were reluctant to have their children immunized
- C. Doctors weren't aware of optimal strategies to immunize their patients
- D. New measles strain for which the vaccine was less effective

What we learned

- Providers were not aware of their own vaccine coverage rates
- Provider prompts are important
- Need to avoid missed opportunities
 - Immunize during sick visits
 - Start vaccines as soon as you can (MMR at 12 months, HPV at 9 years)
 - Give all vaccines that are due
- Remind/Recall is underutilized
- Documentation is important
 - Immunization Information Systems
 - Electronic Health Records

What do we need to improve and how can we do it?

- Providers need to know their own vaccine coverage rates
 - Provider prompts are important
 - Need to avoid missed opportunities
 - Remind/Recall is underutilized
 - Documentation is important
- Use IIS and EMR systems!!
 - Regular coverage rate and missed opportunity reports
 - Provider prompts for all visit types
 - Promote reminder/recall
 - Optimize EMR documentation



H1N1 Influenza 2009-Swine flu #2

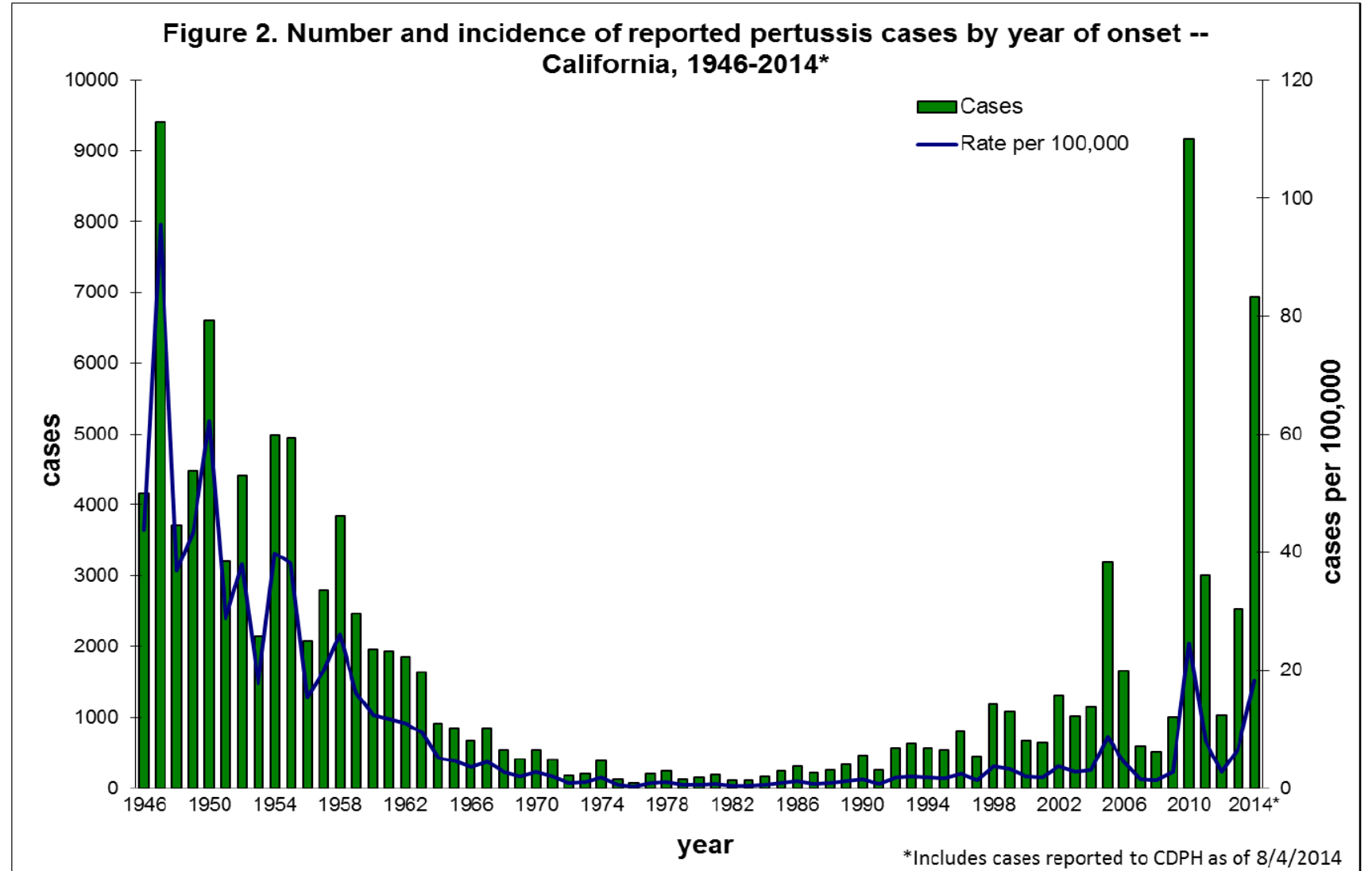
What we learned

- Segments of the population are skeptical about emergently developed vaccines
- It is important to have very specific target populations for the first available doses of a vaccine designed to control and outbreak
- Pregnant women don't do well with influenza
- It needs to be easy for people to get vaccinated
 - Mass vaccination campaigns
 - Extended clinic hours
 - Schools
 - Pharmacies!

