

Recollection

Overview and Lessons Learned for Increasing Influenza Vaccination Coverage Among Healthcare Workers in the United States

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BACKGROUND

Vaccinating healthcare workers (HCWs) annually against influenza is a key strategy for protecting HCWs, preventing nosocomial outbreaks and mortality (particularly among high-risk patient populations), and reducing work absenteeism during the influenza season (1–4). Vaccinated HCWs have also been shown to be more likely to recommend influenza vaccination to their patients (5–7).

US CDC's official position has been recommending annual influenza vaccination to HCWs with direct patient contact since 1984 and for all HCWs since 1993 (8–10). In 2006, the CDC's recommendation for influenza vaccination defined HCW to include physicians, nurses, nursing assistants, therapists, technicians, emergency medical service 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, maintenance, and volunteers) not directly involved in patient care but potentially exposed to infectious agents (1). Since then, influenza vaccination coverage among HCWs in the United States increased from 10.0% in the 1987–1989 influenza season to 81.1% in the 2018–2019 influenza season, largely as a result of state and local government, professional society, and healthcare institutional policy and programmatic efforts to increase vaccination in this population (11–19). Although influenza vaccination coverage among HCWs has improved substantially, differing implementation strategies have been needed to increase influenza vaccination in this population. This paper aims to describe the evolution of influenza vaccination policies for HCWs in the United States and to discuss lessons learned for increasing influenza coverage.

EVOLUTION OF INFLUENZA VACCINATION POLICY AND PROGRAM FOR HEALTHCARE WORKERS IN THE UNITED STATES

1980s–2005

Beginning in 1984, CDC's Advisory Committee on Immunization Practices (ACIP) recommended annual influenza vaccination for HCWs (1,8). As a result, healthcare institutions launched a variety of voluntary influenza vaccination programs including vaccination fairs, provider education, free workplace vaccination, and employee reminder-recall systems aimed at increasing influenza vaccination among HCWs (11–14).

Based on data from the National Health Interview Survey (NHIS), influenza vaccination among HCWs increased from 10.0% in 1989 to 38.4% in 2002 (19). However, during 1997–2002, vaccination coverage among HCWs plateaued around 40% (19). This indicated that while these voluntary programs were able to generate modest gains, they were insufficient for increasing HCW influenza vaccination beyond a suboptimal level despite the allocation of substantial resources to support those programs (20).

To address this continued gap in coverage, Healthy People 2010 (a 10-year initiative released by the United States Department of Health and Human Services to guide national health promotion and disease prevention efforts) included a target influenza vaccination coverage goal for HCWs of 60% (21). Given the plateau in vaccination coverage using voluntary influenza vaccination program strategies, organizations began considering new approaches to increase coverage and exceed the Healthy People 2010 target (22).

2005–2020

In 2005, the Society for Healthcare Epidemiology of America (SHEA), a professional society dedicated to the prevention of healthcare-associated infections, published a position paper stating that “all HCWs should receive influenza vaccine annually unless they have a contraindication to the vaccine or actively decline vaccination” citing evidence of reducing healthcare-associated influenza transmission and having a positive effect on HCW and patient safety (10). To support this, SHEA endorsed a multifaceted program to increase influenza vaccination among HCWs including targeted education, provision of no cost vaccination at convenient locations and times, the use of an annual active declination procedure for those refusing vaccination either for personal preference or medical contraindication, and performance of surveillance of vaccine uptake by medical unit and monitoring of healthcare-associated influenza to assess the impact of the program (10).

In 2006, US CDC’s Hospital Infection Control Practices Advisory Committee (HICPAC) and ACIP issued a joint recommendation for immunization of HCWs (including those in acute care hospitals, nursing homes, skilled nursing facilities, physician’s offices, urgent care centers, and outpatient clinics; and to those providing home health care and emergency medical services), reemphasizing that all HCWs should be vaccinated annually against influenza (1). In 2007, the Joint Commission on Accreditation of Healthcare Organizations (Joint Commission) issued an accreditation standard for hospitals and long-term care facilities to establish an influenza vaccination program to educate and provide influenza vaccination to HCWs (23). The Joint Commission further extended this to include all accredited healthcare organizations in 2012 (24).

