

CONTAGIOUS COMMENTS

Department of Epidemiology

The Adolescent Visit

Time to Order the Meningococcal Conjugate and Adolescent Pertussis Vaccine for your Office!

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2005 has been a busy year for the FDA and the CDC Advisory Committee on Immunization Committee (ACIP). In January of 2005, the FDA approved Menactra™, a quadrivalent (Meningococcal A, C, W135, Y) meningococcal conjugate vaccine for use in adolescents and adults 11 to 55 years of age. In May 2005, the FDA approved Boostrix™ and in June 2005 they approved Adacel™. Both Boostrix™ and Adacel™ are newly formulated adolescent pertussis boosters which contain tetanus toxoid, diphtheria toxoid (reduced amount compared to pediatric formulations) and purified proteins from pertussis. In this issue, we will answer a number of questions regarding these three new vaccines.



Meningococcal Conjugate Vaccine

1. Should the new meningococcal conjugate vaccine replace the old plain polysaccharide vaccine in my practice? The short answer is “YES” if the individual is aged 11 to 55 years. Meningococcal disease remains a rare, but very serious infection affecting approximately 3,000 individuals in the United States each year. The fatality rate remains at 10% despite advances in intensive care medicine. Adolescents account for 30-40% of cases and freshman college students living in dorms have an increased risk of disease. The studies conducted in adolescents and adults were designed to demonstrate “non-inferiority” in production of anti-capsular antibody when the conjugate vaccine was compared to the licensed polysaccharide vaccine. It is believed that the duration of the antibody response will be longer than that seen with the polysaccharide vaccine. The combination of a polysaccharide protein vaccine also induces a memory antibody response that results in a “booster” response when it is followed by a dose of plain polysaccharide vaccine. It is hoped that exposure to the organism might also result in a booster response and protect the individual years after vaccination.

Indications for immunization include:

- Adolescents 11 to 12 years of age and freshmen entering high school.
- College freshmen who will be living in a dormitory.
- Individuals ages 11 to 55 who are asplenic.
- Microbiologists working in hospital laboratories.
- Individuals traveling to endemic areas outside the US who are 11 to 55 years of age.
- Other individuals aged 11 to 55 years of age, without contraindications, who desire immunization.

2. If I immunize a child at age 11, will they need another dose at age 18 before entering college? There is currently no official recommendation for re-immunization of children who have received a dose of meningococcal conjugate vaccine. Long term studies of persistence of antibody are currently underway.

3. Are there any safety concerns I should be aware of with this vaccine and what is the cost of the vaccine? The vaccine was studied in over 7,000 adolescents who were followed carefully for adverse effects. No serious side effects were noted. Low grade fever and local reactions at the injection site were noted in a minority of individuals, but none were serious. The cost of the vaccine varies depending on the contract with the supplier, but it is generally in the range of \$80 per dose.

4. Can I use this vaccine in infants and young children? Aren't they at risk for meningococcal disease too? Although a conjugate Men C vaccine is licensed in the United Kingdom for use in young infants, no conjugate vaccine is recommended or licensed for infants in this country. We hope that an effective infant vaccine will be developed and licensed in the future, but we do not recommend using the new conjugate vaccine in anyone less than 11 years at the present time.

5. Can I use this vaccine instead of rifampin for post exposure prophylaxis of a case? No. It takes approximately 10 days for antibody to develop in response to this vaccine and most secondary cases occur within the first week after exposure to the index case. Additionally, there are no recommendations and no studies regarding using the new meningococcal vaccine for post exposure prophylaxis. If you are prophylaxing contacts of a case, you should administer rifampin or another effective chemoprophylactic medication. You should also advise the contacts to seek immediate medical attention if they develop a febrile illness. If the contacts are age 11 to 55 and have not received meningococcal conjugate vaccine, it would be reasonable to immunize them in our opinion, in addition to prescribing chemoprophylaxis.



Adolescent Pertussis Booster Vaccines

In 2004, more than 1,200 cases of pertussis were reported in the State of Colorado and more than 20,000 cases occurred in the U.S. Approximately 40% of cases occurred in the adolescent age group. Adolescents and young adults are not at high risk of death from pertussis, but they provide a reservoir and may be the source of the organism that infects young infants, causing significant morbidity and even mortality. Adolescents and adults are not asymptomatic, but their coughing illness is frequently misdiagnosed as “bronchitis” rather than pertussis. Adolescents and adults are not adequately protected despite 5 doses of vaccine in infancy, due to waning immunity. Thus, there has been great interest and effort in developing an adolescent pertussis vaccine. The vaccine was reformulated since the amount of diphtheria toxoid in the infant vaccine caused excess local reactions in adolescents.

