Vision of a Vaccine Hero: The Impact of Vaccines

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National Center for Immunization and Respiratory Diseases (NCIRD) Areas of Focus

- Maintain and strengthen childhood immunizations
- Increase vaccination coverage (HPV and maternal vaccination)
- New vaccines (RSV and shingles)
- Influenza (improving vaccine virus selection)
- New technology and systems (Advanced Molecular Detection and lab enhancement)
- Respiratory disease detection and response (Global Health Security, *Legionella*, Influenza, and MERS)
Vaccine Successes
Number of Diseases Prevented by Vaccines Included in the Routine Child/Adolescent Immunization Schedule

- **1964 (6)**
  - Polio
  - Diphtheria
  - Pertussis
  - Tetanus
  - Measles
  - Rubella
  - Mumps

- **1985 (7)**
  - Polio
  - Diphtheria
  - Pertussis
  - Tetanus
  - Measles
  - Rubella
  - Mumps

- **1995 (10)**
  - Polio
  - Diphtheria
  - Pertussis
  - Tetanus
  - Measles
  - Rubella
  - Mumps
  - Hib (infant)
  - HepB
  - Varicella

- **2016 (16)**
  - Polio
  - Diphtheria
  - Pertussis
  - Tetanus
  - Measles
  - Rubella
  - Mumps
  - Hib (infant)
  - HepB
  - HepA
  - Varicella
  - Pneumococcal
  - Influenza
  - Meningococcal
  - Rotavirus
  - HPV
## Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases

<table>
<thead>
<tr>
<th>Disease</th>
<th>20th Century Annual Morbidity†</th>
<th>2016 Reported Cases † †</th>
<th>Percent Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smallpox</td>
<td>29,005</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>21,053</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Measles</td>
<td>530,217</td>
<td>69</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Mumps</td>
<td>162,344</td>
<td>5,311</td>
<td>99%</td>
</tr>
<tr>
<td>Pertussis</td>
<td>200,752</td>
<td>15,737</td>
<td>91%</td>
</tr>
<tr>
<td>Polio (paralytic)</td>
<td>16,316</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Rubella</td>
<td>47,745</td>
<td>5</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Congenital Rubella Syndrome</td>
<td>152</td>
<td>1</td>
<td>99%</td>
</tr>
<tr>
<td>Tetanus</td>
<td>580</td>
<td>33</td>
<td>96%</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em></td>
<td>20,000</td>
<td>22*</td>
<td>&gt; 99%</td>
</tr>
</tbody>
</table>

† JAMA. 2007;298(18):2155-2163
† † CDC. MMWR January 6, 2017/ 64(52);ND-924 – ND-941. (MMWR 2016 week 52 provisional data)

* Haemophilus influenzae type b (Hib) < 5 years of age. An additional 11 cases of Hib are estimated to have occurred among the 222 reports of Hib (< 5 years of age) with unknown serotype.

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

Abbreviations: MMR = measles, mumps, and rubella vaccine; DTP/DTaP = diphtheria, tetanus toxoids, and pertussis vaccine / diphtheria, tetanus toxoids, and acellular pertussis vaccine; Hib = *Haemophilus influenzae* type b vaccine; FS = full series; HepB = hepatitis B vaccine; PCV = pneumococcal conjugate vaccine; HepA = hepatitis A vaccine.
Very Few U.S. Toddlers Have Received No Vaccines

HP2020 Goal:
Protecting Children from Serious Disease through 1st and 2nd Generation Pneumococcal Conjugate Vaccines (PCV)


*PCV13 serotype: 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F

Active Bacterial Core surveillance data, 1998–2015, unpublished

Childhood Immunization Provides Big Savings

CDC estimates that vaccination of U.S. children born between 1994 and 2016 will:

- Prevent 381 million illnesses
- Prevent 24.5 million hospitalizations
- Help avoid 855,000 early deaths
- Save nearly $360 billion in direct costs and $1.65 trillion in total society costs
Vaccines for Preteens and Teens

Adolescent Vaccination Coverage
United States, 2006-2015

Source: Reagan-Steiner, et al. MMWR; August 26, 2016 / 65(33);850–858
Increases in HPV Vaccination Among Boys

Number of HPV-Attributable Cancers Averted Over 100 Years of 9-Valent HPV Vaccination Program

