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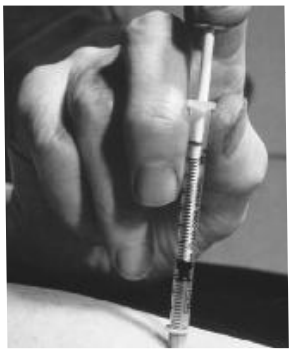
Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis (Tdap) Vaccine Use in Adults

Background

In the United States during 1934-1943 an annual average of 200,752 pertussis cases and 4,034 pertussis-related deaths were reported. After the introduction of childhood pertussis vaccination during the 1940s the number of reported pertussis cases declined dramatically, reaching an historic low of 1,010 cases in 1976. Unfortunately, since the 1980s the number of reported pertussis cases has been steadily increasing (25,616 cases were reported in 2005), especially among adolescents and adults (see Figure). Possible reasons for the increase in reported pertussis cases include a true increase in the burden of disease and an increase in the detection and reporting of cases.



Bordetella pertussis in adults can cause a spectrum of conditions, from asymptomatic infection to mild cough illness to classic pertussis. In symptomatic cases cough generally improves over 2-6 weeks, but may sometimes take months to resolve. Adults with pertussis often make repeated visits for medical care, may miss school or work, and may develop complications (e.g., pneumonia). One study estimated that medical and non-medical costs, as well as the cost of antimicrobials to treat contacts and the cost of personal time, could be as high as $1,952 per adult case.

In addition, adults are frequently the source of infection for infants (who are at the highest risk for pertussis-related complications, hospitalizations, and death compared with older age groups). Therefore, the morbidity and societal cost of pertussis in adults is substantial.

In an effort to assist healthcare professionals in the control of pertussis, this article reviews the December 2006 recommendations of the Advisory Committee on Immunization Practices (ACIP) regarding the use of pertussis vaccine in adults.

Tdap

On June 10, 2005, a tetanus toxoid, reduced diphtheria toxoid, and acel-

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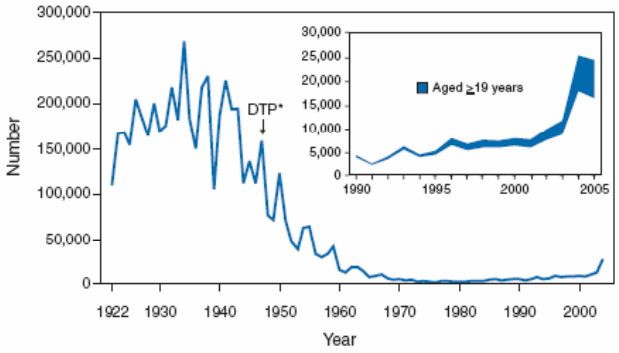
lular pertussis vaccine (Tdap) formulated for use in persons aged 11-64 years was licensed in the United States (ADACEL®; Sanofi Pasteur). Note: a second Tdap formulation, BOOSTRIX® (GlaxoSmithKline Biologicals) is only licensed for persons aged 10-18 years and should not be administered to persons aged ≥19 years. Therefore, references to Tdap vaccination in adults refer to the Sanofi Pasteur product unless otherwise indicated.

FIGURE. Number of reported pertussis cases, by year — United States, 1922–2005



*Introduction of universal pediatric diphtheria and tetanus toxoids and whole-cell pertussis vaccine.
SOURCE: 1950–2005, CDC, National Notifiable Diseases Surveillance System, and 1922–1949, passive reports to the Public Health Service

Recommendations

Pre-licensure studies demonstrated the safety and efficacy of Tdap against tetanus, diphtheria, and pertussis when Tdap was administered as a single booster dose for adults. To protect adults against pertussis, and to reduce the reservoir of pertussis in the population at large, the ACIP has developed recommendations for the use of Tdap in adults:

