

Pertussis 2011: A Look at This Under-diagnosed Condition

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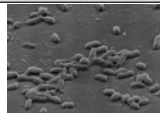
Objectives

- Upon completion of this lecture, the participant will be able to:
 - Discuss the signs and symptoms of pertussis
 - Identify the diagnosis and treatment options for the individual with suspected or confirmed pertussis
 - Develop an appropriate prevention plan to improve pertussis immunization rates within your community

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Pertussis: Highly Communicable, Frequently Overlooked

- Acute respiratory tract infection caused by *Bordetella pertussis* (gram-negative aerobic bacillus)¹
- Highly communicable (90%-100% secondary attack rate among susceptibles)^{2,3}
- Morbidity in all ages, especially infants^{1,2}
- The cause of 13%-17% of cases of prolonged cough in adolescents and adults⁴



Steve of Science Photo Researchers, Inc.

References: 1. Centers for Disease Control and Prevention (CDC). *MMWR*. 2005;55(RR-14):1-16. 2. CDC. *MMWR*. 2006;55(RR-17):1-37. 3. Long SS: Pertussis (*Bordetella pertussis* and *Bordetella parapertussis*). In: Kliegman RM, Behrman RE, Jenson HB, Stanton BF, eds. *Nelson Textbook of Pediatrics*. 18th edition. Philadelphia, PA: Saunders Elsevier;2007:1178-1182. 4. Cherry JD. *Pediatrics*. 2005;115(5):1422-1427.

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Pertussis

- 7 – 10 day incubation period
- Range of 4 – 21 days but can be as long as 42 days

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Pertussis

- Attaches itself to the cilia of the respiratory epithelial cells, producing toxins which paralyze the cilia
- Causes inflammation in the respiratory tract
- Decreases ability to clear respiratory secretions

www.cdc.gov/pertussis/clinical/disease-specifics.html accessed 08-29-2011

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Pertussis Epidemiology

- Reservoir^{1,2}
 - Adolescents and adults are an important source of infection for infants
- Transmission¹⁻³
 - Person-to-person through contact with respiratory droplets generated by coughing and sneezing
- Highly communicable³
 - Patients are most infectious during the catarrhal and early paroxysmal phases of illness and can remain infectious for ≥6 weeks

1. Centers for Disease Control and Prevention. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. Atkinson W, et al, eds. 11th ed. 2009:199-216.
2. Brooks DA, Clover R. *J Am Board Fam Med*. 2006;19:603-611.
3. Centers for Disease Control and Prevention. *MMWR*. 2006;55(RR-17):1-43.

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Various Stages of Pertussis

- Three stages
 - Stage 1: Catarrhal
 - Length 7-10; range 4 – 21 days
 - Runny nose
 - Low-grade fever
 - Mild, occasional cough

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Various Stages of Pertussis

- Three stages
 - Stage 2: Paroxysmal
 - Length: 1 – 6 weeks; may persist for 10 weeks
 - Paroxysms of cough, whoop
 - More common at night
 - Average 15 attacks per 24 hours
 - Thick mucous
 - Cyanosis
 - Vomiting

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Various Stages of Pertussis

- Three stages
 - Stage 3: Convalescent
 - Length: 7 – 10 days; range: 4 – 21 days
 - Gradual recovery
 - Less persistent paroxysms

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Reported Cases of Pertussis Are Highest in Adolescents and Adults ...

- ~10,000-25,000 cases of pertussis are reported in the US every year¹
- ~60% of reported cases occur among adolescents and adults²
- Reported cases are the tip of the iceberg
 - Estimated actual cases among adolescents and adults: 800,000-3.3 million per year³



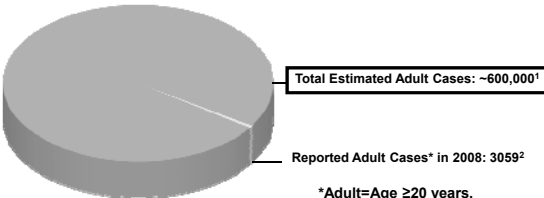
Courtesy of the Centers for Disease Control and Prevention (CDC).

