TABLE 228-3 RECOMMENDATIONS FOR POLIOVIRUS VACCINATION OF ADULTS

1. Most adults in the United States have been vaccinated during childhood and are at little risk of exposure to wild-type virus in the United States. Immunization is recommended for those with a higher risk of exposure than the general population, including:
   a. travelers to areas where poliovirus is or may be epidemic or endemic;
   b. members of communities or population groups with disease caused by wild-type polioviruses;
   c. laboratory workers handling specimens that may contain wild-type polioviruses; and
   d. health care workers in close contact with patients who may be excreting wild-type polioviruses.
2. Three doses of IPV are recommended for adults who need to be immunized. The second dose should be given 1–2 months after the first dose; the third dose should be given 6–12 months after the second dose.
3. Adults who are at increased risk of exposure to wild-type poliovirus and who have previously completed primary immunization should receive a single dose of IPV. Adults who did not complete primary immunization should receive the remaining required doses of IPV.

Abbreviation: IPV, inactivated poliovirus vaccine.

Source: Modified from Pickering LK, ed. Red Book 2012: Committee on Infectious Diseases, 29th ed.

infections in early childhood. HPeV-1 infections occur throughout the year, while other parechovirus infections occur more commonly in summer and fall. Infections with HPeVs present similarly to those due to enteroviruses and may cause generalized disease of the newborn, aseptic meningitis, encephalitis, transient paralysis, exanthems, respiratory tract disease, and gastroenteritis. While HPeV-1 is the most common serotype and generally causes mild disease, deaths of infants in the United States have been associated with HPeV-1, HPeV-3, and HPeV-6. HPeVs can be isolated from the same sites as enteroviruses, including the nasopharynx, stool, and respiratory tract secretions. PCR using pan-enterovirus primers does not detect HPeVs, and while PCR assays are performed by the CDC and research laboratories, many commercial laboratories do not perform the test.

REOVIRUSES

Reoviruses are double-stranded RNA viruses encompassing three serotypes. Serologic studies indicate that most humans are infected with reoviruses during childhood. Most infections either are asymptomatic or cause mild upper respiratory tract symptoms. Reovirus is considered a rare cause of mild gastroenteritis or meningitis in infants and children. Speculation regarding an association of reovirus type 3 with idiopathic neonatal hepatitis and extrahepatic biliary atresia is based on an elevated prevalence of antibody to reovirus in some affected patients and the detection of viral RNA by PCR in hepatobiliary tissues in some studies. New orthoreoviruses have been associated with human disease—e.g., Melaka and Kampar viruses with fever and acute respiratory disease in Malaysia, and Nelson Bay virus with acute respiratory disease in a traveler from Bali.

229 Measles (Rubeola)

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DEFINITION

Measles is a highly contagious viral disease that is characterized by a prodromal illness of fever, cough, coryza, and conjunctivitis followed by the appearance of a generalized maculopapular rash. Before the widespread use of measles vaccines, it was estimated that measles caused between 5 million and 8 million deaths worldwide each year.

GLOBAL CONSIDERATIONS

Remarkable progress has been made in reducing global measles incidence and mortality rates through measles vaccination. In the Americas, intensive vaccination and surveillance efforts—based in part on the successful Pan American Health Organization strategy of periodic nationwide measles vaccination campaigns (supplementary immunization activities, or SIAs)—and high levels of routine measles vaccine coverage interrupted endemic transmission of measles virus. In the United States, high-level coverage with two doses of measles vaccine eliminated endemic measles virus transmission in 2000. More recently, progress has been made in reducing measles incidence and mortality rates in sub-Saharan Africa and Asia as a consequence of increasing routine measles vaccine coverage and provision of a second dose of measles vaccine through mass measles vaccination campaigns and childhood immunization programs.

In 2003, the World Health Assembly endorsed a resolution urging member countries to reduce the number of deaths attributed to measles by 50% (compared with 1999 estimates) by the end of 2005. This target was met. Global measles mortality rates were further reduced in 2008; during that year, there were an estimated 164,000 deaths due to measles (uncertainty bounds: 115,000 and 222,000 deaths). These achievements attest to the enormous public-health significance of measles vaccination. However, recent large outbreaks of measles in Europe and Africa illustrate the challenges faced in sustaining measles control: in these outbreaks, measles was imported into countries that had eliminated indigenous transmission of measles virus.

The Measles and Rubella Initiative, a partnership led by the American Red Cross, the United Nations Foundation, UNICEF, the U.S. Centers for Disease Control and Prevention (CDC), and the World Health Organization (WHO), is playing an important role in reducing global measles incidence and mortality rates. Since its inception in 2001, the Initiative has provided governments and communities in more than 80 countries with technical and financial support for routine immunization activities, mass vaccination campaigns, and disease surveillance systems. Through its 2012–2020 Global Measles and Rubella Strategic Plan, the Initiative aims to reduce measles deaths by 95% (compared with year 2000 estimates) by 2015 and to eliminate measles from at least five of the six WHO regions by 2020. As regional goals for measles elimination are set, global measles eradication is likely to become a public health goal in the near future.

ETIOLOGY

Measles virus is a spherical, nonsegmented, single-stranded, negative-sense RNA virus and a member of the *Morbillivirus* genus in the family Paramyxoviridae. Measles was originally a zoonotic infection, arising from animal-to-human transmission of an ancestral morbillivirus ~10,000 years ago, when human populations had attained sufficient size to sustain virus transmission. Although RNA viruses typically have high mutation rates, measles virus is considered to be an antigenically monotypic virus; i.e., the surface proteins responsible for inducing protective immunity have retained their antigenic structure across time and distance. The public health significance of this stability is that measles vaccines developed decades ago from a single strain of measles virus remain protective worldwide. Measles virus is killed by ultraviolet light and heat, and attenuated measles vaccine viruses retain these characteristics, necessitating a cold chain for vaccine transport and storage.

EPIDEMIOLOGY

Measles virus is one of the most highly contagious directly transmitted pathogens. Outbreaks can occur in populations in which <10% of persons are susceptible. Chains of transmission are common among household contacts, school-age children, and health care workers. There are no latent or persistent measles virus infections that result in prolonged contagiousness, nor are there animal reservoirs for the virus. Thus, measles virus can be maintained in human populations only by an unbroken chain of acute infections, which requires