

Postexposure Management of Vaccine-Preventable Diseases **CE**

Teri Moser Woo, PhD, RN, ARNP, CNL, CPNP, FAANP

ABSTRACT

Because some parents are choosing to not vaccinate or only partially vaccinate their children, vaccine-preventable diseases that once were rarely seen in pediatric practice must now be considered part of the differential diagnosis

when caring for these children. Measles, mumps, varicella, meningococcal disease, pertussis, and influenza are reviewed. Recommendations for prevention and treatment of these vaccine-preventable diseases are discussed. *J Pediatr Health Care.* (2016) 30, 173-182.

Section Editors

Teri Moser Woo, PhD, RN, ARNP, CNL, CPNP, FAANP

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Leah Molloy, PharmD

Children's Hospital of Michigan
Detroit, Michigan

Teri Moser Woo, Associate Professor, Associate Dean for Graduate Nursing Programs, Pacific Lutheran University, Tacoma, WA.

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Correspondence: Teri Moser Woo, PhD, RN, ARNP, CNL, CPNP, FAANP, 2607 N 30th St, Tacoma WA 98407; e-mail: wotm@plu.edu.

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KEY WORDS

Immunizations, vaccine-preventable disease, measles, mumps, pertussis, varicella, meningococcal disease, influenza

OBJECTIVES

1. Review current child and adolescent vaccination rates in the United States.
2. Discuss vaccine-preventable diseases currently experiencing outbreaks in the United States.
3. Review management of vaccine-preventable diseases.

In 2000, measles was declared eliminated in the United States as a result of high two-dose measles vaccine immunization rates, yet in 2014, 600 cases of measles were reported in the United States, and in 2015, 189 cases were reported through October 15 ([Centers for Disease Control and Prevention \[CDC\], 2015a](#)). In 2014 there were 1,223 confirmed cases of mumps in the United States ([CDC, 2015b](#)), including an outbreak that affected six National Hockey League teams ([ESPN.com Staff, 2014](#)). Outbreaks of serotype B meningococcal disease on multiple college campuses in 2014 and 2015 created the need for a U.S.-approved vaccine to provide immunity. It is clear that when children and adolescents are not vaccinated, outbreaks of

vaccine-preventable diseases will occur. Current immunization rates in the United States, recent vaccine-preventable disease outbreaks, and care of children and adolescents exposed during an outbreak will be reviewed.

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CURRENT IMMUNIZATION COVERAGE

Healthy People 2020 set goals for vaccination coverage levels for universally recommended vaccines among young children ages 19 to 35 months of age, children in kindergarten, and adolescents (Office of Disease Prevention and Health Promotion, 2010). Healthy People 2020 set a vaccine coverage goal of 90% of children aged 19 to 35 months to receive four doses of diphtheria-tetanus-acellular pertussis (DTaP) vaccine, three or four doses of *Haemophilus influenzae* type b (Hib) vaccine, three doses of polio vaccine, three doses of hepatitis B (HBV) vaccine, one dose of measles-mumps-rubella (MMR) vaccine, one dose of varicella vaccine, and four doses of pneumococcal conjugate vaccine. For children entering kindergarten, Healthy People 2020 set a goal of 95% vaccine coverage for four doses of DTaP vaccine, three doses of polio vaccine, three doses of HBV vaccine, and two doses each of MMR and varicella vaccine. The goal for adolescents aged 13 to 15 years is for 80% to receive one dose of tetanus-diphtheria-acellular pertussis (Tdap) vaccine, one dose of meningococcal conjugate vaccine, and three doses of human papillomavirus (HPV) vaccine and for 90% to receive two doses of varicella vaccine (Office of Disease Prevention and Health Promotion, 2010).

Current Coverage in Children Ages 19 to 35 Months

Since 1994, vaccination coverage among U.S. children ages 19 to 35 months has been monitored annually via the National Immunization Survey. In 2014, 71.4% of children received the combined (4:3:1:3:3:1:4) vaccine series, which includes four doses of DTaP vaccine, three doses of poliovirus vaccine, one dose of measles-containing vaccine, the full series of Hib vaccine (three or four doses, depending on product type), three doses of HBV vaccine, one dose of varicella vaccine, and four doses of pneumococcal conjugate vaccine (Hill,

Elam-Evans, Yankey, Singleton, & Kolasa, 2015). Healthy People 2020 coverage goals of 90% were achieved for polio, hepatitis B, one dose of MMR, and varicella. Of children aged 19 to 25 months, 94.7% had received three doses of DTaP vaccine, but only 84.2% were fully immunized with four doses. Likewise, 93.3% of preschoolers had received the primary series of Hib, and 82% were fully vaccinated for Hib (Hill et al., 2015). Only 0.8% of U.S. children had received no vaccines by age 35 months (Hill et al., 2015).

Current Coverage Among Kindergartners

The CDC monitors school vaccine data to determine vaccine coverage rates for children attending kindergarten. In the 2014-2015 academic school year, the median coverage for kindergartners was 94% for three doses of MMR vaccine, 93.6% for two doses of varicella vaccine, and 94.2% for DTaP vaccine (Seither et al., 2015). The Healthy People 2020 goal of 95% coverage at kindergarten entry was only achieved by 18 states in the 2014-2015 survey (Seither et al., 2015). States with high rates of exemption from vaccines had lower vaccination rates. Mississippi, which does not allow exemptions (less than 0.1%), had the highest kindergarten vaccination rates at greater than 99.2% (Seither et al., 2015).

Current Coverage in Adolescents

Adolescent immunization rates are derived from the National Immunization Survey-Teen. In 2014, 87.6% of adolescents had received one dose of Tdap vaccine, and 79.3% had received one dose of meningococcal conjugate vaccine (Reagan-Steiner et al., 2015). Sixty percent of adolescent females and 41.7% of males had received one dose of HPV vaccine in 2014. The three-dose completion rate (i.e., the percentage of adolescents who received ≥ 3 HPV vaccine doses among those who had ≥ 1 HPV vaccine dose) in 2014 for HPV was 69.3% for females and 57.8% for males (Reagan-Steiner et al., 2015). The percentage of adolescents who had either received two doses of varicella vaccine or had a history of disease was 85.0% in 2015. The highest vaccination coverage rates in adolescents in 2014 were MMR (90.7% had received two doses) and hepatitis B (91.4% had received three doses).

MANAGEMENT OF VACCINE-PREVENTABLE DISEASE OUTBREAKS

For a variety of reasons, including concerns regarding vaccine safety and immune system overload (Hulse & Bland, 2015), some parents are choosing to not fully

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