What do we need to improve and how can we do it?

- Segments of the population are skeptical about emergently developed vaccines
- It is important to have very specific target populations for the first available doses of a vaccine designed to control and outbreak
- Pregnant women don't do well with influenza
- It needs to be easy for people to get vaccinated
- More education about the vaccine development and safety surveillance systems
- Clear communication about those at highest risk, including pregnant women
- Promote
 - Extended clinic hours
 - School-based vaccination
 - Pharmacy-based vaccination

Pertussis



What is the main reason there was a pertussis outbreak in 2010?



- A. Importation of pertussis cases from other countries
- B. Parents were reluctant to have their children immunized
- C. New pertussis strain for which the vaccine was less effective
- D. The switch from whole cell DTP to DTaP

What we learned

Some vaccine immunity wanes over time

Pertussis is very contagious

Providers weren't recognizing pertussis in older children and adults

It's OK to immunize pregnant women and they will accept vaccines to protect their babies

What do we need to improve and how can we do it?

Some vaccine immunity wanes over time

Pertussis is very contagious

Providers weren't recognizing pertussis in older children and adults

It's OK to immunize pregnant women and they will accept vaccines to protect their babies

Better measures of vaccine protection

Masks, masks, masks

Education of providers about disease frequency

Continue to monitor pregnancy vaccination safety

Measles!



- 13 Confirmed cases in San Diego as of 1/23/2015
- All unimmunized
- >130 cases in California and elsewhere related to this outbreak
- Increased vigilance required
- Make sure your staff is immune



What we learned

- Vaccine preventable diseases are still around
- Some infections are extremely contagious
- Exposures occur in everyday places
- Our society is very mobile
- It is hard to get the genie back in the bottle
- The decisions of one person affect people they don't even know



What do we need to improve and how can we do it?

- Vaccine preventable diseases are still around and some are extremely contagious
- Exposures occur in everyday places
- Our society is very mobile
- It is hard to get the genie back in the bottle
- The decisions of one person affect people they don't even know
- Publicize outbreaks
- Education on disease transmission and prevention measures
- Rapid response
- Promote vaccination for the protection of your community
- Save up your personal stories

Other
outbreaks

Mumps 2015-2017

Hepatitis A 2016

COVID 2020-

?????



