

Routine Adult Immunization: American College of Preventive Medicine Practice Policy Statement, updated 2002

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Burden of suffering

Vaccines are available to prevent a number of illnesses that contribute to morbidity and mortality in adults in the United States. During epidemic, non-pandemic years, influenza has been responsible for more than 20,000 deaths and an average of 114,000 excess hospitalizations, at a cost of \$750 million to \$1 billion. (1-4) Mortality from all pneumococcal disease is estimated at 40,000 deaths annually, with morbidity estimated at 500,000 cases of pneumonia, 50,000 cases of sepsis, and 3,000 cases of meningitis. (1,2,5) Hepatitis B infections occur in 200,000 to 300,000 people per year and result in 10,000 to 15,000 hospitalizations and 250 deaths due to fulminant hepatitis. (2,3,6) Approximately 1 million people are carriers of the hepatitis B virus (HBV); 25% have chronic active hepatitis, 4,000 die annually from HBV-related cirrhosis, and 800 die annually from HBV-related liver cancer. (6) Prior to the availability of the varicella vaccine, approximately 4 million cases of varicella disease with 100 deaths occurred annually in the United States (7). More than 90% of adults are immune to varicella zoster virus (VZV) from natural infection in childhood, however varicella-related mortality increases in persons over 15 years of age (8).

Routine immunization of children has reduced the incidence of some vaccine-preventable diseases to levels far lower than those achieved in adults. Adults older than 20 years of age represented 95% of tetanus cases and 100% of deaths due to tetanus during 1991-1994, (9) more than 60% of cases of diphtheria during 1985-89, (6) and 33% of measles cases during 1996. (10) In 1993, 20% of reported mumps cases for which age was known occurred among persons 20 years of age or older. (11) An estimated 6% to 11% of younger adults are unprotected against rubella; 85% of cases with known age in 1994-1996 were 15 years of age or older. (12) Congenital rubella syndrome is a very rare but serious event and remains a threat for the offspring of unimmunized women.

Description of Preventive Measures

Adult immunizations are administered in primary series (in previously unimmunized persons), booster doses, and periodic doses. Agents of routine immunizations include toxoids (diphtheria and tetanus), live virus vaccines (varicella and measles, mumps, and rubella), inactivated virus vaccine (influenza), inactive viral particles (hepatitis B), and inactivated bacterial polysaccharide vaccine (pneumococcal). (6) Additional immunizations are recommended for adults with special risks, such as travel, occupation, residence

in an area endemic for specific vaccine-preventable diseases, or immune deficiency or other specific medical condition. Immune globulins are also available for passive prophylaxis against infectious diseases. Information on these special indications is available in various *Morbidity and Mortality Weekly Report Recommendations and Reports*.

Evidence of Effectiveness

Influenza Vaccine: In uncontrolled studies of influenza vaccination, the incidence of clinical illness in vaccinated persons has been 70% to 90% less than expected in healthy adults <65 years of age. (2) Controlled studies have demonstrated a 68% efficacy of inactivated parenteral influenza A vaccination. (13). Among the elderly in nursing homes, vaccinated persons experienced a 30% to 40% reduction in the incidence of illness, a 50% to 60% reduction in hospitalization and pneumonia, and a 70% to 100% reduction in mortality. (2,4)

Pneumococcal Vaccine: The estimated effectiveness of the vaccine in preventing morbidity is 60% to 64% overall, but 44% to 61% in persons > 65 years of age. (6) The duration of vaccine-induced immunity is not known.

Hepatitis B Vaccine: The overall effectiveness of the vaccine in preventing infection is 80% to 95%; it is 70% in persons 50 to 59 years of age and 50% in those > 60 years of age. (1) The duration of protection is uncertain. but is at least 7 years among healthy adults. (1,6)

Tetanus-Diphtheria Toxoid: When used properly, the vaccine is nearly 100% effective in preventing tetanus and at least 85% effective in preventing diphtheria.

Measles-Mumps-Rubella Vaccine: A single dose of appropriately timed live measles vaccine will provide long-lasting immunity to measles in at least 95% of recipients. A second dose of vaccine will provide immunity in more than 90% of persons who fail to respond to the first dose and, through herd immunity, will decrease the percentage of nonimmune persons to a level too low to sustain transmission of the disease. Mumps vaccine will reduce the incidence of clinical illness by 75% to 95%. Rubella vaccine has demonstrated a similar effectiveness to that of measles in assuring immunity. (6)

Varicella Vaccine: Two doses of vaccine administered 4-8 weeks apart resulted in seroconversion in 99% of recipients age \geq 13 years. Duration of protection with this dosing is not yet known. (8)

Side effects to the above vaccines are generally mild, consisting of local redness and/or induration and/or tenderness at the injection site. There might also be febrile or dermatologic reactions (measles), arthralgias (rubella), parotitis and fever (mumps), malaise and myalgias (influenza), and rare allergic reactions. (6)

Public Policy Considerations

Every visit to a health professional provides an opportunity for immunization. However, in 1995, among adults aged ≥ 65 years, only 58% had received an influenza vaccination in the previous 12 months and only 34% had ever received the pneumococcal vaccine. Figures improved to 66% and 46% for influenza and pneumococcal vaccination, respectively, in 1997. Younger adults with medical indications for receiving these immunizations were less well covered. In 1995, only 38% of those aged 50-64 years had received the influenza vaccine and 20% had received the pneumococcal vaccine. (15) Coverage for hepatitis B vaccine varies from 1% to 60% (average 10%) depending on the population. (1) Adequate antibody titers against tetanus and diphtheria are present in approximately 40% of adults. Thirty-nine percent of adults aged ≥ 65 years have received tetanus toxoid within the past 10 years, compared to 54% of adults aged 50-64 and 65% of adults aged 18-49.

