

# Standards for Adult Immunization Practices

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**Abstract:** Since the Standards for Adult Immunization Practices were first published in 1990, healthcare researchers and providers have learned important lessons on how to better achieve and maintain high vaccination rates in adults. The success rate of childhood immunization far exceeds the success rate of adult immunization. Thus, information and practices that will produce higher success rates for adult vaccination are crucial, resulting in overall societal cost savings and substantial reductions in hospitalizations and deaths. The Standards, which were developed to encourage the best immunization practices, represent the collective efforts of more than 100 people from more than 60 organizations. The revised Standards are more comprehensive than the 1990 Standards and focus on the accessibility and availability of vaccines, proper assessment of patient vaccination status, opportunities for patient education, correct procedures for administering vaccines, implementation of strategies to improve vaccination rates, and partnerships with the community to reach target patient populations. The revised Standards are recommended for use by all healthcare professionals and all public and private sector organizations that provide immunizations for adults. All who are involved in adult immunization should strive to follow the Standards in order to create the same level of success achieved by childhood vaccination programs and to meet the *Healthy People 2010* goals. (Am J Prev Med 2003;25(2):144–150)

## Introduction

In the United States, years of clinical and programmatic experience have been translated into successful childhood immunization practices. As a result, vaccination rates among infants and children are near or at all-time highs. Today, most childhood vaccine-preventable diseases rarely occur or are non-existent. However, similar success in vaccinating adults has not been achieved.

Goals for adult immunization feature prominently in *Healthy People 2010*,<sup>1</sup> a comprehensive, nationwide health promotion and disease prevention agenda from the U.S. Department of Health and Human Services. The target is 90% coverage for annual influenza immunization among adults aged  $\geq 65$  years and 90% for one dose of pneumococcal vaccine. Success will require a dramatic increase from rates in 2000, which were only

66% for influenza vaccine and 50% for pneumococcal vaccine.<sup>2</sup>

Increasing the use of these two vaccines among older adults could have tremendous health impacts. Influenza and its complications kill approximately 40,000 individuals every year in the United States.<sup>3</sup> Another 100,000 individuals suffer so severely from influenza that hospitalization is required.<sup>4</sup> The overwhelming majority of these deaths and hospitalizations occur in the elderly. When vaccine viruses are well matched to circulating viruses, vaccination lowers the risk of infection among healthy adults by up to 90%.<sup>4,5</sup> Although influenza vaccination is somewhat less effective among the elderly, vaccination has been estimated to reduce their risk of influenza-related hospitalization and death by up to 70%.<sup>4,6–8</sup> The Centers for Disease Control and Prevention (CDC)<sup>9</sup> estimate that for each additional 1 million elderly people vaccinated each year, 900 deaths and 1300 hospitalizations would be averted. Furthermore, economic studies find overall societal cost savings and substantial reductions in hospitalizations and deaths if people aged  $\geq 65$  years receive the influenza vaccine.<sup>4,6,7</sup>

In recent years, pneumococcal infections have accounted for  $>100,000$  hospitalizations for pneumonia,  $>60,000$  cases of bacteremia and other forms of invasive disease, and about 7000 deaths from invasive pneumococcal disease.<sup>10–12</sup> In 1998,  $>50\%$  of these deaths occurred among people aged  $\geq 65$  years. Over-

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all, vaccine effectiveness against invasive pneumococcal disease among immunocompetent people aged  $\geq 65$  years is 75%,<sup>13</sup> and the vaccine has been shown to be cost effective for people in this age group as well.<sup>14</sup> Based on 1998 projections, annually 76% of invasive pneumococcal disease cases and 87% of resulting deaths occurred in people who were eligible for pneumococcal vaccine in the United States.<sup>12</sup>

Additional health benefits could also be gained by reaching immunization targets for younger high-risk adults. *Healthy People 2010*<sup>1</sup> targets are 60% coverage with influenza and pneumococcal vaccines among high-risk adults aged 18 to 64 years. In 1999, only 31% of these adults reported receiving influenza vaccine, and only 17% received pneumococcal vaccine (Centers for Disease Control and Prevention, unpublished data, 1999). In 1998, 41% of deaths attributed to invasive pneumococcal disease occurred among individuals aged 18 to 64 years who had a medical indication for the pneumococcal vaccine.<sup>12</sup>

Despite the availability of a vaccine that is >95% effective in preventing hepatitis B, approximately 80,000 individuals, mostly adolescents and adults, are infected annually in the United States.<sup>15,16</sup> About 6% of newly infected people become chronically infected and face a 15% to 25% lifetime risk of death from chronic liver disease. Annually, an estimated 4000 to 5000 chronically infected people die prematurely from chronic liver disease.<sup>17</sup> Without an improvement in vaccinating adults at increased risk of hepatitis B infection, transmission of hepatitis B will continue for decades.

