INFLUENZA VACCINATION: A COLLABORATIVE EFFORT TO IMPROVE THE HEALTH OF THE COMMUNITY

Michael F. Parry, MD; Brenda Grant, RN; Anthony Iton, MD, MPH; Patricia D. Parry, RN; Diane Baranowsky, RN

Influenza exacts a significant toll in lives, illness, and economic loss each year. Approximately 20,000 deaths, 110,000 hospitalizations, and more than 1 million lost workdays are due to influenza virus infections every year.1,3 Influenza vaccine saves lives and prevents illness. The Centers for Disease Control and Prevention (CDC) estimates that for each million high-risk individuals vaccinated, approximately 900 deaths and 1,300 hospitalizations are prevented during an average influenza season.4,7 Current influenza vaccines are 70% to 90% effective8,9 and provide reliable, strain-specific immunity for 1 to 3 years. Although safe and effective, they are unfortunately not widely used. Only approximately 60% of those individuals for whom the influenza vaccine is recommended receive the vaccine.10,11 Better methods of reaching high-risk groups are needed. Because modern healthcare embraces more individual responsibility for healthcare, new and innovative approaches to vaccine delivery systems must be developed.

The simultaneous impact of the consolidation of two hospital facilities in our city and a busy influenza season resulted in excessively high use of emergency department and hospital beds during the winter of 1998. Although part of the outbreak intensity could have been due to a suboptimal match between vaccine and the circulating strain, it was thought that influenza vaccination rates in the community were too low and in need of improvement. Therefore, the hospital partnered with the Stamford, Connecticut, Department of Health (DOH) to achieve the following goals: (1) to increase the number of patients receiving influenza vaccine, (2) to moderate the severity of lower respiratory tract illness during the winter season, and (3) to build a framework for cooperative programs between the city’s DOH and the community hospital.

METHODS

The Stamford DOH had run community-based influenza vaccination clinics since 1980. It was therefore deemed most effective to build on the city’s success by
enhancing patient access and delivering vaccine to more individuals. To achieve this goal, key personnel were identified and several multidisciplinary planning sessions were held prior to and following each annual campaign. Attendance from the DOH included the Health Director, Health Department Director of Nursing, Health Promotion Manager, and community nurses. Representatives from the hospital included infectious disease physicians, hospital administrators, nurse epidemiologists, health educators, the corporate health director, corporate communications personnel, emergency department personnel, and Immediate Care Center nurses.

A variety of methods were used to increase public awareness, enhance vaccine delivery, and establish a common platform for the hospital and the DOH so as to create a relatively seamless appearance for the community. These included the following:

1. Advertising fliers bearing both agency logos, dates, and venues were widely circulated and published.
2. An annual joint press conference and campaign kickoff was planned to coincide with the annual Senior Health Fair and was covered by local television, radio, and the press. The mayor, the City Health Director, and the hospital’s Director of Infectious Diseases were vaccinated at this press conference.
3. Vaccination cards bearing each agency’s logo were used by both agencies to record the date of vaccination.
4. A common consent form was developed for use by both agencies. This superceded the vaccination cards by serving as a combined fact sheet, informed consent document, vaccination record, and billing form.
5. A common electronic database was created to improve record keeping, tracking, roster billing, and patient recall.
6. Immunization patient assessment and vaccination order forms were approved by the medical executive committee as standing influenza vaccination orders for all inpatients meeting high-risk criteria.
7. The city and the hospital pharmacy ordered greater amounts of the vaccine so as to preempt shortages and expand the coverage area. Vaccine supplies were shared to maximize coverage and were loaned to other healthcare providers in the service area as required.
8. The hospital’s Corporate Health Service provided influenza vaccinations to all hospital employees and volunteers, and negotiated contracts to provide vaccine to healthy adults working for area corporations. A separate in-hospital campaign for employees, supported by a highly publicized raffle for those vaccinated, was initiated.
9. All nursing homes, many senior and assisted living centers, and healthcare clinics (including hospital clinics in three separate locations) were contacted to reinforce existing programs or create new programs, where necessary, to ensure vaccination of all clients.
10. The Visiting Nurses Association and home care agencies were contacted, and letters were sent to physicians in the community to inform them of the joint effort, publicize the merits of vaccination, and encourage referral of patients to city or hospital venues for vaccination.
11. DOH community nurses visited all senior residential facilities to perform in-house influenza vaccination.
12. Arrangements were made to vaccinate homebound patients using hospital nursing resources.
13. The hospital opened and used a brand new Immediate Care Center, which replaced the closed emergency department, served as the hub of its program, and provided vaccine from 7 am to 11 pm, 7 days a week.
14. An identical nominal fee was charged by the Stamford DOH and the hospital: $10 in 1999–2000 and $12 in 2000–2001. Vaccinations were provided at no out-of-pocket cost to those with primary Medicare and were free to employees of either agency.
15. Vaccination clinics at the DOH and at multiple locations within the hospital, including the hospital’s Immediate Care Center, were staffed by more than 30 employees and countless volunteers.