Total U.S. population

- Estimates calculated using published model (Chesson et al, Hum Vaccin Immunother 2016), with modified coverage assumptions. Coverage levels shown (39.7%, 21.6%, and 80%) refer to coverage among ages 13-17. For females, the annual probability of vaccination in the current coverage scenario was modeled as 20.9% for age 12, 8.9% for ages 13 to 18, and 0.89% for ages 19 to 26. For males, these values were 10.5%, 4.4%, and 0.44% (through age 21), respectively. In the 80% coverage scenario, the annual probability of vaccination was 73.8% for age 12, 8.9% for ages 13 to 18, and 0.89% for those 19 and older (through age 21 for men and age 26 for women).
Immunization Challenges
Children living below the poverty level continued to have lower coverage with rotavirus, PCV, Hib, and DTaP vaccines

Children living in more rural areas have lower coverage with DTaP, polio, varicella, PCV, hepatitis A, and rotavirus vaccines

CDC is currently working to identify reasons for disparities and evidence-based interventions
Measles Cases in the U.S.

- Although year-round transmission eliminated from U.S. cases still reported in U.S., including among adults
  - Most cases importation-related
- Measles is still common in many parts of the world including some countries in Europe, Asia, the Pacific, and Africa
- The majority of people who got measles were unvaccinated

Measles Cases and Outbreaks. https://www.cdc.gov/measles/cases-outbreaks.html
Provisional total for 2016: 70 cases reported by 15 states
- 29 cases in Arizona
- Total of 4 outbreaks reported in 2016 (defined as 3 or more linked cases)
- 72% of cases reported were outbreak-related.

So far in 2017 (January 1 to March 25, 2017)
- 28 cases reported by 10 states (CA, CO, FL, MI, NE, NJ, NY, PA, UT, WA)
- 2 outbreaks reported
- 48% of cases are outbreak related
Reported Mumps Cases, United States, Vaccine Era, 1968-2016

Source: National Notifiable Diseases Surveillance System (cases, passive surveillance); National Immunization Survey (NIS) (1st dose coverage 19-35 year olds), National Health Interview Survey & NIS-Teen (2nd dose coverage); 2016 case data is preliminary (Feb 9, 2017) and subject to change.
Reported Mumps Cases and Outbreaks, United States, 2016 (n=5,642)

Stars indicate states that notified CDC of mumps outbreaks
Source: National Notifiable Diseases Surveillance System (cases, passive surveillance), preliminary (Feb 9, 2017); state reports to CDC (outbreaks)
Use of the mumps vaccine reduced disease levels ~99% versus pre-vaccine era in the United States

Since 2006, mumps outbreaks have occurred in highly 2-dose vaccinated populations

Current 2-dose schedule is sufficient for mumps control in the general population

Intense exposure settings and waning immunity appear to be risk factors for secondary vaccine failure

The benefit of a 3rd MMR dose still needs to be assessed

The Advisory Committee on Immunization Practices (ACIP) has established a Mumps Working Group
Pertussis Trends

- Pertussis cases have steadily increased in recent decades
- More than 20,000 cases per year in recent years:
  - 20,762 cases in 2015
  - 32,971 cases in 2014
  - 28,639 cases in 2013
  - 48,277 cases in 2012
- 580 cases in Arizona in 2015
- For U.S. infants under 1 year old:

Sources: https://www.cdc.gov/pertussis/surv-reporting/cases-by-year.html
https://www.cdc.gov/pertussis/surv-reporting.html
Pertussis Summary – “It’s Complicated!”

- Pertussis incidence has increased since 1980s
- Resurgence of childhood disease despite high DTaP coverage
  - Young infants at risk
  - Excellent initial vaccine effectiveness
  - Moderate and immediate waning of immunity
- Re-emergence of adolescent disease
  - Tdap effectiveness about 70%\textsuperscript{1, 2}, duration of protection unknown
  - Tdap boost in DTaP recipients may wane more quickly\textsuperscript{3}
- Switch to acellular pertussis vaccines is changing epidemiology
  - Waning immunity driving disease incidence
  - Contribution of pertactin-deficient strains

\textsuperscript{1}Clin Infect Dis. 2010 Aug 1;51(3):315-21.
\textsuperscript{3}CDC. MMWR 2012;61(28):517-522.
Low Maternal Vaccination Rates

- Coverage of recommended vaccines for pregnant women remains low—leaving a number of pregnant women and their infants at risk for complications from vaccine-preventable diseases

