

National Immunization Update

Where we are vs. where we want to be

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2013 Alaska Immunization Conference: EveryONE Counts

Anchorage, Alaska October 9, 2013



National Center for Immunization and Respiratory Diseases



Immunization in the US

- Most vaccine-preventable diseases at record lows
- Achieved & sustained high childhood immunization
- Reduced disparities in childhood coverage
- Introduced multiple new vaccines
- Improved production and suppliers of influenza vaccine

Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases

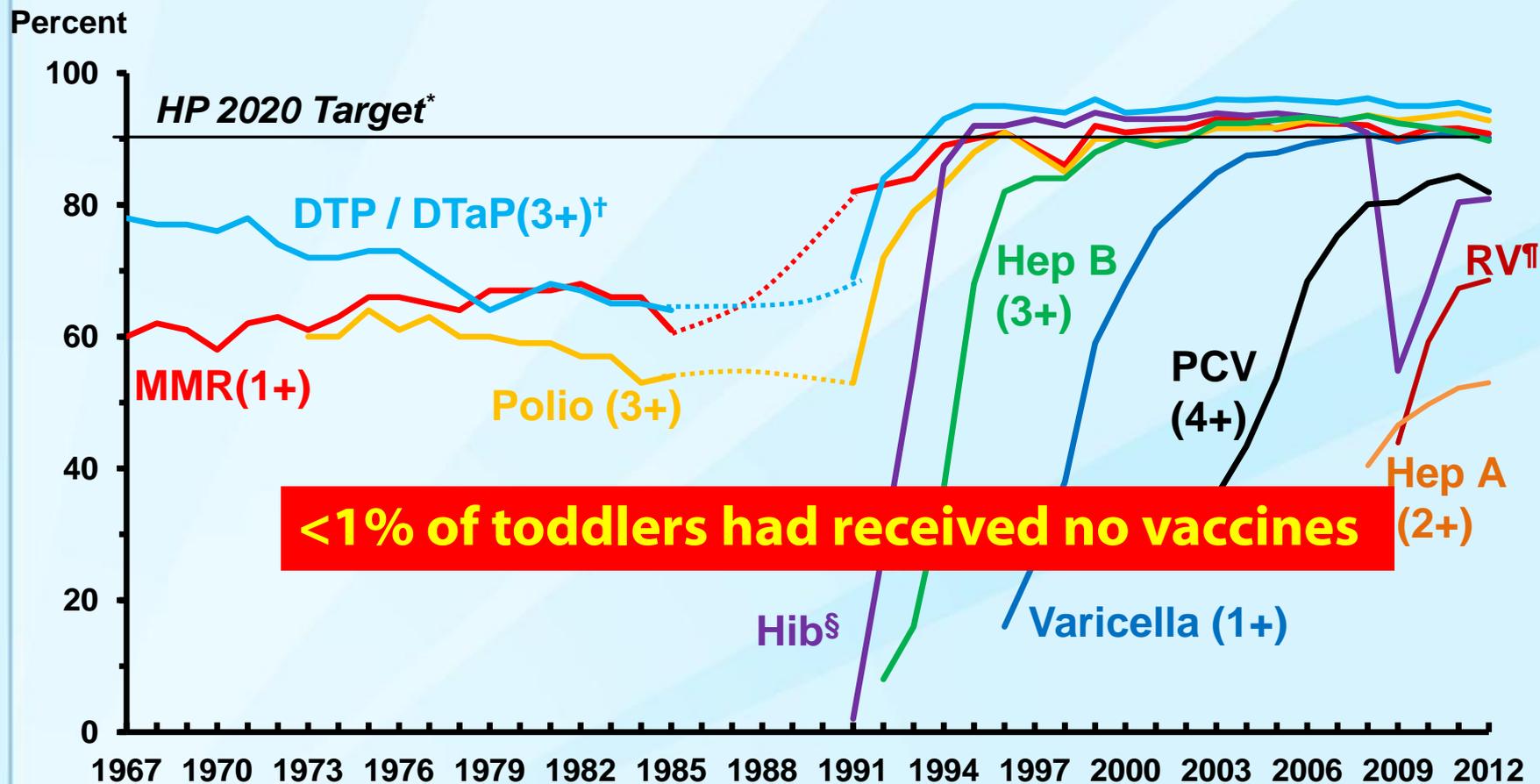
| Disease | 20th Century Annual Morbidity [†] | 2012 Reported Cases ^{††} | Percent Decrease |
|--------------------------------------|---|--------------------------------------|---------------------|
| Smallpox | 29,005 | 0 | 100% |
| Diphtheria | 21,053 | 1 | > 99% |
| Measles | 530,217 | 55 | > 99% |
| Mumps | 162,344 | 229 | > 99% |
| Pertussis | 200,752 | 48,277 | 76% |
| Polio (paralytic) | 16,316 | 0 | 100% |
| Rubella | 47,745 | 9 | > 99% |
| Congenital Rubella Syndrome | 152 | 2 | 99% |
| Tetanus | 580 | 37 | 94% |
| <i>Haemophilus influenzae</i> type b | 20,000 | 30* | > 99% |

[†]Source: JAMA. 2007;298(18):2155-2163

^{††}Source: CDC. MMWR January 4, 2013;61(52);ND-719-ND-731. (provisional week 52 data)

* *Haemophilus influenzae* type b (Hib) < 5 years of age. An additional 13 cases of Hib are estimated to have occurred among the 210 reports of Hi (< 5 years of age) with unknown serotype.

Vaccine Coverage Rates Among Preschool-Aged Children: 1967 – 2012



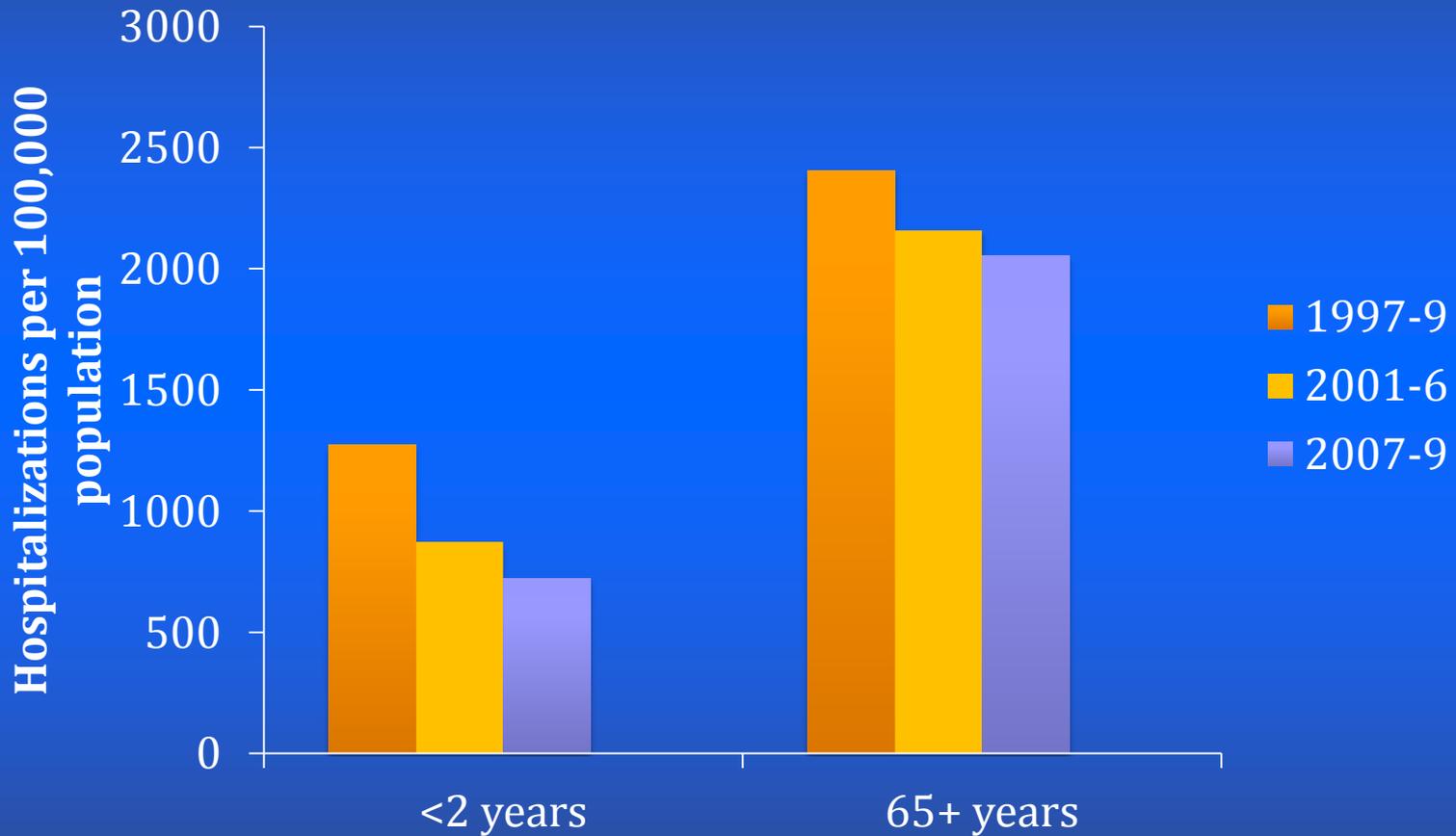
* Target 80% for Rotavirus and 85% for Hep A, † DTP/DTaP (3+) is not a Healthy People 2020 objective..

§ Hib reflects 3+ doses thru 2008, and Full Series (3 or 4 doses per vaccine type) 2009 onward

Note: USIS and NHIS children: 24-35 mos of age. NIS children 19-35 mos of age.

Source: USIS (1967-1985), NHIS (1991-1993) CDC, NCHS and NIP, and NIS (1994-2012), CDC, NIP, NCHS and NCIRD; No data from 1986-1990 due to cancellation of USIS because of budget reductions.

