Published in final edited form as:

Infect Control Hosp Epidemiol. 2008 May ; 29(5): 465–467. doi:10.1086/587970.

Effect of Accessibility of Influenza Vaccination on the Rate of Childcare Staff Vaccination

Ingi Lee, MD, Sarah Thompson, MD, Ebbing Lautenbach, MD, MPH, MSCE, Leanne B. Gasink, MD, MSCE, Barbara Watson, MBChB, FRCP, FAAP, Neil O. Fishman, MD, Zhen Chen, PhD, and Darren R. Linkin, MD, MSCE

Division of Infectious Diseases (I.L., E.L., L.B.G., N.O.F., D.R.L.) and the Division of General Internal Medicine (S.T.), the Hospital of the University of Pennsylvania, and the Center for Clinical Epidemiology and Biostatistics (E.L., L.B.G., D.R.L.) and the Center for Education and Research on Therapeutics (I.L., E.L., L.B.G., D.R.L.) and the Department of Biostatistics and Epidemiology (E.L., Z.C., D.R.L.), University of Pennsylvania, and the Philadelphia Department of Public Health (B.W.), Philadelphia, Pennsylvania

Abstract

We assessed the impact of free on-site influenza vaccination on childcare staff vaccination prevalence using 2 before-and-after studies. Vaccination was offered during the 2003–2004 and 2006–2007 influenza seasons. Staff vaccination prevalence was higher in each intervention season compared to the prior, nonintervention season. No baseline characteristics were associated with receipt of vaccination.

The Centers for Disease Control and Prevention has long recommended influenza vaccination of individuals at high risk of infection and their close contacts. Noting severe influenza-related complications in children, including hospitalizations, emergency room visits, clinic visits, and deaths, the Centers for Disease Control and Prevention expanded the recommendations in 2002 to include children aged 6–23 months and their caregivers¹ and again in 2006 to include children aged 6–59 months and their caregivers.²

Despite these recommendations, healthcare worker (HCW) vaccination rates are low (less than 40%).² The rate of adherence to recommendations among caregivers of young children is unknown. We conducted a study to describe the influenza vaccination rates among childcare staff and to evaluate the impact of free on-site vaccination on staff vaccination rates. We also described staff attitudes toward vaccination and determined baseline characteristics associated with receipt of vaccination.

METHODS

We conducted 2 before-and-after studies at 1 childcare center to examine the effect of offering free on-site vaccination on staff vaccination prevalence. Study subjects included all staff members of a single childcare center that enrolls approximately 150 children aged 6 weeks to 5 years.

© 2008 by The Society for Healthcare Epidemiology of America. All rights reserved

Address reprint requests to Ingi Lee, MD, Division of Infectious Diseases, Hospital of the University of Pennsylvania, 3400 Spruce St., 3rd Fl., Silverstein Building, Suite E, Philadelphia, PA 19104 (ingi.lee@uphs.upenn.edu).

Presented in part: 17th Annual Scientific Meeting of the Society for Healthcare Epidemiology of America; Baltimore, Maryland; April 14–17, 2007.

Potential conflicts of interest. All authors report no conflicts of interest relevant to this article.

The 4 influenza seasons in our study were 2002–2003, 2003–2004, 2005–2006, and 2006–2007. The intervention involved 1 physician offering free inactivated trivalent influenza vaccination for 1.5 hours during single, scheduled days at the childcare center, once in January 2004 and once in December 2006. The intervention occurred during the second and fourth observation periods (ie, 2003–2004 and 2006–2007), while the first and third observation periods (ie, 2002–2003 and 2005–2006) were nonintervention control periods. No observations were performed for the 2004–2005 season because of a shortage of influenza vaccine. The primary outcome was whether the staff member received influenza vaccination at the childcare center or at another location (eg, a personal physician's office); this was assessed through written, anonymous questionnaires given to staff members in January 2004 and March 2007. The January 2004 questionnaire also assessed the following baseline characteristics: whether staff members provided direct child care, knowledge of vaccination recommendations, whether their personal physician recommended vaccination, and whether they would have been vaccinated without the intervention or if they had to pay for the vaccination. A cross-sectional study design was used to determine associations between baseline characteristics and influenza vaccination during the 2003–2004 influenza season.