Vaccines also remain underutilized among other groups of adults, especially among certain racial/ethnic populations. For example, the rates of influenza and pneumococcal vaccination in African-American and Hispanic populations are significantly lower than those among whites.<sup>18</sup> In addition, adult immunization is not limited to pneumococcal, influenza, and hepatitis B vaccines. All adults should be immune to measles, mumps, rubella, tetanus, diphtheria, and varicella, and adults who are susceptible to hepatitis A and polio should be vaccinated if they are at risk for exposure. Further, certain vaccines, such as travel vaccines or vaccines occupationally required, should be reviewed and provided if appropriate. The CDC's Advisory Committee on Immunization Practices (ACIP) has recently published an Adult Immunization Schedule (<http://cdc.gov/nip/recs/adult-schedule.htm>).

## Revising the Standards

The Standards for Adult Immunization Practices, developed to encourage best practices, were first published in 1990.<sup>19</sup> Since then, the healthcare system has changed dramatically. For example, there has been a shift toward managed care, resulting in a change in

**Table 1.** Standards for adult immunization practices

### Make vaccinations available.

1. Adult vaccination services are readily available.
2. Barriers to receiving vaccines are identified and minimized.
3. Patient "out-of-pocket" vaccination costs are minimized.

### Assess patients' vaccination status.

4. Healthcare professionals routinely review the vaccination status of patients.
5. Healthcare professionals assess for valid contraindications.

### Communicate effectively with patients.

6. Patients are educated about risks and benefits of vaccination in easy-to-understand language.

### Administer and document vaccinations properly.

7. Written vaccination protocols are available at all locations where vaccines are administered.
8. Persons who administer vaccines are properly trained.
9. Healthcare professionals recommend simultaneous administration of indicated vaccine doses.
10. Vaccination records for patients are accurate and easily accessible.
11. All personnel who have contact with patients are appropriately vaccinated.

### Implement strategies to improve vaccination rates.

12. Systems are developed and used to remind patients and healthcare professionals when vaccinations are due and to recall patients who are overdue.
13. Standing orders for vaccinations are employed.
14. Regular assessments of vaccination coverage levels are conducted in a provider's practice.

### Partner with the community.

15. Patient-oriented and community-based approaches are used to reach target populations.

provider incentives and reimbursement for preventive services. Also in the past decade, healthcare researchers and providers have learned many valuable lessons about what is needed to achieve and maintain high vaccination rates among adults.

This revision of the Standards for Adult Immunization Practices (Table 1) reflects the experience of the past 10 years. The Standards represent the collective efforts of more than 100 people from more than 60 organizations, including professional societies, state and local health departments, immunization programs, and immunization providers. The National Vaccine Advisory Committee (NVAC) led this effort. As the Federal Advisory Committee is charged by the Secretary of Health and Human Services to ensure the adequate delivery of safe and effective vaccination products in the United States, the NVAC itself is composed of people who represent the spectrum of those with an interest in immunization, including physicians, researchers, developers, manufacturers, state and public health agencies, and more than 20 federal agencies. The revised Standards also incorporate information from two important reports published by NVAC in the last decade on the status of adult immunization<sup>20</sup> and on adult immunization programs in nontraditional settings.<sup>21</sup>

Information published from the *Guide to Community Preventive Services* reviews strategies to improve immunization service delivery and provides a broader base of evidence to support the Standards.<sup>22,23</sup> Based on research published in the 1990s concerning techniques proven to improve immunization rates among adults, three new standards were constructed and require the following: (1) systems that remind patients and providers when an immunization is due, (2) standing orders from physicians that enable other personnel to prescribe and deliver vaccinations, (3) regular assessments of coverage rates at clinics, and (4) pertinent information provided to clinic staff to ensure current patient immunizations.