- Only 50.3% of women received influenza vaccination before or during pregnancy in 2014-2015\(^a\)

- Only 41.7% of pregnant women received Tdap vaccination from 2007-2013\(^b\)

\(^a\) Ding H. *MMWR Morb Mortal Wkly Rep.* 2015.
\(^b\) Kharbanda EO. *Vaccine.* 2016.
Vaccines for Preteens and Teens: HPV

Adolescent Vaccination Coverage
United States, 2006-2015

Source: Reagan-Steiner, et al. MMWR; August 26, 2016 / 65(33);850–858
Estimated Coverage With ≥ 1 Dose HPV Vaccine Among Females Aged 13-17 Years, by State – National Immunization Survey-Teen, United States, 2015
Estimated Coverage With ≥ 1 Dose HPV Vaccine Among Males Aged 13-17 Years, by State – National Immunization Survey-Teen, United States, 2015
Impact of Eliminating Missed Opportunities by Age 13 Years in Girls Born in 2000

Stokley et al. MMWR. 2014.
Reasons Parents Won’t Initiate HPV Vaccine Series for Their Children in the Next Year, NIS-Teen 2014

- Lack of knowledge
- Not needed or necessary
- Safety concern/Side effects
- Not recommended
- Not sexually active

Stokley et al. MMWR. 2014.
Evidence Supports Importance of Strong Recommendation from Clinicians:

- Parents value the HPV vaccine and clinicians underestimate the value that parents place on HPV vaccine
- Younger adolescents less likely to receive a strong recommendation
- An effective recommendation from a clinician is the main reason parents decide to vaccinate
- Recommend HPV vaccination the same way and on the same day you recommend meningococcal and Tdap vaccines
- Some parents may be interested in vaccinating, yet still have questions.
- Give an effective recommendation for HPV vaccine at age 11 or 12:

  “Now that your child is 11/12, he/she is due for three vaccines today. These will help protect him/her from the infections that can cause meningitis, HPV cancers, and pertussis. We’ll give those shots at the end of the visit. Do you have any questions for me?”

CDC and Smith et al. Vaccine. 2016.
“Now that Sophia is 11, she is due for three important vaccines. The first vaccine is to help prevent infection that can cause meningitis, which is very rare, but potentially deadly. The second vaccine helps prevent a very common infection, HPV, that can cause several kinds of cancer. The third vaccine is the “tetanus booster” which also protects against pertussis, so your child doesn’t get whooping cough, but also to protect babies too young to be vaccinated. We’ll give those shots at the end of the visit today and have Sophia stay seated or lying down for about 15 minutes afterwards. Do you have any questions for me?”
Recent Changes to Vaccine Recommendations
HPV Vaccine Recommendation

- CDC recommends routine vaccination at age 11 or 12 years to prevent HPV cancers
- The vaccination series can be started at age 9 years
- Two doses of vaccine are recommended
- The second dose of the vaccine should be administered 6 to 12 months after the first dose.

Prevalence of genital HPV in adults aged 18-69:
- Any strain: 45.2% (males) and 39.9% (females)
- High risk strains: 25.1% (males) and 20.4% (females)

Prevalence of oral HPV in adults aged 18-69:
- Any strain: 11.5% (males) and 3.3% (females)
- High risk strains: 6.8% (males) and 1.2% (females)
Incidence of Meningococcal Disease by Age and Serogroup: 2005–2012

ACIP Recommendations for Use of Serogroup B Meningococcal Vaccines

- Routine immunization of persons aged 10 years and older at “increased risk”
  - Complement deficiency (including eculizumab users)
  - Functional / anatomic asplenia
  - Microbiologists routinely exposed to the organism
  - Outbreak response

- No serogroup B vaccine preference

- This is a Category A or routine recommendation for all persons designated at “increased risk”

- Targets persons at increased risk, small populations
ACIP Recommendations for Use of Serogroup B Meningococcal Vaccines: Adolescents

- Very low disease burden in 18–23 year olds
  - Estimated 30–50 cases (4–7 deaths) per year currently
  - More cases in non-college than college students

- Many unknowns about the vaccines (i.e., effect on carriage; duration of protection; strain coverage)

- MenB may be administered to healthy adolescents and young adults 16 through 23 years of age (preferred ages are 16 through 18 years) to provide short-term protection against most strains of serogroup B meningococcal disease
  - Discussion with healthcare provider and parent
  - Same vaccine for all doses
  - VFC (up to age 19 years) or insurance will cover cost

