Health Advisory:

Increasing Pertussis Cases in Missouri

August 2, 2012

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Health Advisory
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FROM: **MARGARET T. DONNELLY**
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SUBJECT: **Increasing Pertussis Cases in Missouri**

The Missouri Department of Health and Senior Services (DHSS) has been observing a substantial rise in the numbers of reported pertussis cases in Missouri in recent months. This increase is consistent with the 2012 national pertussis trend. A gradual and sustained increase of this cyclical endemic disease has led to year-to-date case counts in the United States surpassing those from the previous five years for the same period. The national trend of high rates of pertussis among adolescents suggests early waning of immunity from acellular vaccines. Nevertheless, pertussis vaccination remains the single most effective strategy for prevention of infection.

During the period from week 1 through week 30, 2012, a total of 443 confirmed and probable pertussis cases were reported in Missouri. This number represents a 184% increase over the median number of pertussis cases, for the same time period, during the previous five years in the state. No fatalities have been reported. The increased number of cases corresponds to an incidence rate of 8 cases per 100,000 population, which is double the national rate of about 4 cases per 100,000 population. Most cases are observed in St Louis and Kansas City metro areas. The most significant relative increase has been observed in the Kansas City metro area, which reported 157 cases (131 of those are confirmed cases) of pertussis through week 30 in 2012. For comparison, the number of pertussis cases reported from this area during this period in the previous five years ranged from low of 6 to high of 48. The increase is documented in all age groups from 0 to 65 years of age, but a particularly significant rise is seen in ages 7 through 14 years. In the St Louis metro area, 260 cases (204 of those are confirmed cases) of pertussis were reported through week 30 in 2012. This number corresponds to 145% increase over the median number of pertussis cases, for the same time period, during the previous five years in the St Louis metro area. The most increase is documented in 1 to 6 years, 11 to 14 years, and 15 to 24 years age groups. In those older than 65 years, 5 cases were reported in 2012, compared to 1 to 2 cases in the previous 5 years during the comparable time period. The observed statewide trend is consistent with the national trend of increased incidence among children aged 10, 13, and 14 years. The same trend is also being observed in an on-going pertussis epidemic in Washington State.

Recent changes in the epidemiology of pertussis in the United States are indicative of diminished duration of protection from acellular pertussis vaccine (DTaP) compared to that of whole-cell pertussis (DTwP) vaccine. Whole-cell vaccines, which were replaced in the 1990s by acellular vaccines, are suspensions of entire

killed *Bordetella pertussis* organisms. The incidence of pertussis in the country started to increase in the mid-2000s. It is likely that additional antigens in DTwP vaccines were inducing immune responses with greater durability compared to acellular vaccines containing only several specific antigens. The observed increase in risk by year of life from age 7 to 10 years also suggests a cohort effect of increasing susceptibility as those children, who exclusively received acellular vaccines, continue to age.

In 2006, the Tdap vaccine was recommended for adults and adolescents, beginning at age 11 to 12 years, to boost pertussis immunity. The subsequent relative reduction in the incidence of pertussis among adolescents aged 11 to 12 years was consistent with vaccine effectiveness in the short run, but the increasing numbers of cases in adolescents aged 13 to 14 years suggests immunity wanes after Tdap vaccination in those adolescents fully vaccinated with acellular vaccines during childhood. In recent years, children aged 7 to 10 years have also accounted for a substantial proportion of pertussis cases in the United States. This phenomenon is likely due to waning immunity in children who were fully vaccinated with acellular vaccines.

While Tdap effectiveness in previous studies was 66% to 72% among adolescents who largely received DTwP, the Tdap effectiveness and duration of protection in adolescents fully vaccinated with DTaP is not known.

Because *B. pertussis* is highly transmissible, even vaccinated persons remain susceptible and can become infected during a pertussis outbreak. Analysis of a 2010 California pertussis outbreak showed that unvaccinated children have at least an eightfold greater risk for pertussis than children fully vaccinated with DTaP. Although vaccinated children can develop pertussis, they are less infectious, have milder symptoms and shorter illness duration, and are at reduced risk for severe outcomes, including hospitalization.