The Standards supplement research with expert consensus in areas where research does not offer guidance but experience does. The revised Standards are more comprehensive than the previous version and organized to focus on the provider's ongoing process of minimizing barriers that prevent patients from receiving vaccines, assessing for valid indications and contraindications, keeping patients' immunizations current, and communicating effectively with patients about vaccines.

Today, more tools are available to support immunization providers. The revised Standards include links to websites that contain information on model standing-order policies, instructions for setting up reminder/recall systems, and templates for personal vaccination records. The tools are currently available free on CD-ROM, but will soon be available online. In addition, information about federal requirements and programs, including Vaccine Information Statements, the Vaccine Adverse Event Reporting System (VAERS), and the National Vaccine Injury Compensation Program (VICP) is current and has been made easily accessible in the Standards.

### Applying the Standards

Once the revised Standards are implemented on a practice-by-practice or program-by-program basis, immediate results can be expected for improved adult immunization. Long-term sustainable improvement in adult immunization necessitates an infrastructure to organize immunization efforts by providers and federal agencies, as well as state and local health departments. Such an infrastructure is lacking.<sup>24</sup> Partnerships among healthcare professionals, state and local health departments, medical and nursing organizations, and insurance companies will need to be strengthened. Factors that cause low vaccination coverage among adults must be addressed. These factors include provider behaviors and practices that may affect accurate identification of patients in need of vaccination, attitudes toward the healthcare system that may impact adults seeking and accepting vaccines, and financial issues that may im-

pede appropriate vaccination of certain populations. For example, although Medicare ensures coverage benefits for vaccines for those aged  $\geq 65$  years, in 2001 an estimated 17% and 13% of adults aged 35 to 44 years and 45 to 64 years, respectively, did not have health insurance.<sup>2</sup> In addition, even though many adults may have insurance coverage, the medical insurance may not cover vaccination.

Overall improvement in our healthcare system will take time. However, we can do much now to improve the delivery of vaccination services for adults. The following Standards for Adult Immunization Practices and the accompanying discussion are intended to address these issues.

## The Standards

### Make Vaccinations Available

**Standard 1: Adult vaccination services are readily available.** Primary care healthcare professionals who serve adults should always include routinely recommended vaccinations as part of their care. Specialists, whose patients may be at increased risk of vaccine-preventable diseases, should also include routinely recommended vaccinations as part of their care. For selected vaccines (e.g., meningococcal vaccine for college entrants and vaccines for international travelers), patients may be referred to another provider.

**Standard 2: Barriers to receiving vaccines are identified and minimized.** Barriers to receiving vaccines may include requiring a physical examination before vaccination, requiring an additional visit for vaccination, long waiting periods, and lack of educational materials that are culturally appropriate. Prior to vaccine administration, simply observing the patient, asking if the patient is well and questioning the patient/guardian about vaccine contraindications is sufficient.

**Standard 3: Patient "out-of-pocket" vaccination costs are minimized.** Resources should be identified to keep patient vaccination costs as low as possible, specifically for those patients aged  $\geq 65$  years and for vaccines not covered by Medicare Part B. In the public sector, patient fees should include only the cost of vaccine and administration that cannot be funded through another source. In the private sector, routinely recommended vaccination services should be included in basic benefits packages. System and policy changes should be addressed to provide adequate reimbursement to providers for delivering vaccinations to their adult population.

### Assess Patients' Vaccination Status

**Standard 4: Healthcare professionals routinely review the vaccination status of patients.** Healthcare professionals should review and document the vaccination

status of all new patients during initial office visits and also review vaccination status on an annual basis thereafter. Healthcare professionals should ascertain if the patient has medical risk factors, lifestyle risk factors, or an occupation for which certain vaccines may be indicated. Healthcare professionals should record this information in the patient's chart and preventive health summary. Healthcare professionals should also routinely review pneumococcal vaccination status at the time of influenza vaccination.

**Standard 5: Healthcare professionals assess for valid contraindications.** Failure to differentiate between valid and invalid contraindications often results in the needless deferral of indicated vaccinations. Healthcare professionals should ask about prior adverse events in connection with a vaccination and about any conditions or circumstances that might indicate vaccination should be withheld or delayed. Healthcare professionals should refer to current ACIP recommendations on valid and invalid contraindications as well as on valid indications for vaccine use ([www.cdc.gov/nip](http://www.cdc.gov/nip)).

