Improved Influenza Vaccination Rates in a Rural Population as a Result of a Pharmacist-Managed Immunization Campaign

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Study Objective. To increase the rate of influenza vaccinations in high-risk patients by means of a pharmacist-managed immunization campaign.

Design. Unblinded, single intervention.

Setting. Rural primary care clinic.

Patients. Six hundred fifty-seven patients at high risk for contracting influenza according to criteria established by the Centers for Disease Control and Prevention.

Intervention. High-risk patients identified by chart review were mailed an education packet on influenza immunization. Vaccinations were given in specially designated clinics and during routine clinic visits. Campaign success and reasons why patients remained unvaccinated were determined by follow-up surveys.

Measurements and Main Results. The influenza vaccination rate increased from 28% at baseline (before program initiation) to 54% after program initiation. Unvaccinated patients were younger and resided in more urban areas than vaccinated patients; vaccinated patients had a higher frequency of cardiovascular disease or diabetes mellitus. Vaccinated patients consistently identified the education packet and their health care providers as primary motivators for vaccination.

Conclusion. Our pharmacist-managed vaccine program increased the influenza immunization rate in high-risk patients.

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Influenza continues to plague the United States population, ranking as the sixth leading cause of death when combined with pneumonia, and resulting in an average of 114,000 hospitalizations/year.1, 2 From health and financial perspectives, vaccinating patients who are at high risk for contracting influenza is the most effective method of preventing the illness and its consequences. The influenza vaccine provides healthy individuals with 70–90% protection and elderly individuals with approximately 50% protection.3, 4 A meta-analysis of 20 studies examining the effect of the vaccine among the elderly found that efficacy was 56% for...
preventing respiratory illness, 50% for preventing hospitalization, and 68% for preventing death. From cost-benefit and cost-effectiveness perspectives, vaccination realizes an estimated net cost saving of $117 for each elderly individual vaccinated. Among working adults, those vaccinated experience 25% fewer episodes of upper respiratory tract illness (URI), 43% fewer days of sick leave due to URI and 44% fewer visits to physicians for URIs, resulting in an estimated $47 savings/vaccinated patient.

The Centers for Disease Control and Prevention (CDC) report, “Healthy People 2000,” established target influenza immunization rates of 60% for noninstitutionalized high-risk adults and 80% for institutionalized high-risk adults. The more recent “Healthy People 2010” goals are more ambitious: 90% for all high-risk adults. Yet the CDC vaccination report indicates that in 1997 only 63% of elderly patients were vaccinated. New York State’s influenza immunization rate among seniors is 34th in the nation. High-risk adults, 50–64 years of age, who have indications for the vaccine, are even less protected: only 21–28% are vaccinated nationwide.

Although influenza is preventable by means of a cost-effective, minimally invasive, well-tolerated vaccine, it remains a leading cause of death among patients at high risk for developing complications from the disease. Four factors predict patients’ unvaccinated status: concern regarding side effects (e.g., believing that vaccination causes influenza), lack of concern about the significance of the illness, feeling impervious to influenza, and lack of a provider directive. Put simply, patient education and provider proactivity are key areas to address when encouraging patients to get vaccinated.

A recent review recommended that all primary care practitioners implement a patient reminder/recall system to improve immunization rates within their practices. Most established vaccination campaigns use large health maintenance organizations or health systems (e.g., Veterans Administration), are conducted in large urban centers or as a statewide program, or increase immunization rates for patients already within a health care system (e.g., being treated in an emergency facility). These campaigns do not address access issues, which are a problem for many U.S. residents who live in rural communities. Rural patients travel to large health care centers for acute, necessary procedures but are unlikely to travel as far for preventive services.

