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INCREASING PNEUMOCOCCAL POLYSACCHARIDE VACCINATION RATES IN
ADULTS AGE 65 YEARS AND OLDER IN A PRIMARY CARE CLINIC

A Scholarly Project Submitted to the Graduate School
in Partial Fulfillment of the Requirements
for the Degree of
Doctor of Nursing Practice

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July 2021

INCREASING PNEUMOCOCCAL POLYSACCHARIDE VACCINATION RATES IN ADULTS AGE 65 YEARS AND OLDER IN A PRIMARY CARE CLINIC

An Abstract of the Scholarly Project by
Ashley Sandbothe

The purpose of this study was to increase PPSV23 vaccination rates in adults over the age of 65 years in a Midwestern primary care clinic.

For this project, staff was educated regarding interventions including patient awareness, provider recommendation, staff and provider education, vaccine access, use of the immunization information systems (IIS) and appropriate use of electronic health record (EHR) reminders that have been shown to increase vaccination rates.

Prior to the intervention, data was retrieved, and it was found that between April 1st-May 31st 2020, there were 162 patients over the age of 65 that presented to the clinic. Of those 112 were already vaccinated or received the PPSV23 vaccination, indicating that the clinic had a 69% vaccination rate at baseline. After the project intervention and during the 8-week study period of April 1st-May 31st 2021 there were 190 patients over the age of 65 seen and 151 of those patients were either already vaccinated or received the PPSV23 vaccination. This increased the rate of vaccination to 79%. Those who continued to refuse the vaccination were given a questionnaire to asking for potential reasons.

Vaccination rates increased in the studied primary care clinic from 69% to 79%. This shows these intervention techniques are successful at increasing vaccination rates in a primary care clinic.

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Chapter I

Introduction

Pneumococcal vaccination is an important preventive health measure that can help reduce the rate of pneumococcal infections. According to the Centers for Disease Control and Prevention (CDC) (2019a), the Healthy People 2020 goal “is to achieve at least 90% coverage for pneumococcal polysaccharide vaccine among persons 65 years of age and older.” However, this same data suggests that only 64% of persons 65 years of age or older had ever received pneumococcal vaccination. Additionally, more than 65% of people who have been hospitalized with pneumococcal disease within the last 3–5 years were not offered the vaccine (CDC, 2019b). Healthy People 2030 goals for immunizations, such as the pneumococcal vaccination are currently still under developmental status, this means that it is a “high-priority public health issue that has evidence-based interventions to address it, but doesn’t yet have reliable baseline data (Office of Disease Prevention and Health Promotion, n.d.).

Opportunities are missed in our health system every day, both inpatient and outpatient. Therefore, more effective programs are needed to ensure there is an increase in vaccination rates. These missed opportunities show the importance of this study.

The CDC recommends all adults receive routine administration of pneumococcal polysaccharide vaccine (PPSV23) at age 65 years or older (CDC, 2019c). This is a one-

time vaccination after age 65. If the patient received one dose prior to age 65, then the dose after age 65 should be given at least 5 years from the prior dose (Musher, 2020).

This is the vaccine of focus for this project.

Description of the Problem

Over 11,500 cases and more than 1,900 deaths occurred in adults over the age of 65 from invasive pneumococcal disease in the United States in 2016 (CDC, 2020a). More than half of the cases that occur each year in adults have an indication for pneumococcal polysaccharide vaccine (CDC, 2019b). These statements prove statistical significance and need for improvement of PPSV23 rate.

The impacts of the PPSV23 are well documented. Getting vaccinated can protect the individual receiving the vaccination. If the majority of a community gets vaccinated, that community can develop herd immunity which decreases the likelihood that the community will get the disease. This would cause a decreased chance of an outbreak because it is more difficult for the disease to spread. The PPSV23 vaccination is known to be 60%–70% effective in preventing disease caused by serotypes included in the vaccine (CDC, 2019b). Therefore, getting the vaccination decreases the likelihood of contracting illness caused by pneumococcal disease.

Pneumococcal disease causes many different illnesses that are preventable by vaccination. These include diseases such as pneumonia, bacteremia, meningitis, and otitis media. The solution to decreasing the prevalence of these diseases would be increasing the number of adults who receive the pneumococcal vaccination.

Significance to Nursing and Patients

Improving vaccination rates is significant in improving the health of the older population. A nurse's role is to improve the health outcomes of all populations; therefore, vaccine compliance is significant to nursing. Education, surveillance, and understanding could all help improve vaccination rates.

Medical staff and provider education regarding vaccines is a factor that limits vaccination rate improvement. Adult vaccination remains a low priority for both physicians and patients (Doherty et al., 2018). As adults, employers rarely require proof of vaccination. Also, many patients are unaware of the recommended immunizations, and health care providers do not have time to assess vaccination at every appointment. According to Ventola (2016) approximately “65% of people were aware of the pneumococcal vaccine, 56% had not gotten it because their doctor had not recommended it.”

Surveillance is necessary in order to set goals, establish priorities and be able to monitor the effectiveness of the program for future adjustments (Doherty et al., 2018). Immunization records are often incomplete for adults. Lack of accurate vaccination records may also cause missed opportunities to educate and vaccinate patients (Ventola, 2016).

Safety, value, and efficacy of vaccination should be understood by both those vaccinating and those receiving the vaccination (Ventola, 2016). This can also be closely related to education because at the time of recommending the vaccination the provider should be able to educate the patient regarding these attributes. An increase in education of vaccination improvement is a responsibility of providers if rates are going to change.

Purpose

The purpose of this project is to increase pneumococcal vaccination rates in the adult population age 65 years and older in a Midwestern primary care clinic. The project will be implemented using provider/staff education to increase assessment of patient vaccination status every appointment/every visit, utilizing appropriate electronic health record (EHR) reminders and providing education regarding the PPSV23 vaccination. After this implementation if a patient still continues to refuse vaccination, there will be a survey questioning the patient as to why the vaccination was refused. The goal is to determine if there will be an increase in PPSV23 vaccination rates compared with current office strategies among adults age 65 and older in a primary care clinic.

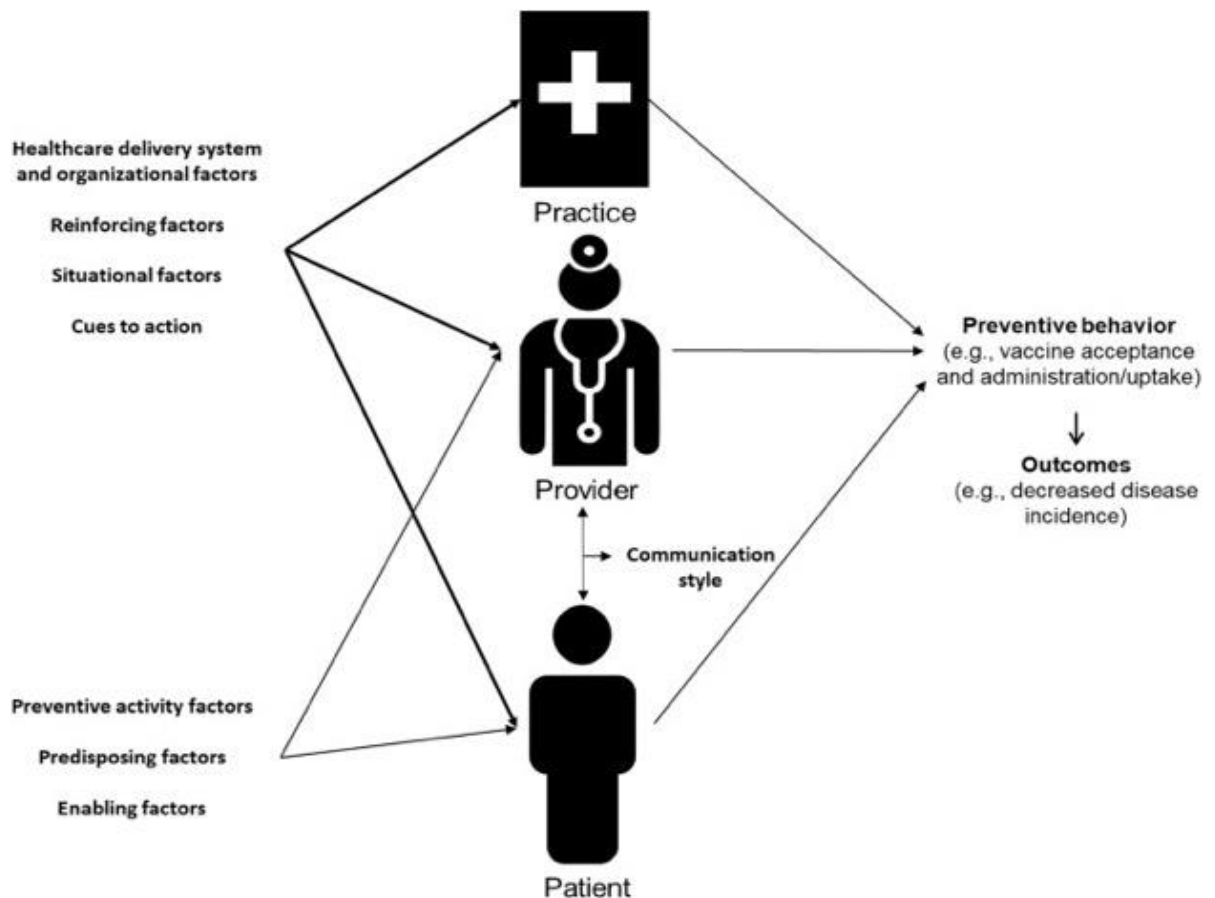
Theoretical Framework

This project was grounded using a model called the P3 model that was developed with preventative health in mind. In an article by Bednarczyk et al. (2018) the authors discuss the development of this model in comparison with other theoretical frameworks. The model is able to address the practice-level, provider-level, and patient-level components that are often involved in preventive care such as vaccine rate improvement. The P3 model was made by gathering key components of other conceptual models, “including the Health Belief Model, Theory of Planned Behavior/Theory of Reasoned Action, Social Cognitive Theory, Social Ecological Model, and the Systems Model of Clinical Preventive Care” (Bednarczyk et al, 2018, p.131). Since this model was formed with preventative care in mind it assumes that prevention is the goal. Bednarczyk,et al (2018) states that the “P3 Model allows for inclusion of factors at levels that may not be addressed fully through standard health promotion and behavioral models” (p.136). An

example of this would be if a provider does not follow the standard best practice guidelines.

