

CHAPTER 7: INFLUENZA VACCINATION OF HEALTH CARE PERSONNEL

I. INTRODUCTION

Health care personnel (HCP) can acquire influenza and transmit it to patients and other HCP. Many HCP provide care for or are in frequent contact with patients with influenza or patients at high risk for complications of influenza, and their involvement in influenza transmission is a long-standing concern.^{1,2,3}

Influenza vaccination is effective and can prevent many illnesses, deaths, and losses in productivity.⁴ Expanding influenza vaccine use among HCP is a high priority. Achieving and sustaining high influenza vaccination coverage among HCP is intended to help protect HCP and their patients and reduce disease burden and health care costs. Until recently, vaccination coverage among HCP has been well below the national Healthy People 2010 target of 60%⁵ (see Figure 2), but preliminary data show that 63% of HCP reported receiving seasonal influenza vaccine in 2010–2011 and 67% reported receiving the vaccine in 2011–2012.^{6,7}

¹ Maltezou HC, Drancourt M. Nosocomial influenza in children. *Journal of Hospital Infection* 2003; 55:83-91.

² Hurley JC, Flockhart S. An influenza outbreak in a regional residential facility. *Journal of Infection Prevention* 2010; 11:58-61.

³ Salgado CD, Farr BM, Hall KK, Hayden FG. Influenza in the acute hospital setting. *The Lancet Infectious Diseases* 2002; 2:145-155.

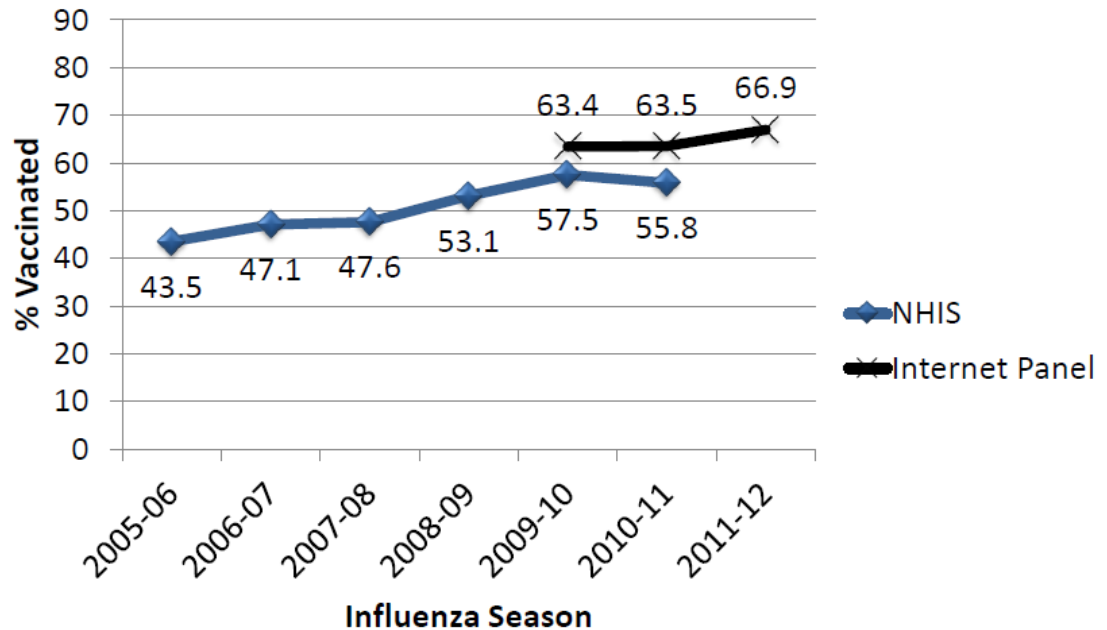
⁴ Wilde JA, McMillan JA, Serwint J, Butta J, O’Riordan MA, Steinhoff MC. Effectiveness of influenza vaccine in health care professionals: a randomized trial. *Journal of the American Medical Association* 1999; 281:908-913.

⁵ Walker FJ, Singleton JA, Lu P, Wooten KG, Strikas RA. Influenza vaccination of healthcare workers in the United States, 1989-2002. *Infection Control and Hospital Epidemiology* 2006; 27:257-265.

⁶ Centers for Disease Control and Prevention. Influenza Vaccination Coverage Among Health-Care Personnel – United States, 2010-2011 Influenza Season. *Morbidity and Mortality Weekly Report (MMWR)*: 60:1073-1077. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6032a1.htm?s_cid=mm6032a1_w

⁷ Health Care Personnel Flu Vaccination. Internet Panel Survey, United States, November 2011. <http://www.cdc.gov/flu/professionals/vaccination/health-care-personnel.htm>. August 24, 2012.

Figure 2. Estimated Influenza Vaccination (Trivalent) Coverage, Health Care Personnel



Sources: *Internet Panel Surveys* - *MMWR* 2012;61(38); *National Health Interview Survey (NHIS)* - Lu et al. CDC unpublished

Healthy People 2020 set a target of 90% coverage for HCP influenza vaccination.⁸ Meeting this target will involve several challenges. The Health Care–Associated Infections (HAIs) Increasing Influenza Vaccination Coverage Among Health Care Personnel Working Group of the Federal Steering Committee for the Prevention of HAIs has been convened to identify and implement areas of strategic focus to increase immunization coverage of HCP and provide direction for future departmental resources in this initiative. The working group’s goals are to promote increased HCP influenza immunization coverage by working with other HHS operating and staff divisions and nonfederal partners and to identify approaches to reaching the 90% target for Healthy People 2020. The group also proposes an interim target of 75% vaccination coverage among HCP by 2015.^{9,10}

It is important to note that although the working group is focused on increasing influenza vaccination of HCP, such vaccination represents only one component of a comprehensive strategy for preventing influenza transmission in health care settings.¹¹

⁸ Healthy People 2020 Immunization and Infectious Disease Objectives, IID -12.9, available at <http://healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=23>

⁹ Influenza Vaccination of Healthcare Personnel Working Group Meeting Notes, meeting of June 4, 2010.

¹⁰ Influenza Vaccination of Healthcare Personnel Working Group Meeting Notes, meeting of June 4, 2010.

¹¹ Centers for Disease Control and Prevention. Prevention Strategies for Seasonal Influenza in Healthcare Settings. Available at <http://www.cdc.gov/flu/professionals/infectioncontrol/healthcaresettings.htm>. Accessed October 20, 2010.

II. BACKGROUND

A. Definition of HCP

For this chapter, we have decided to use the Centers for Disease Control and Prevention's (CDC's) Healthcare Infection Control Practices Advisory Committee (HICPAC) and the Advisory Committee on Immunization Practices (ACIP) HCP definition because of its inclusiveness and the involvement of multiple stakeholders in its development. By this definition, HCP are all paid and unpaid persons working in health care settings who have the potential for exposure to patients or to infectious materials, including body substances, contaminated medical supplies and equipment, contaminated environmental surfaces, and contaminated air.¹²

HCP might include physicians, physician assistants, nurses, nursing assistants, therapists, technicians, emergency medical services personnel, dental personnel, pharmacists, laboratory personnel, autopsy personnel, students and trainees, contractual staff not employed by the health care facility, and persons (e.g., clerical, dietary, housekeeping, laundry, security, maintenance, and billing personnel, and volunteers) not directly involved in patient care but potentially exposed to infectious agents that can be transmitted to and from HCP and patients.

