IMPROVE
ADULT IMMUNIZATION
COVERAGE

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We DO need to improve adult vaccination rates

Immunizations are recommended throughout life by the US Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP) to prevent infectious diseases and their sequelae. Adult coverage, however, remains low for most routinely recommended vaccines and well below Healthy People 2020 targets (www.healthypeople.gov).1 According to the RAND Corporation report published in 2012,2 many factors contribute to US adults having poor immunization rates in spite of adequate vaccine supply. Common barriers to adult vaccinations include the following: 1. The perceived low risks of contracting vaccine-preventable diseases. Because we rarely, if at all, see vaccine-preventable diseases, why should we vaccinate? 2. Skepticism about vaccine safety and effectiveness. 3. Lack of administrative systems for generating reminders. 4. Perceived inadequacy of reimbursement by health care providers. 5. Lack of vaccination-related performance measures and incentives for health care providers.

Routine adult vaccines include influenza; pneumococcal infection; human papillomavirus infection; hepatitis A; hepatitis B; tetanus, diphtheria, and pertussis (Tdap); herpes-zoster; measles, mumps, and rubella (MMR); varicella; and meningococcal infection. In this issue of AOAH Health Watch, the influenza vaccine, pneumococcal vaccine, and MMR vaccine are discussed. In the next issue, Tdap, herpes-zoster, and (in adults) varicella will be addressed.

Alarming findings
Office-based providers should be the primary source of vaccination. Typically, only influenza vaccinations are administered in physician offices and medical clinics. A substantial proportion of physicians who treat adults do not vaccinate at all. Self-reported data from physician surveys conducted between 2007 and 2010 suggest that only 27% of the physicians’ offices stock all recommended adult vaccines other than influenza.2,7 Adult vaccinations are infrequently discussed at health care encounters, even though data suggest that the public places a high degree of trust in health care providers (HCPs) to deliver information about vaccination.8 The RAND report found that relatively few adults, even those specifically recommended for vaccination, receive advice about vaccinations from their HCPs. There are few ongoing efforts to evaluate and improve provider communication regarding the safety and benefits of vaccination with adult patients.2 HCPs’ financial deterrents to providing vaccinations for their patients include such costs as proper storage and cooling facilities, infrastructure for ordering vaccines and managing inventory, inadequate payment rates, and the lack of performance measures. With ever-increasing demands placed on HCPs to care for the primary concerns of their patients, limited time is devoted to other health concerns and practice management issues. Finally, there are no incentives for HCPs who do not vaccinate to refer patients to community vaccinators.

Window of opportunity
Health care reform legislation provides a unique window of opportunity by promoting preventive medicine, which includes vaccinations. The Affordable Care Act has the potential to significantly increase vaccination rates in adults. The Act will ease the financial burden of vaccines to patients and should provide increased availability and access to vaccinations. Hopefully, HCPs will partner with pharmacies, retail medical clinics, and health departments to provide and document vaccinations. The use of electronic health records should help with the documentation of immunizations and increase immunization rates by use of reminders.8
A checklist to assess the effectiveness of office-based providers in ensuring that their adult patients are vaccinated as recommended is needed.

Recommendations
After reviewing the statistics and conducting interviews, surveys, and meetings with stakeholders, the RAND report recommends the following:

1. The need to strengthen evidence for strategies promoting vaccination.
2. Improvement in making informed decisions about whether to administer vaccinations on site.
3. Formalization of procedures for referring patients to complementary vaccinators.
4. Documentation of vaccination support efforts to facilitate performance-based payment.

Research priorities should include the collection and dissemination of data describing patterns of office-based vaccination of adults. Pinpointing gaps in practice and targeting efforts are crucial. Assessments of costs and benefits of promoting vaccination of adults are needed. Comparison is needed of vaccine coverage in office-based settings versus complementary facilities such as schools, health departments, and retail stores.

Improved guidance to providers about vaccinating adults is necessary. Easy-to-understand protocols for vaccination of adults with missing or incomplete vaccination histories are needed. HCPs need to have a mechanism in place to periodically evaluate their adult patients’ vaccination status.

If an HCP does not provide the recommended vaccinations, a procedure should be in place for referring those patients to vaccinating facilities such as health departments, pharmacies, and other resources. Referrals should include the recommended vaccinations, locations and hours for community vaccinators, and the provider’s preferences regarding return of documentation for the vaccines given.

Potential incentives for nonvaccinating providers to encourage vaccination should include procedure codes specific to vaccination counseling and perhaps a reimbursement code for referring their patient to another facility for vaccines. A checklist to assess the effectiveness of office-based providers in ensuring that their adult patients are vaccinated as recommended is needed. Surveys are suggested to gauge the effectiveness of providers in promoting vaccination to patients.

References

About the Author
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Streptococcus pneumoniae, otherwise known as pneumococcus, is the causative organism in a number of different infections, including otitis media, sinusitis, pneumonia, meningitis, peritonitis, and bacteremia. It is a gram-positive, aerobic bacterium that has an external capsule composed of polysaccharides. The external capsule allows the bacteria to adhere to human cells and facilitates invasion and infection.1
Invasive disease, defined as bacteria invading normally sterile areas, most commonly presents as pneumonia with bacteremia, bacteremia, and meningitis. Pneumococcus is capable of producing a variety of polysaccharides on the external capsule, and this variety in polysaccharides is responsible for the formation of 91 different serotypes of Streptococcus pneumoniae. The polysaccharides also provide the mechanisms for pneumococcal vaccines. The vaccines introduce the polysaccharides to the immune system, which produces an antibody response and provides protection against disease.

Vaccination is an important tool to help combat infections caused by Streptococcus pneumoniae; which continues to cause significant disease in the United States. Statistics show that nearly all of the deaths attributed to pneumococcal disease in 2009 were in adults. Despite widespread availability of pneumococcal vaccines, however, the rate of pneumococcal vaccination among adults remains low. One study focusing on vaccine efficacy in the population infected with human immunodeficiency virus (HIV) reports that about 50% of the enrolled subjects had not been vaccinated prior to their participation in the study.

The purpose of this article is to review the differences between pneumococcal vaccines available for the adult population, and to review the current Advisory Committee on Immunization Practices (ACIP) guidelines for adult pneumococcal immunization.

