



Influenza vaccination rates in children decline when the live attenuated influenza vaccine is not recommended



Benjamin Fogel*, Steven Hicks

Penn State College of Medicine, Department of Pediatrics, United States

ARTICLE INFO

Article history:

Received 11 April 2017

Received in revised form 17 July 2017

Accepted 19 July 2017

Available online 29 July 2017

Keywords:

Influenza
Vaccination
Vaccine coverage
Child
Children
Immunization
Live Attenuated

ABSTRACT

Background: In 2016 the Centers for Disease Control and Prevention (CDC) recommended against using the live attenuated influenza vaccine (LAIV) for the 2016–2017 influenza season. This recommendation is potentially important for vaccination rates because perceived effectiveness and ease of administration are among the primary determinants of families decisions to vaccinate their children. This investigation sought to determine whether rates of pediatric influenza vaccination changed in a season when the LAIV was not recommended.

Methods: This study used cohort and cross sectional data from an academic primary care pediatric center in central Pennsylvania that serves approximately 12,500 patients. Early season (prior to November 1) and end-of-season (prior to March 1) vaccination rates in the 2015–16 and 2016–17 influenza seasons were recorded for individuals 2–17 years old. Repeat vaccination rates (percentage of children receiving influenza vaccination in one season who were also vaccinated in the next season) were recorded for the 2015–16 into 2016–17 seasons. A logistic regression model adjusting for race, ethnicity, age, insurance type and type of vaccination received was employed to identify predictors of repeat vaccination.

Results: In the absence of LAIV (2016–17) early vaccination rates were significantly higher (24.7% vs 22.8%, $p = 0.004$), but end-of-season rates were lower (50.4% vs 52.0%, $p = 0.03$) than when LAIV was offered (2015–16). After adjusting for covariates, those who had received IIV in the 2015–16 season had higher odds (OR 1.32, 95% CI, 1.15–1.52) of getting a repeat vaccination in the 2016–17 season, compared with those who had received LAIV in the 2015–16 season.

Conclusions: End-of-season vaccination rates were lower in 2016–17 when LAIV was not recommended, particularly among children who received LAIV in the preceding year. Unavailability of LAIV in the 2016–17 season may have impacted influenza vaccination convenience and perceived effectiveness, two factors which could influence vaccine uptake in pediatric populations.

© 2017 Elsevier Ltd. All rights reserved.

1. Introduction

The live-attenuated influenza vaccine (LAIV) was first approved by the Food and Drug Administration (FDA) in the nasal spray form in 2003 and was quickly adopted by pediatricians and patients due to its ease of administration and effectiveness [1–3]. Several studies prior to 2009 demonstrated superior efficacy of LAIV over the inactivated influenza vaccine (IIV) in children age 6–71 months [4–6]. This led the Advisory Committee on Immunization Practices (ACIP) to recommend preferential use of LAIV for children aged 2–8 years in 2014 [7]. In 2016 a prospective cohort study of 2703 children age 2–17 years vaccinated between 2010 and 2014 sug-

gested that rates of IIV or LAIV effectiveness were similar for Influenza A/H3N2 or B, but that LAIV was inferior for preventing H1N1pdm09 [8].

In June of 2016 the Centers for Disease Control and Prevention (CDC) voted not to recommend the LAIV for the 2016–17 influenza season [9]. This decision was based upon data that showed poor effectiveness against the H1N1 strain during the 2013–14 and 2015–16 influenza seasons. The LAIV also demonstrated decreased efficacy against the 2009 pandemic H1N1 strain that continues to cause disease burden throughout the world. While experts strive to identify explanations for the LAIV's ineffectiveness, general pediatricians on the front lines of patient care attempt to persuade families to protect themselves with the IIV.

This is not an easy task. A review of barriers to influenza vaccination between 2005 and 2016 identified lack of confidence and inconvenience as two of the most important barriers to vaccine

* Corresponding author at: Penn State College of Medicine, 500 University Drive, Mail Code HS83, Hershey, PA 17033-0850, United States.

E-mail address: bfogel@pennstatehealth.psu.edu (B. Fogel).

uptake [10]. In this regard, the highly publicized ineffectiveness of the LAIV might have served as justification for influenza vaccine refusal during the 2016–17 influenza season. In addition, parents of children who viewed painless administration of the nasal influenza vaccine as a welcomed convenience might have opted out of an IIV-only approach. Early season data from the CDC suggested that influenza vaccine rates among children age 6 months through 17 years were in fact 2–4% lower in 2016–17 than in the previous three seasons [11].

This study examined influenza vaccination rates among children age 2–17 years at a tertiary care-affiliated primary care practice from the 2014–15 through the 2016–17 season. We investigated whether new recommendations against LAIV use in children may have altered influenza vaccination rates in our practice. We hypothesized that rates of influenza vaccination would be significantly lower for the 2016–17 influenza season, particularly in children who had received the LAIV the previous influenza season.