“Despite increasing awareness and recognition of pertussis as a disease that affects adolescents and adults, pertussis is overlooked in the differential diagnosis of cough illness in this population.”⁴

References: 1. CDC. (Published July 9, 2009 for 2007). *MMWR*. 2007;56(53):1-94. 2. CDC. Data on file (Pertussis Surveillance Reports), 2003-2008. MKT 17595 (2003-2006); MKT18596 (2007); MKT 18761 (2008). 3. Cherry JD. *Pediatrics*. 2005;115(5):1422-1427. 4. CDC. *MMWR*. 2005;55(RR-14):1-16.

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Pertussis in Adults: Under Diagnosed



Total Estimated Adult Cases: ~600,000¹

Reported Adult Cases* in 2008: 3059²

*Adult=Age ≥20 years.

1. Cortese MM, et al. *Am J Prev Med*. 2007;32:177-185.
2. Centers for Disease Control and Prevention. *Pertussis surveillance report*—10/16/09.

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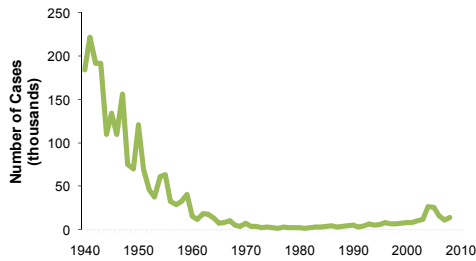
Pertussis Disease Among Adolescents and Adults

- Pertussis symptoms are often not specific and may vary in severity
- Infection may be asymptomatic, or may present as classic pertussis
- Persons with mild disease may transmit the infection
- Adolescents and adults are often the source of infection for children

Centers for Disease Control and Prevention. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. Atkinson W, et al, eds. 11th ed. 2009:199-216.

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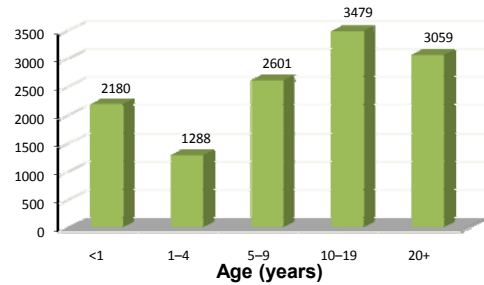
Pertussis—United States, 1940–2008



Centers for Disease Control and Prevention. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. Atkinson W, et al, eds. 11th ed. 2009:199-216.
Centers for Disease Control and Prevention. *MMWR*. 2008;56(53):1-94.
Centers for Disease Control and Prevention. *Pertussis surveillance report—10/16/09*.

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Reported Pertussis Cases, 2008



Total N=13,278; 671 cases with no reported age.

Centers for Disease Control and Prevention. *Pertussis surveillance report—10/16/09*.

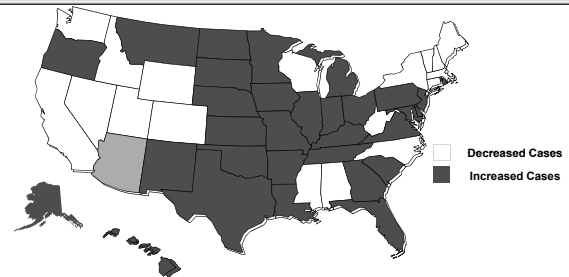
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Cases in 2010 and 2011

- Cases in 2010:
 - 27,550 cases of pertussis reported to CDC
 - Significant increase in cases
 - Number of reasons why:
 - Better recognition
- 2010:
 - Worse outbreak of pertussis in 63 years in California
 - 9,143 cases in California; 10 infant deaths

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Pertussis Cases by State (2007 Versus 2008)

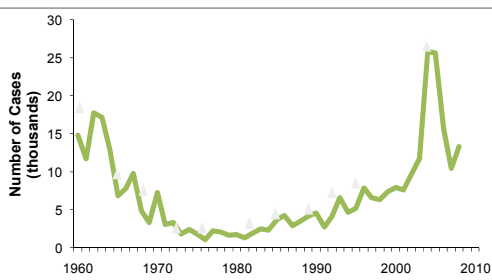


In 2008, the incidence of pertussis per 100,000 was 4.40 (compared with 3.53 for 2007). The total number of reported pertussis cases was 13,278 (compared with 10,454 in 2007).

