

Leveraging Interdisciplinary Teams for Pre-Visit Planning to Improve Pneumococcal Immunization Rates Among Internal Medicine Subspecialty Practices

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Abstract

Background: Despite the ready availability of pneumococcal vaccines and recommendation of vaccination by Center for Disease Control and Prevention (CDC), the immunization rates among adults less than 65 years of age with chronic and immunocompromised conditions remain low. **Methods:** This interventional (cohort) study aimed to improve the pneumococcal vaccination rate for patients with an increased risk of pneumococcal disease by utilizing a three-pronged approach. This included: (1) clinician education webinar, (2) pre-visit counseling performed by registered nurses, targeted toward patients with upcoming appointments, to address vaccination status, and (3) modified pre-visit interdisciplinary team huddle with clinicians and registered nurses to review which patients are amenable to vaccination at the time of visit and those who may benefit from re-engagement and further motivational interviewing. After the completion of the 10-week intervention, study organizers reviewed the percent of patients with completed pneumococcal vaccinations. **Results:** In this 10-week rapid cycle initiative, a total of 482 patients were eligible for vaccination. During the intervention phase, 370 patients were contacted and of these 38% of patients were amenable to receiving a vaccine during the pre-visit counseling, 5% were previously vaccinated, 18% were not amenable, and 38% were unreachable prior to visit. This initiative resulted in a 43% increase in the vaccination rate in this cohort. **Conclusions:** The significant increase in vaccination rate supports the utilization of a framework in the multidisciplinary approach to pre-visit planning in non-primary care specialties and other vaccination efforts, especially emerging diseases such as COVID-19. Future directions of study include the efficacy of telemedicine counseling with a same-day appointment for vaccination, co-location of registered nurses within the practice sites, as well as the use of other ancillary staff (such as medical office assistants) to engage patients in pre-visit planning.

Keywords

pneumococcal vaccination, internal medicine, interdisciplinary team

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Introduction

Pneumococcal infections, which can lead to both invasive and non-invasive disease, are one of the leading causes of morbidity and mortality in patients with chronic or immunosuppressing conditions.¹ In the United States in 2015, 52% of the invasive pneumococcal disease cases, which include bacterial pneumococcal pneumonia, meningitis, and bacteremia, and 40% of the invasive pneumococcal disease related deaths occurred in adults aged 18 to 64 years of age.¹ The Centers for Disease Control and Prevention (CDC) strongly recommends offering and administering pneumococcal vaccination for patients over the age of 65

regardless of chronic disease burden.² In addition, pneumococcal vaccination is recommended for adults under the age of 65 years who are at a greater risk of pneumococcal disease.³ These illnesses include: chronic heart disease (excluding hypertension), chronic lung disease, chronic

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liver disease, alcoholism, diabetes mellitus, cigarette smoking, immunodeficiency disorders (including B- and T-lymphocyte deficiency, complement deficiencies, and phagocytic disorders), sickle cell disease, thalassemia, chronic renal failure, end-stage renal disease, and more.²

Despite the ready availability of pneumococcal vaccines, the vaccination rates among adults with chronic and immunocompromised conditions remains low.¹ The 2015 National Health Interview Survey of the U.S. population reported that the pneumococcal vaccination rates among adults aged 19 to 64 years at increased risk for pneumococcal disease was 23%.⁴ Meanwhile, the burden of invasive pneumococcal disease in 2016 totaled at 30400 in patients between 19 and 64 years of age.⁵ There is evident disparity between those at risk and those immunized. Furthermore, there is disparity in race/ethnicity and vaccination status, as illustrated by Williams et al⁴ study in which 24.0% of white persons were vaccinated compared with 18.4% of Hispanic individuals.

Given the increased morbidity risk due to pneumococcal disease, the CDC and the Advisory Committee on Immunizations Practices (ACIP) support the role of primary and subspecialty physicians in counseling and advocating for pneumococcal vaccination in such patients.²

The education programs for physicians, nurse practitioners, physician assistants, and nursing traditionally relay the importance of vaccination for those over age 65, and there remains a low level of understanding around indications for pneumococcal vaccination in patients under the age of 65.⁶ Thus, vaccination rates in patients under the age of 65 still remain low.

There have been multiple quality improvement studies that have assessed innovative strategies to improve pneumococcal vaccine rates.⁷⁻⁹ Desai et al⁷ implemented point-of-care reminders, Sivaraman et al⁸ initiated pre-visit planning, and a study completed by Kawczak et al⁹ showed that having physician involvement and continued medical education training were beneficial to improving pneumococcal vaccination rates. None of these studies though utilized all the elements implemented in our novel approach.