### Communicate Effectively with Patients

**Standard 6: Patients are educated about risks and benefits of vaccination in easy-to-understand language.** Healthcare professionals should discuss with the patient the benefits of vaccines, the diseases that the vaccines prevent, and any known risks from vaccines. These issues should be discussed in the patient's native language, whenever possible. Printed materials, accurately translated into the patient's language, should be provided. For most commonly used vaccines, the U.S. federal government has developed Vaccine Information Statements for use by both public and private healthcare professionals to give to potential vaccine recipients. For vaccines covered by the National Childhood Vaccine Injury Act, including those vaccines used in children, these forms are required. These statements are available in English and other languages. Healthcare professionals should allot ample time with patients to review written materials and address questions and concerns. Information and assistance can be obtained by calling the Immunization Hotline (1-800-232-2522) or accessing the website ([www.cdc.gov/nip](http://www.cdc.gov/nip)).

Healthcare professionals should respect each patient's right to make an informed decision to accept or reject a vaccine or to defer vaccination until more information is collected.

### Administer and Document Vaccinations Properly

**Standard 7: Written vaccination protocols are available at all locations where vaccines are administered.** The medical protocol should detail procedures for vaccine storage and handling, vaccine schedules, contraindications, administration techniques, management and re-

porting of adverse events, and record maintenance and accessibility. These protocols should be consistent with established guidelines. CDC-recommended storage and handling procedures are available on the Internet at [http://gravity.lmi.org/lmi\\_cdc/geninfo.htm](http://gravity.lmi.org/lmi_cdc/geninfo.htm).

Healthcare professionals should promptly report all clinically significant adverse events following vaccination to VAERS, even if the healthcare professional does not believe that the vaccine caused the event. Reporting is required for those vaccines given to adults and medical conditions covered by the National Childhood Vaccine Injury Act of 1986, as amended. Healthcare professionals should be aware that patients may report to VAERS; if they choose to do so, they are encouraged to seek the help of their healthcare professional. Report forms and assistance are available by calling 1-800-822-7967 or on the Internet at [www.fda.gov/cber/vaers/vaers.htm](http://www.fda.gov/cber/vaers/vaers.htm).

The VICP is a no-fault system that compensates people of any age for injuries or conditions that may have been caused by a vaccine recommended by CDC for routine administration to children. Healthcare professionals should be aware of the VICP in order to address questions raised by patients. Information about the VICP is available on the Internet at [www.hrsa.gov/bhpr/vicp.htm](http://www.hrsa.gov/bhpr/vicp.htm) or by calling 1-800-338-2382.

Since VAERS and VICP are separate programs, a report of an event to VAERS does not result in the submission of a compensation claim to VICP. Such a claim must be filed independently in the U.S. Court of Federal Claims. A brief description and contact information for both programs are provided on each Vaccine Information Statement for vaccines covered by the VICP.

**Standard 8: People who administer vaccines are properly trained.** All people who administer vaccinations should be fully trained in vaccine storage and handling, vaccine schedules, contraindications, administration techniques, management and reporting of adverse events, and record maintenance and accessibility. Office staff should receive continuing education on these issues annually. With appropriate training, people other than physicians and nurses can administer vaccines. Healthcare professionals should contact public health authorities or other medical authorities in their state for more information concerning which individuals are permitted to administer vaccines.

**Standard 9: Healthcare professionals recommend simultaneous administration of all indicated vaccine doses.** Administering indicated vaccines simultaneously is safe and effective. Simultaneous administration decreases the number of required visits and the potential for missed doses. Measles, mumps, and rubella (MMR) vaccine and tetanus and diphtheria (Td) toxoids should always be administered in their combined product. Giving influenza and pneumococcal vaccine at the

same time (but in separate arms) is also safe and effective. Healthcare professionals should respect the choices of patients and their caregivers.

**Standard 10: Vaccination records for patients are accurate and easily accessible.** Patient vaccination histories should be recorded on a standard form in an easily accessible location in the medical record to facilitate rapid review of vaccination status. Accurate record keeping helps ensure that needed vaccinations are administered and unnecessary vaccinations are not administered. Records should indicate the vaccine, the date of administration, the vaccine manufacturer and lot number, the signature and title of the person administering the vaccine, and the address where the vaccine was administered. The medical record at the primary care provider's office, clinic, or worksite should include all vaccinations received (such as those received at a specialist's office, influenza vaccination clinic, or pharmacy).