1. Centers for Disease Control and Prevention. *Pertussis surveillance report—10/16/09*.

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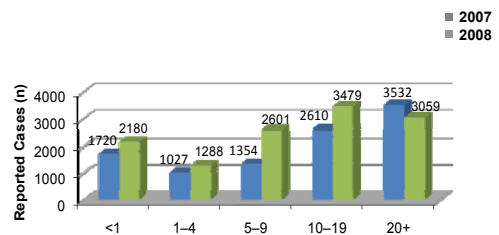
Pertussis Cyclical Activity—United States, 1960–2008



Centers for Disease Control and Prevention. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. Atkinson W et al, eds. 11th ed. 2009: Appendix G.
Centers for Disease Control and Prevention. *Pertussis surveillance report—10/16/09*.

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Reported Pertussis Cases by Age (2007 and 2008)



1. Centers for Disease Control and Prevention. *Pertussis surveillance report—10/16/09*.

2. Centers for Disease Control and Prevention. *Pertussis surveillance report—10/6/08*.

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The Very Young are Very Vulnerable to Complications of Pertussis

Pertussis complications, hospitalizations, and deaths¹

Age	No. with pertussis ^a	Hospitalization	Pneumonia	Seizures	Encephalopathy	Death
<6 months	7203	4543	847	103	15	56
6-11 months	1073	301	92	7	1	1
1-4 years	3137	324	168	36	3	1

^a Individuals with pertussis may have had 1 or more of the listed complications. Data are for 1997-2000.

“Unvaccinated or incompletely vaccinated infants aged <12 months have the highest risk for severe and life-threatening complications and death.”²

References: 1. CDC. *MMWR*. 2002;51(4):73-76. 2. CDC. *MMWR*. 2005;54(RR-14):1-16.

Pertussis Deaths: Youngest Infants Are at Greatest Risk

References: 1. Vitek CR, et al. *Pediatr Infect Dis J*. 2003;22(7):628-634. 2. CDC. *MMWR*. 2006;55(RR-17):1-37. 3. CDC. Data on file (Pertussis Surveillance Reports, 2001-2006, Weeks 1-52 [Final data]). MKT17595. 4. CDC. Data on file (2006 Pertussis Surveillance Report, Pamela Srivastava E-mail), March 2008. MKT15248. 5. CDC. Data on file (Pertussis Surveillance Report, Weeks 1-52, 2007 [Final data]). MKT16596. 6. CDC. Data on file (2008 Pertussis Surveillance Report, Amanda Faulkner e-mail), February 2010. MKT19489.

Preventing Pertussis Requires Breaking the Cycle of Transmission

- Pertussis is transmitted to and from all age groups¹
- Pertussis is readily transmitted within families^{1,2}
 - (90%-100% attack rate)^{3,4}
- Young infants get pertussis primarily from family members³
- Adolescents get pertussis from household contacts, schoolmates
- Adults get pertussis from work and household contacts; parents give pertussis to their infants

References: 1. CDC. *MMWR*. 2005;54(RR-14):1-15. 2. CDC. Pertussis. In: *Epidemiology and Prevention of Vaccine-Preventable Diseases*. (The Pink Book). Atkinson W, Wolfe S, Hamborsky J, McIntyre L, eds. 11th edition. Washington, DC: Public Health Foundation, 2009:199-216. 3. CDC. *MMWR*. 2006;55(RR-17):1-37. 4. Long SS: Pertussis (*Bordetella pertussis* and *Bordetella parapertussis*). In: Kliegman RM, Behrman RE, Jenson HB, Stanton BF, eds. *Nelson Textbook of Pediatrics*. 18th edition. Philadelphia, PA: Saunders Elsevier;2007:1178-1182.

Transmitting Pertussis to Infants Is a Family Matter¹

- Multicenter study in France, Germany, Canada, US
- Study population: 95 infants ≤6 months of age with lab-confirmed pertussis
- Household members were responsible for 76%-83% of transmission to infants in 44 cases where a source could be identified

“Implementation of the ACIP recommendation for adult and adolescent [Tdap] vaccination could substantially reduce the burden of infant pertussis, if high coverage rates among those in contact with young infants can be achieved.”

Reference: 1. Wendelboe AM, et al. *Pediatr Infect Dis J*. 2007;26(4):293-299.

Transmission to Infants—Rationale for CDC Recommendations

Although the source of pertussis in infants is often unknown, adult close contacts are an important source when a source is identified.

Age of Source Among Infants Aged <12 Months

N=219 source cases with known age, 1999-2002.

Bisgard KM, et al. *Pediatr Infect Dis J*. 2004;23:985-989.