This framework is a great blueprint for the project because it encompasses most of the issues that may be a cause of low vaccination rates. At the practice level, there are ways for improvement for example, such as correct utilization of standing orders or if the clinic has an available supply of vaccinations. The provider level is able to determine if there is vaccine hesitancy due to lack of education or if a provider just is not correctly utilizing the electronic health record (EHR) prompts. Finally, it looks at the patient level and is able to determine reasons why the patient may be the reason for not vaccinating, such as fear of needles, unknown vaccine schedule or fear of costs.

Figure 1 *Graphical Representation of the P3 Model*



Note. This representation of the P3 model shows identification of impacting factors and the levels they act within the model (adapted from Bednarczyk et al 2018).

Needs Assessment Tool

The strength, weakness, opportunities and threat analysis tool is also known by the acronym SWOT. Using a SWOT analysis to examine a project enables the examination of the project's positives and negatives. This analysis tool acts as an additional framework to help assist and find ways to eliminate or improve on the project weaknesses and to discover opportunities that are available for improvement. If these aspects of a project are known, a person is "more likely be able to plan and act effectively" (Center for Community Health and Development, n.d.).

This particular tool was chosen in addition to the P3 model because in order to improve vaccination rates an assessment of needs must be completed to understand the strengths and weakness of the current practice. This tool helps examine ways that may help improve vaccination rates or find barriers that may cause issues for vaccination rate improvement. This can be done at the clinic level, the provider level or the patient level as previously discussed with the P3 model. There are many factors that affect why a patient chooses to get a particular vaccination or not and in order to improve vaccination rates those factors need to be considered.

Analysis Results

The SWOT analysis (Table 1) indicates many items under each identified category. This list is not inclusive and during project development there is anticipation that other items will arise in all categories. Internal issues, both strengths and weaknesses are being defined here as tasks that are controlled within the organization such as clinic

factors (hours, location, etc.), provider factors (willingness, education, etc.) and staff factors. External factors are both opportunities and threats, which are out of the organization control, such as patients, insurance, and national guidelines.

For internal strengths, the biggest and most important is probably related to the amount of evidence supporting the vaccination effectiveness and decrease in disease following vaccination. The clinic where the project will be completed has good access to care. There are nurse visit slots that enable patients who have been seen within a year to schedule appointments for vaccination. There are multiple providers at the clinic who are available from 7am-5pm. These providers all have several same-day appointment slots. These are appointments slots that are unable to be booked until the same day. The EHR at this facility is Epic, which does allow for patient and provider reminder of vaccinations that are due. The clinic always stocks the PPSV23 vaccination and has not had any issues keeping it in stock. The staff and the providers at this clinic are aware of a needed change and improvement and are willing to implement new protocols. Several people within the facility have access to the State of Missouri immunization information system website to obtain historical vaccines to update immunization records if the patient is unsure of the date the vaccination was received or where they received it at.

For internal weakness there were also many identified issues that could be improved at a clinic level. Although the EHR has the capability for reminders it is not being utilized. The utilization of the nurse schedule for vaccines is not being utilized as there are currently no standing orders available for vaccination administration. The final issue identified was time restraints of providers and staff members required to further assess each patient visit for immunization status and provide education regarding the

vaccination if needed.

External opportunities were found. The most important is that increasing the rate of vaccination will lead to a decrease in the amount of pneumococcal illness. Decreased hospital visits were another important factor for community opportunity. Ultimately, improved vaccination will save the healthcare system financially.

External threats to PPSV23 rate improvement include anything that risks a vaccination not being administered. This includes those who refuse to receive the vaccination. These reasons can vary, such as religion, fear of needles, fear of cost, and fear of adverse reaction. Other reasons may include the patient being unaware of the vaccination schedule, if they are due for the vaccine, or the vaccine is effectiveness. Many patients and providers fear cost associated with vaccinations, so another external factor is insurance coverage for the vaccine. Lastly, the pneumococcal vaccination administration guidelines were updated in November 2019 which increased confusion of the new dosing schedule (CDC, 2019c).

Considering both positive and negative factors that affect immunization rate improvement, there seemed to be enough evidence to support the need for modification and improvement of the current process. Results of these factors are displayed in the Table 1. Positive factors are displayed (+) along with negative factors (-).

Table 1*SWOT Analysis*

Strengths	Weakness	Opportunities	Threats
+ Evidence supporting vaccination +Access to care +Technology and reminders +Vaccine availability +Staff and provider willingness +Access to state vaccine immunization information systems	-EHR reminders not being correctly utilized -No standing orders -Provider and staff time restraints -Vaccine status not being assessed -Timing with the covid19 vaccination roll outs	Leading to: + Increased vaccination rates + Decreased pneumococcal disease/diagnoses +Decreased hospital visits +Healthcare savings	-Those who are opposed to vaccines -Insurance coverage of vaccinations -New pneumococcal vaccination guidelines -Patient perception to vaccine effectiveness, need and/or risks associated -Patient fear (cost or fear of needles) -Covid19 vaccination

Project Questions

- What are the barriers to receiving the pneumococcal vaccination among adults aged 65 years and older?
- Will staff/provider education regarding appropriate EHR reminders, assessing vaccination status every patient/every time and the use of standing orders improve vaccination rates?

- Will asking the patient, providing patient education and provider recommendation improve vaccination rates?
- Will the clinic see an increase in vaccination among adults after project implementation?

Definition of Key Terms

The following terms will be seen by the reader throughout this paper. For better understanding, the definitions are provided here.

Healthy People 2020 – “Healthy People is a set of goals and objectives with 10-year targets designed to guide national health promotion and disease prevention efforts to improve the health of all people in the United States” (Department of Health and Senior Services, 2010)

Herd immunity- Also called community immunity, this is is “A situation in which a sufficient proportion of a population is immune to an infectious disease (through vaccination and/or prior illness) to make its spread from person to person unlikely”(CDC, 2020b).

Immunization- “The process of being made immune or resistant to an infectious disease, typically by the administration of a vaccine. It implies that you have had an immune response” (CDC, 2020b)

Meningitis- “Inflammation of the brain and spinal cord that can result in permanent brain damage and death” (CDC, 2020b)

Otitis Media- “A viral or bacterial infection that leads to inflammation of the middle ear” (CDC, 2020b).

Pneumonia- “Inflammation of the lungs characterized by fever, chills, muscle stiffness, chest pain, cough, shortness of breath, rapid heart rate and difficulty breathing” (CDC, 2020b).

Polysaccharide vaccines- “Vaccines that are composed of long chains of sugar molecules that resemble the surface of certain types of bacteria. Polysaccharide vaccines are available for pneumococcal disease” (CDC, 2020b).

Provider- Medical care professional with specialized training that individual that is able to assess, diagnose, and treats individuals with medical conditions; physicians, physician’s assistant, or nurse practitioner

Vaccination- “The physical act of administering any vaccine or toxoid” (CDC,2020b).

Logic Model

A logic model (Figure 2) was created to visualize the project. The logic model identifies the inputs and outputs utilized to create an intervention. It also identified the short-term, medium-term, and long-term goals of the scholarly project. Lastly, it denotes assumptions of the author, as well as external factors that could influence the project. This model depicts the identification of pneumococcal vaccination inputs that will be used to support the project, resources/activities to overcome barriers, and expected outcomes of provider/staff education regarding vaccine administration. The model also lists outcomes. The outcomes section of this model has been divided into time frames, including short, mid, and long term with the ultimate goal of disease elimination.

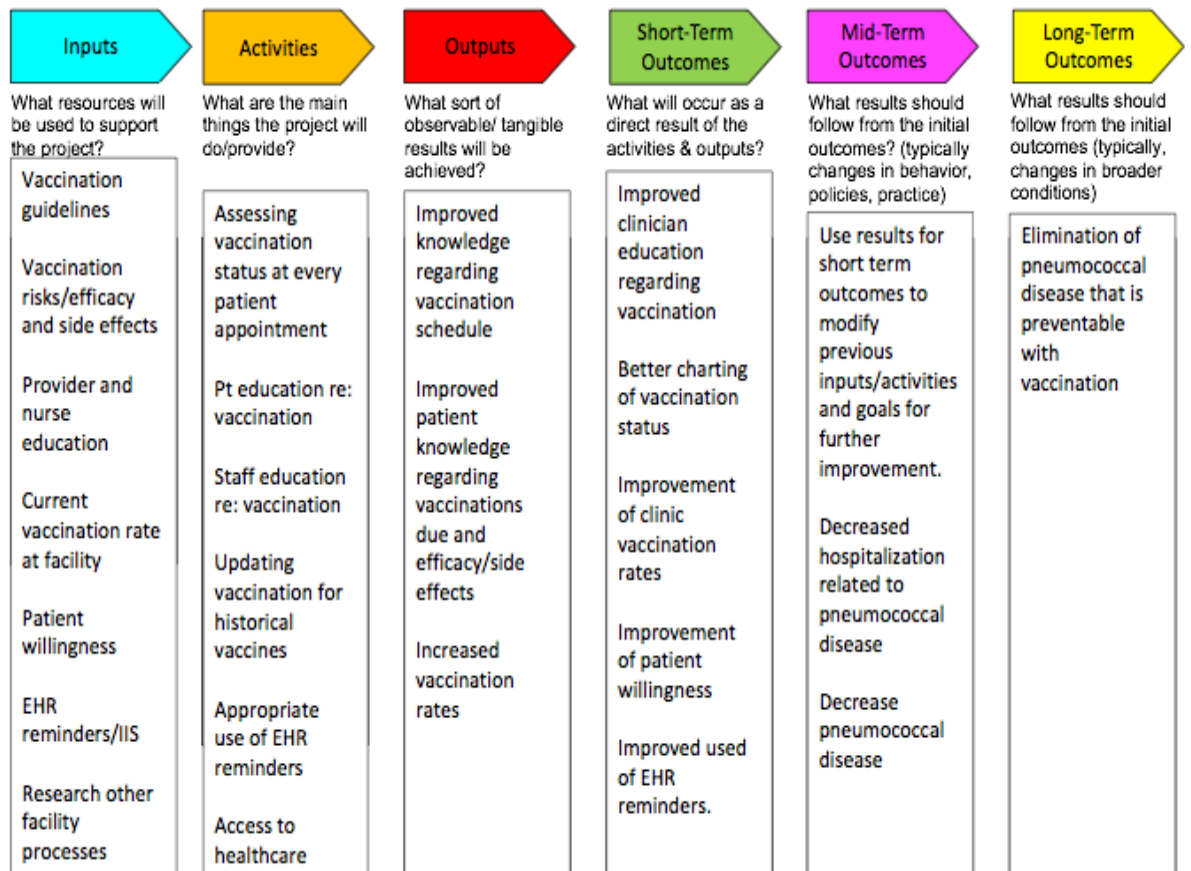
Figure 2

Logic model for increasing pneumococcal vaccination rates

Logic Model

Purpose: Increasing pneumococcal polysaccharide vaccination rate in primary care for adults age 65 years and older

