The Effect of Providing Education & Immediate Pneumococcal Immunization During Specialty Care in Patients Receiving Immunosuppressive Therapy

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Introduction

Immunosuppressive therapies increases risk of vaccine-preventable illnesses at least 2-fold, which are an important cause of morbidity and mortality worldwide.[1-2] **Immunocompromised patients' immunization rates range from 11-49%** for pneumococcal vaccinations.[3] As a result, these patients experience higher rates of preventable infections.[4-5] There was an increase in pneumonia-associated hospitalizations from 18.7% in 2001 to 29.9% in 2014. Total charges for pneumonia-associated hospitalizations in 2014 were over $84 million![6] Failure to vaccinate can occur by *overlooking indication* and an *uncertainty as to who is responsible* for vaccination.[7-9] Factors positively influence vaccination include: receiving a prescription from a clinician and knowledge of vaccines, whereas, a lack of recommendation is a negative influencer. Since the early 2000's, vaccinations have been offered in pharmacies. This could potentially result in additional confusion as to responsibility for vaccination.[10] Dermatologists frequently prescribe immunosuppressants. *Our patient's immunizations were incomplete!* We sought to increase immunizations via quality improvement project starting in Fall 2019

The goal: **determine if patient education + immediate onsite immunization would increase vaccine coverage** per Centers for Disease Control and Prevention (CDC) guidelines[11] We compared this to standard care which is recommending to see primary care provider about immunizations, along with other general coronary heart disease risk reductions

Methodology

Compared **baseline** pneumococcal immunization status & demographics for patients on immunosuppressive therapy subject to QI project (*experimental group*) **vs** patients who were not subject to the QI project (*control group*) in two different dermatology clinics.

Compared demographics for control and experimental groups in relation to immunization status

- **Experimental group:** education of recommended vaccinations per CDC guidelines + offered immediate pneumococcal administration
- **Control group:** standard care (recommended to see their primary care provider about immunization)

Compared **acceptance rates** of pneumococcal vaccines for both groups throughout QI project

- Chi-square tests to evaluate differences in proportions using SAS v9.4 software [Cary, NC, USA].

Definitions:

-Unimmunized: Never received the PCV13 (Pneumococcal) or PPSV23 (Pneumovax)

-Partially Immunized: Received either PCV13 or PPSV23

-Completely Immunized: Received both PCV13 & PPSV23

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Results

Control & Experimental Group Immunization Rates:

	Control Group	Experimental Group Before Intervention	Experimental Group After Intervention
Unimmunized	65.5%	69.2%	13% ↓
Partially Immunized	16.4%	17.8%	50.7% ↑
Completely Immunized	18.2%	13%	36.3% ↑

- At baseline, experimental and control groups were not significantly different in
  - gender (p=0.7)
  - race (p=0.16)
  - age (p=0.95)
  - comorbidities (p=0.9)
  - prior immunizations (p=0.7)
- Control group immunization rates = *unchanged*
- Experimental group immunization acceptance rate: **83.5%**
- Control group immunization acceptance rate: **0%** (X^2=97.8812, p<0.0001)
- Control group and Experimental groups immunization rates differed significantly after QI project (X^2=55.73, p<0.001)

Baseline Immunization Status:

Chronic Heart Disease:

Higher rate of complete immunization before intervention in those **with chronic heart disease** (37%) as compared to without chronic heart disease (11%).

Higher rate of unimmunized in those **without chronic heart disease** (70%) as compared to those with chronic heart disease (56%).

(Chi-Square = 13.56 p <0.0011)

Diabetes:

Higher rate of complete immunization before intervention in those **with diabetes** (27%) as compared to without diabetes (10%).

Higher rate of unimmunized in those **without diabetes** (75%) as compared to those with diabetes (48%).

(Chi-Square = 14.06 p <0.0009)

Age:

Higher rates of **unimmunized** (80.6%) in patients **<65 years old** as compared to >65 years old (11%)

Higher rates of **completely immunized** (50%) in patients **>65 years old** as compared to <65 years old (6.7%)

(Chi-Square = 71.02 p <0.0001)

Comorbidities:

Those with **4+ comorbidities** had **higher rates of complete** (76%) and partial (56%) immunity with the lowest unimmunized (21%).

Those with **no comorbidities** had the **highest rates of unimmunized** (43%) and the lowest rate of partial (15%) complete immunity (0%).

(Chi-Square = 30.35 p <0.0001)

Centers for Disease Control (CDC) recommended schedule for pneumococcal vaccination for patients with chronic inflammatory diseases on immunosuppressive medications:

Unimmunized patients:
PCV13 vaccine given ➔ ***8 weeks later:*** **PPSV23** ***(Recommended but not completed in this study)***

Partially immunized patients:
PPSV23 previously given ➔ ***>1-year subsequent:*** **PCV13 vaccine given**
PCV13 previously given ➔ ***8 weeks later:*** **PPSV23 vaccine given**

Discussion

High proportion of immunosuppressed patients were **not immunized**

- Patients with the following characteristics had higher rates of immunizations
  - >65 years old
  - Multiple comorbidities
  - Past medical history of chronic heart failure
  - Past medical history of diabetes
- However, patients with chronic inflammatory diseases on immunosuppressive therapy should be immunized as well

With **education** & **immediate availability of vaccine,** there was high vaccination acceptance rate

The question becomes: *Who is responsible* for vaccination? This illustrates "Diffusion of responsibility." If everyone is responsible, then no one is responsible.[12]

- Dermatologists prescribing immunosuppressants can increase vaccine coverage & prevent illnesses by administering vaccines
- Guidelines should establish clear responsibility for who is responsible for immunization.

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