

AN EPIDEMIOLOGY PUBLICATION FROM OREGON STATE PUBLIC HEALTH

NEW PERTUSSIS VACCINES FOR ADOLESCENTS AND ADULTS

ALTHOUGH DOWN a bit from levels seen in late 2004 and early 2005 (see figure at right), pertussis remains a problem. Vaccines targeted at young children greatly reduced the incidence of disease in those less than 10 years old, but immunity wanes, leaving older children and adults unprotected. These in turn serve as a reservoir for *Bordetella pertussis* that helps sustain transmission to susceptibles of all ages. After decades of anticipation, we now have safe and effective vaccines^{1,2} that can boost the immunity of not only the young but the young at heart. Recently, the Advisory Committee on Immunization Practices (ACIP) released guidelines covering the use of these vaccines for adolescents and adults.* In a nutshell, one dose of the new vaccines is slipped into the old schedule at the next routine opportunity, and thereafter it's business as usual. For some (including many healthcare workers), the next routine opportunity should come sooner than you think.

Pertussis is a highly contagious respiratory tract infection, affecting persons of all ages. Infants have the highest risks of pertussis-related complications and death as well as the highest reported incidence—averaging 104 cases/100,000 annually since 2000 in Oregon (see figure creeping up the left margin). “Adolescents,” included in the 10–19 year old group, also have high documented rates, and Oregon has seen a number of large and disruptive outbreaks among middle

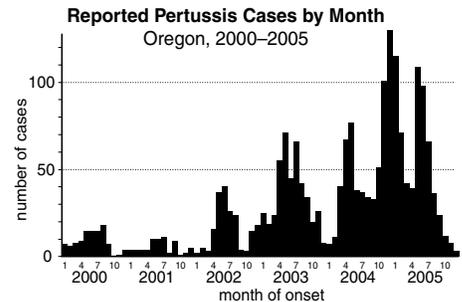
school and high school students. Adults in the 19–64 year-old group account for 27% of reported cases in both Oregon and nationwide. As the vast majority of coughers never enjoy the collection of a nasopharyngeal specimen, the true number of cases among adults alone is estimated at 600,000 annually nationwide.

Pertussis in older children and adults presents as anything from mild cough illness to classic disease (i.e., prolonged cough characterized by paroxysms, post-tussive vomiting, and inspiratory whoop). Complications include rib fractures resulting from severe cough and pneumonia requiring hospitalization. Even those with mild symptoms can transmit the infection.

The two new “Tdap” vaccines—short for Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccine, Adsorbed—were both licensed in 2005. Both have lower doses of the acellular pertussis antigens found in pediatric formulations. ADACEL™ (Sanofi Pasteur) is licensed as a single-dose booster vaccine for persons 11–64 years. BOOSTRIX® (GlaxoSmithKline Biologicals) is currently licensed only for persons 10–18 years of age.

GENERAL CONSIDERATIONS

Adolescents scheduled for a regular booster at age 11–12 years can get their one Tdap dose at that time (or whenever thereafter you can catch them). Adults who have completed a primary series are recommended to get a routine tetanus-diphtheria booster every 10 years. For them, just substitute Tdap for Td at their next injection. After getting the single Tdap dose, both adults and adolescents go onto the every-10-years-unless-you-step-on-a-nail schedule of Td boosters. Some adults (e.g., healthcare workers, those in contact with infants) should not wait for that next decade to roll around—*vide infra*.



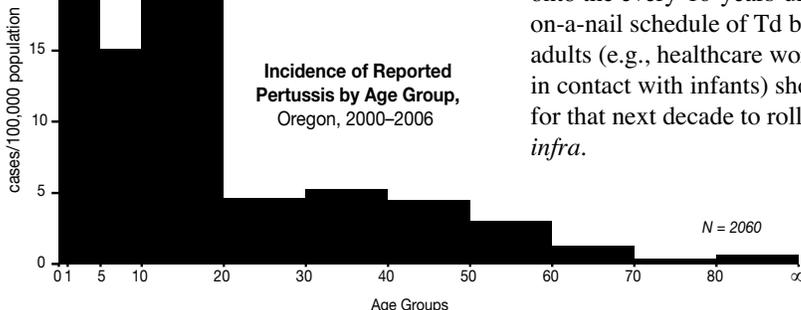
The recommendations are the same regardless of history of vaccination or natural pertussis infection. Those histories are often unconfirmed, and moreover immunity wanes with time. Administering pertussis vaccines to persons with a history of pertussis, parapertussis, or boguspertussis presents no theoretical safety concern.