Settings in which HCP may work include acute care hospitals, long-term care facilities (LTCFs), nursing homes, skilled nursing facilities, rehabilitation centers, home health agencies, physicians' offices, urgent care centers, outpatient clinics, dialysis facilities, and emergency medical services. HCP include hospital and office staff, contract workers, volunteers, trainees, and other types of personnel. Thus, the types of work done, levels of institutional oversight, and employment mechanisms are diverse.

B. Influenza Morbidity, Mortality, and Costs

The morbidity, mortality, and economic impact from influenza each year can be substantial, as the following U.S. statistics demonstrate:

- Each year, between 5% and 20% of the population becomes ill with influenza.¹³
- Between 1976 and 2007, annual influenza-associated deaths have ranged from about 3,000 to about 50,000.¹⁴
- On average, about 200,000 hospitalizations due to influenza occurred each year between 1979 and 2001.¹⁵

¹² Adapted from: Pearson ML, Bridges CB, Harper SA. Influenza vaccination of health-care personnel: Recommendations of the Healthcare Infection Control Practices Advisory Committee (HICPAC) and the Advisory Committee on Immunization Practices (ACIP). *Morbidity and Mortality Weekly Report (MMWR)* 2006; 55:1-16. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5502a1.htm>

¹³ Centers for Disease Control and Prevention: Questions and Answers, Seasonal Influenza. Available at <http://www.cdc.gov/flu/about/qa/disease.htm>

¹⁴ Centers for Disease Control and Prevention. Estimates of deaths associated with seasonal influenza—United States, 1976-2007. *Morbidity and Mortality Weekly Report (MMWR)* 2010; 59:1057-62. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5933a1.htm?s_cid=mm5933a1_w

¹⁵ Thompson WW, Shay DK, Weintraub E, et al. Influenza-associated hospitalizations in the United States. *Journal of the American Medical Association* 2004; 292:1333-40.

- Approximately 600,000 lost life-years, 3 million days of hospitalization, and 30 million outpatient visits annually are attributed to influenza epidemics.¹⁶

Rates of serious illness and death resulting from influenza and its complications are increased in high-risk populations: persons over 50 years or under four years of age and persons of any age who have underlying conditions that put them at an increased risk.¹⁷

C. Limiting Transmission of Influenza in Health Care Settings by Vaccination of HCP

Results of several studies indicate that higher vaccination coverage among HCP is associated with lower incidence of nosocomial influenza, influenza-like illness, or mortality during influenza season.^{18,19,20} Such findings have led some to call for mandatory influenza vaccination of HCP,^{21,22,23,24,25,26} though others have cautioned that “there is an absence of high-quality evidence to guide medical care and public health practitioners to mandate influenza vaccination for healthcare workers.”²⁷

¹⁶ Molinari NM, Ortega-Sanchez IR, Messonnier ML, et al. The annual impact of seasonal influenza in the US: measuring disease burden and costs. *Vaccine* 2007; 25:5086-5096.

¹⁷ Fiore AE, Uyeke T, Broder K, et al. Prevention & Control of Influenza with Vaccines - Recommendations of the Advisory Committee on Immunization Practices (ACIP) 2010. *Morbidity and Mortality Weekly Report (MMWR)* 2010; 59(RR08):1-62.

¹⁸ Salgado CD, Giannetta ET, Hayden FG, Farr BM. Preventing influenza by improving the vaccine acceptance rate of clinicians. *Infection Control and Hospital Epidemiology* 2004; 25: 923-928.

¹⁹ Potter J, Stott DJ, Roberts MA, et al. Influenza vaccination of health-care workers in long-term-care hospitals reduces the mortality of elderly patients. *Journal of Infectious Diseases* 1997; 175:1-6.

²⁰ Hayward AC, Harling R, Wetten S, et al. Effectiveness of an influenza vaccine programme for care home staff to prevent death, morbidity, and health service use among residents: cluster randomised controlled trial. *British Medical Journal* 2006; 333:1241-1246.

²¹ Talbot TR, Bradley SF, Cosgrove SE, et al. SHEA position paper: Influenza vaccination of healthcare workers and vaccine allocation for healthcare workers during vaccine shortages. *Infection Control and Hospital Epidemiology* 2005; 26:882-890.

²² American College of Physicians (ACP). ACP policy on influenza vaccination of health care workers.

http://www.acponline.org/clinical_information/resources/adult_immunization/flu_policy_hcw.pdf

²³ Greene LR, Cain TA, Dolan SA et al. APIC position paper: influenza immunization of healthcare personnel. Association of Professionals in Infection Control (APIC). November 2008.

http://www.apic.org/Content/NavigationMenu/PracticeGuidance/Topics/Influenza/APIC_Position_Paper_Influenza_11_7_08final_revised.pdf

²⁴ National Patient Safety Foundation (NPSF). Mandatory flu vaccinations for healthcare workers. Press Release, November 18, 2009. <http://www.npsf.org/updates-news-press/press/media-alert-npsf-supports-mandatory-flu-vaccinations-for-healthcare-workers/>

²⁵ Infectious Diseases Society of America (IDSA). IDSA policy on mandatory immunization of health care workers against seasonal and 2009 H1N1 influenza. Infectious Diseases Society of America (IDSA). September 30, 2009.

<http://www.idsociety.org/HCWimmunization/>

²⁶ Immunization Action Coalition (IAC). Honor Roll for Patient Safety. <http://www.immunize.org/honor-roll/> August 24, 2012.

²⁷ Thomas RE, Jefferson T, Lasserson TJ. Influenza vaccination for healthcare workers who work with the elderly. *Cochrane Database of Systematic Reviews* 2010, Issue 2. Art. No.: CD005187. DOI: 10.1002/14651858.CD005187.pub3.

D. Annual Influenza Vaccine Development

Preparing for the influenza season each year is a time-critical, highly orchestrated, collaborative effort of the global health community, including disease surveillance authorities in many countries, the World Health Organization, the National Institutes of Health (NIH), the Food and Drug Administration (FDA), CDC, and vaccine manufacturers. It is a year-round process that requires ongoing worldwide influenza disease surveillance, development of recommendations for immunization, selection of virus strains, and the manufacture and distribution of new vaccine.