Baseline Data Collection

At the rural primary care clinic in September 1999, the pharmacy team conducted a manual
chart review to collect patient demographic information, contraindications to influenza vaccine, and previous influenza vaccine history. According to 1999 CDC guidelines, patients are at high risk for contracting influenza and developing complications if they meet one or more of the following criteria: age 65 years or older; diagnosed with any chronic cardiovascular, pulmonary, or metabolic disease (e.g., diabetes mellitus, renal dysfunction, immunosuppression); pregnancy with second or third trimester occurring during the influenza season; children (aged 6 mo–18 yrs) receiving long-term aspirin therapy; or resident of a long-term care facility. Patients' charts were flagged if they met one or more of these criteria. Collected data were entered into Microsoft Access.

Intervention

The pharmacy team developed an education packet that was sent to all patients who needed the influenza vaccine. The packet contained a letter and a two-sided information insert designed in collaboration with a teaching/learning specialist. The letter and insert addressed the following three issues: the need to capture the attention of elderly individuals yet not discourage younger patients who have indications for vaccine, use literacy and reading comprehension levels that correspond to demographics of the clinic's patient population and the National Adult Literacy Survey, and provide a distinctive item in the mailing—an insert—that patients could keep and use as a reminder. Information was included about why the vaccine is important, potential side effects, when vaccinations can be obtained, and a telephone number for asking questions or voicing concerns (Figure 1). A poster containing similar information was placed in the clinic waiting area. Patients were encouraged to make a special appointment or get vaccinated during the vaccination clinic conducted on 2 consecutive days in early November 1999. The pharmacy team designed, initiated, implemented, and managed the logistics of the vaccination program, including conducting patient intake surveys, answering questions, providing information about the influenza vaccine, preparing vaccine syringes, resolving patient-specific clinical issues through chart review, and ensuring that the clinic ran as planned. A nurse administered the vaccine.

Vaccination Clinic Follow-Up

The pharmacy team developed two surveys. One survey, for patients who received the influenza vaccine (entitled “We helped you, now you can help us”), was given by a nurse or pharmacist to patients during the vaccination clinic, at physician appointments, or by mail. This survey was designed to capture four pieces of information: patient immunization histories that may not have been in patients' charts, factors that convinced patients to get vaccinated, whether patients received the mailing and its role in their vaccination decision, and factors that reminded patients to get vaccinated. A comments section encouraged patients to suggest ideas for improving future immunization programs.

A follow-up letter and survey were mailed in early December to unvaccinated patients who had indications for vaccine. The primary focus was to encourage them to get vaccinated if they had not yet done so. The survey also was to determine whether patients had received the first mailing, whether they had been vaccinated (if yes, where; if no, why not), and whether the physician was still their primary care provider.

Analysis

The New York State Department of Health (NYS-DOH) provided additional information about patients who received the influenza vaccine during NYS-DOH vaccination clinics. Information from all data sources (chart reviews, NYS-DOH, and surveys) was entered into Microsoft Access.

Statistical tests performed on the data included the two-sample t test for continuous variables, such as age, and the χ² test for the noncontinuous, nominal data, such as male or female, rural or urban, and vaccinated with indications or unvaccinated with indications. Statistical significance was determined at a p value less than 0.05.

Results

Demographics

Review of 2271 patient charts identified 657 patients in 1998 and 657 patients in 1999 who had indications for the vaccine. In 1999, patients with indications for the vaccine were significantly more likely than those without indications to be men (44% vs 39%, p<0.05) and older (56.7 ±20.9 vs 31.7 ±20.6 yrs, p<0.05). Patients with and without indications for the vaccine lived predominately in rural
communities (86% vs 85%, p=0.248). The most common indications for vaccinated and unvaccinated patients are shown in Table 1. Because of significant overlap of high-risk patients identified in both 1998 and 1999, information is provided only for the 1999 patient group.