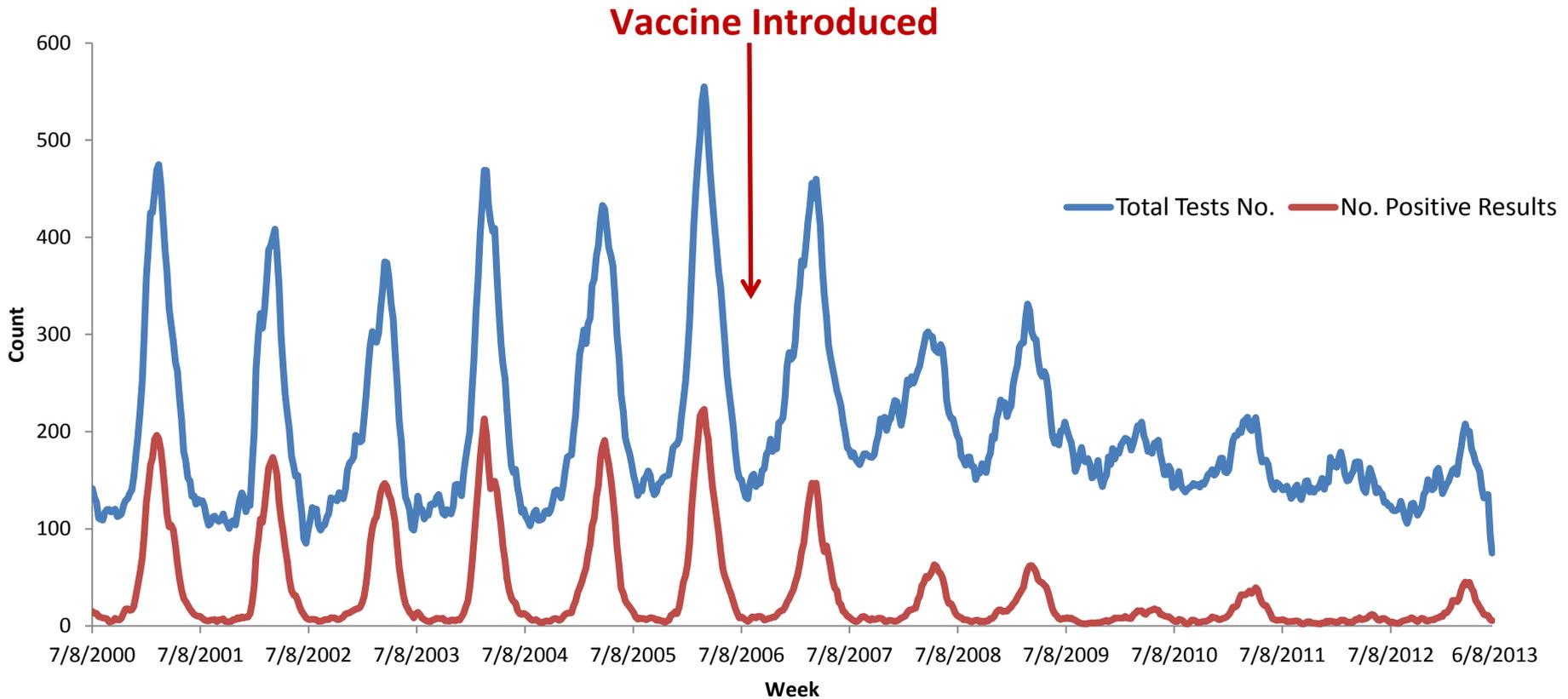
Pneumonia hospitalizations declined after 7-valent Pneumococcal Conjugate Vaccine introduced in 2000



Griffin M et al NEJM 2013



Total rotavirus tests & the number testing rotavirus positive NREVSS laboratories, 2000–2013

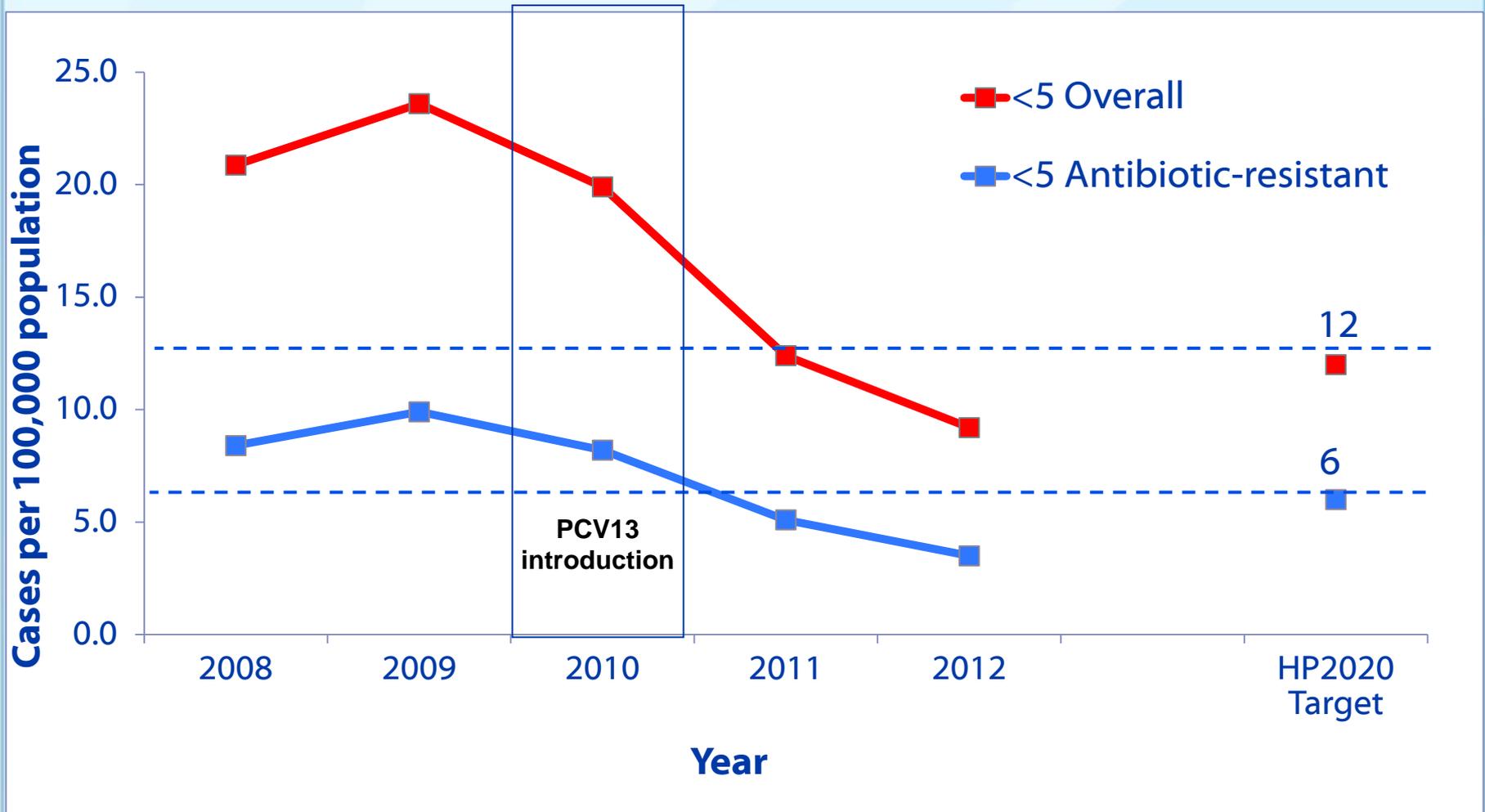


Between 2008 and 2012:

- 200,000-250,000 hospitalizations prevented among children < 5 years
- > \$900 million dollars saved in direct medical costs from averted rotavirus-related hospitalizations and ED visits

Sources: National Respiratory and Enteric Virus Surveillance System and the New Vaccine Surveillance Network

Declining Incidence of Total and Antibiotic Resistant Invasive Pneumococcal Disease in Children <5 years old with PCV13