Hospital Transmission of Pertussis

Location	Index Case	Secondary Cases
Minnesota, 2005 ¹	Unknown	122 cases (64 cases in healthcare personnel)
Texas, 2004 ²	Healthcare worker	11 newborns
Washington, 2004 ³	ED physician (hospital A) Respiratory therapist (hospital B)	5 cases among staff and visitors (hospital A) 3 cases among nurses (hospital B)
Pennsylvania, 2003 ^{4,5}	Infant	17 symptomatic cases in healthcare workers
Louisiana, 2004 ⁶	Infant*	3 infants diagnosed with pertussis

*The source believed to be an adult hospital worker or visitor.

1. Leekha S, et al. *Infect Control Hosp Epidemiol*. 2009;30:467-473. 2. CDC. *MMWR*. 2008;57(22):600-603. 3. Baggett HC, et al. *Infect Control Hosp Epidemiol*. 2007;28:537-543. 4. CDC. *MMWR*. 2005; 54:67-71. 5. Calugar A, et al. *Clin Infect Dis*. 2006;42:981-988. 6. Vrancken P, et al. *Am J Infect Control*. 2006;34:550-554.

Reported Symptoms in Adults With Pertussis¹⁻³

- Nasal discharge (catarrhal stage)¹
- Cough¹⁻³
- Pharyngeal symptoms³
- Sneezing attacks^{1,3}
- Low-grade fever¹
- Headaches³
- Influenza-like symptoms³
- Sinus pain³
- Cough paroxysms and posttussive vomiting³
- Sweating attacks³
- Sleep disturbance³
- Weight loss³

When the presentation of pertussis is not classic, pertussis can be clinically indistinguishable from other respiratory illnesses²

1. Centers for Disease Control and Prevention. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. Atkinson W, et al, eds. 11th ed. 2009:199-216. 2. Centers for Disease Control and Prevention. *MMWR*. 2006;55(RR-17):1-43. 3. Rothstein E, Edwards K. *Pediatr Infect Dis J*. 2005;24(suppl 5):S44-S47.

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For Unimmunized Adults, the Impact of Pertussis Can Be Significant

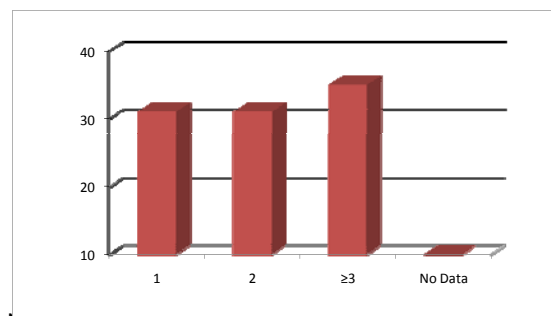
- 61% miss work
 - Mean number of missed days: 10 (range: 0.1–180)
- Full recovery may take more than 3 months
 - In one study, 61% of adult pertussis patients still had cough an average of 94 days after cough onset



Lee GM, Lett S, Schauer S, et al. *Clin Infect Dis*. 2004;39:1572-1580.

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Number of Medical Visits Needed in Adults with Pertussis



N=272 Massachusetts adults.

Centers for Disease Control and Prevention. *MMWR*. 2006;55(RR-17):1-43.

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Medical Management of Pertussis

- Chemoprophylaxis (antibiotics) of close contacts as public health response has limited effectiveness¹
- Antibiotics administered to those who may still be infectious eradicates the organism, reduces communicability, and if initiated early, may modify the course of the illness¹⁻³

1. Cortese MM et al. *Am J Prev Med*. 2007;32:177-185.

2. Centers for Disease Control and Prevention. *MMWR*. 2005;54(No. RR-14):1-16.

3. Centers for Disease Control and Prevention. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. Atkinson W, et al, eds. 11th ed. 2009:199-216.