Staff vaccination prevalence was calculated for each study season. The Wilcoxon signed rank test (matched by questionnaire respondent) was used to compare vaccination prevalence in each intervention season to the previous nonintervention season in 2 separate analyses (ie, 2006–2007 was compared with 2005–2006, and 2003–2004 was compared with 2002–2003). Staff baseline characteristics during the 2003–2004 intervention season were reported. The Fisher exact test was used to determine whether baseline characteristics were associated with vaccination.

RESULTS

Questionnaires were completed by 39 (93%) of 42 staff members in 2004 and 42 (86%) of 49 staff members in 2007. According to the childcare center administration, 32 staff members working at the time the 2004 questionnaire was administered were still working at the center at the time the 2007 questionnaire was administered.

Vaccination rates were higher in each intervention season, compared with the preceding nonintervention season (Figure). Fifty-one percent of subjects were vaccinated during the 2003–2004 intervention season, compared with 28% in the 2002–2003 nonintervention season ($P = .049$). Forty-five percent of subjects were vaccinated during the 2006–2007 intervention season, compared with 26% in the 2005–2006 nonintervention season ($P = .022$). Of those vaccinated during the intervention seasons, 15 (75%) of 20 and 14 (74%) of 19 staff members were vaccinated at the childcare center (as opposed to another site such as a physician's office) during the 2003–2004 and 2006–2007 intervention seasons, respectively.

A majority of staff (77% during the 2003–2004 season; 95% during the 2006–2007 season) had direct childcare responsibilities. Half reported that their personal physicians had recommended vaccination, and half knew the vaccination recommendations for child caregivers. No baseline characteristics were associated with vaccination during the 2003–2004 season. Of staff who were vaccinated, two-thirds indicated that they would not have been vaccinated without the intervention, and a third stated they would not have been vaccinated if they needed to pay for it.

DISCUSSION

At baseline, a quarter of childcare staff at the study childcare center were vaccinated against influenza. Offering free on-site vaccination nearly doubled vaccination prevalence in these 2 before-and-after studies. No measured baseline characteristics were associated with vaccination. A majority of staff reported that they would not have been vaccinated without the intervention. A third of staff reported that they would not have been vaccinated if they had to pay for vaccination.

The low baseline vaccination rate among childcare staff in our study is consistent with findings of prior studies of vaccination among HCWs.² To our knowledge, only 1 other study has examined influenza vaccination among childcare staff, and it found a similarly low vaccination rate (30%).³

Offering free on-site influenza vaccination significantly increased staff vaccination prevalence. Strengths of our study include high response rates and our ability to replicate the effect with reintroduction of the intervention, which is considered among the most rigorous of quasi-experimental study designs.⁴ There is 1 childcare vaccination study that described a self-reported increase in the willingness of staff to accept vaccination after education. However, they did not evaluate whether education actually increased the vaccination rate.³ Studies in medical settings have demonstrated increased HCW vaccination rates with free on-site vaccination.^{5–7} To our knowledge, our study is the first to extend these findings to the childcare setting. Additionally, our study demonstrated a return to low vaccination rates during the nonintervention year 2005–2006. This suggests that the intervention may need to be implemented annually to sustain the positive effect.

No baseline characteristics of staff members were associated with vaccination. Our finding that knowledge of guidelines did not increase vaccination rates differs from the findings of a study done in an acute care hospital.⁸ Differences between childcare and acute care settings, or the fact that the childcare staff vaccination recommendations are newer, may be responsible for this difference. Interestingly, twice as many staff stated that they would not have been vaccinated without the intervention than if they had to pay for the vaccination. Vaccination convenience may have an importance separate from cost.