In this study, we implemented a 3-pronged initiative, which included: (1) educational training for clinicians, (2) interdisciplinary pre-visit counseling to address vaccination status of patients, and (3) an interdisciplinary pre-visit huddle. The initiative's components chosen with intention—to address 3 major barriers to vaccination, which include: misinformation, patient engagement, and missed opportunity.¹⁰

By implementing this initiative, our goal was to improve pneumococcal vaccination rates among patients at increased risk of pneumococcal infection across internal medicine sub-specialty practices.

Methods

This interventional (cohort) study implemented a three-pronged approach, which included: (1) clinician education

webinar, (2) pre-visit counseling to address vaccination status, and (3) modified pre-visit interdisciplinary team huddle. Northwell Health's IRB was engaged in approval of this initiative and a waiver granted by the organization's IRB. This initiative received funding via grant (#FP00001479) from Alliance for Continued Education for Health Professionals and Pfizer.

Clinician Education Webinar

Using an educational webinar, the initiative aimed to provide a baseline understanding of the evidence for clinicians, nursing staff, and other members of the interdisciplinary team. The webinar aimed to address misinformation, a major barrier to vaccination rates.¹⁰ The objectives of the webinar were to: (1) review the historical impact of the pneumococcal vaccinations, (2) review updated ACIP and CDC indications for the pneumococcal vaccinations, (3) identify major barriers to immunization, (4) highlight the importance of interdisciplinary "Team Huddles," (5) review techniques for motivational interviewing, and (6) review the new workflow planned for this test of change.

The audience for the webinar included interdisciplinary clinicians, the registered nurses responsible for pre-visit counseling and huddles, and administrative staff. The webinar was made accessible in order to support ongoing pre-visit education for the health care providers and was eligible for Continuing Medication Education (CME) credit.

Pre-Visit Counseling

At the beginning of each week, patients with forthcoming appointments were screened to identify those eligible for pneumococcal vaccination and who had not yet received vaccination (Figure 1). The eligible patients were then contacted by registered nurses for pre-visit counseling. The pre-visit counseling script was created to ascertain the following information: (1) had the patient received pneumococcal vaccination previously, (2) if no, what have they heard/read about the vaccine, and (3) would they be amenable to vaccination at their upcoming appointment? At the end of the phone call, nursing staff would update the electronic medical record for vaccination status and the "huddle sheets." These sheets were reviewed in a pre-visit huddle between nursing, medical coordinators, and clinicians at each site. A special focus was placed on those patients eligible for vaccination during visits to ensure the patient was captured for counseling and/or vaccination by the clinician.

Modified Interdisciplinary Team Huddle

To address another major barrier to immunization, missed opportunity,¹⁰ the team implemented the use of a pre-visit team huddle. In the last decade, there has been a significant shift toward an interdisciplinary approach to the ambulatory