A Bunch of New vaccines

New vaccines 1995-2007

Varicella 1995

Hepatitis A 1995

DTaP 1996

Rotavirus 1998, 2006

Conjugated pneumococcal
2000

Tdap 2005

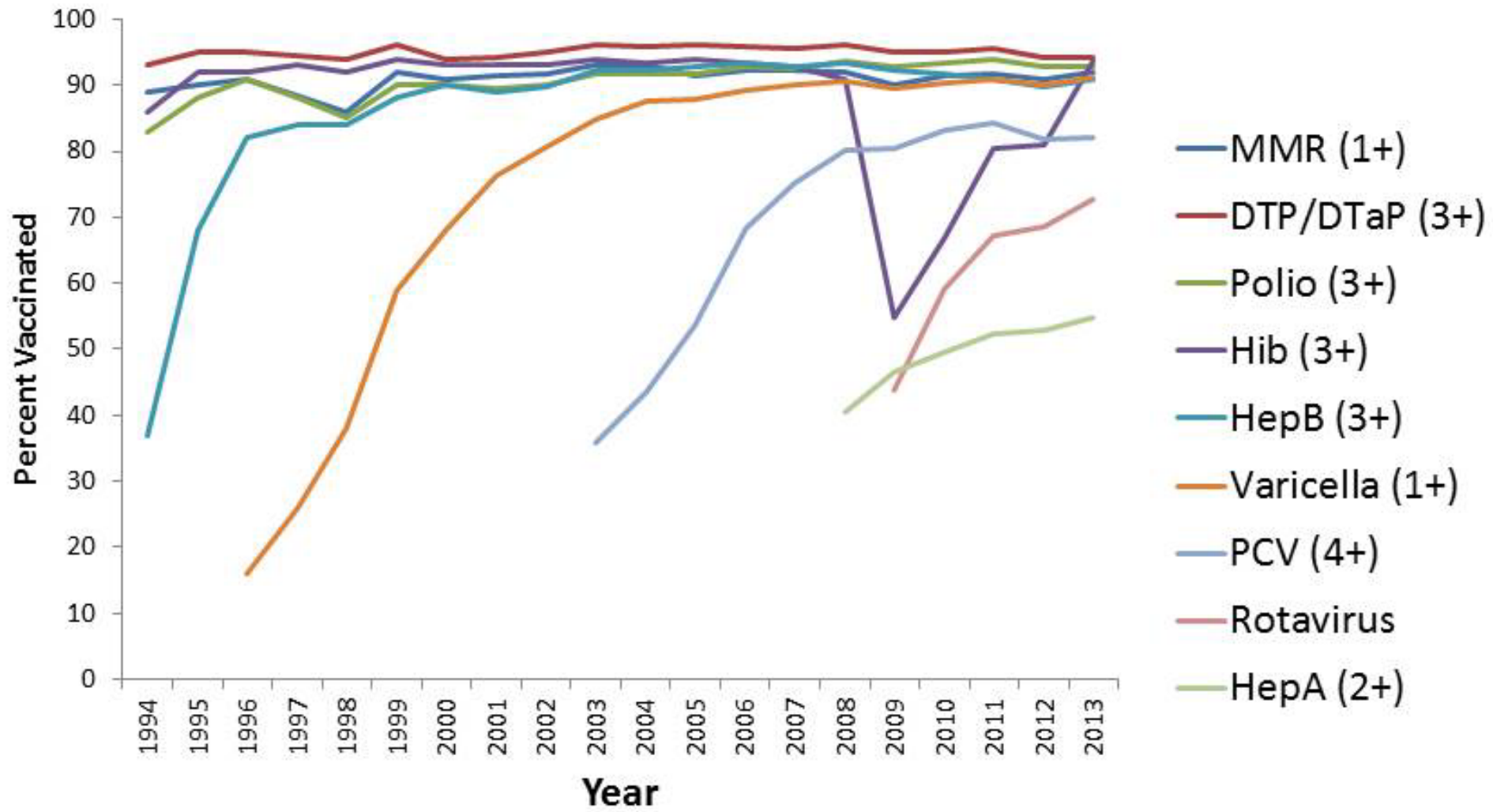
Men ACWY 2005

Zoster 2006

HPV 2006

Nasal influenza 2007

Vaccine-specific coverage* among children 19-35 months, National Immunization Survey, 1994-2013



* The *Healthy People 2020* target for coverage is 90% for all vaccines with the exception of rotavirus (80%) and HepA (85%).

What we learned

- Not all vaccines are perceived as equally important
- There is a limit to how many injections parents are comfortable with at one visit
- It is hard to track down adolescents to get them immunized
- Adults need vaccines too!
- The vaccine schedule has become complicated

It's complicated!

1995 Vaccine Schedule

Vaccine	Birth	2 Months	4 Months	6 Months	12 Months	15 Months	18 Months	4-6 Years	11-12 Years	14-16 Years
Hepatitis B	HB-1	HB-2	HB-3							
Diphtheria-Tetanus-Pertussis (DTP)		DTP	DTP	DTP	DTP or DTaP ≥ at 15 months			DTP or DTaP	Td	
<i>Haemophilus influenzae</i> type b		Hib	Hib	Hib	Hib					
Poliovirus		OPV	OPV	OPV				OPV		
Measles-Mumps-Rubella				MMR				MMR	or MMR	