Vaccine benefits
Several benefits, both direct and indirect, can be derived from pneumococcal vaccination. One of the primary goals of any vaccine program is to reduce the incidence of disease. The number of cases of invasive pneumococcal disease (IPD) has declined with the introduction of pneumococcal vaccines. IPD incidence in 2010 was 3.8 cases per 100,000 adults aged 18-34 years, and 6.4 per 100,000 adults aged 65 or older. The rate increased to 173 cases per 100,000 for those persons infected with HIV, and 186 cases per 100,000 for those persons aged 18-64 years who were diagnosed with hematologic cancer. In 2010, there were an estimated 39,750 cases of IPD and 4000 deaths. This number has decreased significantly from the estimated 64,400 cases and 7300 deaths in 1999. The decline in cases occurred after the 7-valent pneumococcal conjugate vaccine for children was introduced in 2000. The IPD rate in healthy adults, caused by serotypes contained in the 7-valent conjugate vaccine, dropped 6 cases per 100,000 in 2000 to 1 case per 100,000 in 2007.

However, in immunocompromised individuals, the case rates remain elevated, because 50% of IPD is caused by serotypes contained in the 13-valent pneumococcal conjugate vaccine and 23-valent pneumococcal polysaccharide vaccine. Another benefit of vaccination is reduction in the severity of pneumococcal disease. Pneumococcal vaccination is associated with a 40%-70% reduced risk of in-hospital mortality, and has reduced hospital length of stay from an average of 6.5 days in patients without prior vaccination, to 4.5 days in patients who were vaccinated prior to admission.

The vaccine program has provided other indirect benefits, beyond its primary goal of reducing the number of infections and mortality from IPD. Pneumococcal vaccination has reduced the number of pneumococcal infections in unvaccinated persons through a herd immunity effect. In addition, by preventing pneumococcal infections, the 7-valent pneumococcal conjugate vaccine (PCV7) also has prevented infections with resistant strains of pneumococcus. Rates of pneumococcal resistance to penicillin and cephalosporin resistance have decreased since PCV7 was introduced for vaccination in children. In 1999, penicillin resistance was estimated at 26.8% and cephalosporin resistance was 16.9% based on sampling from reference laboratories. By 2010, those numbers had fallen to 10.6% and 8.6%, respectively (see Figure 1, page 6).

History of pneumococcal vaccines
Recommendations and vaccine strategies have evolved over the years as new vaccines have become available. This holds true for pneumococcal vaccines. The 23-valent pneumococcal polysaccharide vaccine (PPSV23), marketed as Pneumovax 23 by Merck, was approved for use in adults in 1983. In 2000, the PCV7 was introduced for use in infants and young children. The PCV7 was replaced by the 13-valent pneumococcal conjugate vaccine (PCV13) in 2010. The PCV13 contains the same 7 serotypes as the PCV7, plus an additional 6 serotypes.

On December 11, 2011, the US Food and Drug Administration (FDA) approved the use of PCV13, marketed as Prevnar 13 by Wyeth Pharmaceuticals, Inc., for use in adults 50 years and older based on studies comparing the immune response of PCV13 to that of PPSV23. Studies on adults show that among the 12 serotypes common to both vaccines, PCV13 induced an antibody level comparable to or higher than the levels induced by PPSV23. Additional trials are being conducted. The approval was granted under the FDA’s accelerated approval pathway. On June 20, 2012, ACIP recommended the use of PCV13 for adults 19 years and older with immunocompromising conditions, asplenia, cerebral spinal fluid (CSF) leaks, or cochlear implants.

Comparison of PPSV23 and PCV13
The 2 vaccines now licensed for use among adults differ in a few areas, including the number of serotypes they protect against, the way they stimulate the immune system, and the magnitude of the immune response. The PPSV23 vaccine contains polysaccharides from 23 different serotypes of Streptococcus pneumoniae (1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19F, 19A, 20, 22F, 23F, and 33F). The PCV13 vaccine contains polysaccharides from 23 serotypes of Streptococcus pneumoniae (1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19F, 19A, 20, 22F, 23F, and 33F).

<table>
<thead>
<tr>
<th>Type of Vaccine</th>
<th>Description</th>
<th>Indicated for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>23-Valent polysaccharide (PPSV23)</td>
<td>Contains polysaccharides from 23 serotypes of <em>Streptococcus pneumoniae</em></td>
<td>All adults &gt;65 years of age and for at-risk adults 19-64 years of age</td>
</tr>
<tr>
<td>13-Valent pneumococcal conjugate (PCV13)</td>
<td>Contains 13 <em>Streptococcus pneumoniae</em> serotypes</td>
<td>One dose for at-risk adults (&gt;19 years of age)</td>
</tr>
</tbody>
</table>
Of the 23 serotypes, 12 are the same as those contained in the PCV13.\textsuperscript{3,10} Epidemiologic data from 2008 show that the serotypes contained in the PPSV23 were responsible for 78% of IPD in the group aged 18-49 years, 76% in the group aged 50-64 years, and 66% of people in the group aged 65 or older.\textsuperscript{4} The PCV13 vaccine contains 13 pneumococcal serotypes: 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19F, 19A, and 23F.\textsuperscript{10} Those serotypes were responsible for 53% of IPD in persons age 18-49 years, 49% in the group aged 50-64 years, and 44% of those 65 years and older in 2008.\textsuperscript{4} The serotype 19A is responsible for most infections with drug-resistant pneumococcus and is included in both vaccines.\textsuperscript{3,10}

The 2 vaccines also differ in how they stimulate the immune system. The PPSV23 vaccine works by inducing type-specific antibodies that enhance the immune system's ability to kill pneumococcus through opsonization and phagocytosis. The polysaccharides contained in the PCV13 are conjugated to a carrier protein that stimulates a T-cell-dependent immune response in addition to the B-cell antibody-mediated response.\textsuperscript{10} Studies show that the PCV13 does elicit an increased antibody response among those with compromised immune systems, including HIV patients and transplant recipients.\textsuperscript{11} The degree to which the immune system is stimulated, measured by the geometric mean antibody titers and the opsonophagocytic activity (OPA) produced following vaccination, is used to estimate a vaccine's effectiveness.\textsuperscript{5}

**Vaccine efficacy**

Vaccine efficacy and immune response varies among risk groups. The overall efficacy of the PPSV23 is 74%, and ranges from 50%-80% among immunocompetent adults with underlying medical conditions.\textsuperscript{3} OPA provides a measure of the ability of serum antibodies to eliminate pneumococci.\textsuperscript{10} Immunogenicity studies comparing PPSV23 and PCV13 revealed the OPA, and geometric mean antibody titers for PCV13 were comparable or higher than those of PPSV23.\textsuperscript{9} It was these data that prompted the approval of the PCV13 for use in adults.\textsuperscript{9} These studies were conducted in healthy individuals.