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Diagnosis of Pertussis

- Culture:
 - Gold standard lab test
 - Most specific lab test for pertussis
 - Affected by collection, transportation techniques
 - Must be obtained from the posterior nasopharynx
 - Dacron or calcium alginate swab
 - Isolation rates: best in first 3 – 4 weeks of illness
 - Can take as long as 2 weeks for results
 - Negative test can still mean patient has disease

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PCR Testing

- Increased sensitivity
- Faster reporting
- Should be used in addition to, not instead of culture
- No PCR product has been approved by FDA therefore labs use different methods
- Specificity rates are often poor (high false +’s)

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Other Tests

- WBC count: often > 20,000 in infants
- Serologic testing:
 - May be helpful late in the course of the illness
 - No FDA approved serologic test
 - Measure antibodies that could result from infection or vaccination

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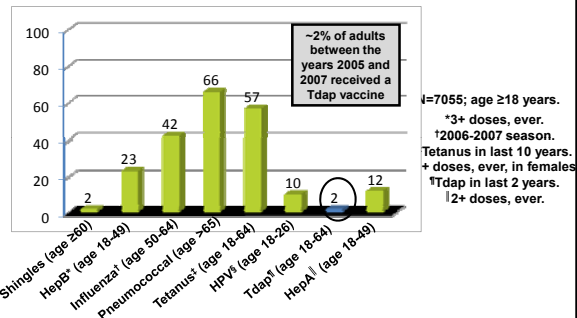
Treatment Options

- Macrolide products:
 - Erythromycin, clarithromycin, azithromycin
 - Ideally, should be started within 3 weeks of cough onset
 - Close contacts:
 - Administer antibiotics within 3 weeks of exposure
- Additional option:
 - Trimethoprim/sulfamethoxazole

www.cdc.gov/pertussis/clinical/disease-specifics.html accessed 08-29-2011

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Many Adults Fail to Receive Recommended Vaccinations



Centers for Disease Control and Prevention. National Immunization Survey—Adult, 2007. <http://www.cdc.gov/vaccines/stats-sur/nis/downloads/nis-adult-summer-2007.pdf>.

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Problem: Not Enough Adults Get Immunized Against Pertussis

Results from National Immunization Survey—Adult, 2007¹

Vaccine	Age Group	
	18-64	65+
Tetanus in past 10 years	57.2%	44.1%
Tdap in past 2 years	2.1%	—
Proportion of tetanus vaccinations in past 2 years given as Tdap	20.7%	—

Reference: 1. CDC. Vaccination coverage among U.S. adults, National Immunization Survey—Adult, 2007. <http://www.cdc.gov/vaccines/stats-sur/nis/downloads/nis-adult-summer-2007.pdf>. Accessed March 10, 2010.

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Problems and Solutions

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Immunizations: 0 – 6 years

Recommended Immunization Schedule for Persons Aged 0 Through 6 Years—United States • 2011
 For those who fall behind or start late, see the catch-up schedule.

Vaccine	Age	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19-23 months	2-3 years	4-6 years
Hepatitis B ¹		HepB	HepB				HepB					
Polio ²			IPV	IPV	IPV ³							IPV
Diphtheria, Tetanus, Pertussis ⁴			DTaP	DTaP	DTaP	see footnote ⁵	DTaP					DTaP
Haemophilus influenzae type b ⁶			Hib	Hib	Hib ⁷							
Pneumococcal ⁸			PCV	PCV	PCV							PPSV
Inactivated Polio ²			IPV	IPV								
Influenza ⁹									Influenza (Yearly)			
Masles, Mumps, Rubella ¹⁰							MMR	see footnote ¹¹				MMR
Varicella ¹²									Varicella	see footnote ¹³		Varicella
Hepatitis A ¹⁴									HepA (2 doses)			HepA Series
Meningococcal ¹⁵												MCV4

www.cdc.gov

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Ages 7 – 18 years

Recommended Immunization Schedule for Persons Aged 7 Through 18 Years—United States • 2011
For those who fall behind or start late, see the schedule below and the catch-up schedule

Vaccine	Age	7-18 years	11-12 years	13-18 years
Tetanus, Diphtheria, Pertussis ¹			Tdap	Tdap
Human Papillomavirus ²		see footnote ³	HPV (3 doses/females)	HPV series
Meningococcal ⁴		MCV4	MCV4	MCV4
Influenza ⁵			Influenza (yearly)	
Pneumococcal ⁶			Pneumococcal	
Hepatitis A ⁷			HepA Series	
Hepatitis B ⁸			Hep B Series	
Inactivated Poliovirus ⁹			IPV Series	
Measles, Mumps, Rubella ¹⁰			MMR Series	
Varicella ¹¹			Varicella Series	

www.cdc.gov accessed 02-01-2011

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Adult Recommendations - 2011

FIGURE 1. Recommended adult immunization schedule, by vaccine and age group—United States, 2011