Record keeping may be paper-based or computerized. Computer systems make record maintenance, retrieval, and review easier.

Healthcare professionals should give patients a personal record of vaccinations they have received, including the dates and places of administration. Patients should be encouraged to bring their vaccination records to all medical visits.

Information and a modifiable template of these forms and records are available at [www.ahcpr.gov/ppip/adultflow.pdf](http://www.ahcpr.gov/ppip/adultflow.pdf) and are also available on CD-ROM and can be ordered on the Internet at [www.atpm.org/Immunization/whatworks.html](http://www.atpm.org/Immunization/whatworks.html).

**Standard 11: All personnel who have contact with patients are appropriately immunized.** Healthcare professionals and other personnel (including first responders) who have contact with patients should be appropriately immunized (e.g., annual influenza vaccination, hepatitis B vaccination). Institutions should have policies to review and maintain the appropriate vaccination of staff and trainees.

ACIP recommendations for vaccinating healthcare workers are available on the Internet at [www.cdc.gov/nip/publications/ACIP-list.htm](http://www.cdc.gov/nip/publications/ACIP-list.htm).

## **Implement Strategies to Improve Vaccination Rates**

**Standard 12: Systems are developed and used to remind patients and healthcare professionals when vaccinations are due and to recall patients who are overdue.** Evidence shows that reminder/recall systems improve adult vaccination rates. Systems may be designed to alert patients who are due (reminder) or overdue (recall) for specific vaccine doses or they may alert patients to contact their provider to determine if vaccinations are needed. Reminders or recalls can be

mailed or communicated by telephone; an autodialer can be used to expedite telephone reminders. Patients who might be at high risk for not complying with medical recommendations may require more intensive follow-up.

Provider reminder/recall interventions inform those who administer vaccinations that individual patients are due or overdue for specific vaccinations. Reminders can be delivered in patient charts, by computer, and/or by mail or other means, and content of the reminders can be specific or general. Information about these strategies and resources to assist in their implementation are available on CD-ROM and can be ordered on the Internet at [www.atpm.org/Immunization/whatworks.html](http://www.atpm.org/Immunization/whatworks.html). Model reminder recall templates are also available at [www.ahcpr.gov/ppip/postcard.pdf](http://www.ahcpr.gov/ppip/postcard.pdf).

**Standard 13: Standing orders for vaccinations are employed.** Evidence shows that standing orders improve vaccination coverage among adults in a variety of healthcare settings, including nursing homes, hospitals, clinics, doctor's offices, and other institutional settings. Standing orders enable nonphysician personnel such as nurses and pharmacists to prescribe or deliver vaccinations by approved protocol without direct physician involvement at the time of the interaction. Standing orders overcome administrative barriers such as lack of physician personnel to order vaccines. Further, the Centers for Medicare and Medicaid allow standing order exemption from Medicare rules ([www.cms.hhs.gov/medicaid/lcsp/sc0302.pdf](http://www.cms.hhs.gov/medicaid/lcsp/sc0302.pdf)).

Information about this strategy and its implementation is available on CD-ROM and can be ordered on the Internet at [www.atpm.org/Immunization/whatworks.html](http://www.atpm.org/Immunization/whatworks.html).

**Standard 14: Regular assessments of vaccination coverage rates are conducted in a provider's practice.** Evidence shows that assessment of vaccination coverage and provision of the results to the staff in a practice improves vaccination coverage among adults. Optimally, such assessments are performed annually. Provider assessment can be performed by the staff in the practice or by other organizations, including state and local health departments. Effective interventions that include assessment and provision of results may also incorporate incentives or compare performance to a goal or standard. This process is commonly referred to as AFIX (assessment, feedback, incentives, and exchange of information). Coverage should be assessed regularly so that reasons for low coverage in the practice, or in a subgroup of the patients served, can be identified and interventions implemented to address them.

Information about this strategy and its implementation is available on CD-ROM and can be ordered on the Internet at [www.atpm.org/Immunization/whatworks.html](http://www.atpm.org/Immunization/whatworks.html). Software to assist in conducting coverage rate

assessments and feedback is available at [www.cdc.gov/nip](http://www.cdc.gov/nip).