Influenza Virus

Influenza viruses are single-stranded, helically shaped ribonucleic acid viruses of the family *Orthomyxoviridae*. The viruses can be divided into three types: A, B, and C. Type A influenza has subtypes that are determined by the surface antigens hemagglutinin (H) and neuraminidase (N). Of the 16 known types of hemagglutinin, three (H1, H2, and H3) are usually present in the influenza viruses that most commonly infect humans. Hemagglutinin has a role in virus attachment to infected cells and fusion to the intracellular structures. Of the nine known types of neuraminidase, two (N1 and N2) are most common in viruses that infect humans. Neuraminidase has a role in new viruses' release from infected cells.²⁸

Type A influenza causes moderate to severe illness in all age groups and infects humans and other animals. Type B influenza primarily affects children, and infects only humans. Type C influenza is rarely reported as a cause of human illness and has not been associated with any epidemics.²⁹

The nomenclature to describe the type of influenza virus is expressed in the following order: (1) virus type, (2) geographic site where the virus was first isolated, (3) strain number, (4) year of isolation, and (5) virus subtype.³⁰

Because seasonal influenza is predominantly caused by two types of influenza virus, influenza A and B, and two subtypes of influenza A, A/H1N1, and A/H3N2, the vaccine includes representative strains of the two A subtypes and a B virus. Using input from its Vaccines and Related Biological Products Advisory Committee and surveillance-based forecasts about which viruses are most likely to cause illness in the coming season, FDA selects the viral strains to be used in the annual trivalent influenza vaccines. Because the influenza virus mutates, each year's vaccine virus strains are often different from the preceding year's. The manufacturing demands are tremendous because a new trivalent

²⁸ Knipe, DM, Howley, PM, Griffin, DE, Lamb, RA, Martin, MA, Roizman, B, & Straus, SE, Eds (2006). *Field's Virology* (5th ed.). Philadelphia: Lippincott, Williams and Wilkins.

²⁹ Centers for Disease Control and Prevention. Prevention & Control of Influenza with Vaccines — 2010–11 Recommendations of the Advisory Committee on Immunization Practices. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr59e0729a1.htm?s_cid=rr59e0729a1_w.

³⁰ Knipe, DM, Howley, PM, Griffin, DE, Lamb, RA, Martin, MA, Roizman, B, & Straus, SE, Eds. (2006). *Field's Virology* (5th ed.). Philadelphia: Lippincott, Williams and Wilkins.

vaccine is manufactured every year. Influenza vaccines undergo the FDA review process for approval, which includes stringent manufacturing and quality oversight processes.^{31,32}

FDA has licensed two forms of influenza vaccine for use in the U.S.: the inactivated vaccine and the live attenuated vaccine. The inactivated vaccine contains inactivated, or killed, virus and is given with a needle in the arm. The live attenuated (e.g., nasal spray) vaccine contains live viruses that are weakened, or attenuated, and is administered to the nasal mucosa with a nasal sprayer. ACIP provides annual recommendations for the control and prevention of influenza, including use of vaccines.³³ In 2012 quadrivalent live attenuated and quadrivalent inactivated vaccines were licensed³⁴ which are expected to be available in the 2013–2014 influenza season.

E. Effectiveness and Safety of Influenza Vaccine

FDA regulates vaccines for use in the U.S.; FDA and CDC are responsible for evaluating their safety and effectiveness and monitoring conformity with statutory and regulatory standards for licensure and use in the U.S. Ensuring an adequate, safe, and effective supply of influenza vaccine each year is one of FDA's and CDC's highest priorities.

Because of the changing influenza viruses and the need for many months between strain determination and vaccine administration, vaccines and circulating viruses do not always match. Studies have shown that influenza vaccines are 59–91% effective in preventing laboratory-confirmed influenza illness when closely matched to the circulating virus strains.³⁵ Even in influenza seasons during which the vaccine does not exactly match the circulating strain, studies have shown that the vaccine still may have protective effects.^{36,37,38,39}

Vaccination of individuals 65 years of age and older not living in nursing homes reduces the likelihood of hospitalization for influenza-related complications by 30–70% when the vaccine is

³¹ Food and Drug Administration. Influenza Virus Vaccine Composition and Lot Release. Available at <http://www.fda.gov/BiologicsBloodVaccines/GuidanceComplianceRegulatoryInformation/Post-MarketActivities/LotReleases/ucm062928.htm>

³² Food and Drug Administration. 2010-2011 Influenza Season Vaccine Questions and Answers. Available at <http://www.fda.gov/BiologicsBloodVaccines/GuidanceComplianceRegulatoryInformation/Post-MarketActivities/LotReleases/ucm220649.htm>

³³ Prevention and Control of Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP) — United States, 2012–13 Influenza Season Weekly. August 17, 2012, 61(32):613-618. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6132a3.htm>

³⁴ <http://www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm293952.htm>;
<http://www.fda.gov/BiologicsBloodVaccines/ucm332623.htm>

³⁵ Osterholm MT, Kelley NS, Sommer A & Belongia EA. Efficacy and effectiveness of influenza vaccines: a systematic review and meta-analysis. *Lancet: Infectious Diseases* 2012; 12(1):36-44.

³⁶ Bridges CB, Thompson WW, Meltzer MI, et al. Effectiveness and cost-benefit of influenza vaccination of healthy working adults: a randomized controlled trial. *Journal of the American Medical Association* 2000; 284:1655-63.

³⁷ Heikkinen T, Ruuskanen O, Waris M, et al. Influenza vaccination in the prevention of acute otitis media in children. *American Journal of Diseases in Children* 1991; 145:445-8.

³⁸ Jefferson TO, Rivetti D, Di Pietrantonj C, et al. Vaccines for preventing influenza in healthy adults. *Cochrane Database Syst Rev* 2007; CD001269.

³⁹ Nichol KL, Lind A, Margolis KL, et al. The effectiveness of vaccination against influenza in healthy, working adults. *The New England Journal of Medicine* 1995; 333:889-93.

well-matched.^{40,41,42} In this age group, influenza vaccination also has been shown to reduce both the frequency of secondary complications and the risk for influenza-related hospitalizations and death for those with and without high-risk medical conditions, such as heart disease or diabetes.^{43,44, 45,46} Some studies have suggested that the influenza vaccine can be up to 80% effective in preventing death from influenza for individuals 65 years of age and older living in nursing homes or other LTCFs.^{47,48}

The most common side effects associated with the inactivated influenza vaccine, administered as an injection, include soreness, redness, tenderness, and swelling at the injection site. These reactions are transient, generally lasting one to two days. Local reactions are reported in 15–20% of vaccinated individuals. Fever, malaise, and allergic and neurologic reactions occur rarely.⁴⁹ Contraindications to inactivated influenza vaccines are severe (life threatening) allergy to a prior dose of a seasonal influenza vaccine, and severe allergy to a component of the vaccine.

Live attenuated influenza vaccine (LAIV), administered as a nasal spray, is recommended for healthy, nonpregnant people 2–49 years of age. The most common side effects reported include cough, runny nose, nasal congestion, sore throat, and chills. No serious adverse reactions have been identified in LAIV recipients.⁵⁰ To reduce the theoretical risk for vaccine virus transmission, ACIP and HICPAC recommended that HCP who receive LAIV should avoid providing care for severely immunosuppressed patients requiring protected environments for 7 days after vaccination, and hospital visitors who have received LAIV should avoid contact with these patients for 7 days after vaccination but should not be restricted from visiting less severely immunosuppressed patients.⁵¹ LAIV is contraindicated for persons who have a severe allergy to

⁴⁰ Nichol KL, Wuorenma J, von Sternberg T. Benefits of influenza vaccination for low-, intermediate-, and high-risk senior citizens. *Archives of Internal Medicine* 1998; 158:1769-76.

