Identifying Missed Opportunities for the Pneumococcal Conjugate Vaccine (PCV13)

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Abstract

Background: The recommendation for the pneumococcal conjugate vaccine (PCV13) in adults 65 years and older is recent, and the dosing schedule of PCV13 and the pneumococcal polysaccharide vaccine (PPSV23) can be complex in this population. **Objective:** The authors assessed the rate of PCV13 immunization in patients 65 years of age and older and identified barriers that contributed to missed opportunities for PCV13. **Methods:** This retrospective review evaluated outpatient Veterans age 65 years or older who did not receive PCV13 at a scheduled primary care appointment despite an electronic reminder. Investigators recorded any documented reason for the patient not receiving PCV13. **Results:** The rate of PCV13 immunizations administered during the primary care visit study period was 37% (89 of 239 PCV13 eligible patients). Of the 150 patients identified who did not receive PCV13, 92% were not offered the vaccine, 6.7% declined vaccination, and 0.7% reported an allergy to vaccination. Electronic immunization records revealed that 48 of the 150 patients who did not receive PCV13 at their clinic appointment did receive PCV13 later the same year. Most patients received PCV13 in influenza vaccine season on the same day as receiving the influenza vaccine. **Conclusion:** The main barrier identified was not offering the vaccination during primary care visits. Pneumococcal vaccine administration was delayed until the influenza vaccine season in a significant portion of patients. This unexpected finding represents a target for education: ensuring health care professionals are reminded that PCV13 is not a seasonal vaccine like the influenza vaccine, but should be offered throughout the year.

Keywords

vaccines, immunizations, pneumonia, community-acquired pneumonia

Introduction

Streptococcus pneumoniae, or pneumococcus, can cause many types of illnesses, ranging from ear infections to pneumonia. It is the most common cause of bloodstream infections, pneumonia, and meningitis in older adults.¹ It is spread via direct contact with respiratory secretions. Approximately 900 000 Americans get pneumococcal pneumonia each year and as many as 400 000 are hospitalized from pneumococcal pneumonia.^{2,3} Most pneumococcal deaths in the United States occur in adults. The most effective way to prevent pneumococcal disease is vaccination.¹

There are currently 2 types of pneumococcal vaccines available, the pneumococcal conjugate vaccine (PCV13 or Prevnar 13) and the pneumococcal polysaccharide vaccine (PPSV23 or Pneumovax 23). PCV13 protects against 13 serotypes of pneumococcal bacteria.⁴ These 13 types of bacteria typically cause the most severe illness in both children and adults. PCV13 was initially recommended for use in infants and young children. In August 2014, the Advisory Committee on Immunization Practices (ACIP) expanded

their recommendation for PCV13 to include adults 19 years or older with certain medical conditions that weaken the immune system and in all adults 65 years or older. The use of PCV13 in adults 65 years or older does not replace PPSV23 vaccine. PPSV23 protects against 23 serotypes of pneumococcal bacteria.⁵ The ACIP recommends PPSV23 for all adults 65 years or older, anyone 2 years or older at high risk of pneumococcal infection, and adults ages 19 to 64 years with certain conditions (smokers or those with cardiovascular disease, chronic pulmonary disease, cirrhosis, diabetes mellitus, alcoholism, chronic renal failure, and certain immunocompromising conditions).^{1,6}

The recent recommendation for use of PCV13 in adults 65 years and older has made the dosing schedule of PCV13

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Figure 1. Timing of pneumococcal immunizations in patients 65 years of age and older.

and PPSV23 complex in this population (Figure 1). The 2 vaccines cannot be co-administered, and immune response is better when the conjugate vaccine (PCV13) is administered before the polysaccharide vaccine (PPSV23).^{4,5} The ACIP currently recommends that in treatment of naïve patients, PCV13 be administered first and PPSV23 be given at least 12 months later. In patients 65 years or older who have received PPSV23, PCV13 should be administered at least 12 months after the most recent PPSV23 immunization. From 2014 to mid-2015, the ACIP recommended an interval of 6 months between PCV13 and PPSV23. Additionally, if a patient had an indication for PPSV23 prior to age 65 and received it, once the patient turns 65, the subsequent dose of PPSV23 should be administered 12 months after PCV13 and at least 5 years after the most recent PPSV23.⁶

PCV13 administration rates have not been assessed since the recommendations were expanded to include patients 65 years and older. Underutilization of PPSV23 has been well documented despite being recommended for many years.⁷⁻⁹ Approximately 67 million adults at increased risk of pneumococcal disease are unvaccinated, leaving them vulnerable.¹

The purpose of this research was to assess the rate of PCV13 immunization in outpatients 65 years of age and older and identify barriers that contribute to missed opportunities for PCV13 in this patient population.