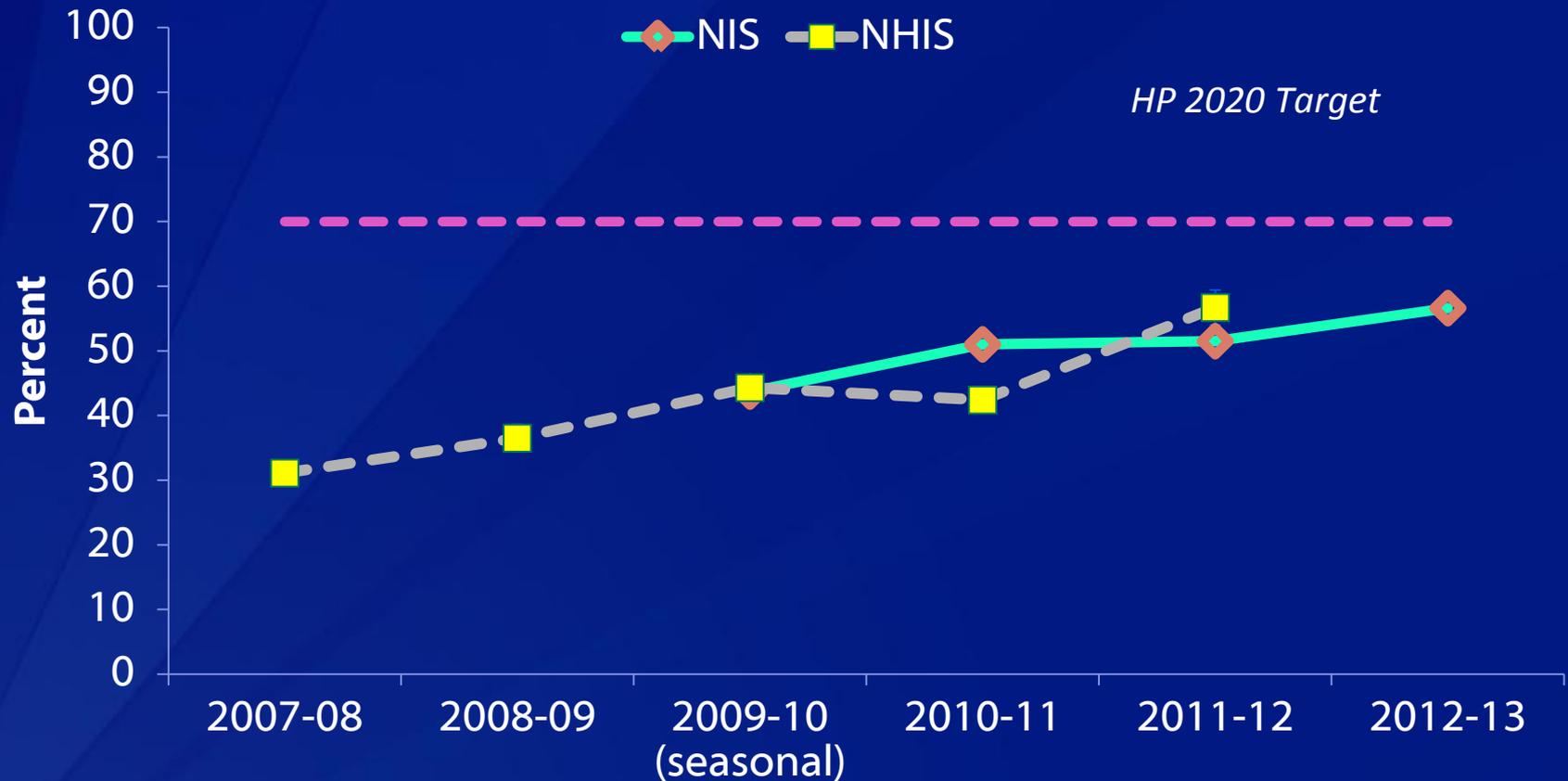


H1N1 FLU
H1N1 Vaccination Clinic At The Palace

>80 million Americans vaccinated in response to pandemic H1N1 influenza

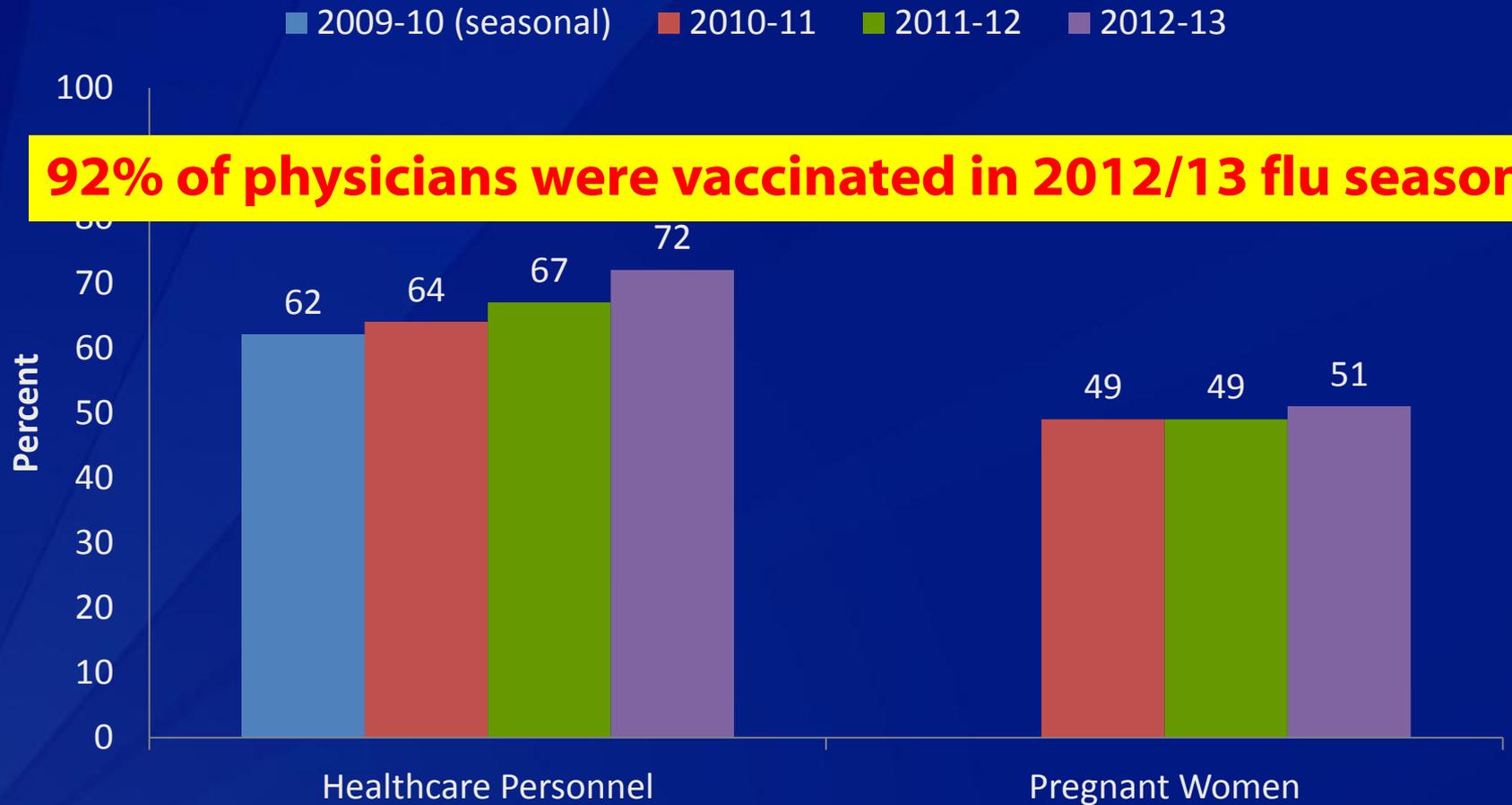


Estimated Influenza Vaccination Coverage, Children 6 Months – 17 Years



Source: CDC, National Immunization Survey (NIS), National Health Interview Survey (NHIS)

Estimated Influenza Vaccination Coverage, Healthcare Personnel* and Pregnant Women, Internet Panel Surveys



* HP 2020 Target is 90 percent for healthcare personnel



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Ted Kennedy's Battle Against Brain Cancer

Will Michelle Obama Hurt Barack In November?



The Last Hurrah: Indiana Jones Shows His Age

TIME

The Truth About Vaccines

Worried about autism, many parents are opting out of immunizations. How they're putting the rest of us at risk