⁴¹ Mullooly JP, Bennett MD, Hornbrook MC, et al. Influenza vaccination programs for elderly persons: cost-effectiveness in a health maintenance organization. *Annals of Internal Medicine* 1994; 121:947-52.

⁴² Nichol KL, Nordin JD, Nelson DB, et al. Effectiveness of influenza vaccine in the community-dwelling elderly. *The New England Journal of Medicine* 2007; 357:1373-81.

⁴³ Mullooly JP, Bennett MD, Hornbrook MC, et al. Influenza vaccination programs for elderly persons: cost-effectiveness in a health maintenance organization. *Annals of Internal Medicine* 1994; 121:947-52.

⁴⁴ Nichol KL, Nordin JD, Nelson DB, et al. Effectiveness of influenza vaccine in the community-dwelling elderly. *The New England Journal of Medicine* 2007; 357:1373-81.

⁴⁵ Hak E, Nordin J, Wei F, et al. Influence of high-risk medical conditions on the effectiveness of influenza vaccination among elderly members of 3 large managed-care organizations. *Clinical Infectious Diseases* 2002; 35:370-7.

⁴⁶ Patriarca PA, Weber JA, Parker RA, et al. Risk factors for outbreaks of influenza in nursing homes. A case-control study. *American Journal of Epidemiology* 1986; 124:114-9.

⁴⁷ Monto AS, Hornbuckle K, Ohmit SE. Influenza vaccine effectiveness among elderly nursing home residents: a cohort study. *American Journal of Epidemiology* 2001; 154:155-60.

⁴⁸ Jefferson T, Rivetti D, Rivetti A, et al. Efficacy and effectiveness of influenza vaccines in elderly people: a systematic review. *Lancet* 2005; 366:1165-74.

⁴⁹ Vellozzi C, Burwen DR, Dobardzic A, et al. Safety of trivalent inactivated influenza vaccines in adults: background for pandemic influenza vaccine safety monitoring. *Vaccine* 2009; 27:2114-20.

⁵⁰ Belshe RB, Gruber WC, Mendelman PM, et al. Efficacy of vaccination with live attenuated, cold-adapted, trivalent, intranasal influenza virus vaccine against a variant (A/Sydney) not contained in the vaccine. *Journal of Pediatrics* 2000; 136:168-75.

⁵¹ CDC. Influenza vaccination of health-care personnel: recommendations of the Healthcare Infection Control Practices Advisory Committee (HICPAC) and the Advisory Committee on Immunization Practices (ACIP). *MMWR* 2006; 55(No. RR-2). Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5502a1.htm>

eggs or another component of the LAIV vaccine, or a severe allergy to a prior dose of an influenza vaccine (TIV or LAIV).

F. Effect of Influenza Vaccination on Costs

Influenza vaccination of adults has been shown to reduce both direct medical costs and indirect costs from absenteeism.⁵² A study of the cost-effectiveness of influenza vaccination found the cost to be \$28,000 per QALY saved (in 2000 dollars) in persons aged 50–64 years, and \$980 per QALY saved among persons aged 65 years and older.⁵³ Several studies demonstrated that the vaccination of adults aged younger than 65 years resulted in 13–44% fewer health care provider visits, 18–45% fewer lost workdays, 18–28% fewer days working with reduced effectiveness, and a 25% decrease in antibiotic use.^{54,55,56}

III. ADDRESSING HCP VACCINATION RATES

Influenza vaccination coverage among HCP has been slowly increasing since the early 1990s. However, HCP influenza vaccination coverage remained well below the Healthy People 2010 target of 60% until 2009–2010, when coverage with seasonal influenza vaccine was estimated at 62%. This increase may be associated with the influenza pandemic that began in 2009, when the seasonal influenza vaccine was the only available vaccine.⁵⁷ HCP vaccination coverage measures reflect a variety of health care settings and occupations. Although self-reported influenza vaccine coverage reported by physicians and nurses exceeded 75% in 2011–2012, coverage among other HCP was estimated at 59%. Vaccine coverage in hospitals was estimated to be almost 78%, but coverage in long-term care settings, where benefit to patients has been best documented, was 45%.⁵⁸ Numerous factors have been described as influences on HCP decisions to accept or decline influenza vaccination.

⁵² Centers for Disease Control and Prevention. Flu Vaccine Effectiveness: Questions and Answers for Health Professionals. Available at <http://www.cdc.gov/flu/professionals/vaccination/effectivenessqa.htm>

⁵³ Maciosek MV, Solberg LI, Coffield AB, et al. Influenza vaccination health impact and cost effectiveness among adults aged 50 to 64 and 65 and older. *Am J Prev Med* 2006;3 1:72-9.

⁵⁴ Bridges CB, Thompson WW, Meltzer MI, et al. Effectiveness and cost-benefit of influenza vaccination of healthy working adults: a randomized controlled trial. *Journal of the American Medical Association* 2000; 284:1655-1663

⁵⁵ Demicheli V, Jefferson T, Rivetti D, Deeks J. Prevention of early treatment of influenza in healthy adults. *Vaccine* 2000; 18:957-1030.

⁵⁶ Kuster SP, Shah PS, Coleman BL, Lam P-P, Tong A, et al. (2011) Incidence of Influenza in Healthy Adults and Healthcare Workers: A Systematic Review and Meta-Analysis. *PLoS ONE* 6(10): e26239. doi:10.1371/journal.pone.0026239

⁵⁷ Centers for Disease Control and Prevention. Interim results: Influenza A (H1N1) 2009 and Monovalent Seasonal Influenza Vaccination Coverage Among Health-Care Personnel—United States August 2009–January 2010. *Morbidity and Mortality Weekly Report (MMWR)* 2010; 59:357-362. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5912a1.htm>

⁵⁸ Centers for Disease Control and Prevention. Health Care Personnel Flu Vaccination: Internet Panel Survey, United States, November 2011. <http://www.cdc.gov/flu/professionals/vaccination/health-care-personnel.htm/>

A. Factors Influencing Individual HCP Acceptance of Influenza Vaccination

Reported reasons for and barriers to HCP acceptance of influenza vaccinations include the following^{59,60}:

Reasons HCP report for accepting influenza vaccination:

- Desire for self-protection
- Desire to protect patients
- Desire to protect family members
- Previous receipt of influenza vaccine
- Perceived effectiveness of the vaccine
- Desire to avoid missing work
- Peer recommendation
- Personal physician recommendation
- Strong worksite recommendation
- Had influenza previously
- Belief that receiving the vaccine is a professional responsibility
- Access to vaccination/coverage
- Vaccinations provided free of charge
- Belief that the benefits of vaccination outweigh the risk of side effects

Reasons HCP report for declining influenza vaccination:

- Fear of contracting influenza/influenza-like illness from the vaccine
- Fear of vaccine side effects
- Perceived ineffectiveness of the vaccine
- Perceived low likelihood of developing influenza
- Fear of needles
- Insufficient time, inconvenience, or forgetting to get the vaccination
- Reliance on homeopathic treatments
- Belief that their own host defenses would prevent influenza
- Lack of physician recommendation
- Belief that other preventive measures would minimize or eliminate influenza risk
- Belief that influenza is not a serious disease
- Lack of free vaccinations
- Belief that the vaccine is not necessary for individuals younger than 65 years of age

⁵⁹ Hollmeyer HG, Hayden F, Poland G, Bucholz U. Influenza vaccination of health care workers in hospitals—a review of studies on attitudes and predictors. *Vaccine* 2009; 19: 3935-3944.