Although HICPAC/ACIP and the Joint Commission did not include mandates among their recommendations, some professional organizations have encouraged mandatory influenza vaccination of HCWs, and some healthcare systems and state and local governments have implemented mandatory vaccination policies. In 2010, SHEA revised its position paper to recommend that annual influenza vaccination be made a condition of employment for HCWs citing continued evidence of the benefits of vaccination but suboptimal performance of voluntary programs at increasing coverage among HCWs (25), even during the 2009 H1N1 pandemic (26). In addition to SHEA, some of the largest US medical

professional societies including the American Academy of Pediatrics, the American College of Physicians, the American Academy of Family Physicians, American Hospital Association, and the American Public Health Association similarly recommended mandatory influenza vaccination for HCWs (27). Although not without controversy, several major healthcare systems also implemented requirements for HCW influenza vaccinations as a condition of employment, which resulted in coverage rates of >90% (16–17,28). In 2004, Virginia Mason Medical Center in Seattle was the first healthcare system in the United States to mandate influenza vaccination for all hospital personnel resulting in coverage levels of 97.5% following the first year of the program, which were sustained at more than 98% in the subsequent 4 years (17). In 2009, New York became the first state to require influenza vaccination for all general hospitals, home health, home care, and hospice HCWs (25).

Prior to discussions of mandatory influenza vaccination policies, efforts to improve reporting of HCW influenza vaccination coverage also occurred following recommendations from HICPAC to monitor vaccination coverage by healthcare facility area (29). In fact, public reporting of HCW vaccination rates were found to result in significant facility level increases in influenza vaccination coverage by as much as 20% over three seasons (30). The 2007 Joint Commission accreditation standard required that healthcare facilities measure HCW influenza vaccination coverage among staff and independent practitioners (23), and in 2008, CDC proposed a standardized measure [National Quality Forum (NQF) #0431] for assessing HCW influenza vaccination coverage in healthcare facilities (31). Beginning in 2013, the Centers for Medicare and Medicaid Services (CMS) began requiring acute care hospitals to report HCW influenza vaccination rates through CDC’s National Healthcare Safety Network (NHSN) using the NQF measure (32). In 2015, CMS began publicly reporting these data (33). In addition to national-level reporting, some state health departments also made public voluntarily reported HCW influenza vaccination coverage for healthcare facilities on their websites and, in some cases, provided public recognition for facilities that achieved HCW vaccination coverage levels above 90% (34–35).

The Healthy People 2020 HCW influenza vaccination coverage goal was 90% (36). HCW influenza vaccination coverage remained at less than 50% until the 2009–2010 season when an estimated 61.9% received seasonal influenza vaccination by mid-January 2010 during the pandemic (26). HCW

vaccination coverage steadily increased, and in the 2018–2019 season, 81.1% of surveyed HCWs reported receiving an influenza vaccination, which was similar to the reported coverage in the previous 4 seasons (18). In the 2018–2019 season, vaccination coverage was highest (97.7%) among HCWs working in settings where vaccination was required. Among those working in settings without a vaccination requirement, coverage was 83.2% when vaccination was available at the worksite at no cost for >1 day. Vaccination coverage was lowest (42.1%) among those working in settings where vaccination was not required, promoted, or offered on-site (18).

