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Title of Project: Improvement of Vaccination Rates in Adult Patients at High Risk for Pneumococcal Disease: A Focus on Reasons for Decline of Vaccination

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Inclusive Dates of Project: 10/1/2012 to 8/1/2015

Federal Project Officer:

Acknowledgment of Agency Support: Pfizer

Grant Award Number: 8905789

1. **Structured Abstract:**
   a. **Purpose:** To identify reasons why patients decline the pneumococcal vaccine and implement formalized strategies to increase the rate of patient acceptance of the vaccine.
   b. **Scope:** Administration of the pneumococcal vaccine was suboptimal in our health system prior to project implementation despite previous efforts to increase vaccination rates in both outpatient and inpatient settings. The main barrier to achieving higher vaccination rates was a high rate of patient refusal (40%) when presented with the offer of vaccination.
   c. **Methods:** Phase 1: Identify top reasons why patients refuse pneumococcal vaccination. Phase 2: Develop and test intervention strategies to persuade patients to accept pneumococcal vaccination. Phase 3: Educate providers, nurses and pharmacists on the techniques and strategies identified in the earlier phases. Analyze vaccination rates of qualified patients from CMS abstraction data and compare pre and post implementation data.
   d. **Results:** Vaccination decline rates were decreased from 40% to 16.2%.
   e. **Key Words:** Pneumonia, vaccination, pneumococcal vaccine

2. **Purpose:** To identify reasons why patients decline the pneumococcal vaccine and implement formalized strategies to increase the rate of patient acceptance to the vaccine.

3. **Scope:** S. pneumoniae is the most common cause of pneumonia (community acquired) with 15% of patients developing invasive disease. In the US in 2010, invasive pneumococcal infection caused an estimated 4,000 deaths. As studies have shown, a sizable portion of hospital admissions, and the associated morbidity and mortality are potentially preventable through vaccination. Administration of the pneumococcal vaccine was suboptimal in our health system prior to project implementation despite previous efforts to increase vaccination rates in both outpatient and inpatient settings.

   In order to meet Centers for Medicare & Medicaid Services (CMS) pneumococcal immunization measure (IMM-1) which mirrors the goals of Healthy People 2020, Yale-New Haven Hospital (YNHH) created a systematic approach to identify and vaccinate all patients that meet the criteria set by CMS. Although this approach has captured more at-risk patients in need of vaccination, vaccination rate had only marginally increased due to high patient refusal rate (40%).

4. **Methods:**
   Phase 1: From October 2012 to February 2013, all patients offered vaccine were identified daily via vaccine charting documentation in electronic medical record using a convenience sample. Patients who refused the vaccine were identified and completed a survey that assessed their reasons for vaccine refusal. Strategies were then identified to target reasons for refusal.

Phase 2: Occurred from March 2013 to May 2013 and all patients who initially refused vaccination were candidates for the intervention strategies.

Phase 3: Once the strategies were validated with the phase 2 trail, we implemented a robust RN education program on the need for vaccination and strategies to improve vaccination rates. The RN education initiative was made mandatory for all inpatient RN staff using a computer-based module for training.

New functionality in the electronic medical record, EPIC, was also developed to allow for more efficient screening of all inpatients who may qualify for vaccine receipt, reviewing vaccination history, and allowing for retiming of vaccination by the RN during the inpatient stay.   Also, a real time reporting for patient care units was developed to allow nurse managers to review their staff's vaccination performance in real time.

In phase III, pharmacists were also educated in the revised protocol vaccination process to help correct missing or incomplete vaccine assessments or vaccine orders. Training was mandatory with a competency quiz.

An analysis of vaccination rates was completed of qualified from our CMS abstraction data from Nov 2014 to Jan 2015.

5. **Results:**
   Phase 1: The following patient characteristics were associated with vaccine refusal:
   - Length of hospital stay longer than 5 days
   - Primary diagnosis of sickle cell disease

   We also identified that 72% of the patients who rejected the vaccine the first time continued to refuse the pneumococcal vaccine at the second time.   However, among those patients, 15% of them actually already had received it within the past 5 years and 13% of them stated that they were never offered vaccine during the hospitalization. Consequently, 28% of "denials" were due to lack of documentation of prior vaccine at the time of vaccine order/entry and or lack of offering the vaccine to the patient.

   Regarding the reasons for pneumococcal vaccine refusal, the top 3 reasons were feeling overwhelmed, feeling otherwise healthy, and concerns of getting ill from vaccines.

Phase 2: 40% of those patients who previously refused vaccination change their mind and agreed to receive a dose of pneumococcal vaccine.

Phase 3: An analysis of vaccination rates was completed of qualified from our CMS abstraction data from Nov 2014 to Jan 2015. A total of 117 patients qualified for the analysis. Of this sample, 98 received or already received the vaccine while only 19 refused giving a 16.2% refusal

rate. Which is a significant reduction in our historical refusal are of 40%. As a result of this project, the refusal rate was reduced by approximately 60%.

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