Context: Primary care clinic with no previous policy for vaccination administration. No vaccination tracking and education/compliance up to each individual clinician



Summary

The recommended use of the PPSV23 vaccination can prevent the risk of pneumococcal-related diseases and decrease the risk of mortality. Primary care clinics have the capability of providing this immunization for all adults age 65 and older. Health

care providers must strive to find effective strategies to increase recommended vaccination rates and prevent illness. The goal of this project will provide insight on how an improved process can increase PPSV23 vaccination rate and bridge the gap towards the Healthy People 2020 goal.

Chapter II

Literature Review

In the United States, pneumococcal illness causes many different types of disease. Pneumococcal disease is more than just pneumonia and can include acute bacterial diseases such as pneumonia, meningitis, bacteremia, sinusitis, and otitis media. These diseases are predominately an issue for those age 65 and older or those with chronic medical conditions.

Impact

In order to explain the importance of the vaccine, it is important to look at several of those illnesses and their impact to determine how the vaccine can decrease illness rates. However, the elderly population or age 65 and older is considered a vulnerable population. This age group has an increased risk of pneumococcal disease and will be the population of focus for this scholarly project.

Pneumococcal Pneumonia

According to the CDC (2019b), approximately 400,000 hospitalizations from pneumococcal pneumonia are estimated to occur annually in the United States. This type of pneumonia has a case-fatality rate of 5-7% and has proven to be much higher in the elderly population. So, the use of the PPSV23 vaccination has the potential to decrease the potential of fatality in this population group.

Bacteremia

About 25-30% of patients with pneumococcal pneumonia also experience pneumococcal bacteremia, where a person develops bacteria in the bloodstream. There are more than 12,000 cases of this occurring yearly in the United States. The fatality rate is up to 60% in the elderly population (CDC, 2019b). This again, can be decreased with vaccination.

Meningitis

Pneumococcal bacteria is the cause for over 50% of all cases of meningitis in the United States. The case-fatality rate of pneumococcal meningitis is about 22% among adults (CDC, 2019b). The incidence of meningitis has decreased since the introduction of the pneumococcal vaccine and could be further decreased with vaccination rate improvement.

Otitis Media

Other causes of pneumococcal illness are also present. Another illness occurs in the form of otitis media (ear infection). Pneumococci is detected in 28%–55% of ear infections (CDC, 2019b). Decreasing the number of ear infections could save a lot of unnecessary visits to primary care and urgent cares for antibiotics.

Decreasing each of the above listed illnesses could save healthcare dollars. Additionally, increasing vaccination rates can decrease illness at both the state and national levels. This can be achieved by the improvement of an adult vaccination program for PPSV23 vaccination.

Significance

As stated in the introductory chapter, low rates of pneumococcal vaccinations are an issue in the United States. Per the Centers for Disease Control (CDC), opportunities to vaccinate are missed both inpatient and during outpatient visits to healthcare offices (2019b). Effective programs for vaccine delivery are needed. Since the development of the pneumococcal vaccines, pneumococcal disease has shown a decline. According to trends pneumococcal disease caused by the serotypes covered by PPSV23 declined from 51 cases per 100,000 people in 1998 to 13 cases per 100,000 people in 2015 in adults 65 or older (CDC, 2017). This improvement proves the efficacy of vaccination and further proves the need for increased vaccination efforts in hopes of disease eradication. The CDC also discusses immunization strategies for improved vaccination rates. However, a more thorough literature review needs to be done to gain current evidence-based research regarding increasing vaccination rates in the adult population.

Literature Review

The attempt to determine a reason behind the low pneumococcal polysaccharide vaccination rates in adults above age 65 requires a review of the literature. This review is used to examine similarities, differences, and patterns of behaviors among providers and patients and obtain the most recent information on vaccinations, knowledge and administration. This literature review was conducted using the online databases CINAHL and PubMed. The CDC website was an online database that was also utilized for vaccination knowledge because the CDC website is a primary resource for best practice guidelines regarding vaccination. The focus of the literature review was broad in terms of all vaccination types for adults to find why all vaccination uptake is low and was not

specific to the pneumococcal vaccines because there was a lack of available literature found specific to pneumococcal vaccinations.

The initial keywords searched, and search phrases, were: “adult pneumococcal polysaccharide vaccination rate improvement”, “vaccination rate improvement”, “adult pneumococcal vaccination barriers”, “improving vaccine uptake” and “interventions to improve adult vaccination rates.” Results were further narrowed down to include only articles in English, those available in full text and articles included were all free and available without payment. Upon completion of database search, 13 articles were chosen within the criteria based on a review of the article abstract.

The review of the literature resulted in many common themes for low vaccination rates in the adult populations. The common barriers will be discussed along with ways to decrease barriers and increase vaccination uptake. According to multiple studies, vaccine coverage for recommended vaccines is low among adults (Barker et al., 2016; Bock et al., 2016; Bridges et al., 2015; Clark et al., 2018; Ho et al., 2017). Each study identified barriers to vaccination. Many of the studies sought to identify a more effective approach to improve vaccination rates. The barriers identified were lack of provider recommendation, lack of awareness that the vaccination exists, lack of knowledge regarding schedule, safety or efficacy, vaccination access, cost, and provider concerns.

Provider Recommendation

Studies have shown that recommendations from a patient’s health care provider have a significant impact on immunization rates, yet many patients report they do not receive these recommendations from their clinicians (Bock et al., 2016; Bridges et al., 2016; Clark et al., 2018; Sandler et al., 2016; Zimmerman et al., 2017). According to

Sandler et al. (2016) who studied vaccination rates in patients with Rheumatoid arthritis, only 3 out of 4 patients said that their providers discussing their risk of infection and only 2 out of 3 said their providers discussed vaccinations. Another study indicated that 88% of people said that would be more likely to receive a vaccination if it included a strong recommendation from their physician (Bridges et al., 2016).

The CDC (2019a) also supports this. They state that a provider recommendation “remains the number one reason parents decide to vaccinate” and even patients who are initially reluctant are likely to get a vaccination when provider has a positive attitude toward the vaccination (CDC, 2019a). This same source also discusses that providers offering vaccinations should use a presumptive approach and assume that the patients being seen will choose to vaccinate (CDC, 2019a).

These statistics show the importance of provider recommendation for patients. However, there were also many barriers to providers recommending vaccination that were also identified in the literature.

Provider/Staff Education

Provider and staff education seemed to be the most common theme identified. Most of the studies identified provider and staff barriers to vaccination rate improvement. Common themes included lack of familiarity regarding the vaccine or the schedule, difficulty using EHR reminders and/or order sets, uncertainty about the efficacy and/or safety of the vaccine, and uncertainty about insurance coverage and prior vaccination history.

“Interventions to improve immunization rates have focused on modifying health care providers’ behavior to encourage them to promote vaccines for adults” (Clark et al.,

2018, p.292). In order to achieve this, many of the studies studied the effectiveness of providing provider and staff education to increase familiarity regarding the vaccination and the schedule (Barker et al., 2016; Chan et al., 2015; Bridges et al., 2016; Sebold et al., 2018). This is further supported by the fact that many providers get confused about the recommended vaccination schedules (Bridges et al., 2016; Clark et al., 2015). There were ways identified to assist these barriers.

One of the identified issues for health care providers was time constraints (MacDougall et al., 2015). Sander et al. (2016) also noted that physicians have insufficient amounts of time to discuss and address preventative care needs that are necessary. One of the ways to combat time restraints is through the use of standing orders. Bridges et al. (2016) found that system interventions such as the use of standing orders and use of EHR reminders for vaccines that were due were strategies that enhanced health care providers' success with increasing vaccination rates. Several other studies also discussed the utilization of standing orders to remove some burden from the physicians (Bock et al., 2016; Sandler et al., 2016).

In addition to standing orders and reminders, Clark et al. (2015) offered additional recommendations for the use of clinical decision support tools that further aid in screening and reminders to ensure administration of vaccines on encounters with patients. Another tool discussed was the use of best practice advisory (BPA) tools (McAdam-Marx et al., 2016). A BPA is a pop-up reminder in the EHR that serves as an intervention that is triggered based on patient demographics to let you know when something is overdue such as vaccines (McAdam-Marx et al., 2016). The last tool identified to aid providers in increasing vaccination rates is the use of audit and feedback. The use of this tool was

discussed in Clark et al. (2018) and Clark et al. (2015). Audit and feedback measured the performance of the provider compared with a set standard. The results are then shared, and those results are meant to motivate to meet the defined targeted goals. The anticipation is that the provider will modify practice if they know their performance does not meet the standard (Clark et al., 2018).