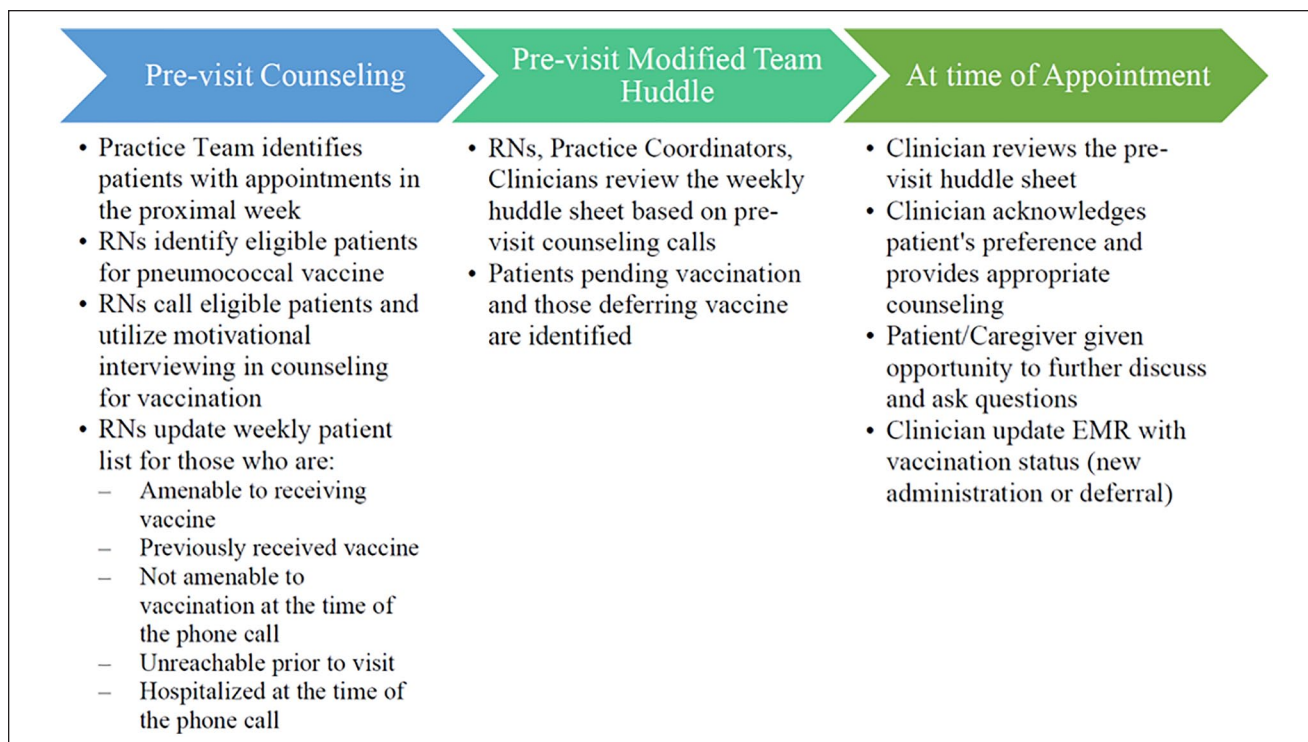


Figure 1. Process of interdisciplinary care.

patient visit.¹¹⁻¹³ An important aspect of an interdisciplinary approach is the concept of a pre-visit huddle.¹¹⁻¹³ A pre-visit huddle is a brief, daily meeting within a team consisting of physicians, physician assistants, nurse practitioners, nurses, medical assistants, office coordinators, pharmacists, behavioral health staff, etc.¹⁴ The pre-visit huddle is an opportunity for members from the interdisciplinary fields to anticipate patient needs.¹⁴ The goal of the initiative was to utilize the benefits of having an interdisciplinary pre-visit team huddle in 3 medicine subspecialty settings to combat the potential missed opportunity of providing the pneumococcal vaccination to those patients at increased risk of disease. The initiative's pre-visit huddle was modified by (1) occurring virtually (due to COVID-19 related social distancing parameters), and (2) occurring after pre-visit counseling with the registered nurses.

Physicians and other members of the interdisciplinary team were trained via the educational webinar about motivational interviewing techniques.¹⁵ During the pre-visit counseling, the nursing staff utilized motivational interviewing techniques to ascertain information as mentioned previously. Furthermore, clinicians attempted to re-engage using motivational interviewing for those patients who deferred vaccination during nursing phone counseling.

At the time of visit, the list of patients identified as "amenable to vaccination" was given to the physicians. During the visit, vaccination was ordered by the clinician and

administered by a licensed provider (RNs or ordering clinician).

Results

Prior to the intervention beginning, the total number of patients, under the age of 65, deemed eligible for the study was 482. The age demographics are shown in Table 1.

For the gender breakdown: 59% were female and 41% were male. Under ethnicity, 75% of patients identified as Non-Hispanic or Latino, 6% identified as Hispanic or Latino, and the remaining either declined to answer or marked "other" (Table 2). Of the eligible patients, 26% identified as Black or African American, 8% as Asian while 36% as White (Table 2).

Of the 482 eligible patients, 112 were excluded in the intervention due to patients' visits being scheduled as either (1) telemedicine visits hence vaccination not administered, (2) new patient visits, or (3) canceled appointments. Thus, 370 patients were the direct cohort of this initiative (Table 3).

The remaining 370 patients were contacted in the intervention phase. Thirty-eight percent of patients were amenable to receiving a vaccine during the pre-visit counseling, 5% were previously vaccinated, 18% were not amenable, and 38% were unreachable prior to visit. Vaccination status for patients who were "unreachable

Table 1. Age Distribution of Eligible Patients.

Age range	Number of patients	Percentage of patients
<20	1	0
20-24	7	1
25-29	13	3
30-34	13	3
35-39	20	4
40-44	30	6
45-49	46	10
50-54	81	17
55-59	126	26
60-64	145	30

Table 2. Distribution of Ethnicity and Race of Eligible Patients.

	Number of patients	Percentage of patients
Ethnicity		
Declined	8	2
Hispanic or Latino	31	6
Non-Hispanic or Latino	363	75
Unknown	80	17
Race		
American Indian or Alaska Native	1	0
Asian	37	8
Black or African American	125	26
Declined	2	0
Native Hawaiian or Other Pacific Islander	1	0
Other race	67	14
Unknown	76	16
White	173	36

Table 3. Outcomes of Pre-Visit Counseling and Calls.