CHALLENGES FOR MANDATORY INFLUENZA VACCINATION AND REPORTING OF INFLUENZA VACCINATION COVERAGE

The implementation of mandatory influenza vaccination policies for HCWs has not been universally accepted. Supporters of mandatory influenza vaccination cite evidence for reductions in healthcare-associated transmission and HCWs' absenteeism, the favorable safety profile of the vaccination, professional duties to protect vulnerable patients, vaccination mandates for other infectious diseases, lack of efficacy of voluntary programs, and strengthening health systems familiarity with vaccination management to enhance pandemic preparedness (10,25,37–38). Critics of mandatory vaccination for influenza argue that such policies deprive HCWs of their decision-making autonomy, force an intervention with only moderate effectiveness, and do not provide sufficient prevention benefits to justify termination of employment (39–40). In some cases, HCWs have initiated legal challenges to employer-imposed influenza vaccination mandates (41). Other challenges for mandatory influenza vaccination programs include costs and staff-time associated with implementing the program including providing vaccination services, tracking and reporting data, and following up with healthcare workers and, if applicable, collecting declination information and evaluating exemption policies (42). In response to concerns of mandatory influenza programs, some proposed an alternative strategy that restricted mandatory vaccination to HCWs working in high risk areas such as intensive care units, oncology departments, and geriatric departments while offering HCWs unwilling to be vaccinated the option of

transferring to alternative non-high risk departments in lieu of employment termination (20,43).

Ensuring accurate and standardized measurement and reporting of influenza vaccination coverage is essential for evaluating the implementation of HCW influenza vaccination programs and increasing vaccination. A study reporting on data from the year prior to the 2007 Joint Commission requirements found that nearly one-third of surveyed hospitals did not measure staff vaccination coverage, and that even among hospitals that did measure vaccination coverage, there was variability in the methods used for measurement (44). For example, hospitals reporting vaccination coverage had differing approaches in whether certain types of HCWs such as contract staff or trainees would be included in the population denominator for vaccination coverage (44). Similarly, the study identified differing practices in counting employees who were vaccinated off site or who declined vaccination (44). Standardized measurements of HCW influenza vaccination coverage are essential for enabling comparisons between different types of healthcare facilities and for evaluating the validity of reported data. In the case of measuring influenza vaccination among HCWs, the NQF #0431 measure provided a standard reporting mechanism to enable calculation of comparable vaccination coverage among diverse healthcare facilities (32). Data collected through standardized reporting measures could then be used to facilitate the development of programs aimed at increasing HCW vaccination coverage in settings or groups reporting suboptimal coverage. For example, during the 2018–2019 season, coverage was highest among HCWs in hospital settings (95.2%) and lowest in long-term care settings (67.9%) (18). Based on these findings, healthcare systems could identify tools such as CDC's long-term care web-based toolkit to increase influenza vaccination among HCWs using a tailored approach (18).

CONCLUSION

Annual vaccination of healthcare workers (HCWs) against influenza is a key prevention strategy and an integral part of healthcare systems' comprehensive infection control program. In the United States, influenza vaccination coverage among HCWs has increased from 10% in 1984 to 81% by 2018–2019. National level policy recommendations coupled with state government, regulatory organization, professional society, and healthcare institution policies and

multicomponent interventions including provider education, occupational programs offering free, onsite vaccination, and institutional vaccination requirements have been critical to increasing influenza vaccination coverage in HCWs. Although not without controversy, healthcare facilities with mandatory HCW influenza vaccination programs have reached the highest influenza vaccination coverage; however, healthcare facilities without mandates have also achieved high levels of vaccination coverage with free, onsite vaccination. In addition, public reporting of HCW influenza vaccination coverage has the potential to improve HCW vaccination uptake but requires a standardized and validated reporting methodology. Finally, increasing influenza vaccination coverage among HCWs requires developing appropriate and achievable goals and targeted interventions that are appropriate and acceptable for the healthcare facility.