In general, an interval of at least 5 years between Td and Tdap is encouraged to minimize the risk for local and systemic reactions after Tdap vaccination. But if there is a good reason—in outbreak settings, for example, or given occupational or household contact with infants—shorter intervals are OK. Exactly how short is not specified by the ACIP, but presumably 2 years is acceptable and possibly even less. Intervals as short as 18 months caused no problems in a recent study.³

Adolescents and adults who have or anticipate having close contact with infants (e.g., parents, grandparents <65 years of age, childcare providers, healthcare workers) should receive a single dose of Tdap.

Ideally, Tdap should be given at least one month before beginning close contact with infants. (Relatives should be discouraged from dropping in with their kids without providing advance notice.) If not immunized before or during pregnancy, new mothers (and fathers, for that matter) may be immunized post-partum.

* The unexpurgated version of the adolescent stuff is available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr55e223a1.htm>. The adult recommendations are still unofficial at this writing—already posted on the CDC web site (http://www.cdc.gov/nip/vaccine/tdap/tdap_adult_recs.pdf) but not yet published in the MMWR.



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Healthcare personnel who work in hospitals or ambulatory care settings and have direct patient contact should receive a single dose of Tdap as soon as feasible if they have not already done so. Those with direct contact with infants should be top priority. Other healthcare personnel (e.g., those who try to avoid patients at all costs) should receive a single dose of Tdap according to the routine recommendation and interval guidance for use of Tdap among adults. In other words, they're just like normal people. However, the draft guidelines also note that such personnel are encouraged to receive that Tdap dose as soon as 2 years following the last Td, suggesting a degree of ambivalence about scheduling that is not yet resolved. In any event, we suggest getting it over with as soon as seems feasible. Hospitals and ambulatory care facilities should provide Tdap for healthcare personnel, using approaches that include education about the benefits of vaccination, convenient access, and provision of Tdap at no charge.

Tdap can be given coincident with other vaccines (e.g., hepatitis A, hepatitis B, influenza, meningococcal conjugate...). Try not to give everything at the same anatomic site.

SPECIAL SITUATIONS

Wound management. Persons 11–64 years of age who require a tetanus toxoid-containing vaccine as part of wound management should receive Tdap instead of Td if they have not received Tdap previously. If Tdap is not available or was administered previously, Td should be administered.

Incomplete vaccination history. Adults who have never received tetanus and diphtheria toxoid-containing vaccine should receive a series of three vaccinations. The preferred schedule is a dose of Tdap, followed by a dose of Td >4 weeks later, and a second dose of Td 6 to 12 months later. Tdap can substitute for Td for any one of the three doses in the series.

Pregnancy. Pregnancy is not a contraindication to Tdap or Td vaccination. Guidance on the use of Tdap during pregnancy is under consideration by ACIP. At this time, pregnant women who received the last tetanus toxoid-containing vaccine <10 years earlier should receive Tdap after delivery, according to routine recommendations for vaccinating adult contacts of infants <12 months of age. Women who received the last tetanus toxoid-containing vaccine >10 years earlier should receive Td during pregnancy in preference to Tdap, and pregnant women who have not received the primary 3-dose vaccination series for tetanus should begin the Td series during pregnancy.* If Td is indicated during pregnancy, vaccinating during the second or third trimester is preferred when feasible.

Post-partum. For mothers who have not already been vaccinated, post-partum vaccination is recommended to reduce the risk of household transmission. It takes an estimated 1–2 weeks after vaccination for protection to kick in.

Superannuated patients. Tdap is not licensed for use among adults ≥65 years old. Recommendations for use of Tdap

* The ACIP ended up punting on the issue of Tdap during pregnancy. We note that the AAP makes no distinction for pregnant women.

among this age group may change as new data become available, but for now...well, there's always a "Cover Your Cough" poster. All adults, regardless of age, should get a dose of Td every 10 years and as indicated for wound management.

CONTRAINDICATIONS

There are a few genuine contraindications: important to consider, but not applicable to many patients. They include: any history of anaphylactic reaction to vaccine components; encephalopathy (e.g., coma, prolonged seizures) not attributable to an identifiable cause within 7 days following administration of a pertussis vaccine; or Guillain-Barré syndrome within 6 weeks of a previous tetanus toxoid-containing vaccine. Other valid excuses include moderate to severe acute illness, unstable neurological condition, or a history of Arthus hypersensitivity reaction to a tetanus toxoid-containing vaccine administered within the previous 10 years. Clinically significant adverse events that follow Tdap or any vaccination should be reported even if a causal relationship to vaccination is uncertain. Private physicians can report directly to the Vaccine Adverse Events Reporting System (VAERS: <http://www.vaers.hhs.gov>, 800/822-7967); local health departments should contact the State Immunization Program.

REFERENCES

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3. How soon after a prior tetanus-diphtheria vaccination can one give adult formulation tetanus-diphtheria-acellular pertussis vaccine? Halperin SA, Sweet L, Baxendale D, et al. *Pediatr Infect Dis J* 2006;25:195–200.