1. Adults aged 19-64 years should receive a single dose of Tdap to replace the next scheduled tetanus and diphtheria toxoids vaccine (Td) for booster immunization against tetanus, diphtheria, and pertussis if they have not previously received Tdap.
2. Adults who have or who anticipate having close contact with a child aged <12 months (e.g., parents, grandparents aged <65 years, child-care providers, and healthcare personnel) and who have not previously received Tdap should receive a single dose of Tdap. If they have not previously received Tdap, women should receive Tdap before becoming pregnant, or in the immediate postpartum period.
3. Healthcare personnel who work in hospitals or ambulatory care settings and who have direct patient contact should receive a single dose of Tdap as soon as feasible if they have not previously received a dose. This includes physicians, other primary-care providers, nurses, aides, respiratory therapists, radiology technicians, students (e.g., medical, nursing, and other), dentists, social workers, chaplains, volunteers, and dietary and clerical workers. Other healthcare professionals (i.e., those without direct patient contact) should receive a single dose of Tdap to replace the next scheduled Td according to the routine recommendation if they have not previously received Tdap.

Although receipt of Td more often than every 10 years (five years for some tetanus-prone wounds) is not necessary to provide protection against tetanus or diphtheria, a dose of Tdap less than five years after Td could provide a health benefit to the above groups by protecting against pertussis. An interval as short as two years from the last dose of Td is supported by a Canadian study and is recommended in situations where the risk of pertussis infection outweighs the risk for local and systemic reactions (e.g., healthcare personnel with direct patient contact); even shorter intervals may be used.

Additional recommendations for specific situations (e.g., pertussis outbreaks, adults with a history of pertussis, Tdap as part of tetanus prophylaxis in wound management, individuals with incomplete/unknown vaccination histories) are provided in the full report.

The above recommendations for the use of Tdap (ADACEL®) are intended for adults aged 19-64 years who have not already received a dose of Tdap. The safety or efficacy of subsequent doses of Tdap is not yet known. After receipt of a single dose of Tdap, subsequent doses of tetanus- and diphtheria toxoid-containing vaccines should follow guidance from previously published recommendations for the use of Td and tetanus toxoid.