Vaccine efficacy in the HIV population has met with conflicting evidence. One randomized, double-blinded, placebo-controlled trial conducted on patients infected with HIV in Uganda reports a lack of efficacy in preventing IPD in this population. However, the results of this study are not considered applicable to the HIV-infected population in developed countries, where there is greater access to antiretroviral therapy.\textsuperscript{5}

A case-controlled study conducted in 4 hospitals in Spain demonstrated that administering the PPSV23 to HIV-infected adults did convey a protective effect.\textsuperscript{5} In this study the protective effect was stronger for those whose CD4 lymphocyte count was below 200, compared with those who had a CD4 count above 200.\textsuperscript{5} In a randomized trial comparing revaccination of HIV-infected patients with PPSV23 versus HIV-infected patients with PCV7, a greater number of HIV-infected patients achieved a 2-fold rise in antibody levels in the PCV7 group, when compared with the number in the PPSV23 group.\textsuperscript{11} The difference in antibody titers waned after 180 days.\textsuperscript{11} Another trial studied the efficacy of PSV7 vaccine in HIV-infected adults.
who survived an episode of IPD.12 The study participants were given 2 doses of PCV7, at 4 weeks apart. The vaccine was effective and prevented 74% of recurrent IPD.12 These studies help lay the foundation for recommending PCV13 use in the HIV-infected population, as well as in other immunocompromised adults.

Adverse effects
Both vaccines produce similar adverse effects. The most common adverse reactions reported occur at the injection site. Those reactions include pain, swelling and redness, and limitation of movement in the injected arm.3,6,10 Other adverse effects include chills, fever, fatigue, headache, appetite loss, and generalized muscle and joint pain.3,6,9 In general, the vaccines are well tolerated. The overall incidence of side effects reported in the first 30 days after vaccination is less than 2% for both vaccines.6

Indications for pneumococcal vaccination
Recommendations on who should receive the pneumococcal vaccine, and which vaccine they should receive, are based on IPD risk factors. IPD rates differ among demographic variables, the strength of an individual’s immune system, and with the presence of those with certain underlying medical conditions.

Demographic risk factors have remained fairly constant over the years. The case rates for IPD are highest among the very young (children 1 year old or less) and the elderly (adults 65 and older).2 All children, and all adults 65 years and older are encouraged to receive pneumococcal vaccination.4,6 Other populations that historically have been at risk are the Alaskan Native and American Indian populations, both children and adults.4 The majority of adult IPD cases in this demographic occur in individuals with other risk factors, such as underlying medical conditions.4 Thus, when the adult pneumococcal vaccination guidelines were revised in 2010, the Alaskan Native and the American Indian populations were no longer given as a separate indication category, as they were included with those individuals with underlying medical conditions.4

Table 2. Vaccination rates for pneumococcal vaccine compared with Healthy People 2020 objectives

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Healthy People 2020 Objective</th>
<th>Percent Vaccinated During 2010</th>
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</thead>
<tbody>
<tr>
<td>&gt;65 years, healthy</td>
<td>90%</td>
<td>59.7%</td>
</tr>
<tr>
<td>18-64 years, high-risk</td>
<td>60%</td>
<td>18.5%</td>
</tr>
<tr>
<td>&gt;18 years, long-term care or nursing home</td>
<td>90%</td>
<td>NA</td>
</tr>
</tbody>
</table>


Another indication for adult pneumococcal vaccination is persons with underlying medical conditions. From 1999 to 2007, the rate of adult IPD cases in individuals aged 18-64 years with underlying medical conditions increased from 52% to 59%.4 The rate increase suggests that this group does not derive as much benefit from herd immunity as the general population does. The list of medical conditions that put an individual at risk for IPD continues to be evaluated and adjusted. The most recent additions to this list include individuals who smoke and those who are diagnosed with asthma.4 Cigarette smokers have 4 times the risk for IPD compared with persons who have never smoked.4 Smoking also further increases the risk of IPD in other high-risk groups, such as those adults who are immunocompromised. One study indicated that in addition to receiving a pneumococcal vaccine, smokers can further reduce their risk of IPD by smoking cessation.4 For adults with asthma, particularly severe disease, the risk of IPD is nearly double that of the general adult population.4 The full list of medical conditions that place an adult at higher risk for IPD, and thus should be vaccinated, is as follows:

- chronic heart and lung disease
- asthma
- diabetes mellitus
- chronic liver disease, including cirrhosis
- persons with alcoholism
- persons with cochlear implants
- persons with CSF leaks
- persons who smoke

The group considered at greatest risk for IPD is adults with immunocompromising conditions. A list of those conditions includes:

- congenital or acquired immunodeficiency
- abnormal innate immune response
- HIV infection
- functional or anatomic asplenia
- chronic renal disease
- nephrotic syndrome
- hematologic malignancies
- generalized malignancies
- recipients of a solid organ transplant
- treatment with immunosuppressive medications

In particular, the IPD risk for those individuals infected with HIV has been well documented. Streptococcus pneumoniae is the most common cause of bacterial pneumonia in adults infected with HIV.5 IPD is more common in HIV-infected patients whose CD4 count is below 200, than in those whose CD4 count is above 200.12 In addition to pneumococcal vaccination, treatment with antiretroviral therapy has reduced the incidence of pneumococcal disease in the HIV-infected population by 50%.11

Pneumococcal vaccine recommendations
ACIP updated its recommendations for adult pneumococcal vaccine in October 2012 to reflect the approval of PCV13 in this age group. These recommendations can be stratified based on the at-risk groups. All adults 65 years or older should receive a...
do the PPSV23 vaccine, even if they have been previously vaccinated. Adults 19 years or older, with 1 of the indicated chronic medical conditions listed earlier, should receive a dose of PPSV23 at the time of diagnosis. The PCV13 vaccine and the PPSV23 vaccines both are recommended for adults, aged 19 and older, who have an immunocompromising condition, asplenia, CSF leak, or cochlear implant. If a patient is naive to pneumococcal vaccine, they should be given the PCV13 vaccine at the time of diagnosis, and then the PPSV23 vaccine at least 8 weeks later. Studies show a higher concentration of antibodies develops if the vaccines are given in sequence, pneumococcal conjugate then pneumococcal polysaccharide vaccines are given in sequence, pneumococcal polysaccharide vaccine d.