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REFERENCES

- Centers for Disease Control and Prevention (CDC). Influenza vaccination of health-care personnel. <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5502a1.htm>. [2020-9-20].
- Saxén H, Virtanen M. Randomized, placebo-controlled double blind study on the efficacy of influenza immunization on absenteeism of health care workers. *Pediatr Infect Dis J* 1999;18(9):779 – 83. <http://dx.doi.org/10.1097/00006454-199909000-00007>.
- Wilde JA, McMillan JA, Serwint J, Butta J, O'Riordan MA, Steinhoff MC. Effectiveness of influenza vaccine in health care professionals: a randomized trial. *JAMA* 1999;281(10):908 – 13. <http://dx.doi.org/10.1001/jama.281.10.908>.
- Carman WF, Elder AG, Wallace LA, McAulay K, Walker A, Murray GD, et al. Effects of influenza vaccination of health-care workers on mortality of elderly people in long-term care: a randomised controlled trial. *Lancet* 2000;355(9198):93 – 7. [http://dx.doi.org/10.1016/S0140-6736\(99\)05190-9](http://dx.doi.org/10.1016/S0140-6736(99)05190-9).
- Ding HL, Black CL, Ball S, Donahue S, Fink RV, Williams WW, et al. Influenza vaccination coverage among pregnant women — United States, 2014–15 influenza season. *MMWR Morb Mortal Wkly Rep* 2015;64(36):1000 – 5. <http://dx.doi.org/10.15585/mmwr.mm6436a2>.
- Hemingway CO, Poehling KA. Change in recommendation affects influenza vaccinations among children 6 to 59 months of age. *Pediatrics* 2004;114(4):948 – 52. <http://dx.doi.org/10.1542/peds.2003-0509-F>.
- Santibanez TA, Mootrey GT, Euler GL, Janssen AP. Behavior and beliefs about influenza vaccine among adults aged 50–64 years. *Am J Health Behav* 2010;34(1):77 – 89. <http://dx.doi.org/10.5993/ajhb.34.1.10>.
- Centers for Disease Control (CDC). Prevention and control of influenza. *MMWR Morb Mortal Wkly Rep* 1984; 33(19):253–60, 265–6. <https://pubmed.ncbi.nlm.nih.gov/6425625/>.
- Centers for Disease Control and Prevention. Prevention and control of influenza: Part I, vaccines recommendations of the Advisory Committee on Immunization Practices (ACIP). <https://www.cdc.gov/mmwr/preview/mmwrhtml/00042288.htm>. [2020-10-13].
- Talbot TR, Bradley SE, Cosgrove SE, Ruef C, Siegel JD, Weber DJ. Influenza vaccination of healthcare workers and vaccine allocation for healthcare workers during vaccine shortages. *Infect Control Hosp Epidemiol* 2005;26(11):882 – 90. <http://dx.doi.org/10.1086/502512>.
- Girasek DC. Increasing hospital staff compliance with influenza immunization recommendations. *Am J Public Health* 1990;80(10):1272 – 3. <http://dx.doi.org/10.2105/ajph.80.10.1272>.
- Fedson DS. Influenza vaccination of medical residents at the University of Virginia: 1986 to 1994. *Infect Control Hosp Epidemiol* 1996;17(7):431 – 3. <http://dx.doi.org/10.1086/647336>.
- Centers for Disease Control and Prevention (CDC). Interventions to increase influenza vaccination of health-care workers—California and Minnesota. *MMWR Morb Mortal Wkly Rep* 2005;54(8):196 – 9.