Our study has several potential limitations. There may have been bias if staff were more likely to recall vaccination in the intervention season (when the questionnaires were administered) than in the nonintervention season, or if they were more likely to claim they were vaccinated in the intervention season even if they were not. However, receiving a single injected vaccination is likely a memorable event, and the anonymity of our study should have limited the number of false socially desirable responses. The statistical significance of our results may be overestimated if the observations are not independent and staff members influenced each other's decision to accept vaccination. Similarly, the results of our 2 studies examining the same intervention in the same site are likely linked. The study was limited to 1 childcare center; other centers with different characteristics may not respond similarly to our intervention. Finally, our study may have lacked sufficient power to show an effect of baseline characteristics on vaccination.

To our knowledge, this study is the first to test an intervention to increase the rate of vaccination among childcare staff and to report the efficacy of offering free on-site influenza vaccination in the childcare setting. Our findings support the recent Infectious Diseases Society of America recommendations to strengthen adult immunization coverage in the United States.⁹ Further studies are needed to evaluate the impact of an increased rate of childcare staff vaccination on the rate of influenza and its complications among children in childcare and among staff members.

Acknowledgments

We thank Edmund Weisberg, MS, for his editorial assistance in preparing the manuscript; the administrators and staff of The Caring Center, a community childcare center in Philadelphia, Pennsylvania, for facilitating the conduct of the study; and the Philadelphia Department of Public Health and the University of Pennsylvania for providing influenza vaccine.

Financial support. This work was supported by the Institutional National Research Service Award (T32 AI055435) (to I.L.), the Mentored Patient Oriented Research Career Development Award of the National Institutes of Health from the National Institute of Allergy and Infectious Diseases (K23-AI-060887) (to D.R.L.), and an Agency for Healthcare Research and Quality (AHRQ) Centers for Education and Research on Therapeutics cooperative agreement (grant HS10399) (to E.L., N.O.F., D.R.L.).

REFERENCES

- Centers for Disease Control and Prevention. Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep.* 2002; 51(RR-3):1–31.
- Centers for Disease Control and Prevention. Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep.* 2006; 55(RR-10):1–42.
- Hayney M, Bartell J. An immunization education program for childcare providers. *J School Health.* 2005; 75:147–149. [PubMed: 15987009]
- Harris A, Bradham D, Baumgarten M, Zuckerman I, Fink J, Perencevich E. The use and interpretation of quasi-experimental studies in infectious diseases. *Clin Infect Dis.* 2004; 38:1586–1591. [PubMed: 15156447]
- Kimura A, Nguyen C, Higa J, Hurwitz E, Vugla D. The effectiveness of Vaccine Day and educational interventions on influenza vaccine coverage among health care workers at long-term care facilities. *Am J Pub Health.* 2007; 97:684–690. [PubMed: 17329659]
- Harbarth S, Siegrist C, Schira J, Wunderli W, Pittet D. Influenza immunization: improving compliance of healthcare workers. *Infect Control Hosp Epidemiol.* 1998; 19:337–342. [PubMed: 9613695]
- Tannenbaum T, Thomas D, Baumgarten M, Saintonge F, Rohan I. Evaluation of an influenza vaccination program for nursing home staff. *Can J Public Health.* 1993; 84:60–62. [PubMed: 8500061]
- Nichol K, Hauge M. Influenza vaccination of healthcare workers. *Infect Control Hosp Epidemiol.* 1997; 18:189–194. [PubMed: 9090547]
- IDSA. Actions to strengthen adult and adolescent immunization coverage in the United States: policy principles of the Infectious Diseases Society of America. *Clin Infect Dis.* 2007; 44:e104–108. [PubMed: 17516388]

FIGURE.

Comparison of childcare staff influenza vaccination rates in intervention and nonintervention seasons. **P* value calculation assumes independent observations.