BY ALICE PARK

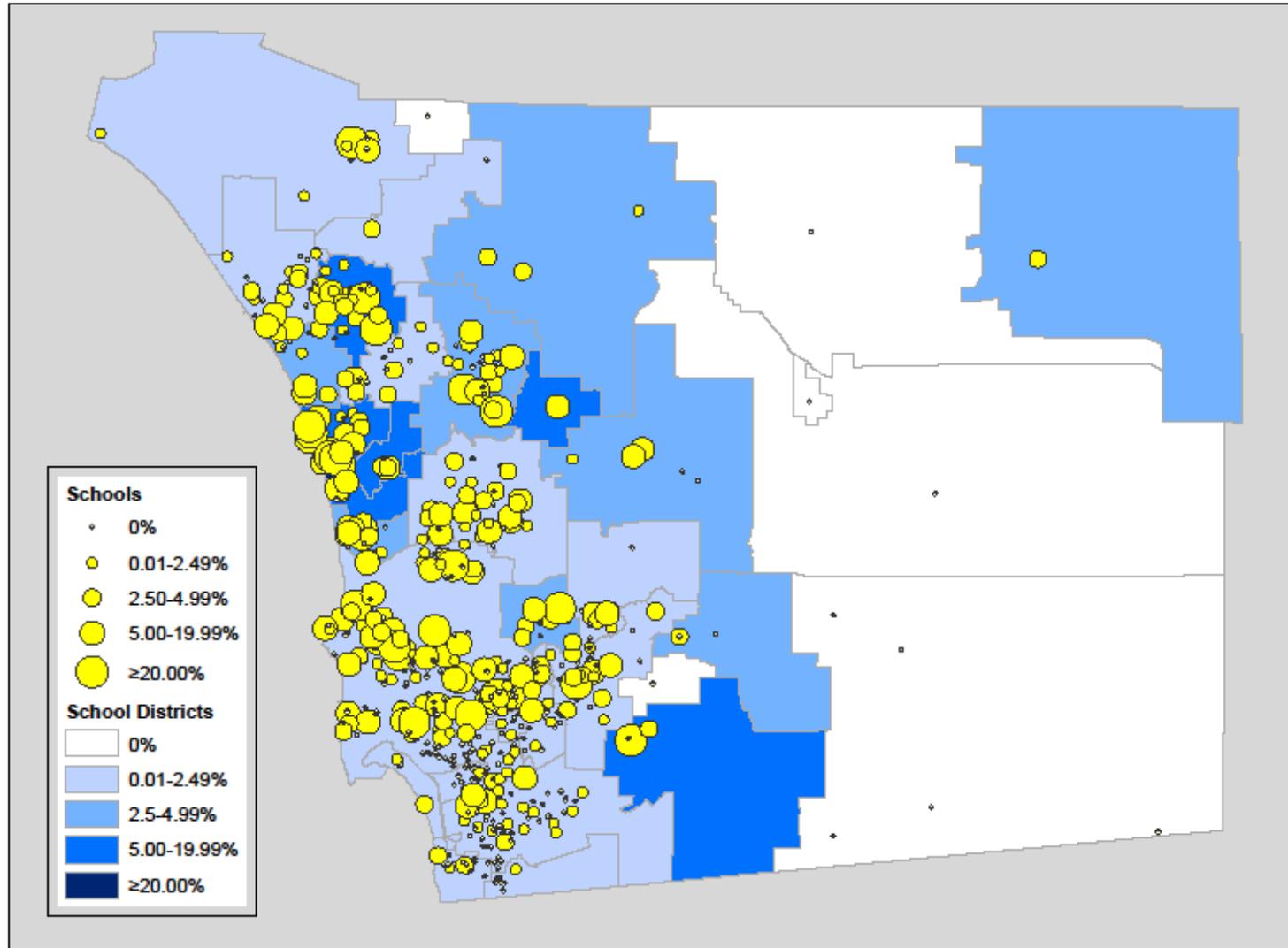


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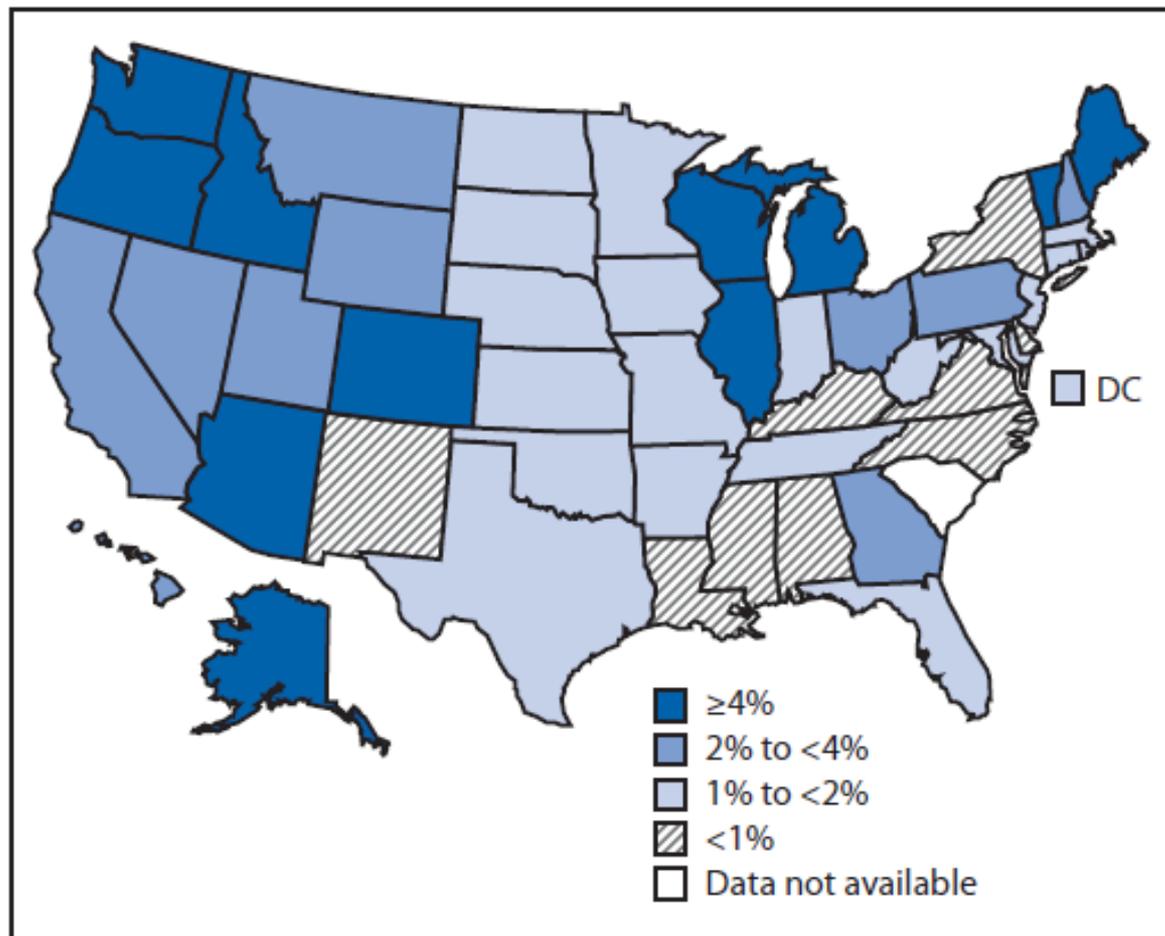
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Personal Belief Exemptions in Kindergarteners, San Diego County, 2008 *



* Courtesy of D. Sugerman et al.

FIGURE. Estimated percentage of children enrolled in kindergarten who have been exempted from receiving one or more vaccines* — United States, 2012–13 school year



* Exemptions might not reflect a child's vaccination status. Children with an exemption who did not receive any vaccines are indistinguishable from those who have an exemption but are up-to-date for one or more vaccines.



**THIN
ICE**

Measles Outbreaks*, United States, 2013

- 77% of 159 year-to-date cases were outbreak-associated
- 8 total outbreaks, including largest since 1996
- 84% of US residents cases were unvaccinated
 - 92 (79%) had philosophic objections to vaccine
 - 15 (13%) <12 mos (not eligible to be vaccinated)

*MMWR September 13, 2013

Notes from the Field

Measles Outbreak Among Members of a Religious Community — Brooklyn, New York, March–June 2013

On March 13, 2013, an intentionally unvaccinated adolescent aged 17 years returned to New York City from London, United Kingdom, while infectious with measles.

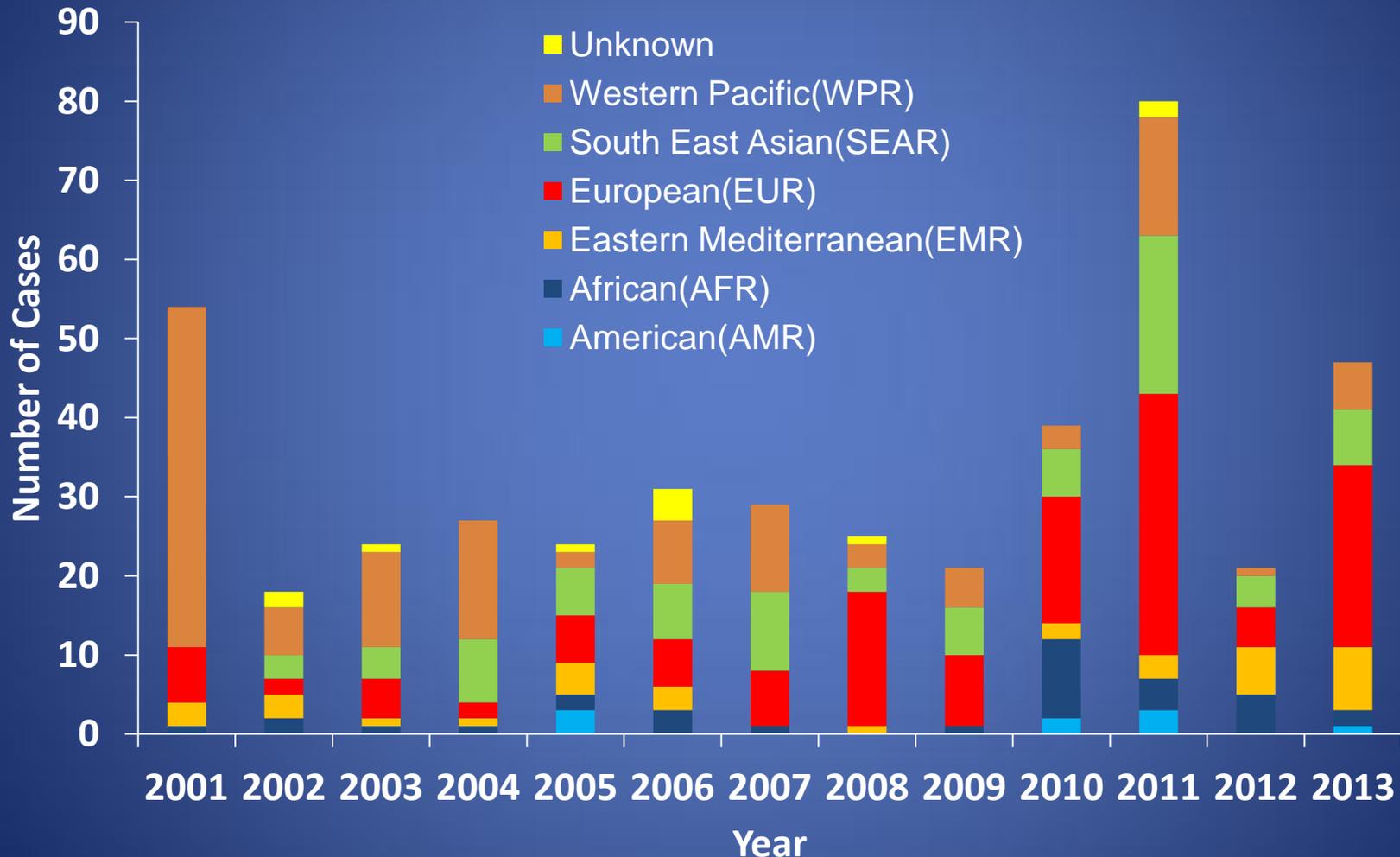


Measles outbreak tied to Texas megachurch sickens 21



Measles, United States, 2001-2013*

Importations by WHO Region



*2013 case count preliminary as of September 14

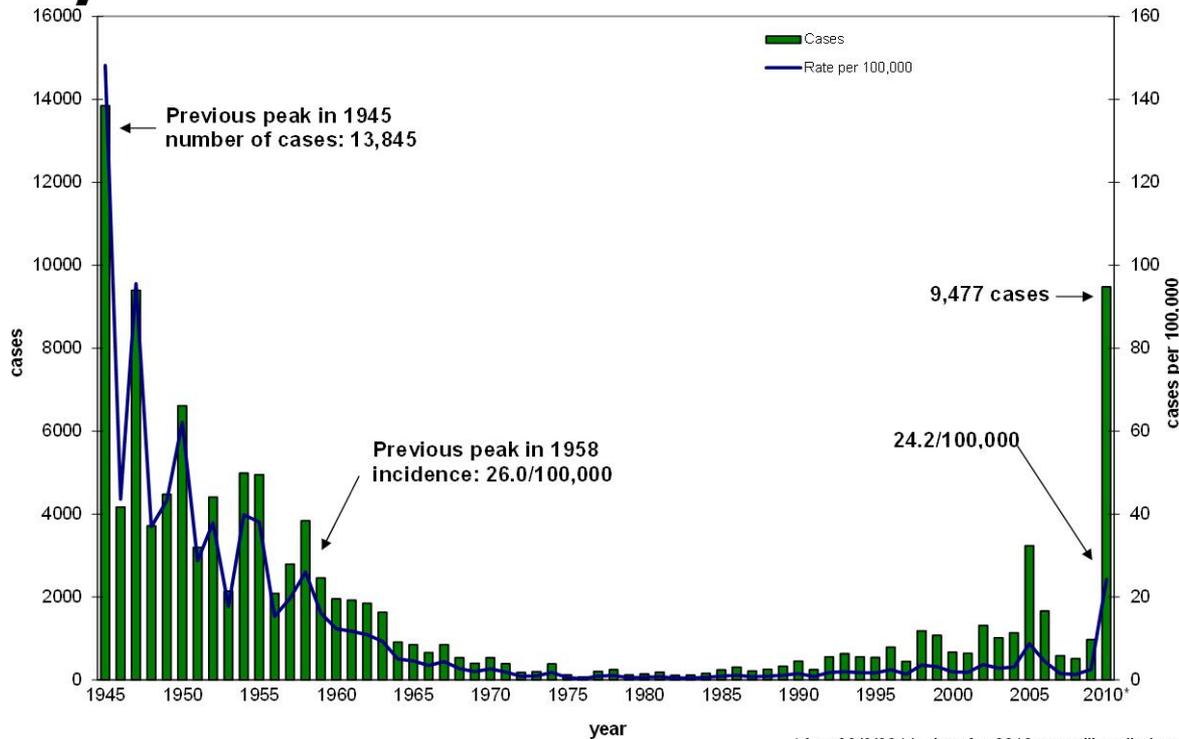
In the Fog





Pertussis is Epidemic in California: Protect Infants, Adolescents & Adults!