Education of providers is important. Providers should be prepared and able to answer questions using common terms that patients are able to understand. Vaccine risks and benefits are important for providers to be aware of to aid in responding to misinformation and concerns that patients may have. Providers can also train staff to discuss these basic vaccine questions to help save time during visits and ensure patients are hearing consistent messages about vaccines (CDC, 2019a). Consistency often helps relay a positive message and helps the patient have a better understanding which increases the likelihood they will receive the vaccination.

Each of these different tools can help assist the provider to identify patients who are due for the needed vaccination. This can then be used to appropriately assess vaccination status. Then, ultimately recommend vaccination when needed to raise awareness.

Lack of Awareness

According to Bock et al. (2016), 84% of the people surveyed are unaware that a pneumococcal vaccination even exists for adults. In this study this lack of awareness was identified as the main barrier to not receiving a vaccination. This was also discussed as a leading factor impacting vaccination status in the study by Bridges et al. (2016). Also, in

a study by Ho et al. (2016), many of the participants were familiar with influenza vaccinations but many had never heard of pneumococcal vaccination.

Lack of education regarding safety, efficacy and vaccine schedule are other reasons patients do not receive vaccinations. Zimmerman et al. (2017) discusses these patient-related barriers to include not knowing that a vaccine was recommended, not believing that the clinician recommended the vaccine, and fear of vaccine side effects. According to Bridges et al. (2016), one of the main reasons for not getting vaccinated was “the belief that the vaccine was not needed because they were healthy” (p.117). This was also an identified theme in a study by MacDougall et al. (2016) where participants thought that all relevant vaccines were administered in childhood. Eighty-three percent of people in this same study said that they would be more likely to receive a vaccination if they had more knowledge about the vaccine effectiveness (Bridges et al., 2016). Ho et al. (2016) discussed that the main barriers identified by research were “poor knowledge of vaccinations and fear of side effects.” This lack of education leads to decreased vaccination rates.

Access to Vaccines

Access to care and vaccinations was another reason that many patients state they are unable to be adequately vaccinated. Bridges et al. (2016) discusses that pharmacies, workplaces and other retail settings are becoming important places for adults to receive vaccinations. They offer access and convenience for patients that many healthcare settings do not. Other studies also discussed the importance of expanding access to sites where patients can be vaccinated (Clark et al., 2015; MacDougall et al., 2015). Bridges et

al. (2016), states that 30% of adults getting vaccinated in a retail/pharmacy setting do so during times when healthcare offices are typically closed, such as on weekends or in the evenings. Another gap that was identified was that there is often difficulty accessing a consistent primary care provider, so this forces patients to seek care at a variety of locations where they receive vaccines at multiple places without proper communication between facilities (MacDougall et al., 2015).

The CDC also identified access barriers. Clinic hours were again discussed for those patients who are working long hours and are unable to make it into a clinic, and long wait times at clinics waiting to see a provider and transportation issues were all identified (CDC, 2019a). Overcoming these barriers such as extending clinic hours, staggering schedules, and holding vaccination clinics were all ways listed to overcome these obstacles (CDC, 2019a). These obstacles regarding access increase the need for better communication amongst healthcare organizations in order to improve vaccine coverage.

Immunization Information Systems (IIS)

Electronic health records can help increase vaccination rates. It was discussed under the provider recommendation section in terms of reminders and order sets/standing orders. Another way to use technology to assist in increased vaccination rates is through the use of immunization information systems (IIS). IIS are computer-based databases that record vaccination doses that are given by participating healthcare professionals/ entities who live in a certain area (Groom et al., 2015). A study by Groom et al. (2015) looked at the IIS function in order to create ways to increase vaccination rates, determine vaccine

status, and provide missed vaccine opportunities. Other studies also briefly mention that IISs could also contribute to improving adult vaccination rates (Bridges et al., 2016).

According to the CDC (2019a), the use of IIS is important at both the level of clinical care and at the population level. IIS can provide a one stop shop for immunization histories on a patient that a clinician is able to use to see if a vaccine is due at the time of service (CDC, 2019). The use of IIS can also provide aggregate information for use in disease surveillance and for helping direct public health officials with goals to increase vaccine use and decrease the rates of vaccine preventable disease (CDC, 2019a)

IISs can be retrieved in clinical settings and offices to see which vaccines the patient is due for. This system allows for a more up to date/complete vaccination record. IIS also eliminate the need of having to rely on patient memory or recall.

Cost

The last theme identified throughout the literature seems to be one that was least discussed: cost. This may be due to providers and patients having little to no control over cost. It basically comes down to organizations and insurance coverage. Regardless, cost was identified as a common theme for vaccination hesitancy. Bock et al. (2016) found that almost 5% of people surveyed said that they were not vaccinated due to cost. Bridges et al. (2015) further explains that there are many factors to consider in terms of cost, including “how adult vaccinations are paid for by private and public insurers, limited funding for vaccination of uninsured adults, costs of and requirements for stocking vaccines, concerns among providers about adequate reimbursement for vaccination.” Vaccination rates are shown to be lower in adults who do not have health insurance (Bridges et al., 2015). Reducing out-of-pocket expenses is one way that was identified to

increase vaccination rates (Clark et al., 2015). Some people even believe that vaccinations for the elderly should be provided free of charge (Ho et al., 2017).

Not only do patients have cost concerns, but so do organizations. MacDougall et al. (2015) discussed the cost of purchasing and stocking vaccinations at the clinic level. This coupled with the unknown reimbursement rates of most insurance companies seems to provide fear that decreases providers willingness to offer the vaccine. Decreasing costs of vaccinations or having vaccination programs that offer lower costs could increase vaccination rates by allowing patients affordability and by increasing provider willingness to recommend.

Practice Change Recommendations

Increasing vaccination rates will require several different interventions. It was identified that providers and staff need to assess the vaccination status of patients at every clinical encounter. Second, using available reminder tools in the EHR (both sick and well visits can increase vaccination rates). Third, providers need to strongly recommend vaccines that are needed, and vaccinations need to be offered at the same visit those vaccinations are recommended. If vaccines are not available, the patient should be offered a referral for the vaccination. Finally, the vaccinations need to be documented (which includes the use of IIS).

Summary

Many common themes were identified for barriers to receiving vaccinations. These barriers were provider recommendation to receive the vaccination, staff and provider education regarding the vaccination in terms of schedule, efficacy and side effects, lack of awareness about the availability of the vaccine, access to the vaccine, the

use of the IIS and appropriate use of EHR reminders and cost. Each of these individual factors work together to ultimately increase vaccination rates.

Provider recommendation was identified as a primary reason a patient chooses to vaccinate or not. Providers and staff should assess vaccination status of every patient at every appointment. They should also be educated to provide an evidence-based recommendation for the patient's timing in receiving the vaccination. In addition, they should be available to answer questions the patient may have regarding the vaccine. This will help ensure the patient has awareness that a vaccine exists. The use of the EHR should be utilized for reminders and apply IIS to obtain complete vaccination histories on patients. Lastly, providers and healthcare organizations need to ensure clinic hours are adapted or that schedules are staggered to help patients obtain access to care.

These barriers are important to understand in order to create ways to overcome them. The use of the practice change recommendations will improve vaccination rate improvement. These interventions will help provide a basis for project development.

Chapter III

Methodology

The project design and target population were selected after analysis of the CDC's and ACIP's recommendations of the pneumococcal polysaccharide (PPSV23) vaccination for adults, as well as a review of literature of vaccinating this age group. The target population for this study was chosen because the ages 65 and older is believed to have the greatest risk for contracting and having issues from the diseases for which the vaccination protects against. Pneumococcal disease is proven to be associated with pneumonia, meningitis, otitis media and bacteremia as discussed in the previous chapters. The focus of this project was to provide education to increase the vaccination rate of PPSV23 in adults age 65 years and older in a primary care clinic in the Midwest. Immunizations were offered on-site by the clinic where the study was performed. This chapter will discuss the methodology implemented to perform this study.

Project Design

The project followed a quasi-experimental design evaluating the rate of pneumococcal vaccination before and after the educational intervention with the clinic staff. The education intervention was provided to each person employed at the clinic who comes in contact with patients on a regular basis. The front desk staff was educated regarding the importance of providing handouts to all patients who were overdue for any

and all health maintenance topics which included the pneumococcal vaccination. The pneumococcal vaccination, if over-due was highlighted to draw specific attention for the purpose of the project. This allowed the patients to review the paperwork after check-in, make corrections and review the information with the nurse upon rooming. The nurse, while rooming assessed pneumococcal vaccination status for every patient at every encounter and if applicable obtained documentation of past immunizations from another provider, pharmacy, or the state immunization information system (IIS). If the patient required a pneumococcal vaccination and agreed, the nurse used standing orders to administer the vaccination. When administering the pneumococcal vaccination, the nurse also provided the patient with a vaccination information sheet (VIS). Finally, the provider saw the patient and if vaccination has not already been completed, asked the patient about the pneumococcal vaccination by using the EHR reminder/care gaps. The provider then educated the patient regarding the pneumococcal vaccination guidelines and effectiveness. At checkout, if the pneumococcal vaccination had still not been ordered, the patient was asked to complete anonymous questionnaire about reasons for refusing the vaccination. This questionnaire included a variety of reasons why the vaccination was not received or refused, such as fear of needles, fear of cost, religious preference, was not asked, do not know enough information, etc.

Data collected was both quantitative and qualitative in nature. The quantitative data was retrieved using the clinics EHR, Epic. Quantitative data consisted of baseline pneumococcal vaccination status of all adults seen in the clinic in the twelve months prior to project implementation and was obtained through a review of the clinic's EHR and was used to compare patient vaccination status for the PPSV23 vaccine before and after

project implementation. Data was obtained with the assistance of the clinic manager and consisted of only numbers of vaccinations and was free of patient identifiers. Additional data retrieved was related to demographics data such as race and gender. This information was also free of patient identifiers. Qualitative data about patient's refusal reasons was collected from all patients who refused vaccination during the project time frame.