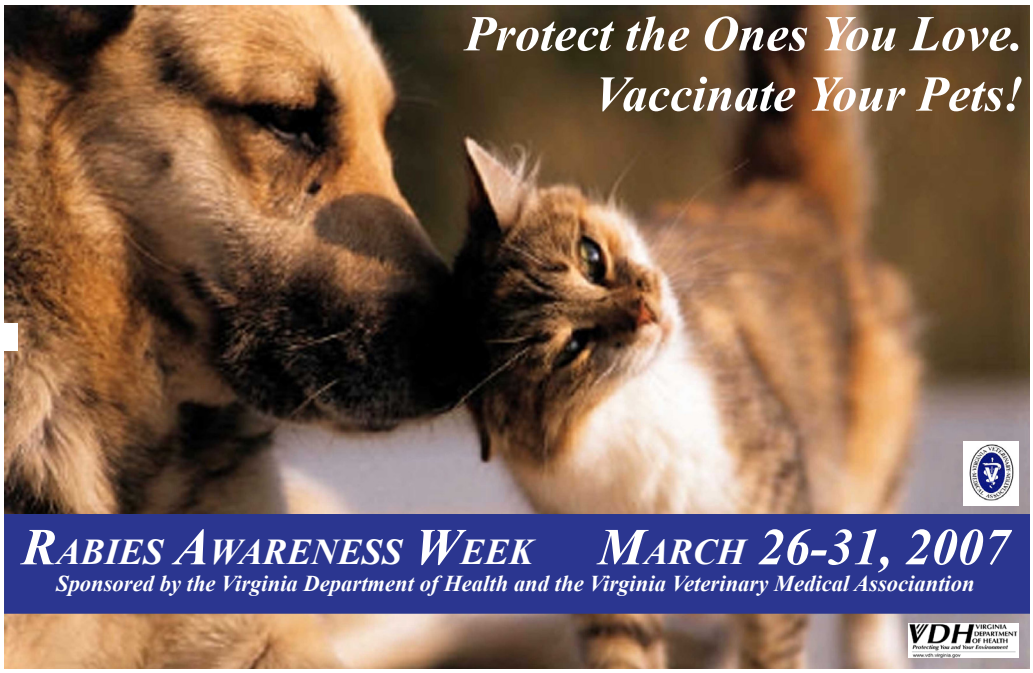
Conclusions

Despite significant vaccination efforts in the U.S., pertussis continues to remain an important source of morbidity. This is partly due to the waning of immunity that occurs following natural infection or vaccination. The availability of a safe and effective vaccine for adolescents and adults may help to further reduce the impact of this illness. By vaccinating healthcare personnel with Tdap, hospitals can also reduce the number of cases of pertussis among healthcare personnel and reduce the substantial costs associated with hospital investigations and control measures. One estimate for a hospital Tdap vaccination program suggested that, for every dollar spent on the vaccination program, the hospital would save $2.38 on control measures.

The full recommendations of the ACIP for the use of Tdap among adults aged 19-64 years are available at: www.cdc.gov/mmwr/preview/mmwrhtml/rr5517a1.htm. Additional recommendations specifically for adolescents (persons aged 11-18 years of age) exist. In particular, the ACIP recommends a single dose of either Tdap product (BOOSTRIX® or ADACEL®) instead of adult tetanus and diphtheria toxoids (Td) for booster immunization of adolescents who have completed the recommended childhood DTP or DTaP vaccination series and who have not received Td or Tdap; age 11-12 years is the preferred time period for the adolescent Tdap dose. The full ACIP recommendations for the use of Tdap among adolescents are available at www.cdc.gov/mmwr/preview/mmwrhtml/rr5503a1.htm.

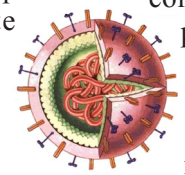
References

MMWR. 2006. 55(RR17);1-33.
MMWR. 2006. 55(32); 883-893.



Flu Corner

As of February 3, 2007, the influenza season has been relatively mild in Virginia. Since October 7, 2006, DCLS has reported a total of nine confirmed influenza cases (four of type A/H1; two of type A/H3; three of type B) in Virginia, and no laboratory confirmed outbreaks have been reported thus far. However, influenza viruses (especially influenza B) continue to circulate, and remain a concern. Please see the Virginia Department of Health website at www.vdh.state.va.us/epi/flu.asp for up-to-date Virginia surveillance information.



National surveillance has shown increased influenza activity in recent weeks. In the U.S., for the week ending January 27, 2007, eight states reported widespread influenza activity; 14 states (including Virginia) reported regional influenza activity; 15 states reported local influenza activity; and 13 states reported sporadic influenza activity. The nationwide proportion of patient visits to sentinel providers for influenza-like illness (ILI) was 2.6% - this percentage is above the baseline of 2.1%. The proportion of deaths attributed to pneumonia and influenza in 122 cities monitored by the U.S. Centers for Disease Control and Prevention (CDC) remains below the epidemic threshold. Nationwide, seven influenza-associated pediatric deaths have been reported to the CDC for the 2006-07 influenza season.

During the week ending January 27, 2007, 618 (17.9%) of 3,450 specimens tested for influenza viruses by U.S. World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories were positive for influenza. This represents a significant increase in the proportion of specimens testing positive for influenza from recent weeks. Since October 1, 2006, WHO and NREVSS laboratories have tested a total of 75,765 specimens for influenza viruses and 5,109 (6.7%) were positive. Among the 5,109 influenza viruses, 4,162 (81.5%) were influenza A viruses and 947 (18.5%) were influenza B viruses. Of the 4,162 influenza A viruses, 1,388 (33.3%) have been subtyped: 1,234 (88.9%) were influenza A (H1) viruses and 154 (11.1%) were influenza A (H3) viruses.

Please see the CDC website at www.cdc.gov/flu/weekly/fluactivity.htm for up-to-date details on influenza surveillance in the U.S.