Methods

This study was a retrospective review of medical records in a large outpatient Primary Care VA health care system that provides medical services to approximately 55 000 Veterans. This work was approved by the facility's institutional review board. The study included a random sample of 150

outpatient Veterans age 65 years or older who did not receive PCV13 immunization at their primary care appointment despite an electronic reminder. Medical records were reviewed for outpatient appointments in Primary Care during March 2015. Patients were excluded if they were younger than 65 years or if they did not come to the scheduled appointment.

Prior to the study period, an electronic alert was implemented that prompted nurses and providers to offer PCV13 immunization to patients 65 years or older who had not previously received the vaccine. Education was provided to primary care staff prior to implementation of the electronic alert, and PCV13 was on the facility formulary for over 1 year prior to the study period. The data source for patients was a report in the electronic medical record listing patients 65 years or older with an electronic alert for the PCV13 vaccine that had not been addressed at their primary care clinic appointment during March 2015. This report also provided the number of patients who did receive PCV13 at their primary care clinic appointment during March 2015.

Computerized patient records were the source for study data to determine if patients had ever received PCV13 or PPSV23. Data recorded included patients' age, sex, whether PCV13 was ordered at the primary care visit, and whether PCV13 or PPSV23 immunizations were ever previously administered. For patients receiving either PCV13 or PPSV23, records were reviewed to determine whether the vaccine administration was timed appropriately based on patients' age, previous pneumococcal vaccine administration, and whether the vaccine administration was initiated in the appropriate order. A time interval of 6 to 12 months was accepted between PCV13 and PPSV23. For patients not given PCV13 at the primary care visit, any documented reason for not receiving vaccine was recorded. Reasons

included (1) patient declined PCV13, (2) medication not available for administration in clinic, (3) PCV13 not recommended to give due to timing of last PPSV23, (4) PCV13 not offered, (5) contraindication of PCV13, or (6) other reason.

For any patients receiving PCV13 after March 2015, records were reviewed to determine the month in which PCV13 was administered, whether PCV13 was administered on the same day as any other vaccination, and whether PCV13 administration was timed appropriately based on ACIP recommendations.

Results

The average age of Veterans included in the study was 74 years of age, and most patients were male (97%). Patients from all outpatient clinics within the health care system were included.

Rate of Administration

The rate of PCV13 immunizations administered at primary care appointments during March 2015 was 37% (89 out of 239 PCV13 eligible patients). Of the 150 patients who did not receive PCV13 at the primary care appointment, none had received PCV13 previously and 85% of patients had received PPSV23 at least 1 year prior.

Barriers to Administration

The most common barrier to PCV13 administration was that the vaccine was not offered ($n = 138$, 92%). Other barriers included 10 patients declining vaccination (6.7%), 1 patient reporting an allergy to the vaccine (0.7%), and 1 patient having an alternative issue (0.7%). The alternative issue involved a patient requesting PCV13 and zoster vaccine at their primary care visit. The patient was provided incorrect information that the 2 vaccines could not be given together. The patient received the zoster vaccine, but never received PCV13.

Subsequent PCV13 Administration

Electronic immunization records revealed that 48 of the 150 patients who did not receive PCV13 at the target primary care visit received PCV13 at a later date. Of those patients who received PCV13 later (not at target primary care visit), 98% received PCV13 timed appropriately with other vaccines. The one patient who did not receive PCV13 at the appropriate time received both PCV13 and PPSV23 on the same day. A significant portion of patients who received PCV13 at a subsequent visit (Table 1) received their vaccination in September and October. More than half the patients who received PCV13 at a later date received it the same day as the influenza vaccine ($n = 27$, 56%).

Table 1. Seasonal Timing of PCV13 Administration.

Month	Patients Receiving PCV13 Immunization After Target Primary Care Appointment ($n = 150$)
April, May, June, July, August	0
September, October	25 (16.6%)
November, December	14 (9.3%)
January, February	9 (6%)

Discussion

All eligible patients should receive PCV13 immunization without delay to optimize efficacy. The health care system in this study had an electronic reminder in place to prompt PCV13 immunization in patients 65 years or older who had not previously received the vaccine. However, only 37% of eligible patients received the vaccination during this time. These results demonstrate a low rate of PCV13 immunization in outpatient Veterans 65 years and older. Identifying reasons behind such a low immunization rate is necessary to develop effective interventions.