## Partner with the Community

**Standard 15: Patient-oriented and community-based approaches are used to reach target populations.** Vaccination services should be designed to meet the needs of the population served. For example, interventions that include community education, along with other components such as extended hours, have been demonstrated to improve vaccination coverage among adults. Vaccination providers can work with partners in the community, including other health professionals (e.g., pharmacists), vaccination advocacy groups, managed care organizations, service organizations, manufacturers, and state and local health departments to determine community needs and develop vaccination services to address them.

## Conclusion

The revised Standards for Adult Immunization Practices provide a concise, convenient summary of the most desirable immunization practices. The Standards have been widely endorsed by major professional organizations. This revised version of the Standards for Adult Immunization Practices is recommended for use by all healthcare professionals and payers in the public and private sectors who provide immunizations for adults. Everyone involved in adult immunization should strive to follow these Standards. Not all practices and programs have the resources necessary to fully implement the Standards; nevertheless, those lacking the resources should find the Standards useful to guide current practice and to guide the process of defining immunization needs and obtaining additional resources in the future.

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These Standards are approved by the National Vaccine Advisory Committee (NVAC), the National Coalition for Adult Immunization (NCAI), the Advisory Committee on Immunization Practices (ACIP), and the U.S. Public Health Service, and endorsed, as of December 1, 2001, by the American Medical Association, Infectious Diseases Society of America, American Academy of Family Physicians, American Academy of Pediatrics, American College of Obstetricians and Gynecologists, Society of Adolescent Medicine, Health Resources and Services Administration, National Medical Association, National Association of County and City Health Officials, Association of State and Territorial Health Officers, Council of State and Territorial Epidemiologists, Association of Professionals in Infection Control and Epidemiology, Inc., Chiron, State of Washington Department of Health, Society of Teachers of Preventive Medicine, Immunization Action Coalition, Partnership for Prevention, National Coalition for Adult Immunization, American Academy of Otolaryngology Head and Neck Surgery, American Health Care Association, Hepatitis B Foundation, American College of Preventive

Medicine, American Pharmaceutical Association, American Society for Health System Pharmacists, State of Maine Department of Health, National Alliance for Hispanic Health, American Academy of Physician Assistants, National Association of School Nurses, Memphis County Health Department, Maine Ambulatory Care Association, Institute for Advanced Studies in Aging and Geriatric Medicine, The Arizona Partnership for Adult Immunization, National Foundation for Infectious Diseases, and the National Partnership for Immunization.

The NVAC was chartered in 1988 to advise and make recommendations to the director of the National Vaccine Program and the assistant secretary for health, Department of Health and Human Services, on matters related to the prevention of infectious diseases through immunization and the prevention of adverse reactions to vaccines. The NVAC is composed of 15 members from public and private organizations representing vaccine manufacturers, physicians, parents, and state and local health agencies, and public health organizations. In addition, representatives from government agencies involved in health care of allied services serve as ex-officio members of the NVAC.

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## References

1. U.S. Department of Health and Human Services. Healthy People 2010. Conference edition in 2 vols. Washington DC: U.S. Department of Health and Human Services, 2000. Available at: [www.health.gov/healthypeople/document/tableofcontents.htm](http://www.health.gov/healthypeople/document/tableofcontents.htm). Accessed December 1, 2001.
2. National Center for Health Statistics. Early release of selected estimates from the 2000 and early 2001 National Health Interview Surveys, 2001.

Available at: [www.cdc.gov/nchs/releases/01facts/keyhealth.htm](http://www.cdc.gov/nchs/releases/01facts/keyhealth.htm). Accessed December 1, 2001.