- This is a Category B recommendation that leaves vaccination up to individual clinical decision making: “Non-routine”
Maternal Tdap Vaccination

- Tdap vaccine (updated guidance Oct 2016\textsuperscript{a}):
  - Tdap should be administered between 27 and 36 weeks gestation, although it may be given at any time during pregnancy
  - Vaccinating earlier in the 27 through 36 week window will maximize passive pertussis antibody transfer to the infant

\textsuperscript{a} October 2016 meeting of the Advisory Committee on Immunization Practices
\textsuperscript{b} Grohskopf et al, MMWR. Morb Mortal Wkly. 2013.
Active Evaluation: Evaluating Safety of Tdap During Every Pregnancy

Clinical Study of Tetanus Toxoid, Reduced Diphtheria Toxoid, and Acellular Pertussis Vaccine (Tdap) Safety in Pregnant Women

- Active evaluation of the recommendation to vaccinate with Tdap during every pregnancy
- Rapid safety evaluation supports ongoing use of Tdap during every pregnancy

Kathryn Edwards, MD
Vanderbilt University School of Medicine
Monroe Carell, Jr. Children’s Hospital at Vanderbilt

Geeta Swamy, MD
Duke University Dept of ObGyn
Division of Maternal-Fetal Medicine

Karen Broder, MD
Immunization Safety Office
Centers for Disease Control and Prevention
Rates of Moderate+Severe Reactions Among Pregnant Women With and Without Prior Tdap Receipt within 7 days after vaccination

All comparisons for moderate/severe or severe reactions met non-inferiority criteria
Maternal Flu Vaccination

- Influenza vaccine:
  - CDC recommends that all women who are pregnant or who might be pregnant in the upcoming influenza season receive the influenza vaccine
  - Influenza vaccination can be administered at any time during pregnancy, before and during the influenza season\(^b\)

- CDC recommends influenza vaccine for pregnant women during each pregnancy to protect both infants and mothers

\(^a\) October 2016 meeting of the Advisory Committee on Immunization Practices
\(^b\) Grohskopf et al, MMWR. *Morb Mortal Wkly* .2013.
The Way Forward
Modernizing Infrastructure through Immunization Information Technology

- Interoperability between electronic health records and immunization information systems (IIS)
- Vaccine Tracking System (VTrckS)
- 2D Vaccine Barcodes
Most Children have Immunization Records in IIS but Adolescents and Adults Lag Behind

Participation in IIS 2006 – 2014

- Child
- Adolescent
- Adult
Benefits of IIS for Clinicians

- IIS foster enhanced care coordination, better health care, and improved patient outcomes.
- IIS can help you improve quality by:
  - Providing immunization histories of new patients
  - Supporting patient compliance by flagging missed opportunities and/or overdue immunizations
  - Identifying and managing panels of patients
  - Using filters to identify patients most in need of intervention
  - Developing clinician reports
  - Managing patient follow up
  - Generating care-planning tools for individual patients (e.g. vaccination forecasts, reminder/recall notifications)
  - Providing clinic-based vaccination coverage estimates
  - Producing official immunization records for compliance with school and daycare requirements

For clinicians who use electronic health records (EHRs), IIS in many states can electronically exchange immunization information in real-time to allow providers to access complete immunization histories and vaccination forecasts directly in their EHR.

HealthIT.gov. What is a disease/immunization registry? https://www.healthit.gov/providers-professionals/faqs/what-diseaseimmunization-registry
Maintain and Strengthen Childhood Immunization Rates
Monitoring of Vaccine Knowledge, Attitudes and Beliefs

- CDC monitors parental knowledge, attitudes, and beliefs about childhood vaccines through bi-annual surveys and polls
- Most parents vaccinate or intend to vaccinate according to the CDC recommended schedule
- Parents’ attitudes about vaccines have remained consistently positive on a national level
- Parents do have questions and concerns
- Health care professionals remain parents’ #1 trusted source of vaccine information
Vaccination Plan for Youngest Child

Which of the following best describes your plans for vaccinating your youngest child?