Recombination recommended for people who received 1 or 2 doses of PPSV23 before age 65 if at least 5 years have passed since previous dose.

Immunocompromising conditions (eg, chronic renal failure and nephrotic syndrome), functional or anatomic asplenia, cerebral spinal fluid leaks, or cochlear implants.

At-risk adults who have previously received ≥1 dose of PPSV23 should be vaccinated with PCV13 one or more years after the last PPSV23 dose was received.

Final notes
Pneumococcal vaccination provides physicians with an effective tool to help combat IPD. The introduction of PCV13 for adult use has expanded the options available for protecting patients against infection. Questions about the efficacy of pneumococcal vaccines in the immunocompromised population remain, particularly in HIV-infected individuals. However, the potential benefit from vaccination outweighs the potential harm in this group. New trials are attempting to clarify further the best vaccination strategies to protect adults against pneumococcal disease.

References

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No vaccine is more controversial than the influenza (flu) vaccine, perhaps because its administration is an annual event. Myths exist regarding its efficacy, reliability, and ability to induce illness, and conspiracy theories even abound.
Vaccine safety has been a strong concern since the 1970s. Anyone who has ever searched “health blogs” can see the Internet is flooded with antivaccination propaganda, and the flu vaccine is always at the top of the list. Almost all other vaccines are made for individual use and do not contain any preservatives, such as thimerosal, polymyxin, or formaldehyde. The influenza vaccine, however, does contain these in minute quantities because it is manufactured in multiuse vials. These preservatives are necessary to keep the vaccine safe for all who use that vial.

Fact versus fiction
There are many false claims about the flu vaccine in almost all communities. Adding to this are nurses and physicians who propagate their own fears and lack of understanding from anecdotal events of influenza and the vaccine. Unfortunately, because nurses and physicians are considered reliable sources, it makes it harder for other health care professionals to undo this damage and re-educate patients.

Myths about the vaccine include the timing of the vaccination, as well as who should or should not receive the vaccination. Many people are not aware that the vaccine is available in August and that it is prudent to get vaccinated as early as possible, because it takes about 2 weeks for the vaccine to be effective and to provide some reliable protection. Along with this myth goes the thought that the flu is not really “that bad” and that young, healthy people don’t need to be vaccinated; therefore, the vaccine should be reserved for the elderly or immunocompromised. Some of this myth is based on historical recommendations, and in the past we vaccinated only those at risk.

After many seasons of epidemic influenza outbreaks, we have a better understanding about the need for widespread immunity to protect those at risk. In fact, it is usually the young and healthy grandchildren who go to visit their elderly grandparents and expose them to many illnesses. Anyone who has had the flu or cared for a person who was hospitalized for the flu knows that the virus can be “that bad,” and in fact has proved deadly as well.

Another line of reasoning is that if you haven’t received the vaccination by December or when an outbreak is occurring, that it’s too late to get vaccinated. Typically, a “why bother” attitude ensues. The fact is that the flu season lasts until early March, and getting vaccinated at any time during the season can potentially be beneficial. We saw some very late and summer outbreaks in limited communities during the H1N1 flu season of 2009. There also is the half-understood myth that if you get the actual influenza infection, you are “protected” and do not need the vaccine. This is extrapolated from observations of the course of other infections (eg, pertussis), in which the infection is at least as or more immunogenic than the vaccines and does confer many years of protection; however, the flu virus mutates rapidly, and, as we have seen this season, there can be several strains in circulation at the same time. Overcoming illness from 1 strain does not give you protection from the others.

The flu vaccine can give patients some mild side effects, such as a sore arm or a rundown feeling, which can be misinterpreted as “getting the virus.”

is available in single-use vials. For those with egg allergy concerns, the US Food and Drug Administration (FDA) recently approved a version that is made with cultured animal cells and not chicken embryos. However, new data have shown that all people with egg allergies, except those at risk of anaphylactic reactions to egg products, can safely take the current influenza vaccine.

Ongoing myths
The most prevalent myth is that the vaccine “gives you the flu.” There is always someone who knows someone who got the flu just days after receiving the vaccination. This type of story propagates faster than true education, and most people take it as fact. This is one of the hardest myths to debunk for 2 main reasons. First, people typically get the vaccination during flu season and it takes about 2 weeks for one’s immune system to process the vaccine and to offer some immunity. In addition, the risk of getting the flu or another seasonal viral infection, such as the common cold, is high during this time. Any illness will be remembered and associated with the vaccine rather than a recent exposure from an ill friend or co-worker. The second reason is that the vaccine can give patients some mild side effects, such as a sore arm or a rundown feeling, which can be misinterpreted as “getting the virus.”

There are many other fears that exist, from increased autism rates to eventual lack of any immunity to “anything,” because of so many vaccines. A new fear that is now circulating purports that there are increased rates of dementia with 5 or more yearly vaccines. Unfortunately, some of the theories have some studies that back the wild claims, but the studies are very poorly designed, have pseudo-health-care professionals overseeing the research, and have too many confounders to be acceptable in mainstream medicine with any degree of believability.
The quadrivalent vaccine also included B/Brisbane/60/2008-like virus. Protection takes about 2 weeks with a normal immune system and usually lasts about 1 year.

Role of the vaccine selection committee
The vaccine selection committee consists of the World Health Organization (WHO) along with representatives from the WHO Collaborating centers, and the Global Influenza Surveillance and Response System, and Essential Regulatory Laboratories. These groups usually meet in February or March to review data collected by several internationally recognized influenza centers to determine trends in antigenic shift and drift, and to predict the next season’s strains.

Once WHO determines the strains most likely to be prevalent in the upcoming season, the information is relayed to vaccine standard committees to evaluate for their particular region. Here in the United States, the FDA-VRBPAC (Vaccines and Related Biological Products Advisory Committee) is the group that meets to either concur or modify the WHO recommendations for production.

Types of flu vaccines
Since the early 1980s the influenza vaccine has been trivalent. There are several types of flu vaccines commercially available: the trivalent intramuscular shot (killed viruses), the trivalent nasal spray (attenuated live viruses), the trivalent intradermal shot.