Intervention

The education packet was distributed to the 657 patients identified in the 1999 chart review. Nine patients were not mailed an education packet because of missing or incomplete addresses, and 27 mailings were returned. An attempt was made to inform these 36 patients of

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**Front side of insert**

**SAY "NO" TO THE FLU BUG!**

<table>
<thead>
<tr>
<th>What:</th>
<th>Flu Clinic</th>
</tr>
</thead>
<tbody>
<tr>
<td>When:</td>
<td>November 3 or 4, 1999</td>
</tr>
<tr>
<td>Time:</td>
<td>8:00–10:00 A.M., no appointment necessary</td>
</tr>
<tr>
<td>Where:</td>
<td>Dr. Migden's Office</td>
</tr>
</tbody>
</table>

**IF you are 65 years or older**

**OR**

**IF you have...**

- Heart disease
- Lung disease
- Diabetes
- Kidney failure
- Damaged or no spleen
- Cancer
- Blood disorder

ASK DR. MIGDEN, CHARLENE (the nurse), OR JEN (the pharmacist) ABOUT THE FLU and/or PNEUMONIA VACCINE TODAY!

**CALL 861-8002 to have your questions and concerns answered.**

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**Back side of insert**

**WHY GET THE FLU and/or PNEUMONIA VACCINE?**

- It can help you stay healthy.
- The shot is safe.
- It does NOT make you sick.

**MAKE YOUR TO DO LIST TODAY:**

- Mark your calendar for November 3 or 4, 1999 (between 8:00 and 10:00 A.M.).
- Go to Dr. Migden's office.
- Get your flu and/or pneumonia shot.
- Rake your leaves.
- Prepare for the holidays and family gatherings.

**TELL THE FLU NOT TO BUG YOU THIS YEAR!**

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*Figure 1.* Insert mailed to high-risk patients.
the influenza clinic by telephone. Messages were left for six patients on their answering machine; eight patients' telephones had been disconnected with no forwarding telephone numbers. The remaining 22 patients were successfully informed about the vaccination clinic.

Vaccination Rates

Before intervention (1998), vaccination rates were low: 182 (28%) patients with and 102 (6%) patients without indications for the vaccine. After the pharmacy-directed intervention in 1999, 354 (54%) patients with and 148 (9%) patients without indications were successfully vaccinated. Vaccination rates for various age-groups with and without indications are shown in Table 2. (Because of a computer error, patients 65 years or older with no other vaccine indication were excluded from the mailing. Results presented thus exclude this group of patients, unless otherwise indicated, because they did not receive intervention. Comments regarding vaccination rates for this excluded group can be found in the limitations section of the discussion.)

In the postintervention group, patients who had indications yet remained unvaccinated were significantly younger (49.9 ± 21.8 vs 62.5 ± 18.1 yrs, p<0.05) and were more likely to live in an urban community (80% vs 88%, p<0.05). Vaccinated patients were significantly more likely than unvaccinated patients to have cardiovascular disease or diabetes (p<0.05). No gender differences existed (54% men vs 56% women). Data from the 1998 group regarding vaccine indications were not analyzed because the data were collected retrospectively, making it difficult to determine when indications such as diabetes were first diagnosed.

Immunization Location

After intervention, 50% of patients were immunized during a special clinic appointment, 26% at the pharmacy-managed vaccination clinic, 17% at other locations, 3% at NYS-DOH vaccination clinics, and 4% at locations not specified.

Survey Results

A total of 283 patients completed the "We helped you, now you can help us" survey. Of these, 199 respondents were patients with positive indications who were vaccinated against influenza and had received the education packet (56.4% response rate). Patients consistently identified the mailing and their health care provider as the top factors that had convinced