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Cases of Selected Notifiable Diseases Reported in Virginia*

Disease	Total Cases Reported, December 2006						Total Cases Reported Statewide, January - December		
	State	Regions					This Year	Last Year	5 Yr Avg
		NW	N	SW	C	E			
AIDS	70	3	19	2	24	22	588	622	743
Campylobacteriosis	50	12	11	10	8	9	645	618	687
Chickenpox	127	12	10	87	11	7	1,664	1,834	985
***E. coli,* Shiga toxin-producing**	7	2	2	2	1	0	163	111	65
Giardiasis	29	8	14	2	1	4	483	602	479
Gonorrhea	417	26	33	79	108	171	6,473	8,346	9,503
Group A Strep, Invasive	10	2	4	2	2	0	129	110	92
Hepatitis, Viral									
A	4	0	3	0	1	0	62	93	141
B, acute	7	0	2	3	1	1	72	146	223
C, acute	1	0	0	0	0	1	10	13	12
HIV Infection	139	11	27	18	28	55	922	833	888
Lead in Children†	44	6	8	13	8	9	659	639	732
Legionellosis	4	1	1	0	1	1	68	55	59
Lyme Disease	53	10	40	0	1	2	321	274	220
Measles	0	0	0	0	0	0	0	0	<1
Meningococcal Infection	5	0	2	0	1	2	23	35	36
Pertussis	19	3	9	3	1	3	207	363	284
Rabies in Animals	63	18	18	7	9	11	636	495	521
Rocky Mountain Spotted Fever	9	2	2	1	2	2	115	121	57
Rubella	0	0	0	0	0	0	0	0	0
Salmonellosis	102	20	28	13	14	27	1,029	1,172	1,238
Shigellosis	8	2	3	2	1	0	111	134	519
Syphilis, Early§	22	2	2	2	7	9	353	291	214
Tuberculosis	90	6	58	4	6	16	332	355	327

Localities Reporting Animal Rabies This Month: Appomattox 1 skunk; Arlington 2 raccoons; Augusta 1 cat, 1 raccoon; Bath 1 cat, 2 skunks; Carroll 1 skunk; Charlotte 1 raccoon; Chesterfield 1 raccoon; Clarke 2 skunks; Cumberland 1 raccoon, 1 skunk; Fairfax 1 fox, 1 groundhog, 8 raccoons, 1 skunk; Fauquier 2 skunks; Fluvanna 1 raccoon; Grayson 1 raccoon; Hanover 1 raccoon, 2 skunks; Highland 1 bobcat; James City 1 skunk; King & Queen 1 raccoon; Loudoun 1 fox, 2 raccoons; Louisa 1 cat; New Kent 1 raccoon; Newport News 1 raccoon; Northampton 3 raccoons; Northumberland 1 raccoon; Orange 1 skunk; Prince William 2 raccoons; Roanoke City 1 skunk; Rockbridge 1 skunk; Shenandoah 2 skunks; Southampton 1 skunk; Spotsylvania 1 fox; Sussex 1 skunk; Tazewell 1 raccoon; Virginia Beach 3 raccoons; Warren 1 raccoon; Wythe 2 skunks.

Toxic Substance-related Illnesses: Adult Lead Exposure 5; Pneumoconiosis 2.

*Data for 2006 are provisional. †Elevated blood lead levels ≥10µg/dL. §Includes primary, secondary, and early latent.

CDC Evaluates Virginia's Strategic National Stockpile (SNS) Program Preparedness

The Centers for Disease Control and Prevention's (CDC) Strategic National Stockpile (SNS) contains large quantities of medicine and medical supplies to protect the American public if there is a public health emergency severe enough to cause local supplies to run out (e.g., terrorist attack, earthquake). Once federal and local authorities agree that the SNS is needed, supplies can be delivered to any state in the U.S. within 12 hours. However, each state must develop specific plans to receive and distribute SNS medicine and medical supplies to local communities as quickly as possible.

For the third consecutive year, Virginia has received the highest possible rating (GREEN) for SNS management from the CDC. Strengths of the Virginia SNS Plan are that it is based on system, rather than individual, accomplishments and that it is an all hazards capable plan used throughout the year and exercised regularly.

Continued training and exercising of these plans help to ensure preparedness. These efforts will be important in supporting healthcare professionals in Virginia in the event of a public health emergency.

For additional information about the federal SNS program, go to www.bt.cdc.gov/stockpile/. Information about VDH's Emergency Preparedness and Response program is available at: www.vdh.virginia.gov/EPR/.