Before and after comparison of patient vaccination status was used to determine if staff education lead to improved pneumococcal immunization rates. Then, if staff education was ineffective, a questionnaire was given to determine what additional reasons patients gave for vaccination refusal. This information was gathered to guide future projects.

Action/Procedure

After gaining approval from SSM Healthcare and Pittsburg State University, education was provided to the staff at the SSM Family Practice Clinic in Jefferson City, MO. Education was presented during the next staff meeting following approval. The date staff education was performed was on March 16, 2021. Collected data was divided into two categories (i) those who are immunized following the appointment and (ii) those who were not.

Target Population

The target population for this study was made up of patients at or above 65 years of age who were seen at the clinic during the data collection period.

Inclusion/Exclusion Criteria

Participants included all patients over the age of 65 years of age who were seen at the SSM Edgewood Clinic in Jefferson City, MO during the study period. Information about race, ethnicity and gender was collected to assess if a difference exists in the demographics of those who agree to the vaccine and those who do not. Patients who spoke other languages were included as well. This clinic utilized a computer-based translation system so all patients were able to understand the information being presented.

Patients who were not seen during the study period were excluded from the study. Additionally, patients younger than 65 years of age were also excluded. Patients were not excluded based on race, ethnicity of language as stated above.

Setting

The project took place at the SSM Edgewood Family Practice Clinic in Jefferson City, MO. This clinic is a family practice clinic that offers primary care services which include, preventative screenings, mental health care, chronic disease management, illness visits and well man and well woman visits. The SSM Health organization accepts all insurance plan and sees patients regardless of ability to pay.

Protection of Human Subjects

An Institutional Review Board (IRB) application was submitted to the Pittsburg State University Committee for the Protection of Human Research Subjects (CPHRS) for review and approval. Upon review, the study qualified for exempt status. All interactions with subjects remained confidential, no personal information was obtained from patients participating in the educational intervention, the vaccination data collected did not

include any personal identifiers. Moreover, the study did not include vulnerable subjects such as children or prisoners.

Data collection took place after the proper institutional review process was completed and final approval was obtained from Pittsburg State University and the Irene Ransom Bradley School of Nursing. All quantitative data was collected using the Epic EHR and only numbers of vaccinated or unvaccinated patients were obtained and was free of any patient identifier. Qualitative data was collected in the form of an administered questionnaire. No deception of subjects took place, nor techniques used that caused discomfort or harassment. Confidentiality was maintained with the questionnaires; no identifying patient information was collected, and completed questionnaires were placed securely in a ballot box after visit which was not be opened until after study completion for data collection. Consent was implied if the patient chose to complete the survey.

Ethical Considerations

An ethical dilemma regarding vaccination rate improvement involves the balance of personal autonomy and choice versus protection of both that individual and the entire community at risk. A vaccine provides a dual benefit: a direct benefit to the person receiving it, and an indirect benefit to other members of the community by offering herd immunity. Patients will often look up to healthcare providers when making medical decisions, including vaccinations. Most healthcare providers, favor vaccination and seek ways to overcome these patients' resistance. In turn, providers face the challenge of balancing the ethical principles of non-maleficence (do no harm) and beneficence (do good) when educating patients regarding vaccine choices.

These principles can often be in conflict when addressing vaccine risks. In doing good, the provider would have the responsibility to promote vaccines for the benefit of the patient and community, despite opposition. However, looking at the principle of non-maleficence requires the provider to inform patients of the risk of the vaccinations and therefore might lead patients to refuse the vaccination the provider is promoting.

Ideally, decisions about vaccination should be reached through mutual participation in a shared decision-making process which would promote patient autonomy and avoid coercion.

Instruments

A cross-sectional questionnaire survey on resistance or refusal to vaccination was administered to patients who continued to refuse the PPSV23 vaccination after intervention. The survey inquired about lack of education, lack of provider recommendation, religious beliefs, and other reasons behind refusing the PPSV23 vaccine. Implied consent was assumed with completion and return of the survey. This tool was implemented to enhance the validity of the study's results and future attempts at educating on PPSV23 vaccination to directly target reservations to vaccinate.

Procedure

After IRB approval, the educational offering to staff took place on March 16, 2021 in collaboration with SSM Health. This offering consisted of a discussion at staff meeting regarding the importance of the PPSV23 vaccination and how vaccination rates can be improved. At the end of the presentation, participants were able to ask questions to the researcher if desired.

After the educational offering clinic staff immediately started implementing discussed behaviors which included providing patients with handout for overdue health maintenance at every visit, assessing pneumococcal vaccination status at every appointment and obtaining historical vaccination or administering vaccinations if due. Patients who continued to refuse were given a post survey asking for reasons for refusal. The project will occur during an eight-week time period, through April 1st to May 31st, 2021. During this time, staff continued implementation strategies to hopefully increase vaccination rates and offering surveys to those who refuse. After project completion, data was run through Epic which is the EHR system utilized by SSM Health. This data was compared to previously collected data from one year prior to implementation to assess improvement. Data was obtained by the help of the clinic manager. Surveys were collected from the ballot box, and responses were analyzed for reasons of vaccination refusal. Demographic data to include age, gender, and ethnicity were retrieved from the EHR to evaluate any difference in the demographics of those who agree to the vaccine and those who don't.

Budget

No cost was incurred for the survey or project. The creation and distribution of the surveys utilized paper provided by the SSM health clinic. Patients were not offered reimbursement for participation.

Strengths/Limitations

A limitation identified is the guideline update to the pneumococcal administration guidelines in November of 2019. This guideline update could have caused some

confusion to staff and providers. Some providers and staff do not stay current on guidelines.

Covid19 was also a limiting factor for this study. Initially it was planned that there would be another clinic included, however, due to the pandemic, and social distancing, educational opportunities were difficult. Additionally, the Covid19 vaccination was a priority due to the global pandemic, so this vaccination took precedence over the pneumococcal vaccination. Current guideline recommended that no vaccination should be administered within two weeks pre and post Covid19 vaccination series.

Strengths identified are that vaccinations were available at the clinic and could be given the same day that they were offered. Additionally, Covid19 also could be viewed as a strength. This was due to many patients may have had an altered opinion regarding vaccinations during the pandemic.

Evaluation plan

The goal of the data collected was to determine whether or not new procedures would increase PPSV23 vaccination rates in adults age 65 years and older in a primary care clinic in Jefferson City, MO when comparing rates from the previous year. In comparing vaccination rates from the same time frame from the previous year a rise in rates would indicate the need for improved clinical process for vaccination education and administration. The survey results were an important addition to the data gathered because they may indicate how future interventions could be done to help increase vaccination rates. Depending on what the analysis shows, education interventions similar

to the one implemented in this study could be replicated to further improve rates of this vaccination or others.

Project Sustainability

If intervention proved effective in increasing PPSV23 vaccination rates among older adults, bi-annual attempts toward staff education using the strategies implemented in this study would be warranted to use in this clinic and other primary care clinics throughout the state of Missouri to improve overall vaccination coverage. Plans to execute a universal educational intervention to be used throughout the state would require a multidisciplinary approach to ensure sustainability. Collaboration between many clinics would be essential for the replication and implementation of the interventions utilized in this study.

Summary

Increasing vaccination rates should be focus of all healthcare providers. Healthcare providers play a key role to significantly increase vaccination rates through the use of screening and education. The goal of this project was to increase PPSV23 vaccination rates. This chapter discussed in detail the population studied, the procedure for study development and data collection. By comparing pneumococcal vaccination rates to those in the prior year, we can assess if vaccination rates increased after intervention. This knowledge would encourage staff to always assess and ask patients about vaccines, which will increase vaccination awareness, and thus increase vaccination rates.

Chapter IV

Evaluation of Results

The purpose of this study was to increase PPSV23 vaccination rates in adults over the age of 65 years in a midwestern primary care clinic. The project also attempted to find out why patients continue to refuse the PPSV23 vaccination after the intervention strategies were utilized to help aid in future projects. Staff was educated to notify the patient that they are overdue for the PPSV23 vaccination by assessing vaccination status at every appointment for every patient, obtaining historical vaccinations data from other providers, pharmacies or the state IIS, and ultimately administering the vaccination after providing education to the patient. Data collection started after staff education was provided and rates were compared from one year prior to the educational intervention.

This chapter will discuss the population that was studied. It will provide an analysis of the data collected as it relates to the purpose of the project. Finally, it will discuss the results of the project in detail.

Sample

Once approval was gained from Pittsburg State University IRB and SSM Health, employees were offered an educational intervention that consisted of a PowerPoint presentation regarding intervention techniques that would be used within the clinic to

hopefully increase PPSV23 vaccination rates. This staff education was performed on March 16, 2021. Data collection began on April 1, 2021 and ran through May 31, 2021.

Inclusion criteria were all patients who were scheduled to be seen in the clinic during the data collection period who were age 65 or older. Information about race, ethnicity and gender was also collected to assess if a difference exists in the demographics of those who agree to the vaccine and those who do not. Patients who speak other languages were also included, as the clinic utilizes a computer-based translation system so patients were able to understand the information and give consent.

Patients not seen during the study period were excluded from the study. Additionally, those patients younger than 65 years of age were also excluded.

Data was collected through a report ran through the clinics EHR record, EPIC. This allowed for historical data to be retrieved from one year prior to the study before the staff education to compare to current data after the education.

Project Variables

The independent variable for this study was the education that was provided to staff members of the SSM Family Medicine Clinic in Jefferson City, MO. The education emphasized the importance of the PPSV23 vaccination, along with efficacy, side effects, vaccination schedule and what data has been shown to help increase vaccination rates.

The dependent variable for this study was the clinics vaccination rates prior to and after the educational intervention for the staff. The goal was to see if the dependent variables were affected by the provided education. The perceived barriers to vaccinate were included in an anonymous survey that was given to the patient after the patient visit was complete. The effect on the dependent variable was shown in comparison to the

previous year vaccination rates to the rates after the education was done and new techniques were initiated.