Some facts
The influenza virus has caused recurrent epidemics of febrile respiratory disease every 1 to 3 years for the past 400 years. The modern understanding of the flu virus was first described in 1933 when Smith et al isolated influenza A in ferrets. Influenza viruses are in the Orthomyxovirus family and have 3 different subtypes: A, B, and C. These subtypes differ based on antigenic properties, as well as host preference, genetic make-up, epidemiology, and clinical characteristics. Each influenza A virus has further subdivisions based on their hemagglutinin (H) and neuraminidase (N) activity.

Epidemics occur when an outbreak of influenza is limited to 1 location, such as a city, town, or country. A pandemic is a severe outbreak that rapidly progresses to involve the entire world and is associated with a new strain emerging. Although epidemics usually occur every 2 to 3 years, a pandemic tends to emerge every decade or so.

One of the most unique aspects of the influenza virus is its adaptability and frequent change. There are antigenic drifts that are relatively minor changes resulting from a gradual accumulation of genetic base pair changes, and this creates a variant strain. In addition, there is antigenic shift, which refers to a major change in the prevalent strain and usually ushers in a pandemic, because the new strain is so very different from the other current strains. This makes predicting the components of yearly influenza vaccine very difficult and highlights why we need to get vaccinated on a yearly basis.

Influenza vaccine development for the next season starts at the end of the current season. This season, the vaccine contained 3 strains:
1. A/California/7/2009 (H1N1)-like (same as in 2011 vaccine)
2. A/Victoria/361/2011 (H3N2)-like (which was new this season)
3. B/Wisconsin/1/2010-like (Yamagata lineage; also new this season).

Table 1. Flu vaccines

<table>
<thead>
<tr>
<th>Type of vaccine</th>
<th>Inactivated (killed) or weakened (live)</th>
<th>Route of administration</th>
<th>Indicated for people:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIV</td>
<td>Killed</td>
<td>Intramuscular</td>
<td>≥6 months of age</td>
</tr>
<tr>
<td>High-dose TIV</td>
<td>Killed</td>
<td>Intradermal</td>
<td>18 to 64 years of age</td>
</tr>
<tr>
<td>LAIV</td>
<td>Live</td>
<td>Intranasal</td>
<td>2-49 years of age and healthy</td>
</tr>
</tbody>
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TIV = trivalent influenza vaccine; LAIV = live, attenuated influenza vaccine
Immunization strategies and recommendations for influenza vaccination among high-risk groups are outlined below.

### Shot Vaccines

- **Indications:** The shot, or killed virus, vaccines are indicated in everyone over the age of 6 months. There are limited valid reasons for not receiving the shot (e.g., egg anaphylaxis reaction or previous severe reaction to the vaccine, including the very rare Guillain-Barré syndrome). Certain populations are at higher risk for a more severe course of the infection or serious complications from the disease; these individuals should get the yearly vaccine without fail. These include persons with children aged 6 months to 4 years at home; individuals 50 years or older; individuals with chronic lung disease, renal problems, liver problems, hematologic disorders, and metabolic disorders, including diabetes; the immunosuppressed; pregnant women; children 6 months to 18 years old who are receiving long-term aspirin therapy (due to the risk of Reye’s syndrome); patients in a nursing home; the morbidly obese; Native Americans; health care professionals (HCPs); and household contacts and caregivers to anyone on the high-risk list. There is some evidence that individuals 65 and older should get the higher dose of the shot or a booster later on in the season.

- **Vaccine Types:** The quadrivalent vaccine, which recently received FDA approval, has 2 A-strains and 2 B-strains and shows efficacy and safety that are equivalent to that of the current vaccine. The attenuated live intranasal vaccine is a preservative-free, single-use vaccine that has a very weak virus that cannot be transmitted to others with an intact immune system. It is recommended for people aged 2-49 years who are otherwise healthy. Because this is a live, albeit attenuated, virus, there are more restrictions for those taking the vaccine, especially if they are pregnant, have respiratory ailments, or will be health providers for immunocompromised individuals.

- **Benefits:** Millions of doses of these vaccines have been administered and have not been associated with any serious problems.

### The shot, or killed virus, vaccines are indicated in everyone over the age of 6 months.

Influenza vaccination has been shown to be highly effective in HCPs, with minimal adverse effects. In a study of staff in 40 matched nursing homes, staff influenza vaccination rates were 69.9% in the vaccination arm versus 31.8% in the control arm. The vaccinated staff experienced a 42% reduction in sick leave from work (P<0.03). A review of 18 studies likewise found a strong net benefit to HCPs. Of these 18 HCP studies, only 2 also assessed the relationship of patient mortality relative to staff influenza vaccine uptake; both found that higher rates of HCP vaccination correlated with reduced patient deaths.

### Table 2. Vaccination rates for influenza compared with Healthy People 2020 objectives

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Healthy People 2020 objective</th>
<th>Percent vaccinated during 2010-2011 season</th>
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<tbody>
<tr>
<td>18-49 years, healthy</td>
<td>80%</td>
<td>31%</td>
</tr>
<tr>
<td>18-49 years, high risk</td>
<td>90%</td>
<td>39%</td>
</tr>
<tr>
<td>&gt;65 years, healthy and high risk</td>
<td>90%</td>
<td>67%</td>
</tr>
</tbody>
</table>

An analysis of data and patient population health in New Mexico’s 75 long-term care facilities and nursing homes revealed that as vaccination rates of HCPs who had direct patient contact rose from 51% to 75%, the chances of a flu outbreak among patients in that facility went down by 87%. The New Mexico study showed that vaccinating HCPs provided more protection to residents than vaccinating the residents themselves.10

Even those who are unable or are ineligible to receive the vaccine get some protection from the infection if the bulk of the community is vaccinated, because the spread of the contagious disease is contained.4 When a critical portion of a community is immunized against a contagious disease, most members of the community are protected against that disease because there is little opportunity for an outbreak; this phenomenon is known as community, or herd, immunity.4

### Final notes
Keeping all of this basic information in mind and speaking factually with your patients, while acknowledging their fears and educating them, will go far in keeping your community more immune from several communicable diseases, including the influenza virus.