⁶⁰ The Joint Commission. Providing a Safer Environment for Health Care Personnel and Patients Through Influenza Vaccination: Strategies from Research and Practice.

http://www.jointcommission.org/assets/1/18/Flu_Monograph.pdf

B. Strategies for Improving HCP Vaccination Rates

Employers of HCP should use evidence-based approaches to maximize vaccination rates. In general, multi-component interventions are the most effective, especially when HCP influenza vaccination is perceived to be a facility leadership priority and sufficient resources are made available to support the intervention.⁶¹ The following strategies are recommended by ACIP and HICPAC.⁶²

Education and Campaigns

- Educational programs that emphasize the benefits of HCP vaccination for patients and staff, especially at new staff orientation where the programs will have a captive audience
- Organized campaigns that promote vaccination using a variety of media, including emails, newsletters, posters, and wearable stickers
- Letters or other communication from senior leadership encouraging vaccination

Role Models

- Vaccination of senior medical staff, hospital executives, or opinion leaders

Improved Access

- Making vaccine readily available at congregate areas (e.g., clinics), during conferences and biological or disaster training exercises, or via mobile carts
- Making vaccine available on all work shifts
- Provision of incentives
- Provision of vaccine at no charge

Measurement and Feedback

- Posting vaccination coverage levels in different areas of a health care facility
- Monitoring vaccination coverage by facility area (e.g., ward or unit) or occupational group
- Use of HCP influenza vaccination coverage as a health care quality measure in states that mandate public reporting of HAIs
- Use of signed declination statements from HCP who refuse vaccination

⁶¹ Hirsch P, Davey V, Hodgson M. Influenza vaccination in health care: results of a 4-year campaign. *Infect Control Hosp Epidemiol* 2011; 32:444-8.

⁶² Centers for Disease Control and Prevention. Influenza vaccination of health-care personnel: recommendations of the Health-Care Infection Control Practices Advisory Committee (HICPAC) and the Advisory Committee on Immunization Practices (ACIP). *Morbidity and Mortality Weekly Report (MMWR)* 2006; 55:1-16. Available at <http://www.cdc.gov/mmwr/pdf/rr/rr5502.pdf>

Legislation and Regulation

- Nine states (California, Illinois, Maine, Maryland, Massachusetts, Nebraska, Oklahoma, Rhode Island, and Tennessee) have “offer” laws for influenza vaccination of HCP, meaning that vaccine must be offered to HCP by health care facilities, though individual HCP may decline vaccination.⁶³
- Two states (Alabama and New Hampshire) have “ensure” laws for influenza vaccination of HCP, meaning that vaccination of non-immune HCP is mandatory in the absence of a specified exemption or refusal.
- Additionally, numerous hospitals and other health care facilities have established policies requiring mandatory influenza vaccination of their HCP.⁶⁴

Although mandatory influenza vaccination for HCP has been successfully implemented in numerous facilities, some ethical and legal considerations are associated with this approach.⁶⁵

In 2009, the HAI Increasing Influenza Vaccination Coverage Among HCP Working Group was formed to address the apparent failure to achieve the Healthy People 2010 target for influenza vaccination of HCP. Subsequently, interim results have reported an estimated 62% coverage of HCP with seasonal influenza vaccine,⁶⁶ suggesting that the 2010 target may have been met. Nevertheless, the working group can play an important role in helping to promote increased influenza vaccination of HCP to help achieve the Healthy People 2020 target of 90% coverage.

Working group tasks include:

- Develop, synthesize, or enhance evidence and tools for improving influenza vaccination of HCP.
- Enroll and maintain stakeholders in the initiative to improve influenza vaccination coverage among HCP.
- Enhance or develop quality standards for influenza vaccination of HCP.

By implementing the above activities and the inaugural project discussed later in this chapter, the working group aims to not only increase awareness of the importance of influenza vaccination for HCP and patients but also make progress toward meeting the national Healthy People 2020 target of 90% for influenza vaccination coverage of HCP.

⁶³ This information was last updated September 2011. For additional information as well as any updated information on state influenza immunization laws for HCP, please see:

<http://www2a.cdc.gov/nip/StateVaccApp/statevaccsApp/AdministrationbyVaccine.asp?Vaccinetsmp=Influenza>

⁶⁴ For additional information regarding health care facilities' influenza vaccine policies, please see:

<http://www.immunize.org/honor%2Droll/>

⁶⁵ The Joint Commission. Providing a Safer Environment for Health Care Personnel and Patients Through Influenza Vaccination: Strategies from Research and Practice.

http://www.jointcommission.org/assets/1/18/Flu_Monograph.pdf

⁶⁶ Centers for Disease Control and Prevention. Interim results: Influenza A (H1N1) 2009 and Monovalent Seasonal Influenza Vaccination Coverage Among Health-Care Personnel—United States August 2009-January 2010.

Morbidity and Mortality Weekly Report (MMWR) 2010; 59:357-362. Available at

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5912a1.htm>

IV. MEASUREMENT OF INFLUENZA VACCINATION AMONG HCP

The National Health Interview Survey (NHIS) is the primary data source for national influenza vaccination coverage estimates for HCP. NHIS has been used to track progress toward the Healthy People 2010 target for influenza vaccine coverage goals for HCP and will continue to track vaccination rates for Healthy People 2020. NHIS is a nationally representative survey of the civilian non-institutionalized household population of the U.S., conducted throughout the year from January through December, that uses in-person interviews to collect information on health and health care for all eligible members of the sampled households. Information on adult vaccinations is self-reported by one randomly sampled adult within a family, except in rare cases when the selected adult is physically or mentally incapable of responding. Results from the in-person interviews are published annually in the National Center for Health Statistics Health E-Stat.⁶⁷

Because of NHIS methods, data are reliable but cannot be available in real time during in influenza season. For this reason, during the 2009–2010 influenza vaccination campaign, CDC used both NHIS and a nationally representative Internet panel survey of HCP to assess influenza vaccination coverage. Interim results from the Internet panel surveys were published in the *Morbidity and Mortality Weekly Report (MMWR)*.⁶⁸ Two national sample surveys of HCP supplemented NHIS data in the 2010–2011 influenza season.

