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Learning Objectives

After studying the literature presented in this Pediatric Respiratory Care series, participants will be able to:

- Describe the disease transmission of influenza and its impact on high-risk patients
- Outline the barriers to receiving the influenza vaccine among healthcare workers

Target Audience

This educational activity is designed for pediatricians, primary care physicians, pediatric and family nurse practitioners, neonatologists, infectious disease specialists, allergists, pulmonologists, immunologists, and other healthcare professionals involved in the care and management of pediatric respiratory patients.

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Vaccinating Healthcare Workers Against Influenza: A Good Use of Resources?

Widespread programs throughout North America and Europe promote the routine vaccination of high-risk populations against influenza. The benefits of vaccination are well-documented and research has proven that vaccinating children may reduce the risk of influenza-associated complications in others. Despite these efforts, influenza remains a substantial health risk causing significant morbidity and mortality for those at high risk.

The World Health Organization recommends influenza vaccinations for healthcare workers (HCWs). Current prevention methods promoting vaccinations have proven ineffective and guidelines are rarely enforced, resulting in low compliance rates. Studies have shown that the majority of vaccinated HCWs choose to get vaccinated as a means of protecting themselves, as opposed to protecting their patients.

The European Scientific Working Group on Influenza commissioned efforts to research the effectiveness, safety, and cost-effectiveness of vaccinating HCWs. Electronic databases, Internet sites, trial registries, and citation lists were reviewed, and disease experts were contacted. The goal was to provide an educational foundation for programs that encourage vaccination.

Two independent reviewers identified 18 out of 493 studies relating to the vaccination of HCWs which met the inclusion criteria. These

studies included HCWs from hospitals, nursing homes, or other communities in contact with people identified as high risk.

Primary outcomes were in high-risk contacts and included all-cause mortality, culture or serologically confirmed influenza, morbidity and mortality associated with influenza/pneumonia, and cost or cost-effectiveness of the intervention. Secondary outcomes were in vaccinated populations and included vaccine effectiveness and adverse events, participants' perceptions, methods for promoting and distributing the vaccine, and absenteeism as a result of disease.

Does vaccinating HCWs protect those at risk? Main evidence was acquired from two cluster-randomized, controlled trials by Carman et al¹ and Potter et al² that took place at geriatric hospitals in Scotland during the 1990s. Both trials revealed very favorable outcomes for those healthcare institutions promoting the vaccination of their staff. For example, Potter et al demonstrated a significant

reduction in mortality (17% to 10%; $P=0.013$; odds ratio [OR], 0.56; 95% confidence interval [CI], 0.4, 0.8. The calculation of the CI did not appear to account for the cluster design, thus caution is raised when interpreting these statistics).

The information gathered by Carman et al became a key source of economic data. This study categorized, randomized, and evaluated 20 hospitals. Documentation included reports on

Vaccinating HCWs against influenza provides direct protection of HCWs and indirect protection of their patients at high risk.

Continued

Disclosures:

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Vaccinating Healthcare Workers *(Continued)*

vaccine effectiveness, costs for promotional programs targeting staff, time allocations, and records for absenteeism. The results supported the need for a vaccination program, demonstrating that 51% of HCWs from the program arm chose to be vaccinated as compared with the 5% vaccination rate in the control arm. Before the results were adjusted for Barthel score, age, and gender, the mortality was 13.6% in the program arm and 22.4% in the control arm (OR, 0.58; 95% CI, 0.40-0.84; $P=0.014$), after adjustment for confounders a trend for significance was observed (OR, 0.61; 95% CI, 0.36-1.04).

Ten of the 18 studies analyzed reasons why HCWs refused vaccination. Data varied extensively among these studies and a systematic review revealed survey response rates fluctuated from 34% to 100% between studies. The majority of subjects reported a fear of side effects (8%–51%) or that the vaccine itself would cause influenza (21%–45%). A percentage of HCWs indicated an overall dislike of injections (5%–27%), or that they had forgotten or did not have the time to comply (5%–60%). Others explained that they were unaware of the vaccine's availability (3%–53%), or felt confident that they were at a low risk of infection (5%–29%).