Reasons for underutilization of vaccines in adults are outlined in the National Vaccine Advisory Committee (NVAC) report. (3) They include under appreciation of the importance of adult vaccine-preventable diseases; uncertainty or lack of knowledge about the safety and efficacy of adult vaccines; confusion related to differing vaccination schedules for various subpopulations rather than universal recommendations for all adults; few organized programs for vaccine delivery; and lack of reimbursement for the cost of adult vaccinations. Strategies to improve adult vaccination rates include improving provider and public awareness of indications for and contraindications to vaccine use; adequate vaccine delivery capacity; financial support for the provision of vaccine to adults from public and private insurers; and support for research on adult vaccine-preventable diseases and vaccines.

Based on evaluation of quality-adjusted life years gained, vaccination has been shown to be cost-effective and possibly cost-saving for influenza vaccination (16) and highly cost-effective for pneumococcal vaccination. (17) Controversy currently exists as to whether tetanus-diphtheria should be administered at 10-year intervals throughout adulthood or if one booster dose at age 50 or 65, following a complete primary series earlier in life, would provide the same protection at a lower cost. (18)

Recommendations of Other Groups

The Advisory Committee on Immunization Practices (ACIP) recommends that adults be immunized according to the schedule in Table I. (4,6,8) Similar recommendations have been issued by the American College of Physicians (ACP), the National Vaccine Advisory Committee, the National Coalition for Adult Immunization, and the U.S. Preventive Services Task Force. (2,3,19,20) ACIP

and ACP also recommend that adult vaccination status be reviewed at age 50, with Td administered at that time if needed and assessment made for the presence of any risk factors that indicate the need for pneumococcal vaccine (ACIP and ACP) and annual influenza vaccines (ACP). (21) ACIP included persons aged 50-64 in recent recommendations for influenza vaccination based on the large percentage of persons in that age group with high-risk conditions. Recommendations for other vaccines to be used in high risk adults have also been issued. (8,22,23)

Rationale Statement

Appropriately timed adult immunizations can reduce or prevent morbidity and mortality related to influenza, pneumococcal infection, hepatitis B, diphtheria, tetanus, varicella, measles, mumps, and rubella. Influenza and pneumococcal disease, which cause considerable morbidity and mortality in the ever-increasing population over age 65, can be reduced through vaccination with little associated harm or net cost. Vaccination of adults at risk for hepatitis B infection can reduce the expenses of perinatally acquired chronic hepatitis B infection in their offspring as well as the cost of adult morbidity and mortality. (14) Diphtheria, tetanus, varicella, measles, mumps, and rubella affect small numbers of adults, but morbidity and mortality attributable to these preventable illnesses can be reduced substantially by selective immunization of susceptible adults.

Recommendations of the American College of Preventive Medicine

Adults aged 18 years of age and older without contraindications should receive immunizations for influenza, pneumococcal disease, hepatitis B, tetanus-diphtheria, varicella, and measles-mumps-rubella as outlined in the ACIP's Update on Adult Immunization (Table 1). (6,8) Priorities should include efforts to improve provider and public awareness of the safety and efficacy of adult vaccination; to avoid missed opportunities for vaccination, such as visits to health care providers for other problems, entry into school or employment situations, or travel; to use reminder systems for patients and providers; to have adequate supplies of vaccine; to improve mechanisms for financing and delivery of vaccine; and to assure support for research on better vaccines. (3) Individuals with special risk factors might require additional immunizations.

Table 1. ACIP recommendations for routine adult immunizations*

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Age group (years)	18-24	25-64	>65
Td (every 10 years)	Indicated	Indicated	Indicated
Measles	(a)	(a)	
Mumps	(b)	(b)	
Rubella	(c)	(c)	
Influenza (annual)		starting at age 50 (d)	Indicated
Pneumococcal polysaccharide			Indicated (e)
Hepatitis B (series)	(f)		
Varicella (series)	(g)	(g)	(g)

*Information about immunizations for adults in special populations (e.g., hepatitis A in residents of endemic areas, men who have sex with men, or in travelers; rabies in persons with occupational risks; Lyme disease in residents of endemic areas; meningococcal disease in college freshman living in dormitories) or with special medical conditions (e.g., hepatitis A in persons with chronic liver disease) is not included in this table.

(a) Indicated for persons born after 1956 and for health care workers even if born before 1957; two doses recommended for individuals in college settings and among health care workers.

(b) Indicated for all adults believed to be susceptible.

(c) Especially indicated for nonpregnant women of childbearing age.

(d) Also indicated for younger persons at high risk of lower-respiratory-tract complications and death (e.g., chronic disorders of the cardiovascular, pulmonary, and/or renal systems; metabolic diseases; severe anemia; and/or compromised immune function); and persons in nursing homes.

(e) Indicated for younger persons at high risk of pneumococcal disease (i.e., chronic disorders of the cardiovascular or pulmonary systems; metabolic diseases; alcoholism; cirrhosis; and/or compromised immune function); persons in special environments or social settings.

(f) Indicated if not previously immunized and at increased risk of occupational, social, family, environmental, or illness-related exposure to HBV.

(g) Indicated for susceptible adults who are at high risk for exposure or transmission of varicella disease, including persons who live or work in environments where transmission of VZV can occur and/or is likely, persons who live in households with children, and international travelers. The need for serologic confirmation of susceptibility prior to vaccination is being assessed.

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ACIP recommendations are available online at the CDC Website: www.cdc.gov

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