### References

### More information about health care professionals (HCPs)

HCPs are at increased risk of acquiring influenza due to exposure by patients and are also at risk of transmitting disease to patients and other HCPs. Despite the Healthy People 2020 annual goal of 90% influenza vaccine coverage for HCPs, only 66.9% of HCPs were vaccinated during the 2011-2012 influenza season. Physicians had the highest vaccination percentage (85.6%) followed by nurses (77.9%) and other HCPs (62.8%). Vaccination rates were highest in hospital settings (76.9%) and lowest in long-term care facilities (52.4%).

Table 3. Percentage of health care professionals (HCPs) who received influenza vaccination during the 2011-2012 influenza season

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No. Participants in Sample</th>
<th>Percent Vaccinated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>2348</td>
<td>66.9%</td>
</tr>
<tr>
<td><strong>By occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician</td>
<td>418</td>
<td>85.6%</td>
</tr>
<tr>
<td>Nurse</td>
<td>373</td>
<td>77.9%</td>
</tr>
<tr>
<td>All other HCPs*</td>
<td>1557</td>
<td>62.8%</td>
</tr>
<tr>
<td><strong>By work setting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td>1187</td>
<td>76.9%</td>
</tr>
<tr>
<td>Physician office</td>
<td>747</td>
<td>67.7%</td>
</tr>
<tr>
<td>Long-term care facility</td>
<td>455</td>
<td>52.4%</td>
</tr>
<tr>
<td><strong>Required by employer to be vaccinated</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>496</td>
<td>93.7%</td>
</tr>
<tr>
<td>No</td>
<td>1829</td>
<td>59.7%</td>
</tr>
<tr>
<td>Promoted by employer</td>
<td>390</td>
<td>75.8%</td>
</tr>
<tr>
<td>No requirement or promotion</td>
<td>1450</td>
<td>55.8%</td>
</tr>
</tbody>
</table>


* Dentists, nurse practitioners, or physician assistants; allied health professionals; technicians or technologists; assistants or aides; administrative support staff; nonclinical support staff.

### About the Author
Heather Bell, DO, is a graduate of the Oklahoma State University Osteopathic School of Medicine. Dr. Bell currently is the medical director of Infection Prevention and Epidemiology at St. John Medical Center in Tulsa. She can be reached at cootiedoc@me.com.
In 2011, there were 222 cases of measles reported from 30 states. Eighty-eight percent (n=194) were import cases from 22 countries and 87% (n=191) were unvaccinated or had undocumented vaccine status. Seventeen measles outbreaks (defined as more than 3 cases linked in time and place) occurred in 2011. The Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control and Prevention updated its 1998 Measles, Mumps, and Rubella (See Figure 1) (MMR) statement in 2012.

Stanley E. Grogg, DO, FACOP, FAAP
T he 2013 ACIP MMR recommendation statements clarify the 1998 policy language and include the following recommendations:1,2

1. Acceptable presumptive evidence of immunity.
2. Vaccination of persons with HIV infection.
3. Use of a third dose of MMR vaccine for mumps outbreaks.
4. Measles postexposure prophylaxis.

Acceptable presumptive evidence of immunity

Acceptable evidence of immunity includes laboratory confirmation of measles and mumps, rather than a physician’s diagnosis. Because of the rarity of measles and mumps in the United States, with the exception of the recent endemics, ACIP believed that physicians may confuse the symptoms of measles and mumps with other diseases and, thus, recommended laboratory confirmation as evidence of immunity. In addition, there are challenges with documenting history from physician records for adults. The new guidelines clarify that age-appropriate vaccination supersedes results of subsequent serologic testing. (For consistency with recommendations for health care personnel, the reader is referred to the following Morbidity and Mortality Weekly Report article.)

Vaccination of persons with human immunodeficiency virus infection

The current ACIP recommendations for persons with human immunodeficiency virus (HIV) infection are as follows: For children and adolescents with perinatal HIV infection who were vaccinated with measles, rubella-, or mumps-containing vaccine prior to the establishment of highly active antiretroviral therapy (HAART) should be considered unvaccinated and should be revaccinated with 2 doses of MMR vaccine once effective HAART has been established (>6 months with CD4 percentage of >5%), unless they have other acceptable current evidence of measles, rubella, and mumps immunity.

All family and other close contacts of immunocompromised persons should receive 2 doses of MMR vaccine, unless they have other evidence of measles immunity.

Use of a third dose of MMR vaccine for mumps outbreaks

During an epidemic of mumps, a third dose of MMR vaccine might be considered, according to ACIP. During recent mumps outbreaks among populations with high rates of 2-dose vaccination, standard outbreak control measures have not prevented the continued spread of mumps. Giving the third dose of the MMR appears to provide an additional tool for outbreak control. A third dose of MMR vaccine may also be considered for health care personnel during mumps outbreaks, given the higher risk of exposure to disease and those at higher risk of complications. The routine use of a third dose of MMR vaccine is not recommended as part of the routine immunization schedule.

Measles postexposure prophylaxis

ACIP recommends the use of intramuscular immune globulin (IGIM) or intravenous immune globulin (IGIV) to unprotected persons exposed to measles. Antibody concentrations in IGIM for measles may be lower now than in the past due to MMR use and the decrease in exposure to measles resulting in lower antibody titer of measles.

Updated recommendations

The updated ACIP recommendations are:4

1. IG is indicated for close contacts of measles patients, particularly those for whom the risk for complications is increased (ie, infants aged <12 months, pregnant women, or immunocompromised persons).
2. Administration of IG to unvaccinated close contacts who do not have other evidence of measles immunity may be considered if their exposure to measles is likely to result in infection (eg, those present in household, daycare, classroom).
3. For infants aged 6-11 months, MMR vaccination is an acceptable and preferred alternative to IG, if given within 72 hours of exposure. Older individuals may also have the MMR instead of IG, if given within 72 hours of exposure to measles.

ACIP’s previous recommendation for IG for immunocompromised persons was a dose of 0.25 mL/kg body weight (maximum dose of 15 mL). The new recommendation is a dose of 0.5 mL/kg body weight (maximum dose of 15 mL). The recommended dose of IGIV is 400 mg/kg body weight.

Commonly asked questions about MMR5

Q: Should a health care professional (HCP) who lacks evidence of immunity to MMR, regardless of age, be immunized with MMR?

Yes. ACIP recommends a routine 2-dose series of the MMR vaccine for HCPs who lack evidence of immunity, regardless of age.