CDC's National Healthcare Safety Network (NHSN), a Web-based surveillance system, will be used to assess influenza vaccination coverage of HCP at the hospital level. In August 2011, the Centers for Medicare & Medicaid Services (CMS) published a final rule requiring acute care hospitals to report HCP influenza vaccination rates through CDC's NHSN system using the measure endorsed by the National Quality Forum (NQF), as part of the Hospital Inpatient Quality Reporting (IQR) program, starting in January 2013.⁶⁹ Acute care hospitals are subject to a 2% payment reduction if they fail to report quality measures required by this program. Quality data reported through the Hospital IQR program are made publicly available on the <http://medicare.gov/hospitalcompare/> Web site.

The measure endorsed by NQF⁷⁰ (NQF #0431) describes three categories of HCP who have worked or will be working 30 days or more during the influenza season:

- Employees (personnel who receive a direct paycheck from the health care facility);
- Licensed independent practitioners (physicians [M.D., D.O., M.B.B.S.], advanced practice nurses, and physician assistants who work at the health care facility but are not directly employed by the facility);

⁶⁷ Available at http://www.cdc.gov/nchs/data/hestat/vaccine_coverage/vaccine_coverage.htm

⁶⁸ Centers for Disease Control and Prevention. Interim results: Influenza A (H1N1) 2009 and Monovalent Seasonal Influenza Vaccination Coverage Among Health-Care Personnel—United States August 2009- January 2010. *Morbidity and Mortality Weekly Report (MMWR)* 2010; 59:357-362. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5912a1.htm>

⁶⁹ *Federal Register*, 76 Fed. Reg. 51629, 51633 (August 18, 2011). Available at <http://www.gpo.gov/fdsys/pkg/FR-2011-08-18/pdf/2011-19719.pdf>

⁷⁰ <http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=511#k=0431>

- Adult students/trainees and volunteers (medical, nursing, or other health professional students; interns; medical residents; or volunteers aged 18 or older who work at the health care facility but are not directly employed by the facility).

CMS IQR will use the NQF-endorsed measure for its required influenza vaccination coverage reporting.

Influenza vaccination data submitted to CDC and CMS will ultimately capture regional trends on the yearly uptake of the vaccine, prophylaxis, and treatment for HCP and may be able to identify elements within yearly influenza campaigns that succeed or require improvement. Data may be further stratified by occupational groups or facility type and size.

V. NEXT STEPS: COLLABORATIONS FOR SHARED SOLUTIONS

A. Develop, Synthesize, or Enhance Evidence and Tools for Improving Influenza Vaccination of HCP

HHS is strategically positioned to catalyze multi-agency integration efforts and foster close collaboration with other public entities and private sector organizations that have a stake in increasing influenza vaccination of HCP. This work depends on department-wide collaborations, which the HAI Increasing Influenza Vaccination Coverage Among HCP Working Group will support. Its members include representatives from CDC, CMS, FDA, NIH, the Agency for Healthcare Research and Quality, the Indian Health Service, the U.S. Department of Veterans Affairs (VA), the Occupational Safety and Health Administration (OSHA), and the Office of the Assistant Secretary of Health in the Office of the HHS Secretary. The working group will use these collaborations to increase vaccination among HCP, sharing already established campaigns, working to develop new campaigns in much needed areas (e.g. long-term care facilities) and further disseminating said campaigns. For example, the VA has shared its Veteran's Health Flu Health Manual, which is released annually, and this can be reviewed to see how it could be used in non-VA health care settings.

The working group will also coordinate efforts with the Healthy People 2020 program to measure progress toward the interim HCP influenza vaccination target of 75% for 2015 and the 2020 target of 90%. HHS will continue to request that agencies monitor and report HCP influenza vaccine coverage. This will help inform efforts to align data collection systems that track immunization rates across agencies and encourage collaboration across those agencies. Identifying a strategic communications strategy will continue to be a priority for this group. Initial surveys of ongoing efforts across HHS agencies allowed the working group to identify initial focus areas, described below.

Many successful strategies are available for implementing influenza vaccination programs for HCP, as previously described. Toolkits can provide convenient compilations of these rationales and strategies and include posters and other materials for implementing HCP influenza vaccination programs. Some toolkits include:

- Seasonal Influenza Vaccination Resources for Health Professionals⁷¹
- American Medical Directors Association, “Immunizations in the Long Term Care Setting”⁷²
- Association for Professionals in Infection Control and Epidemiology (APIC), “Healthcare Personnel Immunization Toolkit”⁷³
- The National Foundation for Infectious Diseases Best Practices Report, “Immunizing Healthcare Personnel Against Influenza”⁷⁴
- The Joint Commission’s monograph “Providing a Safer Environment for Health Care Personnel and Patients through Influenza Vaccination: Strategies from Research and Practice”⁷⁵
- St. Louis County Department of Health, “No Flu For You” campaign⁷⁶
- Veterans Affairs Influenza Manual⁷⁷
- Many others described by the National Influenza Vaccine Summit⁷⁸

HHS has worked with stakeholders to establish best practices and make recommendations to increase HCP vaccination coverage.

- In February 2012, the National Vaccine Advisory Committee (NVAC) made a series of recommendations on improving HCP vaccination coverage to achieve the Healthy People 2020 goal. The NVAC’s recommendations urge U.S. hospitals to establish comprehensive infection control programs that include education on how to prevent transmission of influenza and integrate immunization programs into existing influenza prevention and occupational health programs. The recommendations also encourage federal efforts to standardize methods to measure HCP influenza vaccination coverage.
- In September 2011, HHS held a meeting at which long-term care stakeholders reviewed barriers and solutions for vaccination in long-term care settings. The stakeholders recommended development of a toolkit for use by long-term care administrators seeking to implement influenza vaccination programs for the HCP working in their institutions. Using input from CDC, CMS, and long-term care organizations, HHS is now developing a toolkit that will describe barriers to HCP vaccination and provide solutions for achieving high vaccination coverage among diverse and scattered employees and for reimbursement for those vaccinations.
- CMS established a final rule for reporting of HCP vaccination coverage from acute care hospitals, based on a measure developed by CDC and CMS and endorsed by NQF in May

⁷¹ <http://www.cdc.gov/flu/professionals/vaccination/index.htm>

⁷² <http://www.amda.com/tools/clinical/immunization.cfm#Tools>

⁷³ http://www.apic.org/Resource_/TinyMceFileManager/Practice_Guidance/HCW_Immunization_Toolkit_122012.pdf

⁷⁴ <http://www.nfid.org/HCWtoolkit/report.html>

⁷⁵ http://www.jointcommission.org/assets/1/18/Flu_Monograph.pdf

⁷⁶ <http://www.nofluforyou.com/>

⁷⁷ <http://www.publichealth.va.gov/docs/flu/vaflumanual-2011.pdf>

⁷⁸ http://www.preventinfluenza.org/profs_workers.asp

2012. Starting in January 2013, acute care hospitals will be required to provide a summary report of influenza vaccination coverage for HCP using a NHSN module. Three categories of HCP are included in the reporting: employees on payroll; licensed independent practitioners; and students, trainees, and volunteers aged 18 or older.