Analysis of Project Questions

Data was collected to address the aforementioned needs and answer the following project questions:

- What are the barriers to receiving the pneumococcal vaccination among adults aged 65 years and older?
- Will staff/provider education regarding appropriate EHR reminders, assessing vaccination status every patient/every time and the use of standing orders improve vaccination rates?
- Will asking the patient, providing patient education and provider recommendation improve vaccination rates?
- Will the clinic see an increase in vaccination among adults after project implementation?

Research Question 1

Question one was “what are the barriers to receiving the pneumococcal vaccination among adults aged 65 years and older?” This question was addressed through a review of the literature and it was found that the lack of provider recommendation was the foremost barrier to vaccination. Another barrier included lack of provider or staff education in terms of vaccination schedules, difficulty using EHR reminders and/or order sets, uncertainty about the efficacy and/or safety of the vaccine, and uncertainty about insurance coverage and prior vaccination history. Lack of patient awareness, vaccination

access, and cost were other identified barriers to receiving vaccinations that were addressed.

This was also further assessed in a post survey for vaccination refusal to see if any additional barriers existed. Out of the 39 patients who refused vaccination between the study dates, 22 surveys were returned. The survey results showed the majority, 8 out of 22 people refused based on the Covid19 vaccination. Those wanting to receive or who had already received the Covid19 vaccination had to wait two weeks pre-series and two weeks post-series before receiving another vaccination. Five people listed “I don’t want to” as a reason. Four people expressed safety concerns primarily related to allergies or other medication sensitivities. Other reasons were also listed and are displayed in Table 4 below.

Research Question 2

Question number two was “will staff/provider education regarding appropriate EHR reminders, assessing vaccination status every patient/every time and the use of standing orders improve vaccination rates?” This was addressed after the project was performed. Baseline clinic vaccination rates before implementation of staff and provider education was at 69%. Data was historically retrieved from the EHR from one-year prior to the education. After the educational training that was done on March 15, 2021, a second period of data was ran from April 1-May 30, 2021 which showed the clinic vaccination rate after staff and provider education was increased to 79%.

Research Question 3

Question number three was, “will asking the patient, providing patient education and provider recommendation improve vaccination rates?” which can be answered

collectively with question two. Pre-intervention before asking the patient, providing patient education and provider recommendation the baseline clinic vaccination rate was at 69%. After these intervention techniques, the clinic vaccination rate was at 79%.

Research Question 4

The final research question was “will the clinic see an increase in vaccination among adults after project implementation?” This was answered by comparing baseline data prior to the project intervention. Baseline data was at 69%. This data was compared to the data after staff education and new implementation of assessing vaccination status at every patient appointment, so they are aware of the vaccination, providing patient education and then recommending the patient receive the vaccination. The after intervention PPSV23 vaccination rate ended at 79%.

Additional Analysis

Baseline data was retrieved from the clinic EHR, EPIC. The total number of patients seen over the age of 65 in the SSM Family Medicine clinic during April 1- May 31, 2020 totaled 161 patients. 112 of these patients had historical vaccinations recorded or received vaccinations during this time period which showed the clinic had a 69% baseline vaccination rate during this two-month time period. Table 2 below shows the total number of patients, those who were vaccinated versus unvaccinated and shows comparisons based on gender, race and ethnicity.

Table 2*Baseline PPSV23 Vaccination Rates April 1-May 30, 2020*

		VACCINATED	UNVACCINATED
TOTAL=162	<i>All patients over age 65</i>	112	50
GENDER	<i>Men</i>	47	27
	<i>Women</i>	65	23
RACE	<i>White</i>	109	50
	<i>Black</i>	1	0
	<i>Pacific Islander</i>	1	0
	<i>Hispanic</i>	1	0
ETHNICITY	<i>Not Hispanic Latino</i>	110	50
	<i>Other Ethnicity</i>	2	0

Staff education was provided using the PowerPoint that is displayed in Appendix B. This was performed on March 15, 2021. Project implementation spanned from April 1-May 31, 2021. Project implementation consisted of giving patients an overdue health maintenance handout when the patient checked in for their appointment by the front reception staff. This handout stated all screening tests/vaccinations that were overdue

(colonoscopy, mammogram, CT lung cancer screening, etc.). The PPSV23 vaccination, if due, was highlighted using a yellow highlighter to draw attention to this specific vaccination. The patient held onto this sheet of paper while in the waiting room until their roomed appointment time. The nurse, while rooming, assessed the status of the PPSV23 vaccination status at every patient appointment. If the vaccination was overdue, the nurse asked the patient if they previously had received this vaccine. If yes, they attempted to gain documentation of this historically given vaccination either from the state IIS or from a previous provider. If the patient had not previously received the vaccine, they were then asked if they would like to have the vaccination on the date they were in the office. If the patient required more information the staff provided education regarding the vaccination schedule, efficacy, side effects, and purpose of the vaccination. The nurse would then administer the vaccination with standing orders. Additionally, when the provider went to see the patient after the rooming process, they would also look in the EHR to see if the pneumococcal vaccination had been documented and if not use the EHR reminders to recommend the vaccination to the patient, find out if they had any additional questions and then ultimately ask if they were interested in receiving the vaccine. If the patient continued to refuse the vaccine, then at checkout, patients were anonymously asked to submit a survey asking about reasons why and submit this survey into a locked ballot box. This ballot box sat at check-out desk during the day, was locked into a cabinet drawer at night and only the researcher had access to the key to ensure it could not be accessed during the project period. Following the project completion date on May 31, 2021, data was collected via the EHR in the same manner as the historical data was retrieved.

The total of number of patients seen over the age of 65 in the SSM Family Medicine clinic during April 1- May 31, 2021 totaled 190 patients. 151 of these patients had historical vaccinations recorded or received vaccinations during this time period which showed the clinic had a 79% vaccination rate during this two-month time period. Table 3 shows the total number of patients, those who were vaccinated versus unvaccinated, and shows comparisons based on gender, race and ethnicity.

Table 3

PPSV23 Vaccination Rates April 1-May 30, 2021 After Implementation

		VACCINATED	UNVACCINATED
TOTAL=190	<i>All patients over age 65</i>	151	39
GENDER	<i>Men</i>	49	9
	<i>Women</i>	102	30
RACE	<i>White</i>	146	39
	<i>Black</i>	2	0
	<i>Pacific Islander</i>	0	0
	<i>Hispanic</i>	0	0
	<i>Asian</i>	3	0
ETHNICITY	<i>Not Hispanic Latino</i>	151	39

	<i>Other Ethnicity</i>	0	0
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Additionally, a compilation of responses from the surveys from those who continued to refuse vaccination were analyzed for reasons of vaccination refusal. Refusal reasons are compiled in Table 4.

Table 4

Pneumococcal Vaccination Survey Results

Quantity	Reason from Survey	Patient comments (if any)
5	Other, please describe	"I just don't want to."
1	Fear of needles	
8	Wanting to receive or had already received the Covid19 vaccination	
4	Safety concerns	<p>"have a lot of allergies, fear of allergy"</p> <p>"does not do vaccines based on sensitivities to other meds."</p> <p>"too sensitive to everything."</p> <p>"do not want anything extra like that in my body."</p>
2	Prefer not to disclose my reasoning	
1	Personal belief	"do not believe in vaccines."
1	Multiple boxes checked-religious reasons, personal belief, and safety concerns	

Summary

This purpose of the present study was to increase PPSV23 vaccination rates in adults over the age of 65 years in a midwestern primary care clinic. This was done after provider and staff education. Results of the data analysis and comparison revealed findings significant to the purpose of the study. The study outcomes indicate that education on staff may have a positive effect on increasing vaccination rates. The clinic vaccination rates increased from 69% to 79%, which showed that these interventions were successful in increasing vaccination rates.

Chapter V

Discussion

The intention of this project was to see if staff education and selected intervention would increase pneumococcal polysaccharide vaccination rates in adults over the age of 65 in a midwestern primary care clinic. The number of patients who were vaccinated with the PPSV23 vaccination from April 1-May 31, 2020, were compared to those who were vaccinated in the same time frame in 2021 after staff education was performed at the clinic being studied. The data collected indicates that staff education in terms of making patients aware, assessing vaccination status at every appointment, following provider recommendations, and the using of standing orders and appropriate EHR reminder utilization does increase PPSV23 vaccination rates in adults over the age of 65 years.

Relationship of Outcomes to Research

One of the supporting opening statements that was made to introduce this project was that the Healthy People 2020 goal “is to achieve at least 90% coverage for pneumococcal polysaccharide vaccine among persons 65 years of age and older” (CDC, 2019a). However, since the original project was started Healthy People 2030 goals have been formed. This goal changed slightly and is now is more generalized and states “Reduce the rate of hospital admissions for pneumonia among older adults.” Older adults are those age 65 years and older. This guideline is using a baseline of 713.9 hospital

admissions for pneumonia per 100,000 adults aged 65 years and over in 2016 and has a target of 642.5 admissions per 100,000 adults of the same age. The evidence-based resources related to this objective refers back to the pneumococcal vaccination guidelines (Office of Disease Prevention and Health Promotion, n.d.).

There are two other Healthy People 2030 objectives that are currently under developmental status relating back to this study in terms of vaccinations but are not specific to PPSV23 vaccination. These objectives are to “increase the proportion of immunization information systems that track adult immunizations across the lifespan” and “Increase the proportion of adults age 19 years or older who receive recommended age-appropriate vaccines.” However, these two objectives are still under development which means that they are being viewed as a high-priority public health issue that has evidence-based interventions to address it, but there is no current reliable baseline data (Office of Disease Prevention and Health Promotion, n.d.).

The data gathered in this project does not correlate with the 2030 goals, but data did fall short of the Health People 2020 goal at only raising pneumococcal vaccination rates from 69-79%. However, a 10% improvement in vaccination rates did show significant improvement after only a two-month study period.

Observations

Noteworthy observations made were that vaccination rates were affected by the global Covid19 pandemic. This was included on the post-vaccination refusal survey.