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>My child has already received all of the recommended vaccines</td>
<td>75.1% (71.2, 78.6%)</td>
<td>74.0% (69.2, 78.2%)</td>
<td>79.1% (75.4, 82.4%)</td>
</tr>
<tr>
<td>I intend to have my child receive all as scheduled</td>
<td>12.7% (10.1, 15.9%)</td>
<td>14.9% (11.5, 19.1%)</td>
<td>10.6% (8.3, 13.5%)</td>
</tr>
<tr>
<td>I intend to have my child receive all but will space-out or delay them</td>
<td>6.4% (4.6, 8.9%)</td>
<td>4.7% (2.8, 7.9%)</td>
<td>5.8% (4.0, 8.4%)</td>
</tr>
<tr>
<td>I intend to have my child receive some but not all</td>
<td>3.6% (2.4, 5.4%)</td>
<td>4.2% (2.8, 6.4%)</td>
<td>2.9% (1.8, 4.5%)</td>
</tr>
<tr>
<td>I intend to have my child receive none</td>
<td>2.2% (1.3, 3.9%)</td>
<td>2.1% (1.2, 3.9%)</td>
<td>1.6% (0.9, 2.9%)</td>
</tr>
</tbody>
</table>

- Source: Styles surveys of parents with one or more child under 7 years of age.
## Vaccine Information Source

What are the three most important sources of information that have helped you make decision about your youngest child’s vaccinations?

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>My child’s HCP (66.0%)</td>
<td>My child’s HCP (76.0%)</td>
<td>My child’s HCP (82.4%)</td>
</tr>
<tr>
<td>2</td>
<td>Family (44.8%)</td>
<td>Family (53.2%)</td>
<td>Family (45.4%)</td>
</tr>
<tr>
<td>3</td>
<td>My child’s other parent (22.7%)</td>
<td>My child’s other parent (29.7%)</td>
<td>My child’s other parent (30.9%)</td>
</tr>
<tr>
<td>4</td>
<td>AAP (18.8%)</td>
<td>AAP (24.2%)</td>
<td>CDC (30.1%)</td>
</tr>
<tr>
<td>5</td>
<td>Friends (16.8%)</td>
<td>Friends (23.8%)</td>
<td>AAP (29.1%)</td>
</tr>
<tr>
<td>6</td>
<td>Internet (15.9%)</td>
<td>CDC (22.3%)</td>
<td>Internet (16.4%)</td>
</tr>
<tr>
<td>7</td>
<td>CDC (15.8%)</td>
<td>Internet (20.8%)</td>
<td>Friends (15.9%)</td>
</tr>
<tr>
<td>8</td>
<td>Traditional media (4.4%)</td>
<td>Traditional media (5.5%)</td>
<td>Traditional media (7.2%)</td>
</tr>
<tr>
<td>9</td>
<td>Complementary HCP (0.7%)</td>
<td>Complementary HCP (3.5%)</td>
<td>Complementary HCP (6.1%)</td>
</tr>
</tbody>
</table>

Source: Styles surveys of parents with one or more child under 7 years of age.
## Vaccine Questions Parents Ask

<table>
<thead>
<tr>
<th>Question</th>
<th>2012 (N = 779)</th>
<th>2015 (N = 749)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighted Est. (95% CI)</td>
<td>Missing: n = 16</td>
<td>Missing: n = 8</td>
</tr>
<tr>
<td>How many vaccines will my child get today*</td>
<td>61.6% (45.0, 75.9%)</td>
<td>42.9% (25.5, 62.2%)</td>
</tr>
<tr>
<td>Which vaccines will my child get today*</td>
<td>52.2% (35.4, 68.5%)</td>
<td>35.2% (19.5, 54.9%)</td>
</tr>
<tr>
<td>How likely is there to be side effects*</td>
<td>44.6% (28.5, 61.9%)</td>
<td>41.2% (23.7, 61.2%)</td>
</tr>
<tr>
<td>How harmful/serious are the side effects*</td>
<td>41.0% (25.2, 58.9%)</td>
<td>27.4% (14.0, 46.8%)</td>
</tr>
<tr>
<td>What is normal to expect the day after</td>
<td>38.2% (23.1, 55.9%)</td>
<td>40.5% (23.4, 60.8%)</td>
</tr>
<tr>
<td>What are the side effects I should look for</td>
<td>37.3% (22.4, 55.1%)</td>
<td>29.8% (15.5, 49.6%)</td>
</tr>
<tr>
<td>Can it be delayed until they are older</td>
<td>33.8% (19.3, 52.0%)</td>
<td>28.2% (14.7, 47.2%)</td>
</tr>
<tr>
<td>Does the child really need it*</td>
<td>25.4% (13.3, 43.0%)</td>
<td>21.6% (9.6, 41.5%)</td>
</tr>
<tr>
<td>Has provider vaccinated his/her own child*</td>
<td>13.1% (4.4, 32.9%)</td>
<td>9.8% (3.6, 24.1%)</td>
</tr>
<tr>
<td>Is it required or optional for daycare/school*</td>
<td>10.2% (4.4, 21.8%)</td>
<td>16.0% (6.3, 35.1%)</td>
</tr>
<tr>
<td>Does provider recommend it</td>
<td>8.6% (3.3, 20.5%)</td>
<td>11.8% (4.0, 29.7%)</td>
</tr>
<tr>
<td>Usually don’t ask questions*</td>
<td>8.4% (2.8, 22.6%)</td>
<td>7.1% (1.7, 24.8%)</td>
</tr>
<tr>
<td>How serious is the disease it prevents*</td>
<td>5.0% (1.6, 14.3%)</td>
<td>12.1% (4.5, 28.7%)</td>
</tr>
</tbody>
</table>

