

**Title of Project:** Use of Pharmacy Practice Faculty and Student Pharmacists to Screen, Educate, and Provide Pneumococcal Vaccine to Elderly Patients in Vermont

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## STRUCTURED ABSTRACT

**Purpose:** To utilize pharmacists and pharmacy students in providing mobile health clinics to elderly residents in Vermont with a focus on administering pneumococcal immunizations, vaccine education, and medication reviews.

**Scope:** The target population was Vermont residents over age 65 that reside in communities such as skilled nursing, residential care, assisted living, and independent living facilities or who visit day facilities.

**Methods:** Eligible patients were offered Albany College of Pharmacy and Health Sciences (ACPHS) faculty and student operated pneumococcal vaccination, immunization education, and informal medication reviews at mobile health clinics conducted at target facilities between April 2013 and October 2014.

**Results:** A total of 123 patients were immunized during 13 mobile health clinic visits which resulted in an average vaccination rate increase of 19.3% at participating sites. In addition, 8 subjects that were not residents of a target facility but whom met protocol criteria were vaccinated by their primary care physician as a direct result of the educational materials they received prior to a health clinic. Although unexpected barriers precluded performance of medication reviews at most sites, 9 patients received pharmacy faculty and student medication reviews during which 11 medication interventions were noted.

**Key Words:** pharmacist; vaccination; immunization; invasive pneumococcal disease; elderly; students

## PURPOSE

The objective of this study was to increase pneumococcal vaccination of elderly Vermonters using a pharmacy school faculty and student operated mobile vaccination service. A secondary objective was to provide vaccine education and informal medication reviews to participants of this mobile health service.

## SCOPE

### Background, Context and Setting

The overall aim of this program was to prevent pneumococcal disease through the vaccination of Vermonters over age 65 that reside in skilled nursing facilities, residential care homes, and assisted living residencies which would ultimately assist in achievement of 90% vaccination rates as stated in Healthy People 2020.<sup>1</sup> This project was an effort to enlarge the focus of vaccinations in preventative healthcare from the pediatric population to include the susceptible,

accessible, and growing elderly population in Vermont in the form of pneumococcal vaccination. The project was initially to include 72 mobile health clinics over the life of the grant. The initial list of facilities was provided by the Vermont Healthcare Association and included 54 eligible care entities. Subsequent research expanded this reach to 82 eligible facilities. The project also expanded the role of the pharmacist in Vermont to include a more proactive approach to preventative healthcare.

This program was conducted by the Vermont satellite campus of the Albany College of Pharmacy (ACPHS), the only school of pharmacy in Vermont. Pharmacy students and faculty who were certified immunizers traveled to skilled nursing, residential care, and assisted living facilities throughout the state and provided vaccinations, medication reviews, and vaccine education.

Facilities that were eligible to host a clinic needed to be located in Vermont, have at least 5 residents, and be able to provide at least one staff member to coordinate scheduling and compile patient information. Clinics were scheduled at times that were convenient for the facility staff and that did not disrupt regularly planned activities. Patients had the option of receiving their vaccination either in a main gathering area or in their own room.

### **Participants**

It was necessary for the program to develop partnerships with several organizations for patient access, vaccine supply and billing, and to expand the statewide immunization registry. The Vermont Health Care Association (VHCA) provided a list of skilled nursing, residential care, and assisted living facilities in Vermont with a minimum of 5 beds. The Vermont Immunization Registry provided a mechanism to record immunization data in their database. This database serves as a repository for statewide immunization information and is an important resource for physicians.

Thirteen sites participated in this program. Site participants included coordinators, nurses, administrators, Medical Directors and primary care physicians.

Immunization teams were formed that consisted of one ACPHS faculty member and at least one ACPHS student. The number of faculty members and students that participated in a clinic depended on the schedule of the faculty and students, the anticipated number of immunizations to be administered, the site's physical size, and the timing of the clinic.