Number of reported pertussis cases by year of onset -- California 1945-2010*



*As of 3/9/2011; data for 2010 are still preliminary

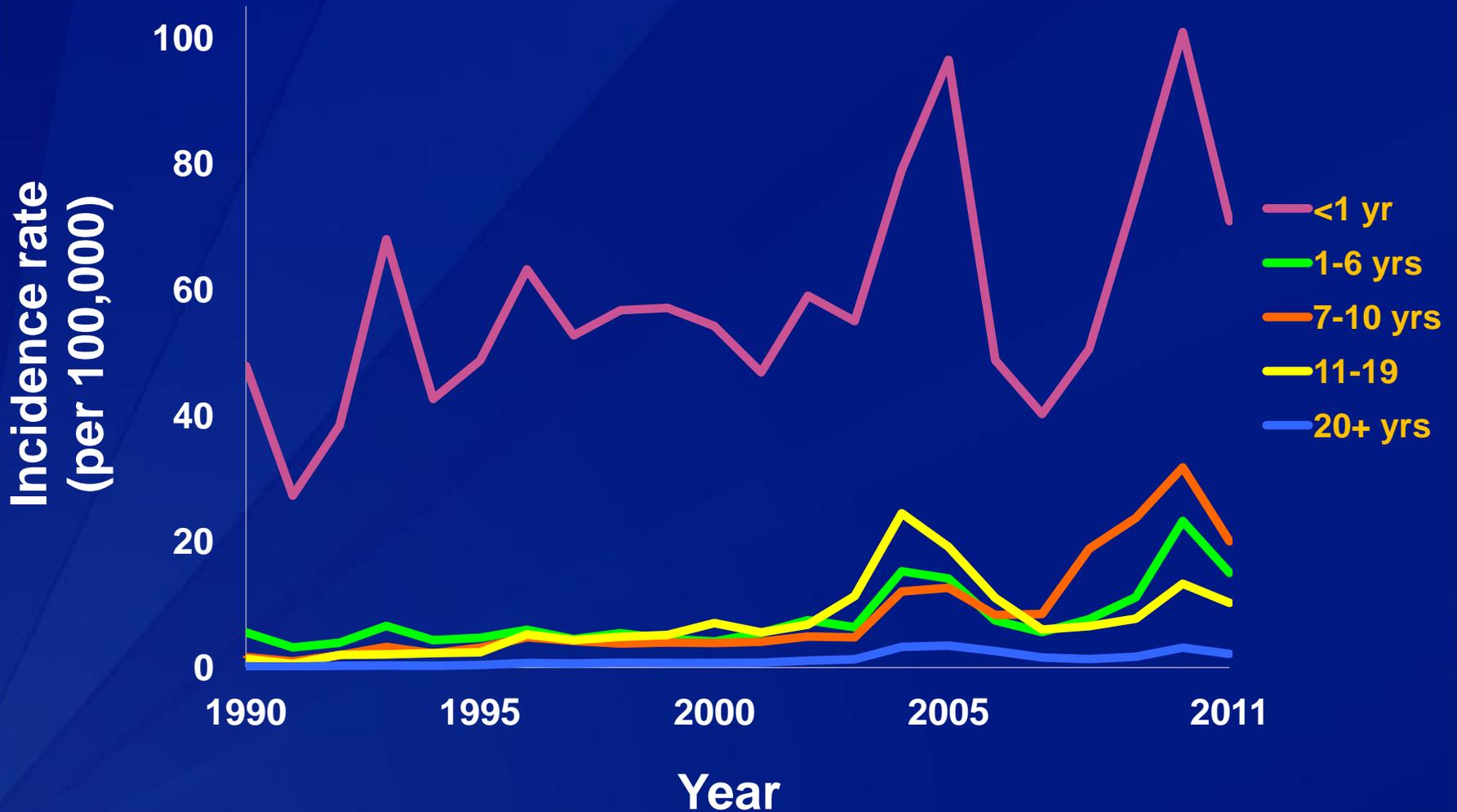
of pertussis in your patients and their close contacts

Pertussis starts with mild cold-like upper respiratory symptoms. In children, adolescents and adults, there is typically progression to coughing paroxysms may be followed by an inspiratory whoop or retching. If fever is absent or minimal and cough is nonproductive. A history of coughing may preclude the possibility of pertussis.

Diagnosis: The diagnosis of pertussis in young infants is often delayed because of mild initial symptoms. Cold-like symptoms may be brief. Gagging, vomiting, cyanosis, apnea, or seizures may be apparent rather than a cough or whoop. A white blood cell count of $>20,000$ cells/mm³ with $>50\%$ lymphocytes is suggestive and may increase over time. Mild illness may rapidly progress into severe illness.

Slide: courtesy of Kathleen Winter, source: California Department of Public Health

Reported pertussis incidence by age group: 1990-2011



Waning protection from Dtap shots in early childhood

- 92-98% vaccine effectiveness (VE) w/in 3 years of fifth dose
- VE 71% by five years after fifth dose

ORIGINAL CONTRIBUTION



Scan for Author Video Interview

Association of Childhood Pertussis With Receipt of 5 Doses of Pertussis Vaccine by Time Since Last Vaccine Dose, California, 2010

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PERTUSSIS REMAINS A POORLY controlled vaccine-preventable disease in the United States, despite a well-established childhood vaccination program and high coverage.¹ Although infants have substantially higher rates of pertussis compared with other age groups, data from the National Notifiable Diseases Surveillance System reflect a recent increase in the number of reported pertussis cases among children aged 7 to 10 years. In 2010, this age group had the second highest incidence of pertussis in the United States.² The changing epidemiology raises important questions about possible waning protection from the childhood acellular pertussis vaccine series.

After the diphtheria, tetanus, and whole-cell pertussis (DTwP) vaccine was introduced in the late 1940s, a dramatic decline occurred in the number of reported pertussis cases. However, whole-cell vaccine was commonly associated with local adverse events (eg, redness, swelling, and pain at the injection site) and less commonly with

Context In 2010, California experienced its largest pertussis epidemic in more than 60 years; a substantial burden of disease was noted in the 7- to 10-year-old age group despite high diphtheria, tetanus, and acellular pertussis vaccine (DTaP) coverage, indicating the possibility of waning protection.

Objective To evaluate the association between pertussis and receipt of 5 DTaP doses by time since fifth DTaP dose.

Design, Setting, and Participants Case-control evaluation conducted in 15 California counties. Cases (n=682) were all suspected, probable, and confirmed pertussis cases among children aged 4 to 10 years reported from January through December 14, 2010; controls (n=2016) were children in the same age group who received care from the clinicians reporting the cases. Three controls were selected per case. Vaccination histories were obtained from medical records and immunization registries.

Main Outcome Measures Primary outcomes were (1) odds ratios (ORs) for the association between pertussis and time since completion (<12, 12-23, 24-35, 36-47, 48-59, or ≥60 months) of the 5-dose DTaP series. Logistic regression was used to calculate ORs, accounting for clustering by county and clinician, and vaccine effectiveness (VE) was estimated as $(1 - \text{OR}) \times 100\%$.

Results Among cases and controls, 53 (7.8%) and 19 (0.9%) had not received any pertussis-containing vaccines, respectively. Compared with controls, children with pertussis had a lower odds of having received all 5 doses of DTaP (OR, 0.11; 95% CI, 0.06-0.21 [estimated VE, 88.7%; 95% CI, 79.4%-93.8%]). When children were categorized by time since completion of the DTaP series, using an unvaccinated reference group, children with pertussis compared with controls were less likely to have received their fifth dose within the prior 12 months (19 [2.8%] vs 354 [17.6%], respectively; OR, 0.02; 95% CI, 0.01-0.04 [estimated VE, 98.1%; 95% CI, 96.1%-99.1%]). This association was evident with longer time since vaccination, with ORs increasing with time since the fifth dose. At 60 months or longer (n=231 cases [33.9%] and n=288 controls [14.3%]), the OR was 0.29 (95% CI, 0.15-0.54 [estimated VE, 71.2%; 95% CI, 45.8%-84.8%]). Accordingly, the estimated VE declined each year after receipt of the fifth dose of DTaP.

Conclusion Among children in 15 California counties, children with pertussis, compared with controls, had lower odds of having received the 5-dose DTaP series; as time since last DTaP dose increased, the odds increased, which is consistent with a progressive decrease in estimated vaccine effectiveness each year after the final dose of pertussis vaccine.

JAMA. 2012;308(20):2126-2132

www.jama.com

For editorial comment see p 2149.
Author video interview available at www.jama.com.

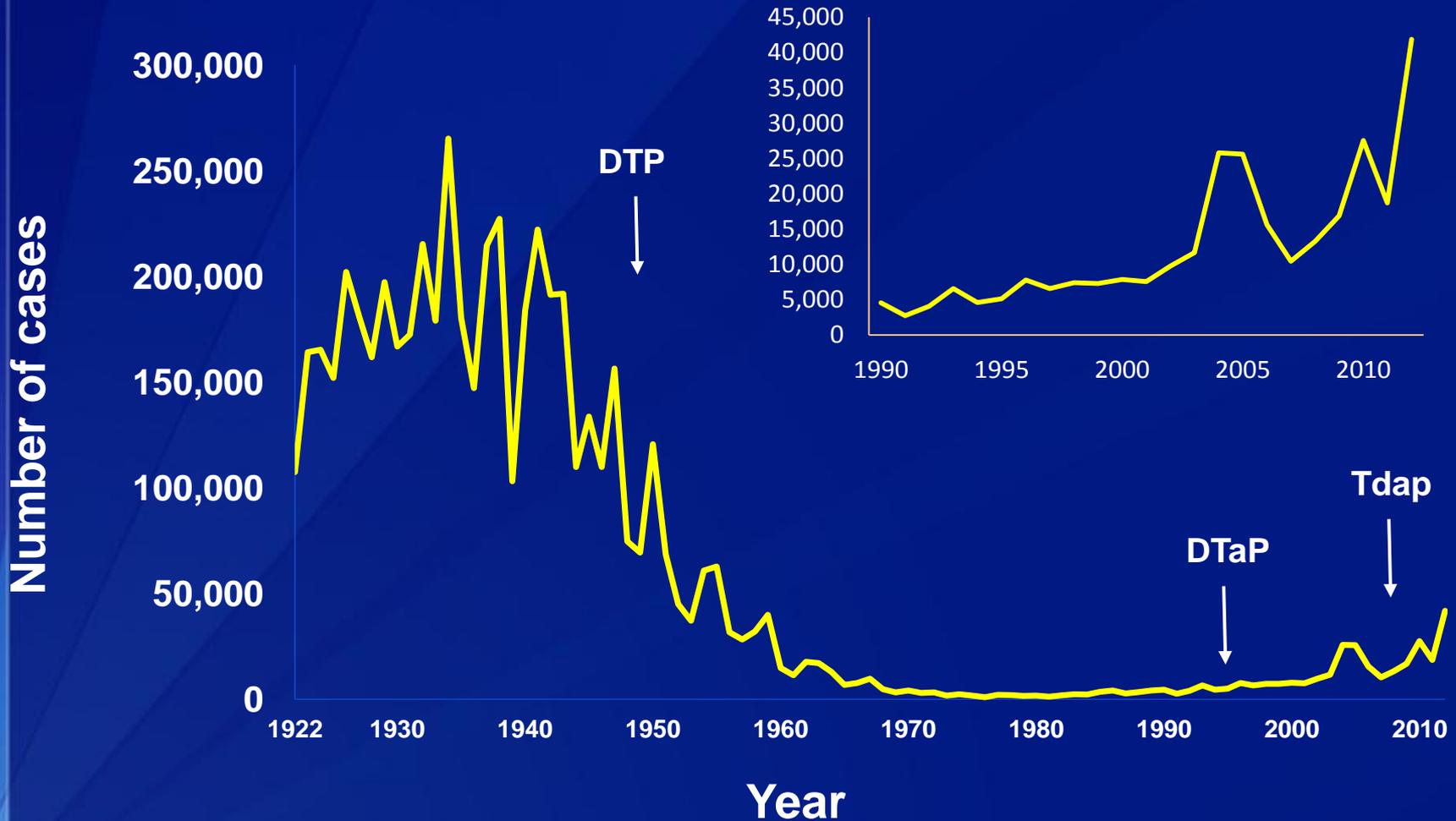
2126 JAMA, November 28, 2012—Vol 308, No. 20

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more serious adverse events.^{3,4} These safety concerns prompted development and licensure of diphtheria, tetanus, and acellular pertussis (DTaP) vaccines, which were recommended by the

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Reported NNDSS pertussis cases: 1922-2012*



*2012 data are provisional.