- McCullers JA, Speck KM, Williams BF, Liang H, Mirro J. Increased influenza vaccination of healthcare workers at a pediatric cancer hospital: results of a comprehensive influenza vaccination campaign. *Infect Control Hosp Epidemiol* 2006;27(1):77 – 9. <http://dx.doi.org/10.1086/500003>.
- Bertin M, Scarpelli M, Proctor AW, Sharp J, Robitson E, Donnelly T, et al. Novel use of the intranet to document health care personnel participation in a mandatory influenza vaccination reporting program. *Am J Infect Control* 2007;35(1):33 – 7. <http://dx.doi.org/10.1016/j.ajic.2006.10.005>.
- Babcock HM, Gemeinhart N, Jones M, Dunagan WC, Woeltje KF. Mandatory influenza vaccination of health care workers: translating policy to practice. *Clin Infect Dis* 2010;50(4):459 – 64. <http://dx.doi.org/10.1086/650752>.
- Rakita RM, Hagar BA, Crome P, Lammert JK. Mandatory influenza vaccination of healthcare workers: a 5-year study. *Infect Control Hosp Epidemiol* 2010;31(9):881 – 8. <http://dx.doi.org/10.1086/656210>.
- Centers for Disease Control and Prevention. Influenza vaccination coverage among health care personnel — United States, 2018–19 influenza season. https://www.cdc.gov/flu/fluview/hcp-coverage_1819estimates.htm. [2020-9-16].
- Walker FJ, Singleton JA, Lu PJ, Wooten KG, Strikas RA. Influenza vaccination of healthcare workers in the United States, 1989–2002. *Infect Control Hosp Epidemiol* 2006;27(2):257 – 65. <http://dx.doi.org/10.1086/501538>.
- Johnson JG, Talbot TR. New approaches for influenza vaccination of healthcare workers. *Curr Opin Infect Dis* 2011;24(4):363 – 9. <http://dx.doi.org/10.1097/QCO.0b013e328347b0e7>.
- US Department of Health and Human Services. Healthy people 2010. <https://www.healthypeople.gov/2010/Document/html/tracking/od14.htm>. [2020-9-8].
- Poland GA, Tosh P, Jacobson RM. Requiring influenza vaccination for health care workers: seven truths we must accept. *Vaccine* 2005;23(17–18):2251 – 5. <http://dx.doi.org/10.1016/j.vaccine.2005.01.043>.
- Joint Commission on Accreditation of Healthcare Organizations. New infection control requirement for offering influenza vaccination to staff and licensed independent practitioners. *Jt Comm Perspect* 2006;26(6):10–1. https://www.michigan.gov/documents/mdch/Joint20Commission_std_flu20vaxx_210912_7.pdf.
- Joint Commission on Accreditation of Healthcare Organizations. Influenza vaccination for licensed independent practitioners and staff. https://www.jointcommission.org/-/media/tjc/documents/standards/r3-reports/r3_report_issue_3_5_18_12_final.pdf. [2020-9-20].
- Talbot TR, Babcock H, Caplan AL, Cotton D, Maragakis LL, Poland GA, et al. Revised SHEA position paper: influenza vaccination of healthcare personnel. *Infect Control Hosp Epidemiol* 2010;31(10):987 – 95. <http://dx.doi.org/10.1086/656558>.
- Centers for Disease Control and Prevention (CDC). Interim results:

- influenza A (H1N1) 2009 monovalent and seasonal influenza vaccination coverage among health-care personnel—United States, August 2009–January 2010. *MMWR Morb Mortal Wkly Rep* 2010;59(12):357–62.
27. Immunization Action Coalition. Influenza Vaccination Honor Roll: mandatory influenza vaccination for healthcare personnel. <https://www.immunize.org/honor-roll/influenza-mandates>. [2020-9-8].
 28. Septimus EJ, Perlin JB, Cormier SB, Moody JA, Hickok JD. A multifaceted mandatory patient safety program and seasonal influenza vaccination of health care workers in community hospitals. *JAMA* 2011;305(10):999–1000. <http://dx.doi.org/10.1001/jama.2011.244>.
 29. McKibben L, Horan T, Tokars JI, Fowler G, Cardo DM, Pearson ML, et al. Guidance on public reporting of healthcare-associated infections: recommendations of the Healthcare Infection Control Practices Advisory Committee. *Am J Infect Control* 2005;33(4):217–26. <http://dx.doi.org/10.1016/j.ajic.2005.04.001>.
 30. Helms C, Polgreen P, Polgreen L, Evans T, Roberts LL, Clabaugh G, et al. Voluntary reporting of employee influenza vaccination rates by acute care hospitals in Iowa: the impact of a four year provider-based statewide performance improvement project. *Vaccine* 2011;29(18):3483–8. <http://dx.doi.org/10.1016/j.vaccine.2011.02.056>.
 31. 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 Rep* 2013;128(1):7–25. <http://dx.doi.org/10.1177/003335491312800103>.
 32. Lindley MC, Bridges CB, Strikas RA, Kalayil EJ, Woods LO, Pollock D, et al. Influenza vaccination performance measurement among acute care hospital-based health care personnel—United States, 2013–14 influenza season. *MMWR Morb Mortal Wkly Rep* 2014;63(37):812–5.
 33. CMS now publicly reporting hospital flu vaccination rates. <https://www.reliasmedia.com/articles/134655-cms-now-publicly-reporting-hospital-flu-vaccination-rates>. [2020-9-20].
 34. Quality Quest for Health of Illinois, hospital employee flu vaccination reporting. http://www.qualityquest.org/quality-reports/flu_shot_measure/index.php
 35. Centers for Disease Control and Prevention (CDC). Boosting flu vaccine coverage among healthcare workers. <https://www.cdc.gov/publichealthgateway/field-notes/2019/boosting-flu-vaccine.html>. [2020-9-20].
 36. U.S. Department of Health and Human Services. IID-12.13 Increase the percentage of health care personnel who are vaccinated annually against seasonal influenza. <https://www.healthypeople.gov/2020/data-search/Search-the-Data#objid=6361>. [2020-8-28].
 37. Ottenberg AL, Wu JT, Poland GA, Jacobson RM, Koenig BA, Tilburt JC. Vaccinating health care workers against influenza: the ethical and legal rationale for a mandate. *Am J Public Health* 2011;101(2):212–6. <http://dx.doi.org/10.2105/AJPH.2009.190751>.
 38. Porter RM, Goldin S, Lafond KE, Hedman L, Ungkuldee M, Kurzum J, et al. Does having a seasonal influenza program facilitate pandemic preparedness? An analysis of vaccine deployment during the 2009 pandemic. *Vaccine* 2020;38(5):1152–9. <http://dx.doi.org/10.1016/j.vaccine.2019.11.025>.
 39. Isaacs D, Leask J. Should influenza immunisation be mandatory for healthcare workers? *BMJ* 2008;337:a2140. <http://dx.doi.org/10.1136/bmj.a2140>.
 40. Thomas RE, Jefferson T, Lasserson TJ. Influenza vaccination for healthcare workers who care for people aged 60 or older living in long-term care institutions. *Cochrane Database Syst Rev* 2016(6):CD005187. <http://dx.doi.org/10.1002/14651858.CD005187.pub5>.
 41. Stewart AM, Rosenbaum S. Vaccinating the health-care workforce: state law vs. institutional requirements. *Public Health Rep* 2010;125(4):615–8. <http://dx.doi.org/10.1177/003335491012500418>.
 42. Ajenjo MC, Woeltje KF, Babcock HM, Gemeinhart N, Jones M, Fraser VJ. Influenza vaccination among healthcare workers: ten-year experience of a large healthcare organization. *Infect Control Hosp Epidemiol* 2010;31(3):233–40. <http://dx.doi.org/10.1086/650449>.
 43. McLennan S, Wicker S. Reflections on the influenza vaccination of healthcare workers. *Vaccine* 2010;28(1):8061–4. <http://dx.doi.org/10.1016/j.vaccine.2010.10.019>.
 44. Lindley MC, Yonek J, Ahmed F, Perz JF, Torres GW. Measurement of influenza vaccination coverage among healthcare personnel in US hospitals. *Infect Control Hosp Epidemiol* 2009;30(12):1150–7. <http://dx.doi.org/10.1086/648086>.