- A working group within HHS will address the potential to align data collection systems that track immunization rates across and within agencies.

B. Enroll Stakeholders in the Initiative

It is important to enroll a wide range of stakeholders, including health care-affiliated organizations; unions and collective bargaining units; and federal, state, and local health departments, to garner support for increasing HCP influenza vaccination and to provide a mechanism to share ideas and opinions and promote adoption of best practices.

Professional organizations without an explicit policy concerning influenza vaccination of HCP should be encouraged to develop a written policy supporting influenza vaccination of HCP. Many organizations, such as the American Nurses Association⁷⁹ and the American Medical Association,⁸⁰ currently recommend voluntary HCP vaccination. Several professional organizations, such as the American College of Physicians,⁸¹ the Infectious Diseases Society of America,⁸² and APIC,⁸³ have put forth policy statements recommending mandatory influenza vaccination of HCP. The working group will need to seek out and consider the concerns of stakeholders who may be affected by mandatory vaccination policies.⁸⁴

C. Enhance or Develop Quality Standards for Influenza Vaccination of HCP

Two CDC advisory committees, ACIP and HICPAC, recommend that all HCP be vaccinated against influenza annually. In 2006, The Joint Commission required that hospitals and LTCFs seeking accreditation establish a program to educate HCP about influenza vaccination and provide vaccination to HCP. HHS will continue to monitor HCP influenza vaccination across federal agencies to help inform efforts to develop standards for HCP influenza vaccination. Although OSHA has a Bloodborne Pathogens Standard (§1910.1030) that includes hepatitis B vaccination for HCP as part of a worker safety regulation, it does not have a comprehensive standard that addresses occupational exposure to contact-, droplet-, and airborne-transmissible diseases. OSHA does not currently include any vaccination besides hepatitis B in its worker

⁷⁹ American Nurses Association: Report to the Board of Directors on Seasonal Influenza Vaccination for Registered Nurses: <http://www.preventinfluenza.org/ANAonHCW.pdf>

⁸⁰ American Medical Association: Policy H-440.973, Immunization of Adults: <https://ssl3.ama-assn.org/apps/ecommm/PolicyFinderForm.pl?site=www.ama-assn.org&uri=/ama1/pub/upload/mm/PolicyFinder/policyfiles/HnE/H-440.973.HTM>

⁸¹ American College of Physicians: American College of Physicians Recommends Flu Vaccination for Health Care Workers: <http://www.acponline.org/pressroom/hcw.htm>

⁸² Infectious Diseases Society of America: Pandemic and Seasonal Influenza: <http://www.idsociety.org/influenza/>

⁸³ Greene LR, Cain TA, Dolan SA et al. APIC position paper: influenza immunization of healthcare personnel. Association of Professionals in Infection Control (APIC). November 2008.

http://www.apic.org/Resource_/TinyMceFileManager/Advocacy-PDFs/APIC_Influenza_Immunization_of_HCP_12711.pdf

⁸⁴ American College of Occupational and Environmental Medicine (ACOEM). Position Statement: Seasonal Influenza Prevention in Health Care Workers. 2006: <http://www.acoem.org/guidelines.aspx?id=5362>

safety regulation. The office recently released a request for information that includes a section on “Vaccination and Post Exposure Prophylaxis,” which OSHA will use to explore the potential inclusion of other vaccines recommended for HCP, such as influenza; measles, mumps, and rubella; varicella; tetanus, diphtheria, and pertussis; and meningococcal, as part of its worker safety regulations.⁸⁵

Additional steps are being taken to increase the reach of quality standards for influenza vaccination of HCP:

- The Joint Commission expanded its influenza vaccination performance standard IC.02.04.01 to:
 - Extend the standards for HCP influenza vaccination to outpatient and other health care settings.
 - Establish a performance measure for the percentage of HCP vaccinated against influenza.
 - Establish a specific target for the percentage of HCP to be vaccinated against influenza.
- CDC partnered with CMS’s Division of Hospital & Medication Measurement, Quality Measures and Health Assessment Group, and Office of Clinical Standards and Quality to develop and pilot test the NQF time-limited influenza vaccination measure in 234 facilities, including acute care hospitals, ambulatory surgical centers, LTCFs, outpatient physician practices, and renal dialysis centers. The pilot test was completed in 2011.

CMS:

- Is responsible for IQR
- Published a rule in August 2011 requiring hospital reporting of HCP influenza vaccination coverage following NQF standards, starting in January 2013, for posting on the Hospital Compare Web site

CDC:

- Established a steering committee with representatives from CMS, The Joint Commission, and the Hospital Quality Alliance to provide guidance during the pilot of the NQF measure
- Developed methods to collect aggregate hospital-specific and statewide coverage levels in acute care facilities using NHSN
- Identified how the data reported by acute care hospitals will be transmitted to CDC and CMS
- Revised the proposed NQF measure after pilot testing and presented the revised measure to NQF
- Developed an analysis plan for the data to support permanent endorsement by NQF

⁸⁵ Department of Labor, Occupational Safety and Health Administration. Infectious diseases: request for information. Federal Register 75(87): 24835-24844. May 6, 2010. Available at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=FEDERAL_REGISTER&p_id=21497

The working group suggests an interim target of 75% influenza vaccination coverage for HCP by 2015⁸⁶ to mark progress toward the Healthy People target of 90% by 2020.⁸⁷

VI. WORKING GROUP PROJECTS

A. Inaugural Project

The working group undertook an inaugural project in 2009 that addressed Goal/Task A — to develop, synthesize, or enhance evidence and tools for improving influenza vaccination of HCP. The purpose of the project was to examine the effect that various policy changes may have on influenza vaccination coverage for HCP. The intended outcome of the project is to have a comprehensive report that identifies existing policies in each state, allowing for comparisons among states. Collaborations with state and local policymakers, facility leadership, workforce representatives, professional associations, patient advocates, and others was an integral component of this project and will address Goal/Task B — to enroll stakeholders in the initiative.

The project developed a common definition of “health care personnel,” described the strategies that facilities have implemented to encourage voluntary vaccination, and outlined the current coverage rates among HCP. Working with the National Vaccine Advisory Committee, the working group reviewed materials related to evidence-based practice of seasonal influenza vaccination of HCP as it relates to transmission of illness to patients (Goal/Task A) and summarized the literature that addresses the relationship between influenza vaccination of HCP and influenza disease rates among patients.⁸⁸

The project also reviewed the legal environment surrounding requirements for influenza vaccination of HCP, such as requirements for employers to offer vaccination to HCP, to obtain declination forms from HCP who decline vaccination, or to mandate vaccination. Federal and state laws, individual facilities’ policies, and judicial decisions were reviewed. The findings of the environmental scan are outlined below:

- Twenty states have enacted laws that address mandatory influenza vaccination of certain categories of the health workforce.
- All the laws define the category of HCP governed by the law; however, only 14 states have adopted a broad definition of HCP.
- All the laws define the categories of health care employers that must comply with the law, although few states have included both acute care hospitals and residential care facilities (11 states include long-term care only, 5 include acute care only, and 4 include both).