SOURCE: CDC, National Notifiable Diseases Surveillance System and Supplemental Pertussis Surveillance System and 1922-1949, passive reports to the Public Health Service

Pertussis Summary – “It’s Complicated!”

- ❑ **Pertussis incidence has increased since 1980s**
- ❑ **Resurgence of childhood disease despite high DTaP coverage**
 - Excellent initial vaccine effectiveness
 - Moderate and immediate waning of immunity
- ❑ **Re-emergence of adolescent disease**
 - Tdap effectiveness about 70%^{1, 2}, duration of protection unknown
 - Tdap boost in DTaP recipients may wane more quickly³
- ❑ **Switch to aP vaccines is changing pertussis epidemiology**
 - i.e. a problem of susceptibility *despite* vaccination
 - Waning immunity driving disease incidence

¹Clin Infect Dis. 2010 Aug 1;51(3):315-21.

²Ped Infect Dis J 2009;28(2):152-153.

³CDC. MMWR 2012;61(28);517-522.

Maximizing the Vaccination Program

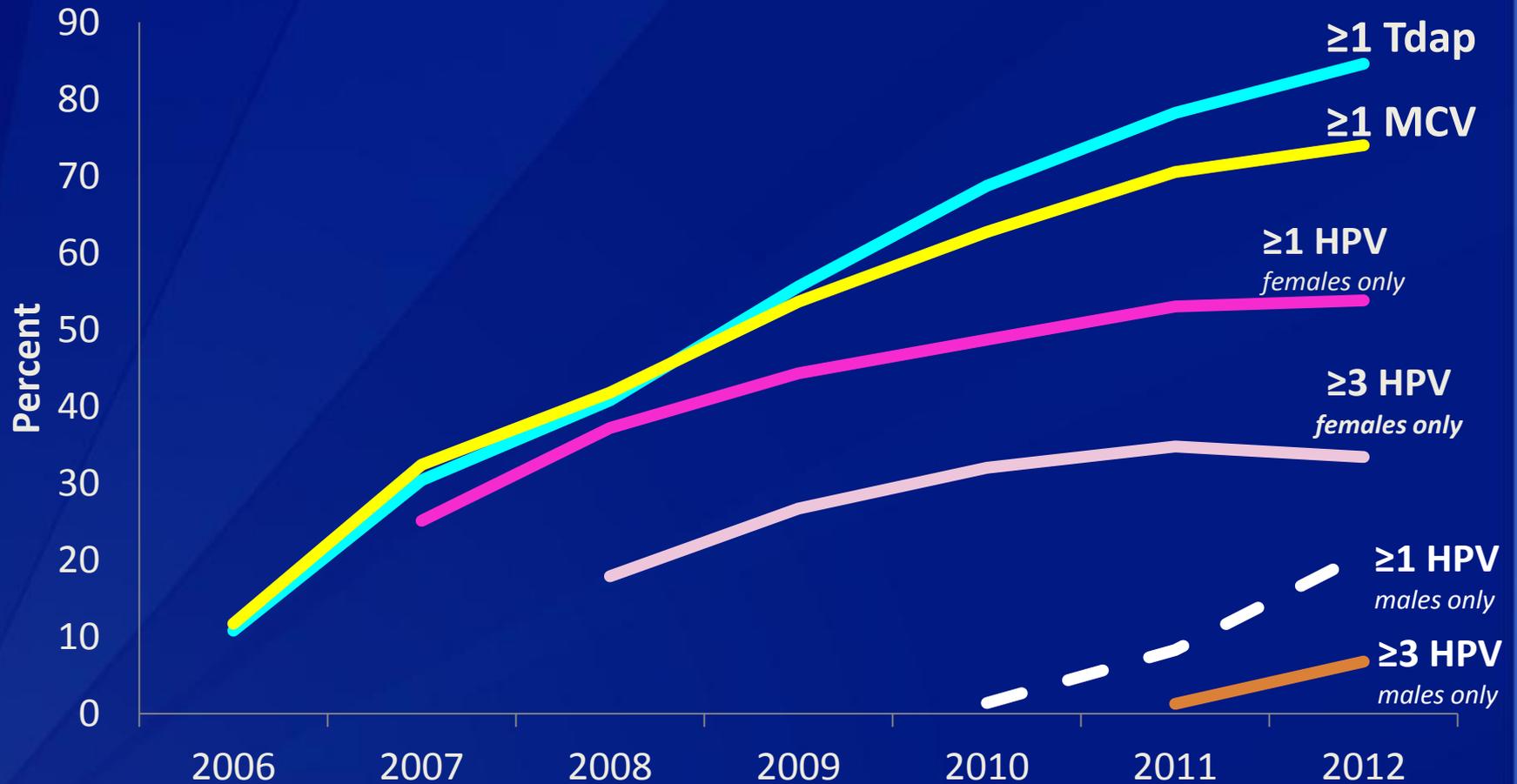


- Sustaining DTaP coverage
- Increasing Tdap coverage
- **Vaccinating to protect infants**

Hitting a Wall

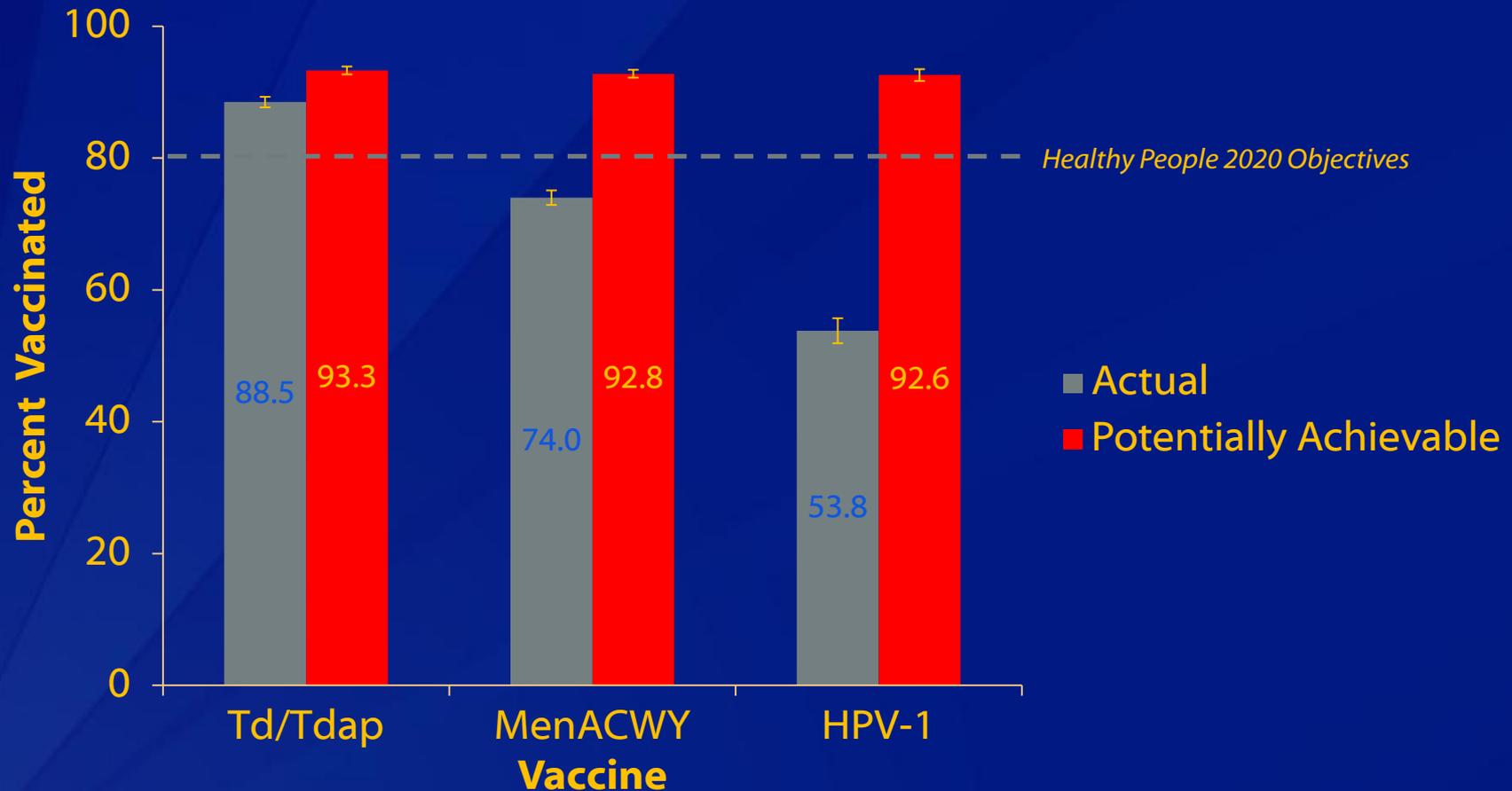


Vaccination trends in 13-17 yr. olds, US, 2006-2012



Too Many Missed Opportunities!

Actual v potential coverage if each vaccine was given whenever another teen vaccine was provided: NIS-Teen 2012



HPV-1 coverage is among females only.