### **Incidence**

Pneumococcal vaccination rates for adults over the age of 65 in the state of Vermont were higher in 2013 (34%) versus 2012 (31%).<sup>2</sup>

### **Prevalence**

In 2013, 73% of Vermonters 65 years or older indicated that they had ever received a pneumococcal vaccine.<sup>2</sup>

## METHODS

### Study Design

A student team developed three tools to begin the vaccine education program offered to each facility; a poster (Appendix 1), a brochure (Appendix 2), and a Microsoft PowerPoint® presentation (Appendix 3). The poster was offered to target facilities to be displayed in common areas and included the date and time of the scheduled clinic. The educational brochure was delivered by mail or in person to most facilities prior to clinic day to be distributed to residents and was also available during the clinic. Student led presentations were given at clinics where time, space, and staff were available to support this service. The educational presentations were not just open to residents; families of residents, facility staff, and volunteers were also encouraged to attend.

A supply list (Appendix 4) for each clinic was developed to ensure that the host facility was not financially burdened by using their expendable supplies and to ensure that each clinic was run efficiently. The Immunization Action Coalition<sup>3</sup> document “Supplies You May Need at a Community Adult Immunization Clinic” was referenced in the creation of the supply list. The supplies of vaccine and printed materials brought to each clinic were based on the estimated number of residents to be served. The quantity of each recommended emergency item was doubled to allow two immunization teams immediate access to supplies even if the teams were not physically near each other in the facility. The New England District of Walgreens offered support by supplying vaccine, syringes, and needles through their Burlington, Vermont retail location and handling vaccine billing for Medicare Part B and Blue Cross/Blue Shield Anthem policies.

Technology use at the clinics was for the purposes of gathering information and providing immediate materials for the facility and residents. A Canon® iP90 mobile printer was purchased so that chart vaccination stickers can be printed for the facility’s records and to provide residents with immediate access to the results of their medication review. Laptop computers and an iPad® were provided by faculty and staff.

Administrators at facilities that were potential clinic sites were initially contacted by phone and email. To increase interest in the program an introductory packet (Appendix 5) was designed and delivered at in-person meetings with administrators, nurses, and other key facility staff.

Facility staff that expressed interest in hosting a clinic were sent a set of approval forms to fax or mail to each resident’s primary care physician (PCP) (Appendix 6) and power of attorney (POA) (Appendix 7) if applicable. The facility was also provided a variety of possible dates to choose from 2-3 weeks into the future to allow for return of the approval forms. The main clinic coordinator at each facility was offered the opportunity to utilize each of the three components of a clinic: pneumococcal vaccination, a student-led educational presentation, and medication

reviews. Vaccination was the core component and the other components were completed per the facility's ability to provide extra space, staff, and time.

The coordinator at each facility was responsible for sending out and gathering back the approval forms and maintaining a roster of residents that included the resident's name, birth date, room number, accepted insurance information, previous pneumococcal vaccination date if known, and status of PCP response.

The day before each clinic visit all required materials were verified as usable, counted, and gathered in the secure pharmacy skills teaching laboratory preparation room at the college. The estimated number of vaccinations was provided by the facility coordinator and the vaccine was stored in a refrigerator, also located in the laboratory preparation room. Each clinic adhered to a standard set of procedures to ensure consistency in all aspects of the clinic visit.

At the completion of each clinic the project coordinator received the completed forms and lists and the data was entered into the database. Any issues involving missing data were resolved as soon as possible by contacting the facility coordinator.

Immunization teams were formed that consisted of one ACPHS faculty member and at least one ACPHS student. The number of faculty members and students that participated in a clinic depended on the schedule of the faculty and students, the anticipated number of immunizations to be administered, the site's physical size, and the timing of the clinic. Medication reviews were offered to facilities as an additional benefit of the mobile vaccination clinics if supported by adequate staffing, time and space. Patient medication regimens were acquired from medication bottles, oral patient history, and/or medical charts. This information was gathered by students and faculty on-site during the clinic and a medication action plan was produced when significant interactions or adverse reactions were present.