3. Thompson WW, Shay DK, Weintraub E, et al. Mortality associated with influenza and respiratory syncytial virus in the United States. *JAMA* 2003;289:179-86.
4. Centers for Disease Control and Prevention. Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep* 2001;50:1-28.
5. Palache AM. Influenza vaccines: a reappraisal of their use. *Drugs* 1997;54:841-56.
6. Mullooly JP, Bennett MD, Hornbrook MC, et al. Influenza vaccination programs for elderly persons: cost effectiveness in a health maintenance organization. *Ann Intern Med* 1994;121:947-52.
7. Nichol KL, Wuorenma J, Von Sternberg T. Benefits of influenza vaccination for low-, intermediate-, and high-risk senior citizens. *Arch Intern Med* 1998;158:1769-76.
8. Nordin J, Mullooly J, Poblete S, et al. Influenza vaccine effectiveness in preventing hospitalizations and deaths in persons 65 years or older in Minnesota, New York, and Oregon: data from 3 health plans. *J Infect Dis* 2001;184:665-70.
9. Centers for Disease Control and Prevention. Notice to readers: updated recommendations from the Advisory Committee on Immunization Practices in response to delays in the supply of influenza vaccine for the 2000-01 season. *MMWR Morb Mortal Wkly Rep* 2000;49:888-92.
10. Centers for Disease Control and Prevention. Active Bacterial Core Surveillance (ABCs) Report, Emerging Infections Program Network (EIP), 2000. Available at: [www.cdc.gov/ncidod/dbmd/abcs/survreports/spneu00prelim.pdf](http://www.cdc.gov/ncidod/dbmd/abcs/survreports/spneu00prelim.pdf). Accessed September 15, 2001.
11. Feikin DR, Schuchat A, Kolczak M, et al. Mortality from invasive pneumococcal pneumonia in the era of antibiotic resistance, 1995-1997. *Am J Public Health* 2000;90:223-9.
12. Robinson KA, Baughman W, Rothrock G, et al. Epidemiology of invasive *Streptococcus pneumoniae* infections in the United States, 1995-1998. *JAMA* 2001;285:1729-35.
13. Butler JC, Breiman RF, Campbell JF, Lipman HB, Broome CV, Facklam RR. Pneumococcal polysaccharide vaccine efficacy: an evaluation of current recommendations. *JAMA* 1993;270:1826-31.
14. Sisk JE, Moskowitz AJ, Whang W, et al. Cost-effectiveness of vaccination against pneumococcal bacteremia among elderly people. *JAMA* 1997;278:1333-9.
15. Centers for Disease Control and Prevention. Notice to readers: National Hepatitis Awareness Month—May 2001. *MMWR Morb Mortal Wkly Rep* 2001;50:399.
16. Centers for Disease Control and Prevention. Viral hepatitis B fact sheet, 2001. Available at: [www.cdc.gov/ncidod/diseases/hepatitis/b/fact.htm](http://www.cdc.gov/ncidod/diseases/hepatitis/b/fact.htm). Accessed December 1, 2001.
17. Centers for Disease Control and Prevention. Vaccine fact sheet, 2001. Available at: [www.cdc.gov/ncidod/diseases/hepatitis/b/factvax.htm](http://www.cdc.gov/ncidod/diseases/hepatitis/b/factvax.htm). Accessed December 1, 2001.
18. Centers for Disease Control and Prevention. Influenza and pneumococcal vaccination levels among adults aged  $\geq 65$  years—United States, 1999. *MMWR Morb Mortal Wkly Rep* 2001;50:532-7.
19. Centers for Disease Control and Prevention. Health objectives for the national public health burden of vaccine-preventable diseases among adults: standards for adult immunization practice. *MMWR Morb Mortal Wkly Rep* 1990;39:725-9.
20. Fedson DS. Adult immunization. Summary of the National Vaccine Advisory Committee report. *JAMA* 1994;272:1133-7.
21. Centers for Disease Control and Prevention. Adult immunization programs in nontraditional settings: quality standards and guidance for program evaluation. A report of the National Vaccine Advisory Committee. *MMWR Morb Mortal Wkly Rep* 2000;49:1-13.
22. Centers for Disease Control and Prevention. Vaccine-preventable diseases: improving vaccination coverage in children, adolescents, and adults. A report on recommendations of the Task Force on Community Preventive Services. *MMWR Morb Mortal Wkly Rep* 1999;48:1-15.
23. Briss PA, Rodewald LE, Hinman AR, et al. Review of evidence: interventions to improve vaccination coverage in children, adolescents, and adults. *Am J Prev Med* 2000;18(suppl 1):97-140.
24. Institute of Medicine. Calling the shots: immunization finance policies and practices, 2001. Available at: [www.iom.edu](http://www.iom.edu). Accessed December 1, 2001.