Outcomes of pre-visit counseling and calls N=370	Number of patients	Percentage of patients
Amenable to receiving vaccine	141	38
Previously received vaccine	19	5
Not amenable to vaccination at the time of the phone call	68	18
Unreachable prior to visit	140	38
Patient hospitalized at the time of the phone call	2	1
Total	370	100

prior to visit” and arrived for scheduled visit was not tracked. Baseline data 3 months prior to the intervention reflected that 28% of patients with upcoming appointments were appropriately immunized with pneumococcal vaccination. At the completion of 10 weeks of the intervention phase, 40% of all arrived patients at the 3 practices had a documented pneumococcal vaccination, up from 28% prior to intervention. This resulted in a 43% increase in pneumococcal vaccination rate.

Discussion

While the CDC recommends pneumococcal vaccination for patients at increased risk of infection under the age of 65 years, the rates of vaccination remain low. Additionally, knowledge of the current pneumococcal vaccine recommendations for adults under the age of 65 years is variable among providers. The initiative incorporated 3 major components: (1) clinician and team education, (2) pre-visit counseling by registered nurses, and (3) interdisciplinary

pre-visit huddles. Although quality improvement efforts have utilized elements of pre-visit planning, point-of-care reminders, and educational training,⁷⁻⁹ none have applied a combined effort like the one implemented in this initiative.

Through the education webinar, members of the interdisciplinary team were provided a baseline knowledge of recent CDC and ACIP recommendations for the pneumococcal vaccine to address the barrier of misinformation.

The pre-visit phone call was essential to this initiative. The calls, performed by registered nurses, addressed patient engagement via counseling using motivational interviewing techniques to address vaccine hesitancy.

The interdisciplinary pre-visit huddle mitigated missed opportunities for vaccination. This initiative showcases that detailed strategy on addressing common barriers by utilizing interdisciplinary huddles and pre-visit patient counseling is helpful in improving pneumococcal vaccination rates among vulnerable populations.

Although the initiative was limited to a 10-week time frame, we still were able to achieve a 43% increase in pneumococcal vaccination rate amongst the sub-specialty practices using our 3-pronged approach. Additionally, it is likely that increased emphasis placed on pneumococcal vaccination in these practice sites created a halo effect in that it heightened the clinical teams' radar for addressing immunization status of other patients.

Limitations

The COVID-19 pandemic caused a significant delay in the start of this grant funded project, and further shortened the intervention phase. In addition, given that practices were unable to co-locate registered nurses within the practice sites, the true experience of interdisciplinary care was not fully realized. In addition, patients with telehealth visits or those who were new patients to the practices were excluded from the intervention. Therefore, 38% of the eligible patients were unable to be reached prior to visit, and if the intervention time frame was extended, the team would have been able to reach a significantly higher number of patients. It is likely that given an extended opportunity outside of the parameters of a pandemic, subsequent improvement cycles would be able to address these limitations.

Future Directions

Future directions of study include the efficacy of telemedicine counseling with same-day appointments for vaccination, co-location of registered nurses within the practice sites, as well as use of other ancillary staff (such as medical office assistants) to engage patients in pre-visit planning. The use of interdisciplinary care has significant potential in areas with limited medical staffing/workforce. Furthermore, use of telemedicine and pre-visit planning can be of

significant consequence to areas with geographic distance or complex social structure requiring coordination of services to occur "out of the box" of a medical office. Lastly, the future scope of this study's takeaway includes applying principles of patient centered medical home model in specialties beyond primary care.

Conclusion

By applying provider education, pre-visit counseling, and pre-visit interdisciplinary huddles, a significant improvement in immunization rates for patients at increased risk of pneumococcal disease between the ages of 19 and 64 years can be achieved. This initiative provides a framework for a multidisciplinary approach to pre-visit planning as a method to increase vaccination rates and address patient needs. Despite significant barriers posed by the pandemic, rates increased with this approach. Additionally, this framework can be utilized for other vaccination efforts, especially considering COVID-19 vaccination attempts. The principles of patient centered approach have significant promise if extended beyond primary care and leverages interdisciplinary team care.

Author Note

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Author Contributions

All authors listed have contributed substantially to the conception, formulation, drafting, and revision of the submission. All authors take public responsibility for its content.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Dr. Maria Carney is a board member for Haven Behavioral Health, and it poses no conflict with her current or past role in this initiative or manuscript. For the remaining authors none were declared.

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