

Controversies in Adult Immunization

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Summary

Although there are numerous vaccinations recommended for adults, there are gaps in adult vaccine coverage. Each year a significant number of adults suffer consequences of vaccine-preventable diseases. Because of their contact with patients, health care workers should be particularly conscientious about their vaccination status. Managed care can play a significant role in increasing adult vaccination rates to prevent disease.

Key Points

- Each year 50,000 adults have consequences of diseases that could be prevented with appropriate immunizations.
- The current health care system is not prepared for an influenza pandemic.
- In years when the influenza vaccine does not match well with the circulating virus, the inhaled vaccine seems to offer some cross-protection better than the injectable.
- Numerous vaccinations are recommended for adults.
- Two newer vaccines, which are recommended for some adults, immunize against human papillomavirus and herpes zoster.
- The influenza vaccination rates need to be increased, particularly among health care providers.

THERE ARE SEVERAL CONTROVERSIES in adult immunizations. A significant number of adults, approximately 50,000 yearly, have consequences of diseases that could be prevented with appropriate immunizations. There are many fewer cases of vaccine-preventable diseases each year in children. Pediatricians do an excellent job of vaccinating children, resulting in 90 percent of children receiving appropriate vaccinations. Adult vaccination rates are much lower. Managed care can play a significant role in increasing adult vaccination rates to prevent disease.

Many internists and family practitioners view immunizations as something they would prefer not to deal with. This is partially due to low reimbursement. Another big issue is the segmentation of health care without a central record of care.

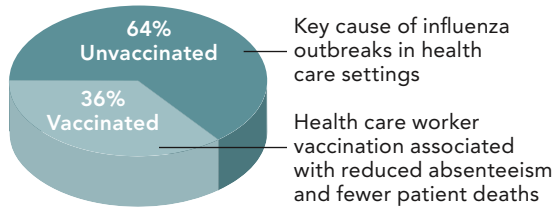
No vaccine is 100 percent effective. Childhood vaccines are better at completely eradicating disease. With adult vaccines, only about two-thirds of cases of disease are prevented. Increasing vaccination rates to reduce the rate of vaccine-preventable diseases in adults by 50 percent would be a tremendous public health accomplishment.

The biggest killer that can be prevented is influenza. Influenza results in approximately 36,000 excess deaths per year. Greater than 90 percent of the deaths related to influenza occur among persons older than 65. There is a higher mortality during seasons when influenza type A (H3N2) viruses predominate.

There have been four influenza pandemics in the past century as a result of changes in the virus. During a pandemic, about two-thirds of the population would be affected (~200 million people), which would result in up to 40 million outpatient visits; 700,000 hospitalizations; and 89,000 to 200,000 deaths. No one in the current health care system is prepared for an influenza pandemic, and many experts feel we are overdue for a pandemic.

There are at least five controversies with the influenza vaccine. In some years, the vaccine has not matched the circulating strains very well. The time it takes to produce the influenza vaccine, (~six months) by current methods, can lead to this mismatch. The included strains for each year must be chosen months ahead of time. As a result of the avian flu scare, many vaccine manufacturers are

Exhibit 1: Average Annual Influenza Vaccination Rates in Health Care Workers



Source: CDC. Prevention and control of influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR*. 2003; 52 (RR8); 1-44.

working to improve ways of quickly producing the vaccine using a cell-based culture system.

Inactivated (killed) influenza vaccine is typically used in the U.S. The elderly do not respond as well to killed vaccines as younger people. There is a question of whether there should be a special formulation for the elderly, or whether the elderly should receive the live attenuated vaccine (Flumist®) in order to improve response.