Table 1. Indications for Influenza Vaccine in Patients after Intervention, 1999

<table>
<thead>
<tr>
<th>Indication</th>
<th>Total (n=657)</th>
<th>Vaccinated (n=354)</th>
<th>Unvaccinated (n=303)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≥ 65 yrs</td>
<td>267 (41.0%)</td>
<td>189 (34.0%)</td>
<td>78 (33.7%)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>458 (70.0%)</td>
<td>264 (46.2%)</td>
<td>194 (64.0%)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Pulmonary disease</td>
<td>175 (27.0%)</td>
<td>86 (24.3%)</td>
<td>89 (29.4%)</td>
<td>0.142</td>
</tr>
<tr>
<td>Diabetes</td>
<td>91 (14.0%)</td>
<td>58 (16.4%)</td>
<td>33 (10.9%)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Immunosuppressed</td>
<td>29 (4.0%)</td>
<td>19 (5.4%)</td>
<td>10 (3.3%)</td>
<td>0.199</td>
</tr>
</tbody>
</table>

Table 2. Influenza Vaccination Rates

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Baseline No. (%)</th>
<th>After Intervention No. (%)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≥ 65 yrs, with another indication for vaccine</td>
<td>116 (44.6%)</td>
<td>190 (70.9%)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Age ≥ 65 yrs, with no other indication³</td>
<td>44 (37.9%)</td>
<td>52 (41.9%)</td>
<td>0.527</td>
</tr>
<tr>
<td>Age &lt; 65 yrs, with indication for vaccine</td>
<td>66 (16.6%)</td>
<td>164 (42.2%)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Age &lt; 65 yrs, with no indication</td>
<td>59 (3.9%)</td>
<td>96 (6.4%)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>All patients with an indication for vaccine (excluding those aged ≥ 65 yrs with no other indication)</td>
<td>182 (27.7%)</td>
<td>354 (53.9%)</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

³Did not receive study intervention.
and reminded them to get vaccinated (Table 3). Patients viewed the education packet as playing an important role in their decision to get vaccinated. They felt that it caused them to think about getting the vaccine, or was a great reminder and requested that it be done again next year. The most common suggestions for improving the vaccination program were to provide more days and times available to be immunized and to increase the number of providers to administer vaccinations (Table 4).

The survey mailed to the 303 unvaccinated patients yielded a 51.5% response rate. Of these patients, 121 (77.6%) reported receiving the education packet from the clinic. Fifty-seven (36.5%) patients reported that they had already been vaccinated, at either their place of employment or their new primary care physician’s office; 21 (13.5%) patients reported that they had changed to another primary care provider. The 99 (63.5%) patients who did not get vaccinated indicated that they believed the influenza vaccine was not necessary, that schedule conflicts precluded being vaccinated, or that they simply forgot (Table 5).

**Discussion**

This study demonstrated that this pharmacy-directed program, which included a mailing and improved access to the influenza vaccine, significantly increased immunizations by 95% for a group of high-risk patients in a rural community practice. This almost doubling of the vaccination rate is comparable with, or higher than, results of intervention programs described in the literature that were directed by pharmacists (19–57% increase) \(^{21-26}\) or other health care providers (14–97% increase) \(^{12-17}\).

Our preintervention vaccination rates of 43% for all patients aged 65 years and older, and 17% for those younger than 65 years with an indication for vaccine, are lower than national statistics (63% and 21–28%, respectively) \(^2\). New York State is in the bottom third of states for influenza immunization rates in the U.S., and numbers from our study reflect this state’s poor standing. After our study intervention, 71% of seniors with an indication and 42% of at-risk patients younger than 65 years had been vaccinated. These numbers exceed not only those of New York State but also national rates.

The success of this study is likely related to several factors: use of a targeted intervention designed to meet needs of a specific community, taking into consideration issues such as literacy level and age-group; increased availability of vaccine through an accessible influenza clinic; increased awareness of clinic personnel of the opportunity for vaccination during clinic visits; and the strong relationship between patients and the clinic health care providers.