Patients who continued to decline vaccination were asked to provide additional information as to why they still preferred not to receive the vaccination. Based on those who returned the survey, eight additional patients stated that would have received the

vaccination if it was not for the timing of their scheduled Covid19 vaccinations which were given priority due to the current pandemic. If, all eight of those patients would have indeed received the pneumococcal vaccination the percentage would have increased to 84%, which would have increased the 10% improvement rate to 15%.

Evaluation of Theoretical Framework

The theoretical framework applied to this project was the P3 model. This framework was a good fit for this project and provided a good blueprint for the basis of the project because the project was able to follow the practice level, provider level, and patient level components discussed in the framework that is seen in Figure 1 displayed in Chapter 1. At the practice level, correct utilization of standing orders was addressed in the staff education. At the provider level, the providers were educated regarding vaccine hesitancy due to lack of education and correct utilization of the EHR prompts. Finally, at the patient level, a survey was given to determine reasons why the patient may be the reason for not vaccinating, such as fear of needles, unknown vaccine schedule or fear of costs.

Evaluation of Logic Model

In Chapter 1 (Figure 2), a logic model was provided to show the short-term, intermediate, and long-term outcomes of implementing provider and staff education on ways to increase PPSV23 vaccination rates. The short-term goal of improvement of clinical vaccination rates was met with this project. The project did not evaluate improved clinician education regarding vaccination- although, while providers did verbalize this to be true at the project conclusion, there was no official evaluation method. The use of Show Me Vax (Missouri IIS) and EHR reminders were utilized

throughout the project. Finally, there was also improvement of clinic vaccination rates. The intermediate-goals and long-term goals will need further evaluation to assess on future projects.

Limitations

This study was not without bias and limiting factors. The comparative/historical data was pulled from April-May 2020. This was right in the middle of the Covid19 pandemic which could have skewed the total number of patient visits or the visit types and this information was not pulled for confidentiality and HIPAA reasons.

The time allotted for data collection could also be considered a limiting factor. After staff education data was only obtained for an eight-week period of time. A longer allotment period would have assessed sustainability for intervention.

The study lacked clinic diversity as it was only performed using one clinic and the staff employed within that clinic. This was due to social distancing guidelines and attempting to limit staffing based on the Covid19 pandemic. This makes the study potentially lack generalizability since there was no additional clinics studied.

Finally, the study lacked a diverse patient population to determine if there was any vaccination bias based on rates or ethnicity. This data was pulled but there were really only a few patients who identified as another race or ethnicity. There was lack of data to determine if there is a difference across race and/or ethnic groups.

Implications for Future Projects

Limitations stated above should be addressed for future studies. Future studies should be completed with larger sample sizes, additional clinics and larger geographical areas, and obtain a more diverse patient population. Looking at reasons for vaccination

refusals and coming up with ways to decrease reasons identified would also be areas for additional project expansion.

Implications for Practice

Vaccinations are some of the best ways to prevent diseases and illnesses. The incidence, prevalence, morbidity and mortality caused by vaccine-preventable diseases have all been decreased by their use. There are many different vaccine-preventable diseases however, and due to the significance regarding vaccination against pneumococcal disease, there needs to be improvement in vaccination rates against this disease. The State of Missouri, where this project was performed, has low PPSV23 rates, and there is need for improvement. These low rates are proven to be both a state and a healthcare issue, and the need for a health impact assessment may be beneficial for future practice. In the State of Missouri, the pneumococcal vaccination rate is at 74.4%, which was decreased from 77.7% in 2017 (CDC, 2019d). This gives Missouri plenty of room for improvement. There needs to more effective programs to ensure there is an increase in adult vaccination rates. This is where practice change is necessary.

The impacts of the PPSV23 are well documented. Getting vaccinated can protect the individual receiving the vaccination. If the majority of a community gets vaccinated, that community can develop what is called herd immunity, which decreases the likelihood that the community will get the disease. This would be a decrease chance of an outbreak because it is harder for the disease to spread. To improve pneumococcal vaccination rates, it is necessary to identify barriers to increased uptake among the adult population and to modify these where possible. This will help determine why vaccination rates are low.

Health impact assessments and quality improvement projects for future practice can keep cost, access, education, and surveillance in mind. Providers need to understand and educate regarding the importance of vaccination. This will help to decrease disease and ultimately aid in disease eradication in the future.

Implications for Health Policy

There are often bills introduced to the House and Senate that relate back to vaccinations. For example, there is currently a bill that was introduced to the House on November 13, 2019, this was called "Protecting Seniors Through Immunization Act of 2019." This bill is to amend the Social Security Act to specify that "certain deductible, coinsurance, initial coverage limit, and cost-sharing requirements that apply under the Medicare prescription drug benefit shall not apply to vaccines that are recommended by the Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention" (GovTrack, 2021). This includes the PPSV23 vaccination. These bills are necessary to help control vaccination access, pricing and ultimately improve vaccination rates.

Implications for Education

A strong recommendation by a health care provider is the key reason that patients choose to vaccinate. Studies show that patients who receive a provider recommendation are 4-5 times more likely to receive a vaccination (CDC, 2019b). It is important for providers to be educated on how important their recommendation is for patients to hear. That way they can use a presumptive approach that assumes that the patient will vaccinate if being offered.

This recommendation will be enough for most patients; - however, there will be

some patients that will require more education and information prior to receiving the vaccine. So, all healthcare members need education regarding vaccination schedules, side effects, and efficacies. Additionally, they need to be able to be available to provide patient with the needed resources for discussion of the benefits and risks of vaccination.

Conclusion

The aim of this scholarly project was to increase PPSV23 vaccination rates in adults age 65 years of age and older in a midwestern primary care clinic after provider and staff education were performed. Comparison of vaccination rates from April 1-May 31, 2020, to the same days in 2021 showed a 10% vaccination rate increase after the intervention consisting of patient awareness of vaccination status, assessment of vaccination status at the time of appointment, use of standing orders, provider recommendation and use of EHR reminders.

The outcome of the study enhanced the awareness of the PPSV23 vaccination to the providers and staff at the clinic in which the intervention was implemented. Even though the study's results are optimistic regarding the increase of PPSV23 vaccination rates, recommendations for further research were addressed. In order to achieve an PPSV23 vaccination rate of at least 90%, providers must continue to educate patients on the cancer-preventing benefits the PPSV23 vaccination and make strong vaccination recommendations to ultimately decrease pneumococcal-related illness.

References

- Baker, D. W., Brown, T., Lee, J. Y., Ozanich, A., Liss, D. T., Sandler, D. S., & Ruderman, E. M. (2016). A multifaceted intervention to improve influenza, pneumococcal, and herpes zoster vaccination among patients with rheumatoid arthritis. *The Journal of Rheumatology*, 43(6), 1030–1037.
<https://doi.org/10.3899/jrheum.150984>
- Bednarczyk, R.A., Chamberlain, A., Mathewson, K., Salmon, D.A., & Omer, S.B. (2018). Practice-, Provider-, and Patient-level interventions to improve preventive care: Development of the P3 model. *Preventive Medicine Reports*, 11, 131–138. <https://doi.org/10.1016/j.pmedr.2018.06.009>
- Bock, A., Chintamaneni, K., Rein, L., Frazer, T., Kayastha, G., & MacKinney, T. (2016). Improving pneumococcal vaccination rates of medical inpatients in urban Nepal using quality improvement measures. *BMJ Quality Improvement Reports*, 5(1), 1-5. <https://doi.org/10.1136/bmjquality.u212047.w4835>
- Bridges, C. B., Hurley, L. P., Williams, W. W., Ramakrishnan, A., Dean, A. K., & Groom, A. V. (2015). Meeting the challenges of immunizing adults. *Vaccine*, 33 Suppl 4, D114–D120. <https://doi.org/10.1016/j.vaccine.2015.09.054>
- Centers for Disease Control and Prevention [CDC]. (2017). *Surveillance and reporting*. <https://www.cdc.gov/pneumococcal/surveillance.html>
- Centers for Disease Control and Prevention [CDC]. (2019a). *The pink book: Chapter 3. Immunization strategies for healthcare practices and providers*. <https://www.cdc.gov/vaccines/pubs/pinkbook/strat.html>.
- Centers for Disease Control and Prevention [CDC]. (2019b). *The pink book: Chapter*

17. *Pneumococcal disease.*

<https://www.cdc.gov/vaccines/pubs/pinkbook/pneumo.html#goals>

Centers for Disease Control and Prevention [CDC]. (2019c). *Pneumococcal vaccine recommendations.*

<https://www.cdc.gov/vaccines/vpd/pneumo/hcp/recommendations.html>

Centers for Disease Control and Prevention. (2019d). *AdultVaxView: 2008 through 2018 adult vaccination coverage trend report.* <https://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/data-reports/general-population/trend/index.html>

Centers for Disease Control and Prevention [CDC]. (2020a). *Pneumococcal manual for the surveillance of vaccine-preventable diseases.*

<https://www.cdc.gov/vaccines/pubs/surv-manual/chpt11-pneumo.html>

Centers for Disease Control and Prevention [CDC]. (2020b). *Vaccines & Immunizations: Glossary.* <https://www.cdc.gov/vaccines/terms/glossary.html>

Center for Community Health and Development (n.d.) *Chapter 3, Section 14: SWOT Analysis: Strengths, Weaknesses, Opportunities, and Threats.* University of Kansas. <https://ctb.ku.edu/en/table-of-contents/assessment/assessing-community-needs-and-resources/swot-analysis/main>

Chan, S. S., Leung, D. Y., Leung, A. Y., Lam, C., Hung, I., Chu, D., Chan, C. K., Johnston, J., Liu, S. H., Liang, R., Lam, T. H., & Yuen, K. Y. (2015). A nurse-delivered brief health education intervention to improve pneumococcal vaccination rate among older patients with chronic diseases: a cluster randomized

controlled trial. *International Journal of Nursing Studies*, 52(1), 317–324.

<https://doi.org/10.1016/j.ijnurstu.2014.06.008>

Clark, R. C., Carter, K. F., Jackson, J., & Hodges, D. (2018). Audit and feedback: A quality improvement study to increase pneumococcal vaccination rates. *Journal of Nursing Care Quality*, 33(3), 291–296.