Source: NIS Teen 2012; Slide courtesy Shannon Stokley (CDC/NCIRD/ISD)

Top 5 reasons* for not vaccinating teen, among parents with no intention to vaccinate in the next 12 months, NIS-Teen 2012

| Parents of girls | | Parents of boys | |
|-----------------------------|-------|-------------------------|-------|
| Not needed or necessary | 19.0% | Not recommended | 23.9% |
| Not recommended | 15.0% | Not needed or necessary | 22.3% |
| Safety concern/side effects | 14.2% | Lack of knowledge | 17.5% |
| Lack of knowledge | 13.6% | Not sexually active | 8.6% |
| Not sexually active | 11.5% | Child is male | 5.4% |

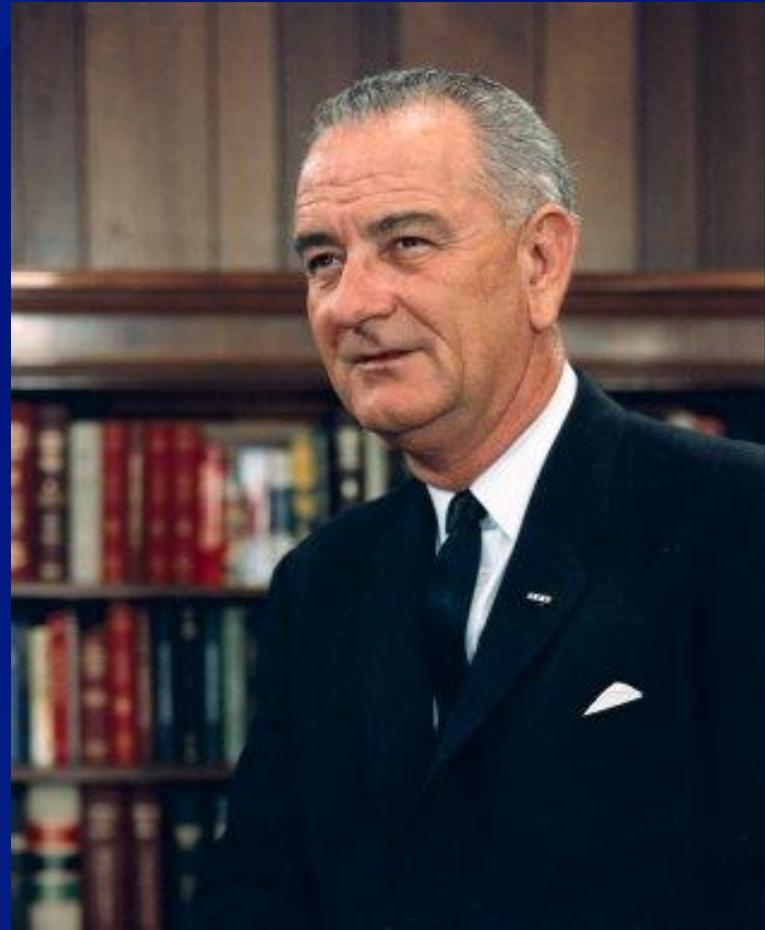
*Response categories are not mutually exclusive.

Interpretation of HPV Uptake Situation

- ❑ **Plateau in HPV uptake in girls is persisting**
- ❑ **Provider “hesitancy” (voicing weak recommendations)**
 - “Won’t go to the mat for this one”
 - Possible reasons: haven’t bought in to rationale for 11-12 yr timing, cost, competing priorities, communication skills
- ❑ **Parental attitudes appear open to influence of providers – which requires clinicians to be convinced, confident and communicating effectively**
- ❑ **System interventions (e.g., HEDIS, AFIX) won’t succeed without clinician commitment**

'The ultimate victory will depend on the hearts and minds...'

Lyndon Baines Johnson



Where we want to be



DEPARTURES

| TIME | TO | FLIGHT NO. | GATE | REMARKS |
|-------|--------------|------------|------|-----------|
| 07:35 | LOS ANGELES | TK3946 | A1 | ON TIME |
| 07:40 | FRANKFURT | LH3211 | C3 | ON TIME |
| 07:45 | TORONTO | GT4638 | A2 | ON TIME |
| 07:45 | LONDON | KV3323 | B4 | DELAYED |
| 07:50 | NEW YORK | F02753 | A6 | DELAYED |
| 07:55 | SYDNEY | LV2317 | A5 | ON TIME |
| 08:05 | PARIS | 609032 | B1 | ON TIME |
| 08:15 | OSLO | F85810 | C4 | ON TIME |
| 08:20 | BUENOS AIRES | 067792 | A4 | DELAYED |
| 08:25 | BARCELONE | 605433 | C1 | ON TIME |
| 08:35 | TOKYO | LY4488 | B2 | ON TIME |
| 08:40 | MOSKOW | KF3280 | B4 | CANCELLED |
| 08:50 | ZURICH | TH7252 | A4 | ON TIME |
| 08:55 | MIAMI | LX3100 | A2 | ON TIME |
| 09:05 | HONG KONG | ED4267 | C4 | ON TIME |
| 09:10 | ROME | AZ1408 | B3 | DELAYED |
| 09:15 | HONOLULU | ER9319 | A1 | ON TIME |



Tools for Clinicians and Parents

- ❑ **Provider Resources for Vaccine Conversations with Parents**
 - www.cdc.gov/vaccines/conversations
- ❑ **Health Care Professional Home Page**
 - www.cdc.gov/vaccines/hcp
- ❑ **“Get the Picture” Childhood Video**
 - www.youtube.com/user/CDCStreamingHealth
- ❑ **Public awareness campaigns (Niiw, NIVW)**
 - Radio, TV , print PSAs



Protect Babies from Whooping Cough

If you're pregnant get a Tdap shot!

Whooping cough is deadly for babies



Pregnant women need to get a Tdap



Create a circle of protection around your baby

4 out of 5 babies who get whooping cough catch it from someone at home*

Everyone needs whooping cough vaccine:

Parents

Brothers &

Tips and Time-savers for Talking with Parents about HPV Vaccine



Recommend the HPV vaccine series the same way you recommend the other adolescent vaccines. For example, you can say "Your child needs these shots today," and name all of the vaccines recommended for the child's age.

Parents may be interested in vaccinating, yet still have questions. Taking the time to listen to parents' questions helps you save time and give an effective response. CDC research shows these straightforward messages work with parents when discussing HPV vaccine—and are easy for you or your staff to deliver.

- CDC RESEARCH SHOWS:** The "HPV vaccine is cancer prevention" message resonates strongly with parents. In addition, studies show that a strong recommendation from you is the single best predictor of vaccination.
- TRY SAYING:** HPV vaccine is very important because it prevents cancer. I want your child to be protected from cancer. That's why I'm recommending that your daughter/son receive the first dose of HPV vaccine today.
- CDC RESEARCH SHOWS:** Disease prevalence is not understood, and parents are unclear about what the vaccine actually protects against.
- TRY SAYING:** HPV can cause cancers of the cervix, vagina, and vulva in women, cancer of the penis in men, and cancers of the anus and the mouth or throat in both women and men. There are about 26,000 of these cancers each year—and most could be prevented with HPV vaccine. There are also many more precancerous conditions requiring treatment that can have lasting effects.
- CDC RESEARCH SHOWS:** Parents want a concrete reason to understand the recommendation that 11–12 year olds receive HPV vaccine.
- TRY SAYING:** We're vaccinating today so your child will have the best protection possible long before the start of any kind of sexual activity. We vaccinate people well before they are exposed to an infection, as is the case with measles and the other recommended childhood vaccines. Similarly, we want to vaccinate children well before they get exposed to HPV.
- CDC RESEARCH SHOWS:** Parents may be concerned that vaccinating may be perceived by the child as permission to have sex.
- TRY SAYING:** Research has shown that getting the HPV vaccine does not make kids more likely to be sexually active or start having sex at a younger age.