Vaccine	AGE GROUP	19-26 years	27-49 years	50-59 years	60-64 years	≥65 years
Influenza ¹				1 dose annually		
Tetanus, diphtheria, pertussis (Td/Tdap) ²			Substitute 1 dose dose of Tdap for Td booster; then boost with Td every 10 years			1 booster every 10 years
Varicella ³				2 doses		
Human papillomavirus (HPV) ⁴		3 doses (females)				
Zoster ⁵						1 dose
Measles, mumps, rubella (MMR) ⁶		1 or 2 doses			1 dose	
Pneumococcal polysaccharide ⁷			1 or 2 doses			1 dose
Meningococcal ⁸				1 or more doses		
Hepatitis A ⁹				2 doses		
Hepatitis B ¹⁰				3 doses		

¹Covered by the Vaccine Injury Compensation Program. ²For all persons in this category who meet the age requirements and who fall outside of pregnancy (e.g., lack documentation of vaccination or have no evidence of previous infection). ³Recommended if some other risk factor is present (e.g., based on medical, occupational, lifestyle, or other indications). ⁴No recommendation.

www.cdc.gov accessed 02-14-2011

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CDC Objectives of Pertussis Booster Vaccination for Adults

- Replace a dose of Td with Tdap to protect the vaccinated adult against pertussis
- Reduce the reservoir of pertussis in the population at large, and thereby potentially:
 - Decrease exposure of persons at increased risk for complicated infection (eg, infants)
 - Reduce the cost and disruption of pertussis in healthcare facilities and other institutional settings

Centers for Disease Control and Prevention. *MMWR*. 2006;55(RR-17):1-43.

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ACIP^a Recommendations for Use of Tdap^b in Adults and Adolescents

- All adults 19-64 years of age who have not already received Tdap:¹
 - Single dose to those who received their last tetanus and diphtheria toxoid (Td) vaccine ≥10 years ago
 - No longer any interval restrictions between Td and Tdap
- All adolescents 11-18 years of age²
 - Single dose of Tdap instead of Td
 - Preferred timing is 11-12 years of age

^a ACIP = Advisory Committee on Immunization Practices. ^b Tdap = Tetanus, diphtheria, and acellular pertussis vaccine.

Reference: 1. CDC. *MMWR*. 2006;55(RR-17):1-37. 2. CDC. *MMWR*. 2006;55(RR-3):1-43.

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October 2010 – ACIP Recommendations

- Tdap – for those over 65 years of age who have not received Tdap previously, those desiring Tdap, or those who to be in contact with infants
 - Ideally, 2 weeks before contact
- Interval has been removed for time between Td and Tdap
- Also – Tdap may now be given (off-label) to individuals 7 years of age (as a catch up) for children not immunized

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Support for ACIP Recommendations on Tdap

More than 20 medical societies endorse ACIP's Tdap recommendations for adolescents and adults, including:

- American Academy of Pediatrics
 - American Academy of Family Physicians
 - American Congress of Obstetricians and Gynecologists
 - American College of Physicians
 - Infectious Diseases Society of America
 - Society for Adolescent Health and Medicine
- "The AAP and ACIP recommend that immunization status of household contacts of newborn infants should be evaluated, and those who are eligible for DTaP or Tdap should be immunized as soon as feasible. Protection against pertussis may develop 7 to 10 days after immunization."¹*

Reference: 1. American Academy of Pediatrics (AAP) Committee on Infectious Diseases. Pertussis (whooping cough). In: *Red Book*. AAP, Elk Grove Village, IL, 2009:504-519.

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ACIP Recommendations: Tdap for Mothers

- Women are encouraged to receive a single dose of Tdap before conception if they have not already received Tdap¹
 - Maternal antibody affords only limited (<2 months) protection for the infant^{2,3}
- For mothers who have not already received Tdap, Tdap is recommended “as soon as feasible” in the immediate postpartum period¹
 - Vaccination should occur before discharge from the hospital or birthing center

References: 1. CDC. *MMWR*. 2008;57(RR-4):1-56. 2. Healy CM, et al. *J Infect Dis*. 2004;190(2):335-340. 3. Shakib JH, et al. *J Perinatol*. 2010;30(2):93-97.

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A Simple, Straightforward Approach¹

“The strategy of vaccinating contacts of persons at high risk to reduce disease and therefore transmission is used with influenza. Influenza vaccine is recommended for household contacts and out-of-home caregivers of children aged 0-59 months, particularly infants aged 0-6 months, the pediatric group at greatest risk for influenza-associated complications. A similar strategy for Tdap is likely to be acceptable to physicians.”