<https://doi.org/10.1097/NCQ.0000000000000289>

Clark, R. C., Jackson, J., Hodges, D., Gilliam, B., & Lane, J. (2015). Improving pneumococcal immunization rates in an ambulatory setting. *Journal of Nursing Care Quality*, 30(3), 205–211. <https://doi.org/10.1097/NCQ.0000000000000110>

Department of Health and Senior Services (2010). *Healthy People 2020*.

https://www.healthypeople.gov/sites/default/files/HP2020_brochure_with_LHI_508_FNL.pdf

Doherty, T.M., Connolly, M.P., Del Guidice, G., Flamaing, J., Goronzy, J.J., Grubeck-Loebenstein, B., Lambert, P.H., Maggi, S., McElhaney, J.E., Nagai, H., Schafner, W., Schmidt, R., Walsh, E., Di Pasquale, A. (2018). Vaccination programs for older adults in an era of demographic change. *European Geriatric Medicine*. 9, 289-300. Doi: <https://doi.org/10.1007/s41999-018-0040-8>

GovTrack.us. (2021). S. 1872 — 116th Congress: Protecting Seniors Through Immunization Act of 2019. Retrieved

from <https://www.govtrack.us/congress/bills/116/s1872>

Groom, H., Hopkins, D.P., Pabst, L.J., Murphy, M., Morgan, J., Patel, M., Calonge, N., Coyle, R., Dombkowski, K., Groom, A., Kurilo, M.B., Rasulnia, B., Shefer, A., Town, C., Wortley, P., Zucker, J. (2015) Information systems to increase

vaccination rates. *Journal of Public Health Management and Practice*. 21(3). 227-248. doi: 10.1097/PHH.0000000000000069

Office of Disease Prevention and Health Promotion. (n.d.). Increase the proportion of adults age 19 years or older who get recommended vaccines. *Healthy People 2030*. U.S. Department of Health and Human Services. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/vaccination/increase-proportion-people-who-get-flu-vaccine-every-year-iid-09>

Ho, H. J., Chan, Y. Y., Ibrahim, M., Wagle, A. A., Wong, C. M., & Chow, A. (2017). A formative research-guided educational intervention to improve the knowledge and attitudes of seniors towards influenza and pneumococcal vaccinations. *Vaccine*, 35(47), 6367–6374. <https://doi.org/10.1016/j.vaccine.2017.10.005>

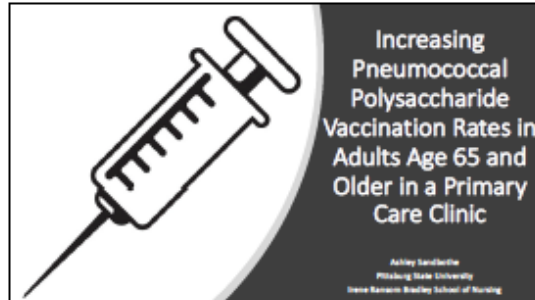
MacDougall, D. M., Halperin, B. A., MacKinnon-Cameron, D., Li, L., McNeil, S. A., Langley, J. M., & Halperin, S. A. (2015). The challenge of vaccinating adults: attitudes and beliefs of the Canadian public and healthcare providers. *BMJ Open*, 5(9). <https://doi.org/10.1136/bmjopen-2015-009062>

McAdam-Marx, C., Tak, C., Petigara, T., Jones, N. W., Yoo, M., Briley, M. S., Gunning, K., & Gren, L. (2019). Impact of a guideline-based best practice alert on pneumococcal vaccination rates in adults in a primary care setting. *BMC Health Services Research*, 19(1), 474. <https://doi.org/10.1186/s12913-019-4263-2>

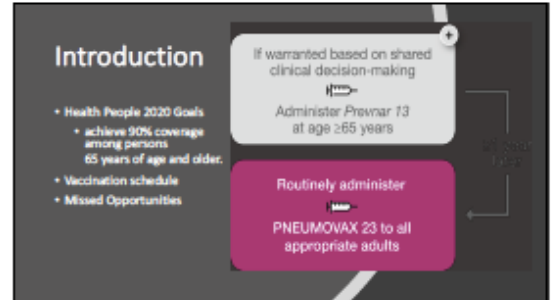
- Musher, D. (2019). Pneumococcal vaccination in adults. In S. Bone (Ed.), *UpToDate*.
<https://www.uptodate.com/contents/pneumococcal-vaccination-in-adults>.
- Sandler, D.S., Ruderman, E.M., Brown, T., Lee, J.Y., Mixon, A., Liss, D.T., Baker, D.W. (2016). Understanding vaccination rates and attitudes among patients with rheumatoid arthritis. *American Journal Managed Care*, 22(3),161-167.
- Sebald, C., Joubert, L., Novakosky, M., Rosel, M. (2018). Improving pneumococcal vaccination rates in a community-based internal medicine resident clinic. *SMRJ*. 3(1).
- Ventola C. L. (2016). Immunization in the United States: Recommendations, barriers, and measures to improve compliance: Part 2: Adult vaccinations. *P & T*. 41(8), 492–506.
- Zimmerman, R. K., Brown, A. E., Pavlik, V. N., Moehling, K. K., Raviotta, J. M., Lin, C. J., Zhang, S., Hawk, M., Kyle, S., Patel, S., Ahmed, F., & Nowalk, M. P. (2017). Using the 4 pillars practice transformation program to increase pneumococcal immunizations for older adults: A cluster-randomized trial. *Journal of the American Geriatrics Society*, 65(1), 114–122. <https://doi.org/10.1111/jgs.14451>

APPENDIX

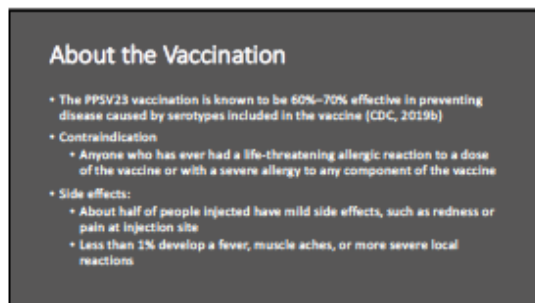
Appendix B



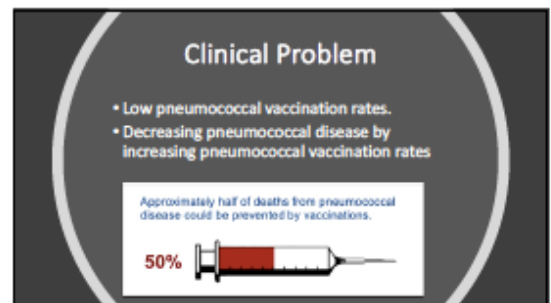
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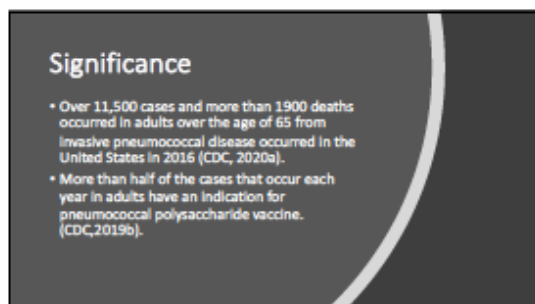
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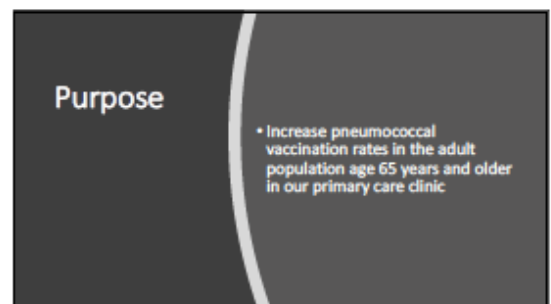
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5



6

How?

Get everyone involved

- Front desk: Reminders for patient-passing out overdue health maintenance
- Nurses and Providers:
 - Appropriate use of EHR
 - ASK- every patient, every visit
 - Use of standing orders
 - Giving the vaccination when due
- Gathering data from previous providers or utilization of immunization information system (ShowMeVax)

7

WHY?

- Many patients are unaware of vaccination guidelines.
 - 84% of the people surveyed are unaware that a pneumococcal vaccination exists for adults
- The CDC (2019a) states that a provider recommendation "remains the number one reason parents decide to vaccinate"
 - So to improve rates WE have to promote vaccines

8



Questions

9

References

- Centers for Disease Control and Prevention [CDC]. (2019a). *The pink book: Chapter 3. Immunization strategies for healthcare practices and providers.* <https://www.cdc.gov/vaccines/pubs/pinkbook/strat.html>
- Centers for Disease Control and Prevention [CDC]. (2019b). *The pink book: Chapter 17. Pneumococcal disease.* <https://www.cdc.gov/vaccines/pubs/pinkbook/pneumo.html#goals>

10

References continued...

- Centers for Disease Control and Prevention [CDC]. (2019c). *Pneumococcal vaccine recommendations.* <https://www.cdc.gov/vaccines/vpd/pneumo/freq/recommendations.html>
- Centers for Disease Control and Prevention [CDC]. (2020a). *Pneumococcal manual for the surveillance of vaccine-preventable diseases.* <https://www.cdc.gov/vaccines/imz/downloads/pneumo-manual.html>

11

THE END

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Appendix C

Pneumococcal Vaccination Survey:

We noticed today that you did not receive the pneumococcal vaccination. This survey is attempting to gather information on reasons why. This is for research purposes only and results will not be able to be placed back to you nor will they affect the treatment you receive at our office.

Please check one or more of the boxes below:

- ☐ Lack of provider recommendation/ was not discussed or aware
- ☐ Lack of ability to pay or fear of cost
- ☐ Religious Reason
- ☐ Personal Belief
- ☐ Safety Concerns (regarding side effects)
- ☐ Fear (of needles)
- ☐ Desire for additional information
- ☐ Wanting to get the Covid vaccination and have to wait based on timing
- ☐ Prefer not to disclose my reasoning
- ☐ Other, please describe_____