### **Data Sources/Collection**

A set of databases were created using FileMaker Pro<sup>®</sup> version 12 software. The software was chosen because it provided a way to create a version of the vaccination form (Appendix 8) for input on an iPad<sup>®</sup>. The password-protected databases managed patient data, facility data, medication review data, and inventory and were kept on one computer accessed by the Project Coordinator.

Patient data was provided by clinic sites and by patients. Clinic sites were given forms to send to the primary care physician for each patient and to the power of attorney for patients that had one. The clinic site either provided a copy of these forms or the information was provided as a patient roster. Patients provided information during interviews prior to vaccination. Vaccination data was either recorded on a paper form, an iPad<sup>®</sup> form, or an Excel<sup>®</sup> form. The data was then transferred to the main FileMaker Pro<sup>®</sup> vaccination database.

An Excel<sup>®</sup> form was created to collect data during patient medication reviews. This data was then added to a FileMaker Pro<sup>®</sup> database.

## **Intervention**

There were no vaccination related adverse events recorded.

## **Measures**

Patient information and vaccination data was collected as needed for billing, inclusion in the Vermont Immunization Registry, and for reporting to the Vaccine Adverse Event Reaction System (VAERS).

As part of the Vaccination Procedure in "Physician's Approval for Administering Pneumovax23 to Adults" (Appendix 4) three standard screening questions were asked of each patient.

## **Limitations**

Several factors prevented facilities from coordinating a clinic. The most common limitations were having a pneumococcal vaccination protocol already in place and lack of response from facility administrators. Data collection was hindered in some instances by a lack of complete documentation in patient health records either with the facility, their primary care physician, or both. Other limitations included the inability of some patients to answer questions for themselves which limited the ability to perform pharmacist based patient education and medication reviews.

## **RESULTS**

### **Principal Findings**

The program completed 13 visits to different clinics during which 123 pneumococcal vaccines were administered and 9 medication reviews were performed by pharmacists and students from a pool of approximately 638 patients. A description of the outcomes of each contact made to an eligible facility is shown in Figure 1. Initial contact was made via email, phone call, or in-person meeting. Although the goal of each contact was to complete a clinic visit, barriers such as a lack of interest from facility staff or residents, current vaccination protocols being in place, policy barriers, and lack of response from facility staff reduced the pool of potential clinic sites.

As a result of this mobile service, the average reported pneumococcal site vaccination rate increased 19.3% (see Table 1). The initial rate of vaccination was reported by the facility coordinator as those individuals who were already current on their vaccination or under palliative care and thus were contraindicated to receive a vaccination.

The pneumococcal vaccination rate of patients at clinic sites reported in Table 1 is likely to be lower than the actual rate because 7 out of 13 clinics did not provide complete documentation.

Table 1 *Summary of Pneumococcal Vaccination Data*

Clinic	Patient outcome										
	Vaccinated		Approved but not vaccinated		Already current or palliative		Unknown or no response from PCP		Documented patients		Patient census
	Number	Rate*	Number	Rate*	Number	Rate*	Number	Rate*	Number	Rate*	
1	6	13.3	6	13.3	21	46.7	12	26.7	45	100	45
2	18	46.2	-	-	-	-	-	-	18	46.2	39
3	13	13.0	3	3.0	50	50.0	18	18.0	84	84.0	100
4	24	38.7	7	11.3	-	-	-	-	31	50.0	62
5	14	22.6	11	17.7	4	6.5	14	22.6	43	69.4	62
6	5	13.9	2	5.6	-	-	-	-	7	19.4	36
7	13	36.1	4	11.1	11	30.6	8	22.2	36	100	36
8	8	22.9	0	0.0	24	68.6	3	8.6	35	100	35
9	4	36.4	0	0.0	7	63.6	0	0.0	11	100	11
10	2	3.0	-	-	17	25.8	-	-	19	28.8	66
11	1	3.3	-	-	-	-	-	-	1	3.3	30
12	3	10.0	0	0.0	27	90.0	0	0.0	30	100	30
13	12	14.0	3	3.5	71	82.6	0	0.0	86	100	86
Total**	123	19.3	36	5.6	232	36.4	55	8.6	454	71.2	638

\* Rate is listed as a percent.

