

Issue Brief – Prevention of Pertussis in Infants

Pertussis typically follows a cyclical pattern, with peaks in incidence every 3 to 5 years, leaving vulnerable infants and others at ongoing risk. Local incidence rates of pertussis declined in 2013 and much of 2014, though illnesses increased significantly during the last quarter of 2014, particularly among high school-aged children. In 2012, pertussis infections in Washington grew to their highest level since 1942, with 4,918 confirmed cases, including 770 in King County. During that outbreak, 43 (5.6%) of King County cases were in infants < 12 months of age and 10 (23.3%) of those infants were hospitalized.

Young infants are at increased risk for severe pertussis, including hospitalization and death, compared to any other age group. Infants < 6 months account for 90% of all pertussis-related deaths and the majority of hospitalizations.¹ **For this reason, vaccination of pregnant women with Tdap vaccine is the top priority to prevent infant pertussis.**

To protect infants, pregnant women should receive a dose of Tdap during each pregnancy.

- In 2013, the Advisory Committee on Immunization Practices (ACIP) recommended that women receive a dose of Tdap with each pregnancy in response to research showing that maternal antibodies wane quickly and that one dose of Tdap in a pregnancy is unlikely to be protective in subsequent pregnancies.² Infants depend on maternal antibody transfer for protection during the first months of life.
- The American College of Obstetricians and Gynecologists recommends that healthcare providers administer a dose of Tdap with each pregnancy.³
- To maximize protection through passive maternal antibody transfer to the infant, Tdap vaccine should be given between 27-36 weeks gestation.
- If not vaccinated during pregnancy, women should be vaccinated in the immediate post-partum period before hospital discharge, however this is inferior to vaccination during pregnancy because it provides no direct protection to the newborn.

Vaccination during pregnancy has been shown to be highly effective in maximizing infant protection from pertussis.

- Research shows that passive maternal antibody transfer to the infant offers significantly more protection to the infant than vaccination of close-contacts. A 2014 Lancet study found that maternal Tdap vaccine effectiveness was 90% in preventing pertussis in infants younger than two months.⁴

Tdap in pregnancy is immunogenic and safe for mothers and their infants.

- A 2014 randomized, double-blind, placebo-controlled clinical trial designed to evaluate the safety and immunogenicity of Tdap during pregnancy and its effect on infant response to DTaP found no increased risk of adverse events among women or their infants. Moreover, Tdap immunization resulted in high pertussis antibodies during the first two months of life and did not substantially alter infant response to DTaP.⁵
- A study published in the Journal of the American Medical Association found no association between Tdap vaccination during pregnancy and increased risk for hypertensive disorders of pregnancy, preterm birth, or having a small-for-gestational age baby.⁶

Pregnant women with unknown or incomplete tetanus vaccination should complete their

vaccine series.

- To ensure protection against maternal and neonatal tetanus, pregnant women who have never been vaccinated against tetanus should receive three vaccinations containing tetanus and reduced diphtheria toxoids during pregnancy. The recommended schedule is 0, 4 weeks, and 6 to 12 months. Tdap should replace one of the Td doses, preferably during the third trimester of pregnancy to maximize maternal antibody response and passive antibody transfer to the infant.

Susceptible adolescents and adults, in whom the disease is underdiagnosed, may serve as a reservoir for transmission to infants.

- From 2010-2014, a household contact was identified as the most likely source of infection for approximately 50% of all King County cases < 12 months of age and for 60% of all cases < 3 months of age. Other studies have shown household members are responsible for 75%–83% of pertussis transmission to infants, with parents representing more than half of the source cases; mothers, in particular, were the source in more than one-third.^{7,8,9}
- Adolescents and adults with pertussis may be asymptomatic or have mild disease, but can also suffer complications such as urinary incontinence, rib fracture and pneumonia. Regardless of disease severity, infection may be transmitted to close contacts, including vulnerable infants.¹⁰
- Of 141 confirmed, probable and suspect pertussis cases reported in King County in 2014, 64% were school aged. Forty percent of cases were 14-17 years old, 9% of cases were 11-13 years old, and 15% of cases were 5-10 year olds.

Vaccination of adults and adolescents in close contact with young infants may eliminate a substantial proportion of infant pertussis

- Although the national adolescent Tdap coverage rate was 86% in 2013, coverage is substantially lower for adults. In 2012, only 14% of adults \geq 19 years of age and 31% of healthcare workers reported receiving a dose of Tdap.^{11,12}
- A study utilizing medical record and claims data for seven Vaccine Safety Datalink sites to identify pregnancies and Tdap administrations observed coverage levels between 15.9% and 30.0%. Women receiving early prenatal care and other vaccines during pregnancy had higher Tdap coverage.¹³

Adolescents and adults should receive one dose of Tdap, regardless of interval since last tetanus- or diphtheria toxoid-containing vaccine, and at least 2 weeks before close contact with an infant.^{14,15}

- Tdap is routinely recommended for children aged 11-12 years and for all adolescents and adults who have not received a dose of Tdap.
- Unvaccinated children aged 7 years and older and unvaccinated adults should receive three vaccinations containing tetanus and reduced diphtheria toxoids. The recommended schedule is one dose of Tdap, followed by a dose of Td \geq 4 weeks later and another Td in 6 to 12 months.
- After receiving Tdap or completing their three-dose series, adults should receive Td every ten years per routine recommendations.
- Infants and children aged 2 months through 6 years are recommended to receive 5 doses of DTaP per the routine childhood immunization schedule.
- No booster dose of Tdap is currently recommended for non-pregnant adults.

Pertussis Testing and Reporting

Pertussis should be suspected in the differential diagnosis of:

- Respiratory tract symptoms of any duration in infants <12 months, even if they have been

immunized against pertussis or test positive for RSV (respiratory syncytial virus) because co-infections have been documented

- Cough illness >2 weeks duration in patients of any age, even if they have been immunized against pertussis
- Respiratory illness of any duration in patients of any age who have had contact with persons with a prolonged cough illness, or a confirmed pertussis case

If you suspect pertussis, a nasopharyngeal specimen for pertussis polymerase chain reaction (PCR) is the preferred test because it is more sensitive and more rapid than culture. Pertussis cases are reportable to Public Health at (206) 296-4774.

- PCR testing is available through the King County Public Health Laboratory (206-744-8950) and at many commercial reference labs.

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