Underutilization of immunizations in adults is a commonly reported problem with published guidance on improving immunization rates in adults.^{10,11} Previous studies have reported on barriers such as other urgent concerns at office visits, lack of a reminder system, or patient attitudes and beliefs.⁹ This research confirms underutilization of PCV13 in patients 65 years of age and older, but more important, our findings also identify an important and perhaps unrecognized gap in pneumococcal immunization in adults.

On review of the 63% of eligible patients who did not receive PCV13, it was found that the main barrier to these patients receiving PCV13 was lack of offering the vaccination during the primary care visit. After further review, it was determined that 48 of these patients (32%) received PCV13 at some point in September 2015 through February 2016. It is important to note that while some patients received PCV13 at a later date, none received the vaccination during March, April, May, June, July, or August. More than half of the patients received their vaccination in October and 56% received PCV13 the same day as the influenza vaccine. Based on the timing of PCV13 given after the study period, there appears to be an inappropriate delay of PCV13 with increased administration during the influenza season and with the influenza vaccination. It is important to note that this finding resulted in numerous patients remaining unvaccinated for months.

Conclusion

The unexpected finding of the timing of PCV13 vaccine administration with influenza vaccine is an important

target for clinician education as well as future research. The timing may reflect a knowledge gap in which pneumococcal vaccine is inappropriately considered seasonal. Additionally, the timing could reflect clinicians' heightened awareness of immunizations during the influenza vaccine season. This is an important education piece for community pharmacies screening for vaccine indications and providing front-line access to the communities they serve. Education and outreach at the local and national levels focusing on influenza vaccine each year could affect administration rates of other vaccines during that season each year.

Potential process improvements for the future should include education regarding administering PCV13 year-round, the appropriate timing of PCV13 administration with regard to PPSV23, and which immunizations may be co-administered. Given the association of PCV13 with influenza vaccinations, it is important to educate providers, pharmacists, and nurses that there is no pneumococcal vaccine season as seen with influenza and that patients should be vaccinated for pneumococcal disease at any time of the year. Education regarding appropriate timing of PCV13 should help prevent this unnecessary lapse in vaccination. By vaccinating patients year-round, numerous pneumococcal disease cases can potentially be prevented.

Declaration of Conflicting Interests

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References

1. Centers for Disease Control and Prevention. About pneumococcal disease. <http://www.cdc.gov/pneumococcal/about/index.html>. Accessed July 17, 2015.
2. Centers for Disease Control and Prevention. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. 12th ed. Washington, DC: Public Health Foundation; 2012.
3. Huang SS, Johnson KM, Ray GT, et al. Healthcare utilization and cost of pneumococcal disease in the United States. *Vaccine*. 2011;29:3398-3412. doi:10.1016/j.vaccine.2011.02.088.
4. Prevnar 13 (pneumococcal 13-valent conjugate vaccine [Diphtheria CRM₁₉₇ protein]) [package insert]. Philadelphia, PA: Wyeth Pharmaceuticals, Inc; 2015.
5. Pneumovax 23 (pneumococcal vaccine polyvalent) [package insert]. Whitehouse Station, NJ: Merck & Co, Inc; 1986.
6. Centers for Disease Control and Prevention. Recommended immunization schedules for adults. <http://www.cdc.gov/vaccines/schedules/hcp/adult.html>. Accessed February 26, 2016.
7. Weycker D, Strutten D, Edelsberg J, Sato R, Jackson LA. Clinical and economic burden of pneumococcal disease in older US adults. *Vaccine*. 2010;28:4955-4960. doi:10.1016/f.vaccine.2010.05.030.
8. Centers for Disease Control and Prevention. Adult vaccination coverage—United States, 2010. *MMWR Morb Mortal Wkly Rep*. 2012;61:66-72.
9. Johnson DR, Nichol KL, Lipczynski K. Barriers to adult immunization. *Am J Med*. 2008;121(7 suppl 2):S28-S35. doi:10.1016/j.amjmed.2008.05.005.
10. Centers for Disease Control and Prevention. Data 2010: the Healthy People 2010 database. <http://wonder.cdc.gov/data2010/obj.htm>. Accessed July 15, 2017.
11. Immunization Work Group of the National and Global Public Health Committee of the Infectious Diseases Society of America. Executive summary—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;44:1529-1531. doi:10.1086/519542.