\*\*Columns labeled "Number" are the sum of the column and columns labeled "Rate" are the arithmetic mean.

- Represents a lack of documentation provided by the coordinator at the clinic site.

In addition to providing pneumococcal vaccination, a total of 11 medication interventions were noted in brown-bag style medication reviews provided to 9 individuals. The intervention types listed in Table 2 highlight the importance of regular consultation with a pharmacist. None of the adverse reactions listed were severe.

Table 2 *Summary of Medication Review Intervention Data*

Intervention type	Number
High dose causing adverse reactions	1
Extended dose causing adverse reactions	3
Remove from chart/discontinued	4
Add to chart	1
Indication without medication	1



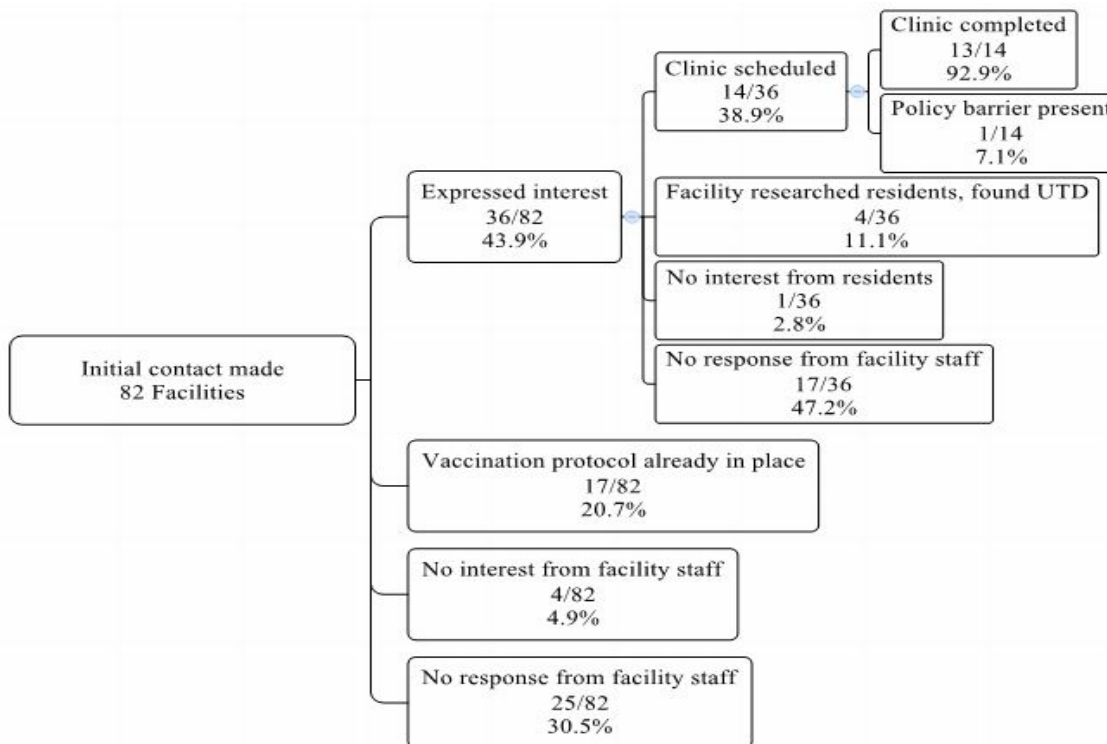


Figure 1 Facility Outcomes From Initial Contact

## Outcomes

A summary of the outcomes of the student and faculty mobile pneumococcal vaccination service are displayed in Table 1, Table 2 and Figure 1. As a result of contacting approximately 82 potential sites, a visit was scheduled for 38.9% of the 43.9% of sites that expressed interest. Of those sites who scheduled a visit, the visit was completed 92.9% of the time.