Q: A new HCP has 2 documented doses of measles-mumps-rubella (MMR) vaccine, but the serologic testing doesn’t show immunity to measles. Is a third MMR followed by serological testing necessary?

No. Two documented doses of MMR vaccine is considered proof of immunity. ACIP considers receipt of 2 documented doses of MMR vaccine, given on or after the first birthday and separated by at least 28 days, to be proof of immunity to measles, mumps, and rubella. No serologic testing is required or recommended to confirm immunity in this instance.

Q: A 21-year-old woman is starting as a medical assistant at a local hospital. She does not have any documented doses of MMR. What are her options, because the hospital requires evidence of either vaccination with 2 doses of MMR vaccine or positive serologic results. Should she be given the 2 doses of MMR separated by 28 days?

Maybe, but she could be tested for immunity. If the test indicates that she is not immune to 1 or more of the vaccine components, she should receive 2 doses of MMR vaccine at least 4 weeks apart. ACIP does not recommend serologic testing after vaccination.

Q: The HCP in question 3 on page 16 is given an MMR vaccination and develops a rash and a low-grade fever 10 days later. Is she infectious?

No. Approximately 5%–15% of susceptible people who receive the MMR vaccination will develop a low-grade fever and/or mild rash 7–12 days after vaccination. The person is not infectious, and no special precautions (eg, exclusion from work) need to be taken.

Q: A patient born in 1960, who has a history of receiving 1 dose of MMR vaccine as a child, plans to travel to France soon. Should she be given a second dose of MMR?

Yes. ACIP recommends a second dose of MMR vaccine for any adult born during 1957 or later who plans to travel internationally.

Q: An unvaccinated 18-year-old was exposed to a child with measles. Can he be given an MMR dose to protect him from developing measles?

Yes. Measles vaccine, given as MMR, may be effective if given within the first 3 days (72 hours) after exposure to measles. IG may be effective for as long as 6 days after exposure.

Q: A college student has no titer evidence of measles immunity. What type of vaccine should he receive?

Single-antigen vaccine is no longer available in the United States; therefore, the student should get the combined MMR vaccine. He should receive 2 doses of MMR vaccine separated by at least 1 month.

Q: An adult female patient is going back to college to complete her degree. She has a history of an “egg allergy.” Can she be given the MMR vaccination?


References


About the Author

Stanley E. Grogg, DO, FACOP, FAAP is an associate dean of clinical research and professor of pediatrics at Oklahoma State University Center for Health Sciences College of Osteopathic Medicine in Tulsa. Dr. Grogg also serves as the American Osteopathic Association’s representative to the Centers for Disease Control and Prevention’s Advisory Committee on Immunization Practices. Dr. Grogg can be reached at Stanley.grogg@okstate.edu.
This quiz provides a convenient means for osteopathic physicians to assess their understanding of the scientific content of the March 2013 issue of AOA Health Watch.

To apply for 1 AOA Category 1-B continuing medical education credit, AOA members may take this quiz online at www.docmeonline.com, where this and other quizzes can be accessed by clicking on the link at the bottom of the home page. Quizzes that are completed online will be graded and credited to members' CME activity reports.

Alternatively, osteopathic physicians can complete the print version of this quiz and send it to the mailing address or fax number below by September 30, 2014. For those who mail or fax this form, the AOA will record the fact that they submitted this quiz for Category 1-B CME credit.

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Fax: (312) 202-8202

AOA No. ________________________________

Full Name ________________________________________________________

For each of the questions that follow, circle the letter next to your answer.

1. How many days does it usually take for the influenza vaccine to confer adequate immunity for the season?
   a. 5
   b. 7
   c. 10
   d. 14
   c. vaccinating HCPs has been shown to provide even more protection than if patients themselves are vaccinated
   d. HCP vaccination rate has no effect on patient mortality

2. All of the influenza vaccines are killed virus preparations except:
   a. intramuscular trivalent vaccine
   b. intradermal trivalent vaccine
   c. intranasal spray vaccine
   d. intramuscular quadrivalent vaccine
   c. reduction in the length of hospital stay
   d. reduction in mortality from pneumococcal disease

3. Which of the following statements is true regarding health care professionals (HCPs)?
   a. HCPs may be more likely than other groups to experience serious problems with vaccination
   b. vaccinated HCPs have been shown to have less than a 20% reduction in sick leave from work.
   c. vaccinating HCPs has been shown to provide even more protection than if patients themselves are vaccinated
   d. vaccination with the PPSV23 then the PCV13 at least 8 weeks later

4. The benefits of vaccination against pneumococcus include:
   a. reduction in the length of hospital stay
   b. reduction in resistant pneumococcal disease
   c. reduction in mortality from pneumococcal disease
   d. all of the above
   c. vaccinating HCPs has been shown to provide even more protection than if patients themselves are vaccinated
   d. vaccination with the PPSV23 then the PCV13 at least 8 weeks later

6. M.H. is a 60-year-old woman who received a PPSV23 vaccination at the time she was diagnosed with Hodgkin's lymphoma. It is now 1 year later. What further recommendations would you make?
   a. nothing, she is caught up on her vaccinations
   b. give her a second dose of PPSV23 at age 65
   c. give her a dose of PCV13 at age 65
   d. give her a dose of PCV13 now, and a second dose of PPSV23 at age 65
   c. vaccinating HCPs has been shown to provide even more protection than if patients themselves are vaccinated
   d. vaccination with the PPSV23 then the PCV13 at least 8 weeks later

7. The following is true of HCPs and the measles, mumps, and rubella (MMR) vaccine:
   a. the Advisory Committee on Immunization Practices (ACIP) recommends a routine 2-dose series of the MMR for HCPs who lack evidence of immunity
   b. a third dose of the MMR should be given to an HCP who has documented 2 doses of MMR separated by at least 28 days if their serologic testing is negative for measles
   c. a newly hired medical assistant who is going to have patient contact does not need documentation of 2 doses of MMR or serologic evidence of immunity
   d. since measles is not a serious disease, HCPs do not need MMR
   a. the Advisory Committee on Immunization Practices (ACIP) recommends a routine 2-dose series of the MMR for HCPs who lack evidence of immunity
   b. a third dose of the MMR should be given to an HCP who has documented 2 doses of MMR separated by at least 28 days if their serologic testing is negative for measles
   c. a newly hired medical assistant who is going to have patient contact does not need documentation of 2 doses of MMR or serologic evidence of immunity
   d. since measles is not a serious disease, HCPs do not need MMR

8. ACIP guidelines for acceptable presumptive evidence of immunity for MMR have changed. Which of the following is no longer accepted as evidence of MMR immunity?
   a. documentation of 2 doses of MMR vaccine separated by more than 28 days
   b. a physician's documentation of the disease
   c. positive serology for the disease
   d. individuals born during or before 1956 are generally considered immune to MMR due to having had the diseases
   a. documentation of 2 doses of MMR vaccine separated by more than 28 days
   b. a physician's documentation of the disease
   c. positive serology for the disease
   d. individuals born during or before 1956 are generally considered immune to MMR due to having had the diseases
Quiz and answers to AOA Health Watch

HPV Epidemiology  December 2012, Vol. 7, No. 5

The correct answers to the following questions appear in **bold** type.