www.cdc.gov/vaccines

Where we want to be: Reaching the moon

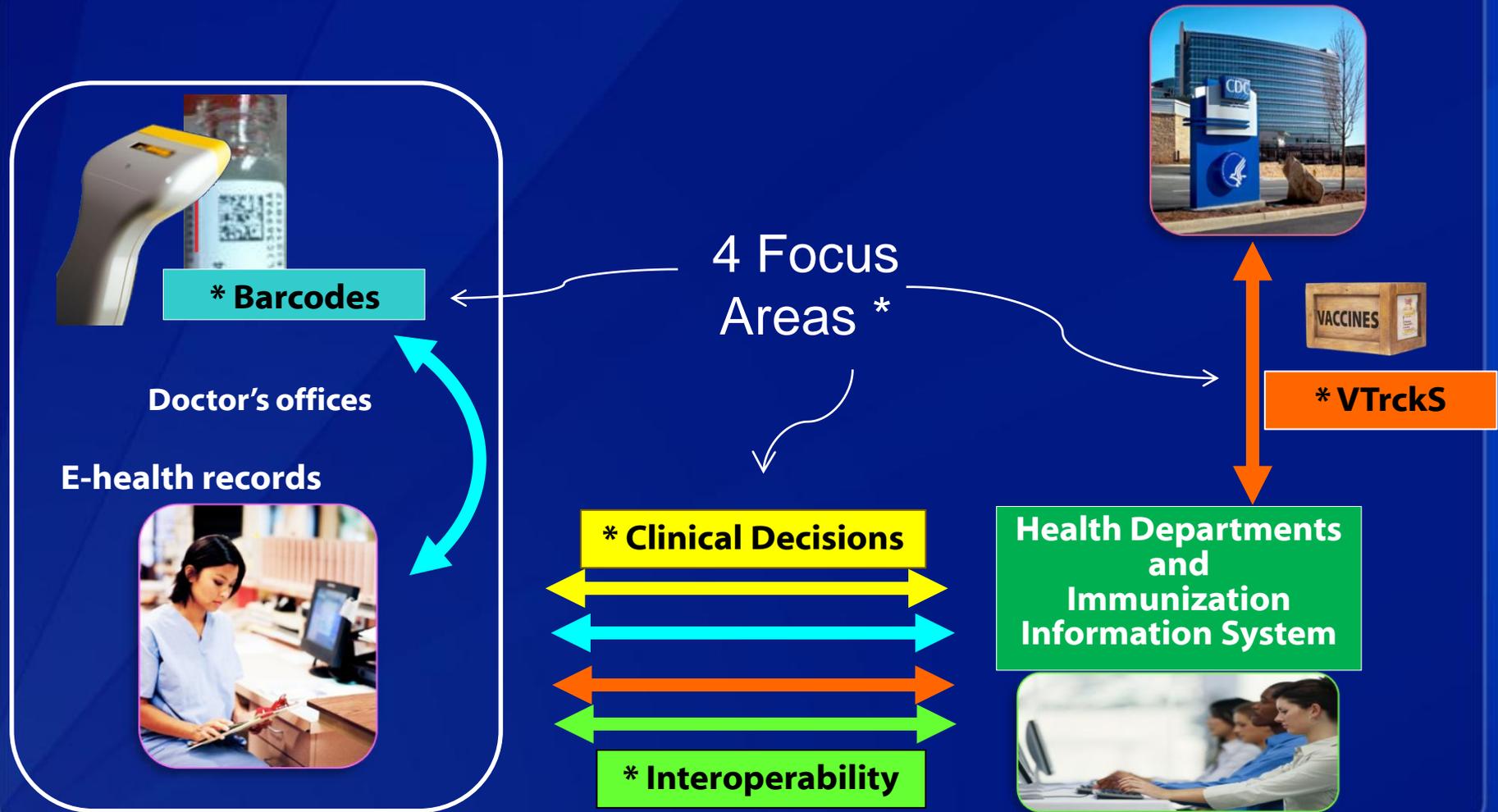
Setting and Achieving Ambitious Goals

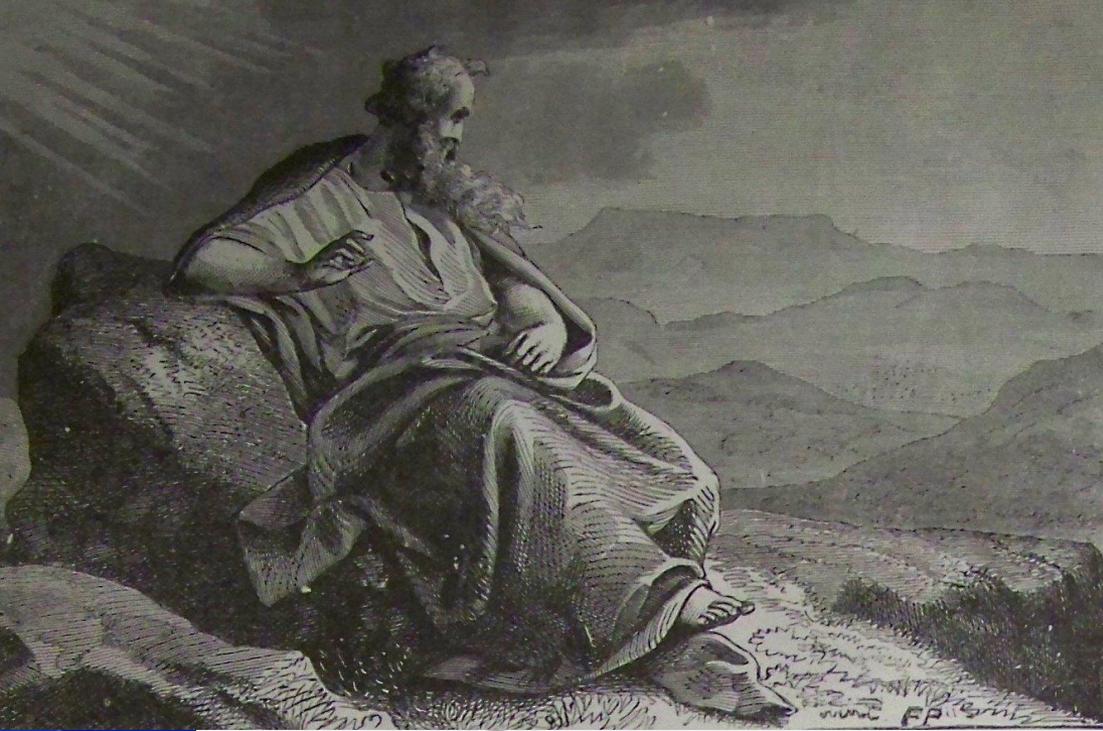
I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth.

- President John F. Kennedy, May 25, 1961



Modernizing Immunization Practice through IT Investments





Where we want to be:
The Promised Land



Immunization and Equity

- ❑ ~25 years ago resurgent measles epidemics in LA, Houston, and other US cities led to recognition that many poor children were missing vaccines due to lack of insurance
- ❑ The Vaccines for Children Program, implemented in 1994, has nearly eliminated racial, ethnic, and economic disparities in infant immunization in America

Today, more than 80 percent of the world's children receive vaccines – I believe around 82 per cent as measured by the 3rd dose of the DTP3 vaccine. That's around four out of every five children.

But what of the fifth child – the child we don't reach?

Tony Lake
UNICEF Executive Director



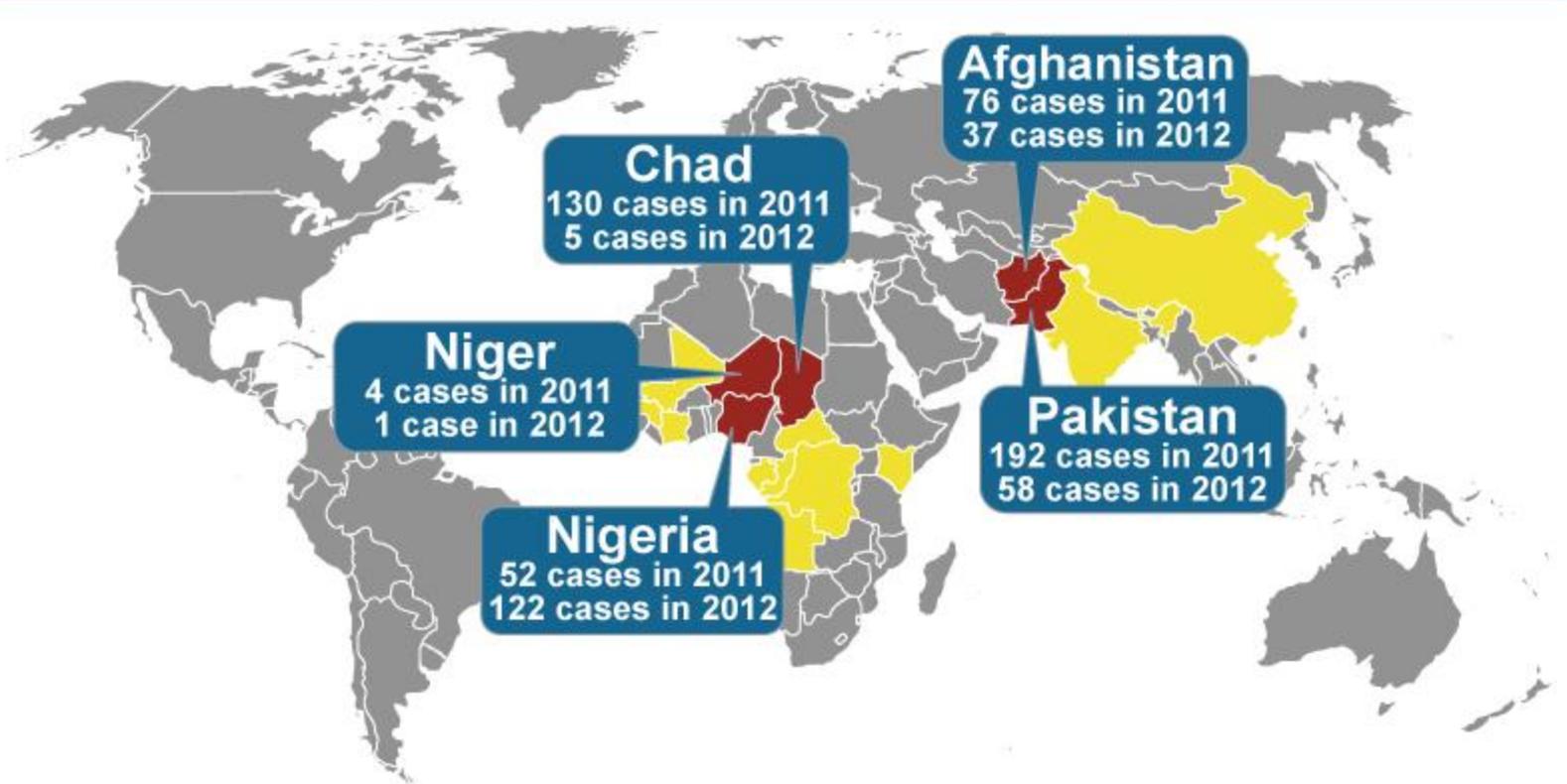


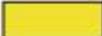
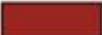
**Same children
are chronically
missed**

In 2012, the world got closer than ever to polio eradication

2011
11 outbreaks
Cases in 16 countries

2012
1 outbreak
Cases in 5 countries



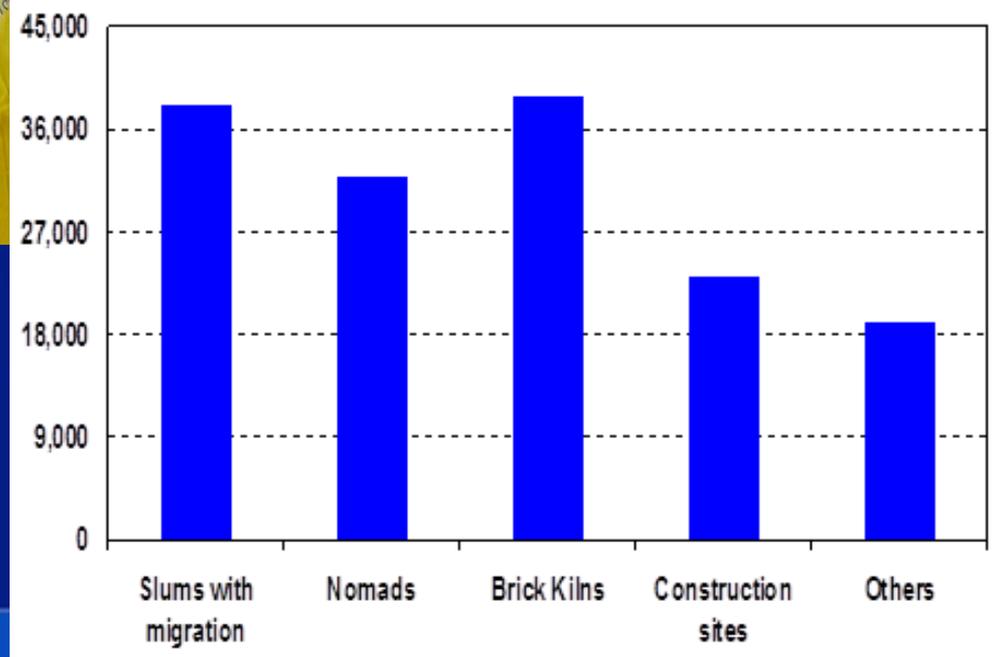
-  Countries with cases in 2011 but none in 2012 (n=11)
-  Countries with cases in 2011 and 2012 (n=5)

**As of 27 February 2013

Mapping and reaching migrants for polio eradication in India, 2011



sites w/ migrants: 162,000
children < 5 yrs in sites : ~ 4.2 M





2/11/12

The Distance Between *where we are and where we want to be*

- Knowing that *we aren't there yet* is the first step
- Figuring out where we should be going is next
- Measuring our progress along the way is essential
- Together we can get there
- Together we will get there