Seven studies measured the effectiveness of campaigns designed to promote staff vaccinations in a healthcare setting. The quality of these studies was generally limited by study design or outcome measurement. At baseline, vaccination rates varied from 5% to 17% and after campaigns were implemented, rates increased from 5% to 45% (depending on the study). A mobile clinic in Australia fostered the greatest increase in staff vaccinations after program initiation when their 8% baseline rate rose to 81% in staff with patient care (the overall vaccination rate of 49%). A similar mobile vaccination unit in the United States resulted in a 61% increase in vaccination rates.

None of the reviewed studies demonstrated the financial benefits for patients in the care of

vaccinated staff. Ten of the 14 studies reporting the financial effects of immunizing HCWs did reveal a cost savings and depicted these results from a societal or institutional perspective. By combining all of the data, regardless of the differences in study design, guidelines, and campaign costs, reviewers were able to establish a cost savings of £28,000 (~\$55,000 US) for 1,437 vaccinations during 2003-2004. Savings were primarily based on the cost of replacing staff arising from absenteeism as a result of illness; these findings translated to a cost savings of about £12 (~\$24 US) for each person vaccinated.

Demicheli et al³ found that routine vaccinations reduced absenteeism by approximately 0.4 working days per healthy adult (95% CI, 0.1–0.8). Saxén⁴ et al revealed a significant mean reduction in absenteeism due to respiratory infection (1.0 days/person vaccinated as compared with 1.4 days/person not vaccinated; $P=0.02$). Further analysis was conducted, and in the event that HCWs are confirmed absent and not replaced, which often happens in a clinical setting, a cost of £51 (~\$100 US) per life-year was gained.

Overall, the data support that vaccinating HCWs against influenza provides direct protection of HCWs and indirect protection of their patients at high risk. Institution of such a policy is cost-effective and possibly cost-saving. Investigators strongly support the implementation of motivational campaigns designed to increase influenza vaccination rates in clinical institutions.

1. Carman WF, Elder AG, Wallace LA, et al. *Lancet*. 2000;355:93-97. 2. Potter J, Stott DJ, Roberts MA, et al. *J Infect Dis*. 1997;175:1-6. 3. Demicheli V, Jefferson T, Rivetti D, Deeks J. *Vaccine*. 2000;18:957-1030. 4. Saxén H, Virtanen M. *Pediatr Infect Dis J*. 1999;18:779-783.

Burls A, Jordan R, Barton P, et al. Vaccinating healthcare workers against influenza to protect the vulnerable—is it a good use of healthcare resources? A systematic review of the evidence and an economic evaluation. *Vaccine*. 2006;24:4212-4221.

COMMENTARY

ROBERT B. BELSHE, MD, Diane and J. Joseph Adorjan Endowed Professor of Infectious Diseases and Immunology, Professor of Medicine, Pediatrics and Molecular Microbiology, Saint Louis University School of Medicine, St. Louis, Missouri.

We as HCWs serve as vectors for influenza to our patients and HCW vaccination is one of the most well-studied areas in infection control. Burls et al reviewed 493 clinical trials and winnowed out this large literature to the 18 best articles. The data are quite clear—HCWs are responsible for the spreading of influenza among patients. What can we do to reduce iatrogenic influenza?

Uptake of vaccine is poor among HCWs. Do we as physicians, nurses, and other practitioners realize that we are putting our patients at risk when we do not get vaccinated? Among some of the excuses given by HCWs are fear of adverse events, urban myth, fear of vaccination causing influenza, pain or fear of injections, and difficulty in obtaining vaccine. It is time to get serious about stimulating vaccine uptake among HCWs. When I confront an unvaccinated HCW and boldly point out that he or she is putting my patients at risk of death and request that a vaccinated HCW assist my patients, it gets attention. Active declination (requiring a signature for HCWs to avoid annual immunization) should be required. I also advocate making choices more widely available for the influenza vaccine (ie, intranasal and intramuscular).



Should Nurses Be Required to Get the Influenza Vaccine?