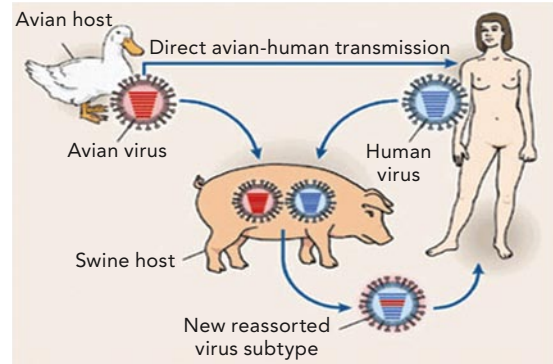
The recommendations for immunizing children against influenza have been broadened. Immunizing children leads to herd immunity because children are the reservoir of influenza. Improving the influenza immunization rates in children will have spillover benefit into adult populations.

The inactivated influenza vaccine is 70 percent to 90 percent effective among healthy persons younger than 65, and 30 percent to 40 percent effective among frail elderly persons. It is 50 percent to 60 percent effective in preventing hospitalization, and 80 percent effective in preventing death. Although the elderly are not as responsive, there are benefits.

The live attenuated influenza vaccine (Flumist®) allows the development of a mucosal immunity to prevent attachment of the virus in the upper airway. There are better results with the live attenuated vaccine versus the inactivated virus in most clinical trials. Vaccination with the live attenuated influenza virus results in 20 percent fewer severe febrile illness episodes; 24 percent fewer febrile upper respiratory illness episodes; 27 percent fewer lost work days due to febrile upper respiratory illness; 18 percent to 37 percent fewer days of health care provider visits due to febrile illness; and 41 percent to 45 percent fewer days of antibiotic use, compared with unimmunized populations. In years when the vaccine does not match well with the circulating virus, the inhaled vaccine seems to offer some cross-protection better than the injectable, probably because of the mucosal immunity.

One issue with the live vaccine is shedding of the

Exhibit 2:



virus. When initially approved, it was recommended not to immunize people who were immunocompromised or who had contact with the immunocompromised (i.e., health care workers). New recommendations are to avoid using the live product only in health care workers who directly work with the severely immunocompromised (i.e., bone marrow transplant). The cost differential between the inactivated injectable and the live inhaled is still an issue. The prices are becoming more comparable. Many people do not want to receive a shot – the inhaled product may help reduce barriers to increasing vaccination rates.

For 20 years or more it has been stressed by the Centers for Disease Control and Prevention that there are high-risk people who need to be immunized against influenza, but people who care for high-risk people also need to be immunized. The healthy person's mild illness is potentially fatal to the high-risk person. Unfortunately, only about 36 percent of health care workers receive an annual influenza vaccine (Exhibit 1).¹ All health care workers should receive the influenza vaccine yearly. Being fully immunized is a fundamental issue of professionalism. Some health care systems have made immunization a condition of employment. Improving immunization rates also can be good business for a hospital by reducing nosocomial influenza and reducing employee absenteeism. We need to find ways to improve immunization rates among health care workers.

Avian influenza has occurred in about 150 people during approximately the past 10 years. Although this is a low number of cases, about half of the people died. Most were young and healthy. There is some evidence that H5 influenza, avian, and others have become more robust in the animal world. The virus has not learned how to infect humans very well. But if this virus were to evolve to better infect humans, population vulnerability would be universal. This

Exhibit 3: Recommended adult immunization schedule by vaccine and age group – United States, October 2007 – September 2008

Vaccine	Age group (yrs)		
	19-49	50-64	≥65
Tetanus, diphtheria, pertussis (Td/Tdap) ^{1*}	1 dose of Td booster every 10 yrs		
	Substitute 1 dose of Tdap for Td		
Human papilloma-virus (HPV) ^{2*}	3 doses (females) (0, 2, 6 mos)		
Measles, mumps, rubella (MMR) ^{3*}	1 or 2 doses	1 dose	
Varicella ^{4*}		2 doses (0, 4-8 wks)	
Influenza ^{5*}	1 dose annually	1 dose annually	
Pneumococcal (polysaccharide) ^{6,7}	1 - 2 doses		1 dose
Hepatitis A ^{8*}	2 doses (0, 6-12 mos, or 0, 6-18 mos)		
Hepatitis B ^{9*}		3 doses (0, 1-2, 4-6 mos)	
Meningococcal ^{10*}		1 or more doses	
Zoster ¹¹			1 dose

*Covered by the Vaccine Injury Compensation Program.