As evidenced by our survey of vaccinated patients, the education packet received by mail was the most common reason patients were both convinced and reminded to get vaccinated. Most
immunization programs reported in the literature say little about critical issues such as how to reach and persuade target patient groups, and they provide few, if any, specific details about types and forms of information provided to patients. One is left to assume that information provided to patients, either directly (by mailings or pamphlets distributed at retail pharmacies) or indirectly (through other media conduits), is generic. Studies that we reviewed gave minimal information about education intervention, saying only, for example, that a postcard described vaccine availability, or a letter was sent informing patients of the need to get vaccinated. Nothing was said about how well information was tailored to ensure a match between reading level of the material and literacy level of the intended recipients, whether document design allowed readers to navigate and assimilate information provided, or whether persuasive strategies used in the material affected decisions made by recipients.

Demographic data for our patients indicate that approximately 50% were older than 40 years and 60% were women. Census survey data for the Altamont community indicate that 40% of individuals have a high school diploma or less, 43% have taken college classes or hold a college degree, and 17% have a graduate or professional degree. The literature suggests that 44% of those 65 years or older are classified as level 1, the lowest reading level (defined as inability to perform basic reading tasks necessary to function in society). Other research indicates that regardless of reading level, simply worded materials offer the best communication, and recall rates can go from 15% to 85% when pictures accompany text.

Aware of our population’s demographics and estimated literacy levels, we based our insert on the complex information provided by the CDC/NYS-DOH and modified our material to match our target population’s literacy levels.

The patient education influenza sheet, provided by the CDC/DOH, is written at seventh grade (6.7) reading level based on the Flesch-Kincaid Grade Level score. By replacing many medical and technical terms with more common words (e.g., “flu shot” instead of “influenza vaccine,” “heart” instead of “cardiovascular”), we developed an insert written on a third grade (3.1) reading level. We also provided a telephone number for patients to call if they had questions and a checklist on the insert to help patients remember to get vaccinated.

In planning and developing education materials used in this project, ideas were put forward on how to attract our diverse target population. To reach a broader population than just those 65 years or older, cartoon characters were used. With assistance of an artist, the “super syringe” and “green bug” were designed to serve as our project icons. These characters were entertaining, colorful, and simple and would capture attention of individuals of all ages. The insert was printed on card stock with the intention that patients would keep it and use it as a reminder.

To make our mailing different from other mass mailing that patients might receive, and to capitalize on the strong relationship these patients have with the clinic, a letter, hand-signed by the primary care provider, nurse, and pharmacist, was sent with the insert. The connection with health care providers in the clinic was important, as “health care professionals” was the second response given for what convinced and reminded patients to get vaccinated.

The unique approach we took to increase the rate of influenza vaccinations is easily replicated in any health care setting with relatively little financial or personnel cost. Our most significant outlay was the time required to review charts manually and enter information into a database. With many centers now computerized, development of queries to identify high-risk patients and develop a mailing list is feasible. Other items, such as designing, developing, printing, and mailing the education packets, could be paid for with financial assistance from community donations or drug companies.

Our study had limitations. We missed some specific CDC indication criteria, such as being a health care worker or a patient living with an elderly family member; this type of information is difficult to obtain from a chart review. The computer error that resulted in no intervention being provided to 124 patients whose only
vaccine indication was age 65 years or older was unfortunate. However, an opportunity was presented to consider these patients as a control group. No significant difference was seen in vaccination rates for patients whose only vaccine indication was age 65 years or older between 1998 (37.9%) and 1999 (41.9%, p=0.527). This lack of improvement in vaccination rate strengthens the premise that our study intervention affected patients’ decisions to get vaccinated.

Pharmacists will have to meet further challenges if we are to reach “Healthy People 2010” goals of 90% for all high-risk patients.\(^8\) Issues requiring further examination include addressing needs of subpopulations, such as the new group of individuals identified as high risk (aged 50–65 yrs or older with no other indication)\(^2\) and those hesitant to get vaccinated; continuing to improve access to vaccination; and avoiding and/or managing vaccine shortages. As this study has shown, pharmacy initiatives to examine these issues can be successful and involve work worth doing.

Acknowledgments

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References