1. A 38-year-old female smoker presents with worsening dysphagia and lymphadenopathy. She has been in a monogamous sexual relationship since she was 17 years old. She drinks 2 to 3 glasses of wine per week. A tender ulcerative mass is palpated at the base of the tongue. No cervical or supraclavicular lymphadenopathy is appreciated. Which of the following most likely suggests human papillomavirus (HPV)-positive oral squamous cell cancer?
   a. alcohol consumption
   b. smoking history
   c. age
   d. sexual history

2. A 43-year-old female with no history of smoking or alcohol use presents for a health maintenance visit. She has a history of sexual activity with multiple partners over the past 20 years. You suspect she is at risk of developing HPV-positive head and neck cancer. Which of the following is the most appropriate action to take at this time?
   a. examine the oral cavity with bimanual palpation of the neck
   b. referral to an oncologist for evaluation
   c. oral swab for HPV PCR analysis
   d. head and neck CT scan

3. One of the most effective prevention strategies against HPV and HPV-related diseases is:
   a. avoiding all contact with anyone who may have been exposed to HPV
   b. routine vaccination of males and females at age 11 years
   c. taking precautions not to share utensils or cups with known carriers of HPV
   d. vaccination of females only at age 8 years

4. A 25-year-old female asks you how often she needs to come in for Papanicolaou tests. According to the US Preventive Services Task Force guidelines, she should come every:
   a. 5 years
   b. 3 years
   c. 2 years
   d. year

5. A mother would like to know which HPV types the quadrivalent HPV vaccine (Gardasil) covers, and how many times she must bring her child in for it. What do you tell her?
   a. 3 doses are given at once and it covers HPV types 6, 11, 16, and 18
   b. it is given in 3 separate doses and only covers HPV types 16 and 18
   c. it is given in 3 separate doses and covers HPV types 6, 11, 16, and 18
   d. 3 doses are given at once and it only covers HPV types 6 and 11

6. Approximately 85% of anal cancers are associated with HPV infection, and the HPV type most commonly detected is:
   a. HPV-6
   b. HPV-11
   c. HPV-16
   d. HPV-18

7. A 16-year-old female presents to the office for a health maintenance assessment. Her mother is concerned regarding her daughter’s poor progress in school and disinterest in extracurricular activities. Which of the following elements of the HEADSS screening tool would be helpful in assessing the patient?
   a. health, education, AIDS, divorce, sex, suicide
   b. home, education, activities, drugs, sex, suicide
   c. home, environment, activities, drugs, sex, suicide
   d. home, education, activities, divorce, sex, suicide

8. Which of the following is a correct statement regarding immunization with HPV vaccine?
   a. 2 doses of HPV are recommended for females aged 11-26 years
   b. the bivalent HPV vaccine is recommended for males aged 11-26 years
   c. 3 doses of HPV vaccine are recommended for males and females aged 9-26 years.
   d. 3 doses of HPV vaccine are recommended after adolescent patients become sexually active

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In This Corner

Take 10
Following are 10 key points for understanding adult immunization and strategies for improving rates of immunization.

1. Many people are unaware that vaccine-preventable disease continues to cause unnecessary suffering and death in adults. Nearly all deaths attributed to pneumococcal disease in 2009 were in adults. Yet, the 2010 rate of pneumococcal vaccination in older persons was 60%, far less than the “Healthy People 2020” objective of 90%.

2. The Advisory Committee on Immunization Practices (ACIP) publishes updated immunization recommendations annually based on the latest research. Health care professionals (HCPs) must stay current in their vaccine knowledge and adhere to the vaccination schedule recommended by ACIP.

3. Although office-based providers should be the primary source of vaccination, most physicians who treat adults do not vaccinate at all. To reduce the rate of vaccine-preventable disease, HCPs must be ardent advocates for immunization.

4. Lack of physician recommendation is a common barrier for vaccination, and most patients are unfamiliar with current vaccination recommendations. Therefore, HCPs must take the lead in evaluating immunization status and recommending vaccination. A strong recommendation can be very persuasive to patients.

5. Protocols should be in place for evaluating each patient’s vaccination status and identifying missing or incomplete vaccination histories. Patients should be vaccinated within the facility or referred to another vaccinating facility.

6. Strategies should be used routinely to increase adult vaccination rates such as use of standing orders; record, chart, and mailed/telephone reminders; patient education; and performance feedback. Most of these strategies are inexpensive and easy to implement.

7. Standing orders are a particularly effective strategy for adult immunization, because they allow nurses, pharmacists, and other licensed HCPs to administer immunizations without an individual physician order. Examples of standing orders for specific immunizations are available in the public domain and can be used free of charge from www.immunize.org/standing-orders.

8. Patient misunderstandings about vaccines are common barriers to adult immunization. HCPs must have an in-depth understanding of each vaccine so that they can dispel their patients’ fears. For example, many people believe that the measles, mumps, and rubella (MMR) vaccine causes autism. However, a thorough review by the National Academy of Science’s Institute of Medicine found no evidence to support a link between the MMR vaccine and autism.

9. The entire office staff should deliver consistent messages to patients regarding the safety, efficacy, and importance of keeping current on their immunizations. HCP education is critical for increasing rate of adult vaccination.

10. HCPs must be champions for adult vaccination. With all of the misinformation about vaccines, HCPs play a critical role in improving public acceptance of and compliance with adult vaccination. www.immunize.org.

Check it Out
Standing order forms can be downloaded free of charge at: www.immunize.org.