Table 1 Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2023

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	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
Hepatitis B (HepB)	1 st dose	← 2 nd dose →			← 3 rd dose →												
Rotavirus (RV): RV1 (2-dose series), RV2 (3-dose series)			1 st dose	2 nd dose	See Notes												
Diphtheria, tetanus, acellular pertussis (DTaP <7 yrs)			1 st dose	2 nd dose	3 rd dose			← 4 th dose →				3 rd dose					
<i>Haemophilus influenzae</i> type b (Hib)			1 st dose	2 nd dose	See Notes		← 3 rd or 4 th dose → See Notes										
Pneumococcal conjugate (PCV13, PCV15)			1 st dose	2 nd dose	3 rd dose		← 4 th dose →										
Inactivated poliovirus (IPV <18 yrs)			1 st dose	2 nd dose		← 3 rd dose →						4 th dose					See Notes
COVID-19 (1vCOV-mRNA, 2vCOV-mRNA, 1vCOV-aPS)										2- or 3- dose primary series and booster (See Notes)							
Influenza (IV4)										Annual vaccination 1 or 2 doses					Annual vaccination 1 dose only		
Influenza (LAIV4)													Annual vaccination 1 or 2 doses		Annual vaccination 1 dose only		
Measles, mumps, rubella (MMR)							See Notes	← 1 st dose →				2 nd dose					
Varicella (VAR)								← 1 st dose →				2 nd 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-D ≥9 mos, MenACWY-CRM ≥2 mos, MenACWY-TT ≥2 years)										See Notes					1 st dose	2 nd dose	
Meningococcal B (MenB-4C, MenB-FHbp)																	See Notes
Pneumococcal polysaccharide (PPSV23)																	See Notes
Dengue (DENVACYD; 9-16 yrs)																	Seropositive in endemic dengue areas (See Notes)

Range of recommended ages for all children
 Range of recommended ages for catch-up vaccination
 Range of recommended ages for certain high-risk groups
 Recommended vaccination can begin in this age group
 Recommended vaccination based on shared clinical decision-making
 No recommendation/not applicable

What do we need to improve and how can we do it?

- Not all vaccines are perceived as equally important
 - There is a limit to how many injections parents are comfortable with at one visit
 - It is hard to track down adolescents to get them immunized
 - Adults need vaccines too!
 - The vaccine schedule has become complicated
- Communicate risk and benefit
 - Combination vaccines and alternative delivery methods
 - School-based immunizations
 - Community-based immunization

Vaccine Hesitancy

Why is there so much vaccine hesitancy



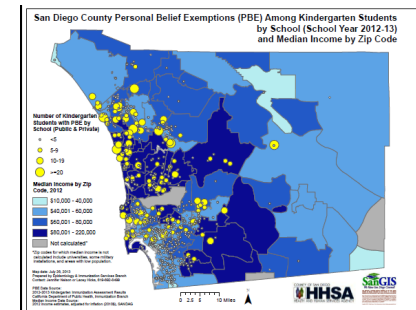
- A. There are real adverse events caused by vaccines
- B. Communication about the risks and benefits of vaccines is challenging
- C. Distrust of government and industry
- D. The Internet
- E. Scientific illiteracy

Some
challenges in
communicating
about vaccines

- Vaccines don't always work
- Vaccines VERY rarely have serious adverse effects
- Vaccines make people lose sight of the reasons we give them
- It is human nature to assume a causal link between two things that are temporally associated
- Low scientific literacy
- Emotion trumps science

What we learned

- Bad news travels better than good news
- Science alone is not enough
- School entry requirements work
- Herd immunity depends on what herd you are in



What do we need to improve and how can we do it?

- Bad news travels better than good news
 - Science alone is not enough
 - School entry requirements work
 - Herd immunity depends on what herd you are in
- Promote vaccination on social media
- Know where to find credible information about vaccines
- If you hear something say something
- Personal stories

Vaccination during pregnancy



What we learned

- Pregnant women will accept immunizations to protect their baby
- Pregnant women are at increased risk from some infections
- Pregnancy vaccination is safe
- Not all OB/GYN clinics provide immunizations

What do we need to improve and how can we do it?

- Pregnant women will accept immunizations to protect their baby
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- Not all OB/GYN clinics provide immunizations

Promote pregnancy vaccination at pre-pregnancy visits

Educate pregnant women about their risk and their infants risk

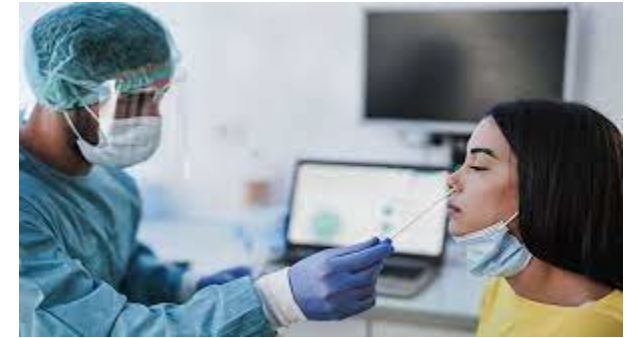


Measure pregnancy vaccination rates in clinics and systems

Encourage OB/GYN clinics to provide vaccinations

COVID!

What we learned



- Let's hope we don't have to do this again!



It's tough to make predictions, especially about the future.



YOGI BERRA

Summary

- Vaccines work
- We need to learn from the past and continue our efforts-it is worth it
- New vaccines are coming that will challenge us in new ways