Full compliance with current DTaP and Tdap recommendations is needed to prevent infection in all age groups and, especially, to protect infants who are most vulnerable to pertussis.

Since 2005, the Advisory Committee on Immunization Practices (ACIP) has recommended Tdap booster vaccines to unvaccinated postpartum mothers and other family members of newborn infants to protect infants from pertussis, a strategy referred to as cocooning. ACIP has concluded that there is no elevated frequency or an unusual occurrence of adverse events among pregnant women who have received Tdap vaccine, or in their newborns. Tdap vaccine is recommended after 20 weeks gestation because that optimizes antibody transfer and protection at birth, and likely provides protection against pertussis in early life, before the baby starts getting DTaP vaccines. Breastfeeding is not a contraindication for receiving Tdap vaccine. Tdap vaccine can and should be given to women who plan to breastfeed.

Tdap can be administered regardless of the interval since the previous Td dose. Shorter intervals between Tdap and the last Td may increase the risk of mild local reactogenicity, but may be appropriate if your patient is at high risk for contracting pertussis, such as during an outbreak, or if he or she has close contact with infants.

Missouri DHSS DTaP and Tdap Vaccination Recommendations:

- Ensure that children are fully vaccinated with **DTaP** as recommended at 2, 4, and 6 months, at 15 through 18 months, and at 4 through 6 years of age.
- Vaccinate with **Tdap** children ages **7 through 10 years** who are not fully vaccinated. Fully vaccinated is defined as 5 doses of DTaP or 4 doses of DTaP if the fourth dose was administered on or after the fourth birthday. Give a single dose of Tdap for those not fully vaccinated, **or** if additional doses of tetanus and diphtheria toxoid-containing vaccines are needed, then children aged 7 through 10 years should be vaccinated according to the catch-up schedule with Tdap preferred as the first dose.
- Provide vaccination with **Tdap** as a single dose for those **11 through 18 years** of age, with preferred administration at 11 through 12 years of age. Minimum age is 10 years for **Boostrix** and 11 years for **Adacel** vaccines.
- **Any adult 19 years of age and older** who has not received a dose of **Tdap** should get one as soon as feasible – to protect themselves and infants. This Tdap booster dose can replace one of the 10-year Td booster doses.
- Give either **Tdap** vaccine product, Adacel or Boostrix, to a person **65 years or older**. Do not miss an opportunity to vaccinate persons aged 65 years and older with Tdap, especially those who may have contact with infants.
- Vaccinate **pregnant women** who have not been previously immunized with **Tdap** with one dose of Tdap during the third trimester or late second trimester. Give Tdap in the immediate postpartum period before discharge from hospital or birthing center for new mothers who were not previously vaccinated or whose vaccination status is unknown.
- Provide DTaP or Tdap (depending on age) vaccination for **all family members and caregivers** of the infant – at least two weeks before coming into close contact with the infant.
- Give a single dose of **Tdap** to **health care personnel** who have not previously received Tdap as an adult and who have direct patient contact. Priority should be given to vaccinating those who have direct contact with babies younger than 12 months of age. Health care personnel include but are not limited to physicians, other primary care providers, nurses, aides, respiratory therapists, radiology technicians, students (e.g., medical, nursing, and pharmaceutical), dentists, social workers, chaplains, volunteers, and dietary and clerical workers.

References

CDC. Updated Recommendations for Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis (Tdap) Vaccine from the Advisory Committee on Immunization Practices, 2010. *MMWR* 2011;60(1):13-15

CDC. Immunization of Health-Care Personnel: Recommendations of the Advisory Committee on Immunization Practices (ACIP)**.** *MMWR* 2011;60(RR07):1-45.

CDC. Updated Recommendations for Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis (Tdap) Vaccine in Pregnant Women and Persons Who Have or Anticipate Having Close Contact with an Infant Aged Less than 12 Months — Advisory Committee on Immunization Practices (ACIP), 2011. *MMWR* 2011;60(41):1424-1426.