1. What is the difference between the two licensed vaccines? The table below lists the content of the two newly licensed adolescent pertussis vaccines (Boostrix™ and Adacel™) compared to infant pertussis vaccines. (*Adapted from www.FDA.gov*)

Diphtheria, Tetanus and Acellular Pertussis Vaccines					
Antigenic Components	Tripedia	Infanrix [†]	Daptacel	Boostrix	Adacel
	Infants / Children*	Infants / Children*	Infants / Children*	Adolescents	Adults / Adolescents
PT (µg)	23.4	25	10	8	2.5
FHA (µg)	23.4	25	5	8	5
PRN (µg)	--	8	3	2.5	3
FIM 2+3 (µg)	--	--	5	--	5
D (Lf)	6.7	25	15	2.5	2
T (Lf)	5	10	5	5	5

DTaP, diphtheria-tetanus-acellular pertussis; PT, pertussis toxoid; FHA, filamentous hemagglutinin; PRN, pertactin; FIM 2+3, fimbrial agglutinin 2 and 3; D, diphtheria toxoid; T, tetanus toxoid.

*6 weeks to younger than 7 yrs.

[†]Pediatric also contains these DTaP components

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Both vaccines result in tetanus and diphtheria serum antibody levels that are non-inferior to those seen after a Td booster. Responses to the pertussis antigens show a booster response based on the levels seen after immunization in infancy. (*Adapted from www.FDA.gov*)

Antibody Responses Measured by ELISA to Pertussis Antigens		
	DtaP (Infants)	Tdap (Adolescents)
GMT to Pertussis Toxoid	46	87
GMT to FHA	84	615
GMT to Pertactin	112	471

- 2. Do the two new adolescent pertussis vaccines have different indications?** The two vaccines should be considered equivalent in terms of antibody response, but they were studied in different age groups and thus are licensed for different age groups. Boostrix™ is licensed for individuals aged 10 to 18 years and Adacel™ is licensed for individuals aged 11 to 64 years. Both vaccines are currently licensed as a single dose.
- 3. Who should you vaccinate with these new adolescent pertussis vaccines?** Provisional ACIP recommendations (formal recommendations will be published in MMWR) indicate that:
 - Adolescents aged 11 to 12 should receive a single dose of Tdap (instead of Td) if they have completed the DTaP/DTP childhood series and have not yet received a Td booster.
 - Adolescents age 13 to 18 years of age, who have not yet received a Td booster and who have completed the DTaP/DTP infant series, should be given 1 dose of Tdap as their catch up booster.
 - Some adolescents 11 to 18 years may have already received a Td booster. ACIP encourages these adolescents to receive a single dose of Tdap to protect against pertussis. A five year interval between the last Td, DTaP, or DPT and the new Tdap is encouraged to reduce the chance of a local reaction. However, the 5 year interval is not set in stone. The ACIP did not define an absolute minimum interval between a dose of Td and a

subsequent dose of Tdap to give maximum flexibility to providers. The provider will have to decide when to administer Tdap depending on whether the benefit of pertussis immunity in a particular patient outweighs the possible risk of a local reaction (sore arm). Canadian studies have shown intervals as short as 2 years to be safe.

- 4. What is the safety data on these two vaccines?** Both vaccines produced fever and local reactions at the injection site, but no serious adverse reactions were seen in the thousands of children immunized.
- 5. Can a provider give both Tdap and meningococcal conjugate vaccine to an adolescent at the same visit?** Administration at the same visit is recommended as protection against both meningococcal disease and pertussis. If it is not feasible to administer both vaccines at the same visit, these vaccines can be given at any time before or after each other. Mening conj vaccine contains diphtheria toxoid as a carrier protein (although it is not indicated to provide protection against diphtheria). There has been some discussion that the risk of a local reaction could increase if two diphtheria antigen-containing vaccines (MCV and Td or Tdap) are administered in close sequential use (i.e., a few days or weeks). To date, in studies of Td and MCV administered simultaneously, and in studies of Td followed 1 month later by MCV, the rate of adverse reactions has been low and about equivalent in severity to a Td booster. Clinical studies of various sequential administration intervals between these 2 vaccines are ongoing. For now, ACIP recommends giving Tdap and MCV at the same visit if possible. However, in those individuals where this is not possible, the vaccines can be given in any order and at any time (no minimum interval between the two vaccines).