Influenza is highly contagious and can spread rapidly in a healthcare facility. The influenza vaccine can prevent infection in 90% of cases involving healthy adults <65 years of age when the vaccine strain is well matched to the circulating strain, according to the Centers for Disease Control and Prevention (CDC). Disease transmission would be significantly reduced if the majority of healthcare workers (HCWs) who care for high-risk patients chose to receive the influenza vaccine. Currently, about 40% of HCWs choose to be vaccinated. As a result, healthcare providers are designing programs and adopting policy changes to help correct the situation.

Implementing more stringent guidelines for routine vaccination of HCWs invites some debate. In September 2004, the Virginia Mason Medical Center located in Seattle, Washington, made it mandatory for nursing staff to obtain influenza vaccinations and presented the ruling as "fitness for duty." The nurses strongly objected because they stated it "takes away individuals' right to decide about their own healthcare and violates labor law because it was dictated without bargaining with the nurse association." In August 2005, an arbitrator ruled in favor of the nurses and the decision was backed by the United States District Court in Seattle.

Evidence versus autonomy. This raises ethical questions: What is the obligation of the HCW to the patient? To what degree is the HCW compelled to meet that obligation? Should erroneous interpretation of data be respected in making healthcare decisions?

The nurses felt compelled to either receive vaccinations with the potential to jeopardize their own health or face termination. Stripped of their freedom of choice and struggling with their desire to protect their patients, the nurses contacted the Washington State Nurses Association (WSNA), their bargaining unit, and asked it to oppose the policy.

In reply, the WSNA confirmed its support of annual influenza vaccination as well as educational campaigns featuring materials designed to both clarify the value of immunizations and motivate healthcare workers to comply. However, a dispute evolved from the hospital's failure to consult the nursing association or discuss the new program with its staff before implementation.

The hospital declared that its mandatory policy was justified based on clinical research demonstrating the considerable benefits for patients when the majority of individuals in any healthcare facility are vaccinated. The hospital intended that vaccinations would provide considerable public good with minimal risk to those immunized.

"The nurse's primary commitment is to the patient," according to the ANA Code of Ethics, which also states, "the same duties that we owe to others we owe to ourselves." These advocate both self-care as well as an obligation to incur some risks on the behalf of patients. Interpreting the risks involved with the influenza vaccine can be very subjective, and dependent on individual life circumstances, preferences, fears, religious factors, and education.

One question still remains: In the preceding case, does the nurse's obligation to his/her patient far outweigh the personal risks incurred? At this point, programs designed to assist with the natural decision-making process or encourage a desired behavior may be a more successful plan of action. A dictatorial policy should only be considered after all other measures have failed and a significant public risk has been established without reasonable doubt.

Olsen DP. Ethical issues: should RNs be forced to get the flu vaccine? *Am J Nurs.* 2006;106:76-79.

PRCI MISSION STATEMENT

The PRCI is a multicomponent educational program on pediatric respiratory disorders designed for pediatricians, primary care physicians, pediatric and family nurse practitioners, neonatologists, infectious disease specialists, allergists, pulmonologists, immunologists, and other healthcare professionals involved in the care and management of pediatric respiratory patients. PRCI programs address issues concerning asthma, respiratory syncytial virus, and other respiratory tract infections and disorders. Methods to prevent, control, and treat respiratory illnesses in children are also evaluated.

Clinical Insights® in Pediatric Respiratory Care Post-Test

1. As summarized in Burls et al, common reasons cited for why healthcare workers refused vaccination included which of the following:
 - a. Fear of side effects
 - b. Fear that the vaccine itself would cause influenza
 - c. Dislike of injections
 - d. Belief that they were at a low risk of infection
 - e. All of the above
2. What is the current percentage rate of healthcare workers who choose to be vaccinated?
 - a. 20%
 - b. 40%
 - c. 60%
 - d. 80%

1. e. All of the above. The majority of subjects reported a fear of side effects (8% to 51%) or a fear that the vaccine itself would cause influenza (21% to 45%). A percentage indicated an overall dislike of injections (5% to 27%), or that they had forgotten or did not have the time to comply (5% to 60%). Others explained that they were unaware of the vaccine's availability (3% to 53%), or felt confident that they were at a low risk of infection (5% to 29%).

2. b. Currently, 40% of healthcare workers choose to be vaccinated.

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