■ For all persons in this category who meet the age requirements and who lack evidence of immunity (e.g., lack documentation of vaccination or have no evidence of prior infection)

■ Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)

evolution is more likely to happen when pigs become infected with both an avian and a human virus (Exhibit 2).

There is now a weak vaccine against avian influenza. One of the benefits of yearly influenza vaccination with different strains is the development of background immunity. An unanswered question is whether we should begin immunizing now to build background immunity to avian influenza.

The pneumococcal vaccine has similar indications to the influenza vaccine. One controversial issue with this vaccine is whether the vaccine prevents pneumonia. The current vaccine is not a great vaccine in reducing pneumococcal pneumonia because it does not produce much local mucosal immunity. There are significant benefits in preventing invasive pneumococcal disease, which kills 9,000 to 10,000 people in the United States yearly. An unanswered question with pneumococcal vaccine is how often should someone be revaccinated. Some experts have suggested routine revaccination every five to 10 years, while others suggest once at age 75.

Although many people consider only influenza and

pneumococcal vaccines when thinking about adult vaccinations, many other vaccines are recommended (Exhibit 3).² These include tetanus/diphtheria/pertussis, measles/mumps/rubella, varicella, hepatitis B, hepatitis A, meningococcal, herpes zoster, and human papillomavirus. Because some of these vaccinations are recommended based on presence of risk factors, consult the CDC website for specifics on each vaccine recommendation (www.cdc.gov/vaccines/recs/schedules/adult-schedule.htm). There are also numerous vaccines which are recommended for travelers to specific countries. Consult the CDC travel vaccine website for specific recommendations (wwwn.cdc.gov/travel/contentVaccinations.aspx).

The two newest adult vaccines on the market are herpes zoster (Zostavax[®]) and human papillomavirus (Gardasil[®]). Both of these vaccines have generated controversy on who should receive them and when they should be given.

A single dose of zoster vaccine is recommended for adults older than 60 regardless of whether they report a prior episode of herpes zoster.² Persons with chronic medical conditions may be vaccinated unless

a contraindication or precaution exists. The lifetime risk of developing herpes zoster in people who previously had chicken pox is estimated at 20 percent. Herpes zoster and its major complication, post-herpetic neuralgia, can cause significant pain and suffering. Post-herpetic neuralgia is more common and more severe in people older than 60. The vaccine has been shown to decrease the rate of post-herpetic neuralgia and herpes zoster, and there is some amelioration of disease in breakthrough cases. How significant the decreases in post-herpetic neuralgia and zoster are has been debated.

Human papillomavirus (HPV) is a significant cause of cervical, anorectal, and oropharyngeal cancers, and genital warts. HPV vaccination is recommended for all females younger than 26 who have not completed the vaccine series.² History of genital warts, an abnormal Papanicolaou test, or a positive HPV DNA test is not evidence of prior infection with all vaccine HPV types; however, HPV vaccination is still recommended for these persons. Ideally, the vaccine should be administered before potential exposure to HPV through sexual activity; however, females who are sexually active should still be vaccinated. Sexually active females who have not been infected with any of the HPV vaccine types receive the full benefit of the vaccination. Vaccination is less beneficial for females who have already been infected with one or more of the HPV vaccine types. The age at which females need to be vaccinated against a sexually transmitted disease has generated controversy among conservative parent groups.

Conclusion

Adult vaccination rates are significantly lower than those for children, resulting in many cases of vaccine-preventable disease annually. The health care system needs to find ways to increase vaccination rates among adults, particularly health care workers. Strategies to reduce barriers to vaccination include reducing or eliminating costs to the patient and making immunizations available in additional settings, such as pharmacies. **JMCM**

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References

1. Centers for Disease Control and Prevention. Prevention and control of influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR*. 2003;52(RR8):1-44.
2. Centers for Disease Control and Prevention. Recommended Adult Immunization Schedule — United States, October 2007–September 2008. *MMWR Weekly*. 2007;56:Q1-Q4.

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