– ACIP

Reference: 1. CDC. *MMWR*. 2006;55(RR-17):1-37.

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Solution: Be A Vaccine Champion

- Parents and other family members may not be aware that they pose a risk of infecting their babies
- They need to know they can reduce that risk by getting vaccinating themselves
- They trust their pediatrician’s advice on how best to protect and care for their babies
- Regular office visits offer you opportunities to deliver important disease prevention messages

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Solution: Educate Everyone About Tdap Vaccine

- Start educational efforts with parents at early infant visits
- Include the Vaccine Information Statements for Tdap and influenza in your newborn visit packets¹
- Display Tdap brochures in the waiting area, exam rooms
- Place reminders throughout the office encouraging adult contacts to seek immunization for themselves
- Include information on Tdap, influenza, other vaccines on your practice’s Web site, newsletters, billing statements



Reference: 1. CDC. Vaccine Information Statements. <http://www.cdc.gov/vaccines/Pubs/vis/default.htm>. Accessed March 19, 2010.

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Solution: Make Parents’ Immunization Status a Routine Part of Office Screening

- Include parents’ Tdap and influenza immunization status on paper and electronic medical record (EMR) newborn checklists
- Add it to the medical history and vitals checklist
- Have the receptionist ask parents about it at prenatal, newborn, or 1-month visits
- Have the nurse ask when checking an infant’s height and weight
- Use chart stickers on infants’ files, or notations in EMRs, to keep track of parents’ immunizations

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Solution: Vaccinate Parents in the Pediatric Office

- Pediatricians are recognized and experienced immunization experts¹
- Building on that foundation, some pediatric practices have begun to expand their immunization efforts to include the entire family²
 - Staff is trained to embrace a pro-immunization mind-set
 - Staff education is provided on vaccine-preventable diseases
 - Parents are asked routinely about their immunization status
 - Office staff sets an example by getting immunized themselves
 - Office develops strategies for handling practical matters: issues of consent, reimbursement, etc.
- Parents are either vaccinated in the pediatric office, or vaccination is coordinated with their primary-care physician^{1,2}

References: 1. Shah S. *Arch Pediatr Adolesc Med*. 2009;163(5):410-412. 2. Domachowski J, et al. *Best Immunization Practices: A Family Approach*. CD-ROM. Boston University School of Medicine, Sanofi Pasteur Inc., Haymarket Medical Education, 2008.

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Many Hands Can Spin the Cocoon

- Private pediatric practices¹
- Hospital postpartum programs²
 - Program in Houston has vaccinated >10,000 family members³
- Neonatal Intensive Care Units^{4,5}
 - Success seen with both pertussis and influenza vaccines
- Programs are vaccinating moms, dads, grandparents, aunts, uncles, other contacts

References: 1. Walter EB, et al. *Acad Pediatr*. 2009;9(5):344-347. 2. Healy CM, et al. *Vaccine*. 2009;27(41):5599-5602. 3. Texas Children's Hospital. Nation's first "cocoon strategy" vaccination program delivers 10,000³ immunization. <http://www.texaschildrens.org/AllAbout/News/2010/Cocoon.aspx>. Accessed March 24, 2010. Dylag AM, Shah SI. *Pediatrics*. 2008;122(3):e550-e555. 5. Shah SI, et al. *Pediatrics*. 2007;120(3):e617-e621.

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Summary of Pertussis Disease in Adults

- In 2008, 49% of reported pertussis cases were among persons 10 years of age and older, with 23% reported in persons 20 years of age and older
- The number of reported cases greatly underestimates the true pertussis burden
- Adolescents and adults are often the source of infection for children

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Summary of Pertussis Disease in Adults (cont.)

- Adults can miss work and may undergo extensive medical evaluations by providers in search of a diagnosis
- Current ACIP guidelines recommend vaccination with Tdap for adults
 - Target groups: adults with close contact with infants and HCPs
- Many adults fail to receive recommended vaccinations
- All providers should immunize at appropriate medical encounters

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Websites with Vaccine Information

- www.pertussis.com
- www.cdc.gov/nip/vacsafe
- www.cispimmunize.org
- www.vaccine.chop.edu
- www.vaccineprotection.com



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Questions & Answers

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