* p-value < 0.05

Source: Styles surveys of parents with one or more child under 7 years of age.
How Can We Maintain and Increase Immunization Rates?

- Convene, educate, and partner with healthcare and community organizations to make increasing immunization coverage a priority

- Implement effective strategies:
  - Support AFIX focused on adolescent and childhood vaccination
  - Use EHR/EMR prompts as reminders/cues
  - Promote Adult Immunization Practice Standards
  - Use HPV and adult immunization as a quality measure

- Support STRONG and EFFECTIVE RECOMMENDATIONS for all vaccines

- Educate prenatal healthcare professionals

- Share data—what gets measured, gets done
Knowing the Vaccination Rates in Your Community is Important

- Unvaccinated people tend to cluster and put communities at risk for outbreaks of diseases like measles
- Arizona is making vaccination data available online so you can see local vaccine coverage and vaccine exemption data
Very little low-hanging fruit
Innovative vaccine technology
New vaccines cost more
Compared to prior successes
Free CDC Resources
Provider Resources for Vaccine Conversations with Parents

- Taking to Parents about Vaccines
- Understanding Vaccines and Vaccine Safety
  - How Vaccines Work
  - The Recommended Childhood Immunization Schedule
  - Ensuring the Safety of U.S. Vaccines
  - Understanding MMR Vaccine Safety
  - Understanding Thimerosal, Mercury, and Vaccine Safety
  - The Advisory Committee on Immunization Practices

www.cdc.gov/vaccines/conversations
You Are the Key to HPV Cancer Prevention

www.cdc.gov/HPV
Maternal Vaccination Resources

Making a strong vaccine referral to pregnant women

Strategies for healthcare professionals

1. Provide the best prenatal care to prevent pertussis

Strategies for healthcare professionals

Pertussis is on the rise and outbreaks are happening across the United States. In recent years, up to 4,000 infants have been hospitalized and about 15 to 20 babies die each year in the United States due to pertussis. Most of these deaths are among infants who are too young to be protected by the childhood pertussis vaccine series. That starts when infants are 2 months old.

The whooping cough vaccine can also help protect the baby later for up to 12 months after birth. This is important because a baby is not protected against whooping cough until after the first 4 months of age.

Strongly recommend Tdap to your patients during the 3rd trimester of each pregnancy.

www.cdc.gov/vaccines/pregnancy
Immunization Training for Clinicians

- **You Call the Shots**: Web-based modules that discuss vaccine-preventable diseases (VPDs) and explain the latest recommendations for vaccine use. CE/CME credit offered.

- **Current Issues in Immunization Net Conference (CIINC)**: Live 1-hour audio and visual presentations with on-demand replays. Offered 4-5 times per year. CE/CME credit offered.

- **Pink Book Webinar Series**: Online series of 15 1-hour webinars. Provides an overview of the principles of vaccination, general recommendations, immunization strategies for providers, and specific information about VPDs and vaccines. CE/CME credit offered.

- **Webcasts**: Topics include HPV, pertussis, flu, vaccine storage and handling, and more. CE credits offered.

www.cdc.gov/vaccines/ed
Questions?
Contact Information

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For more information, contact CDC
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