2. Methods

2.1. Study population

This study included patients seen between September 1, 2014 and February 28, 2017 at a single, academic primary care center in Hershey, PA. The practice serves approximately 12,500 patients from south central Pennsylvania. Influenza vaccination seasons were defined as September 1 through February 28 because over the past three years 99% or more of influenza vaccinations given in our practice were given in that time period. Inclusion criteria for each influenza season was (1) age ≥ 2 and < 18 years on September 1st of that season (beginning of the influenza vaccination season); and (2) patients with a clinical visit of any type in the 12 months prior to the season start, or at any point during that season. The 2 year age cutoff was set so that all patients would be eligible for LAIV during the season. The 18 year cutoff was selected to exclude college age patients with increased rates of on-campus influenza vaccine administration. Data were collected through interrogation of the electronic medical record (EMR) and patient level information, including demographic characteristics, date of receipt and type of influenza vaccination was collected for all patients. This study was approved by the Independent Review Board at the Penn State College of Medicine.

2.2. Vaccination rates

The total clinic population was defined as all children who met inclusion criteria, whether or not they had received an influenza vaccination. All documented vaccinations for patients who met inclusion criteria were included. Vaccinations documented in our EMR but received outside of our clinic location were also included, although the vast majority of documented vaccinations (>99%) were administered at our clinic location. Early vaccination rate was defined as number of patients vaccinated prior to November 1st divided by total clinic population, an approach consistent with the CDC's reporting of early vaccination as "late October/early November." End-of-season vaccination rate was defined as percent vaccinated prior to March 1st.

re-vaccination rates were defined as the percentage of children vaccinated in one season who were also vaccinated in the subsequent season. Patients were classified by vaccine type (LAIV or IIV) based on the type of vaccine that they received in the 1st season.

For each season with complete information on the number of unvaccinated patients (2015–16 and 2016–17) we selected a random sample of 100 patients without a clinic record of vaccination

and queried the Pennsylvania Statewide Immunization Information System (PA-SIIS). If patients had record of vaccination in PA-SIIS but not in our EMR, this was recorded and a chi-squared test was used to compare these rates between seasons.

2.3. Data analysis

The effect of LAIV absence in the 2016–17 season on influenza vaccination rates was assessed by comparing early and total vaccination rates from the 2015–16 season to the 2016–17 season with chi-squared tests. The behavior of individual patients was examined by assessing re-vaccination rates for two pairs of seasons; the 2014–15 to 2015–16 and 2015–16 to 2016–17 (in which LAIV was not available in the second season). Rates were stratified by vaccination type and classified by early or late vaccination receipt. These rates were compared using chi-squared tests.

Factors associated with re-vaccination rates from the 2015–16 season to the 2016–17 season were evaluated by building a logistic regression model using re-vaccination as the outcome variable and patient race, ethnicity, age, gender, insurance status, and type of vaccination in the 2015–16 season as candidate covariates. Type of vaccination is a co-variate of interest for this study and the demographic characteristics were chosen a priori because they are commonly reported by the CDC and have known differences in influenza vaccination rates [12]. Ethnicity is characterized as Hispanic or not-Hispanic. Race is characterized according to CDC reporting standards of Black, White, Asian and other (CDC reports American Indian/Alaskan Native as well but we did not have a large enough sample of this group to include them independently). Age was characterized categorically according to CDC standard reporting as pre-school aged (2–4 years), school aged (5–12 years) and adolescent (13–17 years). All children < 18 years old in Pennsylvania are eligible for some type of insurance and all patients who present to our clinic without insurance are helped to obtain insurance by our social worker, thus all patients seen in this clinic have insurance. In light of this, insurance was dichotomized as Medicaid vs Private. Variables that were significant at $p < 0.20$ in the unadjusted analysis were considered for the multivariable model. Effect measures are reported as odds ratios (OR) and corresponding 95% confidence interval (CI). All analyses were conducted using Minitab v17 (2010, State College, PA). All tests were 2-sided at a significance level of $p < 0.05$.

3. Results

3.1. Patient characteristics

8255 patients met study criteria in the 2015–16 season and 8654 in 2016–17. We were unable to identify patients who were seen in 2014–15 but were not vaccinated so used this season for calculating re-vaccination rates only. There were 4521 vaccinated children who met study inclusion criteria for the 2014–15 season, 4294 in 2015–16 and 4354 in 2016–17. Reliable information about patient demographics were available for the 2015–16 and 2016–17 seasons only (Table 1).

3.2. Influenza vaccination rates

Early vaccination rates (prior to November 1) for any influenza vaccine (LAIV or IIV) were lower ($p = 0.004$) in the 2015–16 season (22.8%, 1882/8255) than in the 2016–17 season (24.7%, 2134/8654). Total end-of-season influenza vaccination rates were lower ($p = 0.03$) in the 2016–17 season (50.4%, 4294/8255) compared with 2015–16 (52.0%, 4354/8654). 1/100 (1%) of randomly selected patients for whom we had no evidence of vaccination in

Download English Version:

<https://daneshyari.com/en/article/5536887>

Download Persian Version:

<https://daneshyari.com/article/5536887>

[Daneshyari.com](https://daneshyari.com)