⁸⁶ Influenza Vaccination of Healthcare Personnel Working Group Meeting Notes, meeting of June 4, 2010.

⁸⁷ This recommendation assumes adequate vaccination supply to cover HCP. However, we note that although vaccine supply has historically impacted the rates of vaccination in the general population, HCP are considered priority candidates for vaccination. See ACIP recommendations: http://www.cdc.gov/flu/professionals/acip/flu_vax1011.htm#box1

⁸⁸ National Vaccine Advisory Committee. Strategies to Achieve the Healthy People 2020 Annual Influenza Vaccine Coverage Goal for Health-Care Personnel: Recommendations from the National Vaccine Advisory Committee. Public Health Reports 2012; 128:7-25.

- More than half (16) of the laws require employers to “provide,” “arrange for,” “ensure,” or “offer” influenza vaccinations to HCP.
- Most (15) of the laws require health care employers to allow HCP to decline vaccination by signing a declination statement, showing the existence of a medical contraindication, or declaring that the vaccination conflicts with a religious belief.
- Few states (5) address how health care employers must manage the cost of vaccine purchase and administration.
- One state discusses how to treat HCP who do not comply with the vaccination requirement.
- Half of the laws require health care employers to use the CDC/ACIP standards as the standard of care when administering influenza vaccine.

Federal and state partners will be asked to review all materials, develop consensus, and make recommendations. Once this process is complete, the inaugural project will disseminate authoritative, evidence-based recommendations and promotional materials for influenza vaccination of HCP.

B. Year Two Project

The working group’s second-year project will focus on increasing the influenza vaccination coverage of HCP in LTCFs. This project will address Goal/Task A through the development of LTCF-specific tools and messages. The project comprises two parts. First, the working group collected feedback from the LTCFs community through a meeting held in Washington, DC, in September 2011. This meeting brought together national stakeholders in LTCFs and staff from local LTCFs, adult day care centers, and home health agencies. The participants discussed barriers to influenza vaccination of HCP in LTCFs, current strategies to address these barriers, and what support HHS could provide to those working in LTCFs to increase influenza vaccination rates. Second, the working group will use the input gathered at this meeting to construct a toolkit and messaging; these materials will be distributed to LTCF providers in future influenza seasons.

VII. RESEARCH GAPS

Key gaps remain in research related to vaccination of HCP. In particular, additional epidemiologic studies are needed to improve understanding of the link between influenza vaccine coverage among HCP and influenza rates in facilities. Additional implementation science is also needed to better define the reasons HCP receive or decline the vaccine so that more targeted approaches can be developed. In particular, the potential role of vaccination mandates for health care workers in achieving high coverage should be explored, and as CMS reporting requirements are implemented, the effect of these requirements on vaccine uptake should be assessed.

VIII. CHALLENGES AND OPPORTUNITIES

Continuing to increase influenza vaccination coverage among HCP will be a challenge requiring the working group to identify and work with all influential partners and stakeholders. The Healthy People 2020 national target of 90% coverage is ambitious and will be achieved only with significant commitment and effort from numerous stakeholders.

Additionally, rates of vaccination vary across groups and settings. For example, estimated vaccination coverage among physicians and nurses was above 60% in 2009–2010, whereas coverage among all other types of HCP was less than 50%. Coverage among HCP working in hospitals in 2007–2008 was over 60%, whereas coverage for HCP in LTCFs was well below 50%, though data from a CDC Internet panel survey for 2010–2011 have shown that this gap has closed.^{89,90} Controversy remains between employers and employees regarding strategies to increase vaccination rates, particularly employer mandates. Based on a careful and comprehensive review of the existing evidence and with stakeholder input, the working group will generate recommendations about the usefulness for individual health care facilities to tailor strategies to their setting, workforce, and region.

Finally, the definition of HCP is still not standardized, allowing variations regarding for whom influenza vaccine would be recommended or mandated in different settings and different institutions. Several organizations, including the National Foundation for Infectious Diseases, The Joint Commission, the Society for Healthcare Epidemiology of America, and HICPAC, have recommended measurement of vaccination rates as an important component of health care facility influenza vaccination programs.^{91,92,93} A standardized, comprehensive measurement system for tracking that coverage would represent a major opportunity for improving HCP vaccine coverage.

However, implementing such a measurement system presents several challenges. A recent study conducted by Lindley et al.⁹⁴ found substantial variation in measurement practices among hospitals surveyed. The investigators found that more than one-third of responding hospitals excluded certain HCP groups, such as contract staff, attending physicians, volunteers, students,

⁸⁹ Strikas R, Euler G, Singleton J. Disparities in influenza vaccination rates among healthcare personnel, United States, 2007-08. March 22, 2010. Fifth Decennial International Conference on Healthcare-associated Infections, Atlanta, Georgia.

⁹⁰ CDC. Influenza Vaccination Coverage Among Health-Care Personnel – United States, 2010-2011 Influenza Season. *MMWR*. 2011; 60(32):1073-1077.

⁹¹ Pearson ML, Bridges CB, Harper SA: Influenza vaccination of health-care personnel: Recommendations of the Healthcare Infection Control Practices Advisory Committee (HICPAC) and the Advisory Committee on Immunization Practices (ACIP). *Morbidity and Mortality Weekly Report (MMWR)* 2006; 55:1-16. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5502a1.htm>

⁹² Fiore AE, Uyeki T, Broder K, Finelli L, Euler G, et al. Prevention & Control of Influenza with Vaccines - Recommendations of the Advisory Committee on Immunization Practices (ACIP) 2010. *Morbidity and Mortality Weekly Report (MMWR)* 2010; 59(RR08):1-62.

⁹³ Improving influenza vaccination rates in health care workers: strategies to increase protection for workers and patients. National Foundation for Infectious Diseases 2004. Available at <http://www.nfid.org/pdf/publications/hcwmonograph.pdf>

⁹⁴ Lindley MC, Yonek J, Ahmed F, Perz JF, Torres GW. Measurement of Influenza Vaccination Coverage among Healthcare Personnel in US Hospitals. *Infection Control and Hospital Epidemiology* 2010; 30: 150-157.

and residents, in their influenza vaccination coverage measurements, although all of these groups are included in the ACIP/HICPAC definition of HCP. A standard definition of which groups should be included when assessing influenza vaccination coverage in health care facilities is needed to enable comparisons among different types of health care facilities. The final NQF-endorsed measure and CMS rule should bring some standardization to measurement for acute care hospitals to which the rule currently applies; this standard may be adopted in other settings as well. With the new NQF measure and CMS reporting rule for HCP influenza vaccination coverage in acute care hospitals, new ground is being broken in working toward the Healthy People 2020 coverage goals.