After providing the pneumococcal mobile vaccination service, the reported pneumococcal vaccination rate increased from 36.4% to 55.7% at participating sites. During the 13 scheduled mobile pneumococcal health visits, 123 elderly Vermonters received the pneumococcal vaccine resulting in an average vaccination rate increase of 19.3% (Table 1). Eight subjects who were not residents of the sites visited but were 65 years old or older also received the pneumococcal vaccine from their primary care provider as a result of the educational materials provided; although an indirect result of this service, these subjects were not included in the final results.

## Discussion

A pharmacy school student and faculty operated mobile immunization clinic is feasible and can result in an increase in the number of eligible elderly patients immunized. Although a number of barriers limited the participation of a significant portion of eligible sites, 123 pneumococcal vaccines were administered during the 13 site visits that were completed. Considering that the pool of eligible vaccine recipients was approximately 638, the potential exists for an increase in

the number of elderly Vermonters vaccinated through the provision of a student and faculty run vaccination clinic. In addition, now that the latest Advisory Council on Immunization Practices recommends that elderly patients receive both the 13 and 23 valent pneumococcal vaccine, services like the one provided in this study may have even greater potential to influence the number of eligible patients in each state who meet vaccination guidelines.

Although the reported pneumococcal vaccination rate increased from 36.4% to 55.7% as a result of the mobile vaccination service provided by pharmacy students and faculty, a number of barriers were identified that limited the vaccination, education and medication therapy review provided including lack of coordination of the service at the site, inability of patients to answer medication related questions and participate in patient education and medication reviews and the inability of the facility coordinator to provide complete documentation of all residents at the time of visit. These and other unidentified barriers most likely precluded performance of medication reviews at most site; only 9 patients received pharmacy student and faculty medication reviews. In addition, the pneumococcal vaccination rate of patients at clinic sites reported in Table 1 is likely to be lower than the actual rate because 7 out of the 13 clinics did not provide complete documentation. Although pneumococcal vaccination rates for adults over the age of 65 in the state of Vermont increased during the time that this study was conducted (34% in 2013 compared to 31% in 2012), data was not collected to discern if and how much our service contributed to this increase.<sup>2</sup>

### **Conclusions**

Pneumococcal vaccination rates of elderly Vermonters can be increased through a pharmacy school student and faculty led mobile immunization service.

### **Significance**

An additional 131 elderly Vermonters who may have not have received pneumococcal vaccination were vaccinated as a result of this service.

### **Implications**

Although our results are only reflective of pneumococcal vaccination in the state of Vermont, the potential exists that a pharmacy school student and faculty led vaccination service can increase the vaccination of elderly Vermonters for all indicated vaccines which would ultimately contribute to the improvement of healthcare outcomes in the state of Vermont.

## LIST OF PUBLICATIONS AND PRODUCTS

An abstract will be submitted to a scientific or pharmacy professional meeting during 2015 or 2016.

## REFERENCES

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<sup>1</sup> Huang S, Johnson K, Ray G et al. Healthcare utilization and cost of pneumococcal disease in the United States. *Vaccine* 2011; 29(18): 3398-3412.

<sup>2</sup> Vermont Behavioral Risk Factor Surveillance System 2013 Data Summary. Vermont Department of Health 2013. [http://healthvermont.gov/research/brfss/documents/summary\\_brfss\\_2013.pdf](http://healthvermont.gov/research/brfss/documents/summary_brfss_2013.pdf).

<sup>3</sup> Supplies You May Need at a Community Adult Immunization Clinic. Immunization Action Coalition 2010. <http://www.immunize.org/catg.d/p3047.pdf>.