The success of the program was first measured by counting the number of patients vaccinated in all venues during each season. In an attempt to assess the impact of the program on overall community health and hospital use, the Connecticut Health Information and Management Exchange (CHIME) database was asked to provide diagnosis-related group (DRG)–specific hospital and emergency department use rates for the influenza seasons (October through March) from 1996 through 2001. The CHIME database collects discharge information from UB-92 forms submitted to it by all Connecticut hospitals. DRG-specific (pneumonia, otitis media, exacerbations of chronic obstructive lung disease, and congestive heart failure) hospitalization and the rate of visits to the emergency department were measured for all Stamford residents as determined by postal zip code and compared with those of all other residents of the county (those not directly involved in our vaccination program). Annual deaths attributable to pneumonia and influenza in Stamford and the rest of Fairfield County for 1996 to 2001 were obtained from the State of Connecticut DOH vital statistics (James Hadler, MD, PhD, personal communication, October 28, 2003).

In addition, self-reported influenza vaccination rates were assessed using a Behavioral Risk Factor Surveillance survey, conducted in Stamford in the spring of 2002, which included questions on influenza vaccination status. The Behavioral Risk Factor Surveillance survey is a standardized telephone health interview survey designed by the CDC’s National Center for Chronic Disease Prevention and Health Promotion.

RESULTS

In the fall of 1999, the program increased the number of vaccinations given by approximately 70%. Based on this success, the partnership has expanded its efforts in each succeeding year. In the fall of 2000, the number of
vaccinations increased by an additional 20%. Although vaccine was in short supply during the 2000–2001 season, resulting in delayed initiation of the campaign, a total of 14,988 vaccinations were given. The program provided influenza vaccination to 18,471 individuals in the 2001–2002 season, a 23% increase over the previous year and a 150% increase over baseline (Table, Fig. 1). Much of this was facilitated by the opening of a new immediate care facility owned and operated by the hospital that offered vaccinations to walk-in patients 7 days a week from 7 am until 11 pm. This facility replaced the previously closed emergency department. The effort put into the campaign and its collateral publicity actually increased rates of hospital employee vaccination from 34% to 58% during the same 4-year period.

Based on analysis of UB-92 data from the Connecticut Hospital Association, the program had an apparent positive impact on emergency department visits in our city for all respiratory diagnoses and particularly for exacerbations of chronic obstructive lung disease, for which visits declined by 34% (Pearson chi-square, 144.36; \( P < .001 \)) and 46% (Pearson chi-square, 31.15; \( P < .001 \)), respectively, compared with the rest of the county (Figs. 2 and 3). Inpatient admissions were not significantly reduced and there was no impact on deaths from pneumonia or influenza reported to the state for any year during the program.

The collaborative effort vaccinated 16% of the entire community of Stamford, having a population of approximately 117,000 in 2001–2002. A Behavioral Risk Factor Surveillance telephone survey of residents of Stamford in the spring of 2002 also revealed that 75.7% of those older than 65 years had received a flu vaccine in the preceding 12 months (Anthony Iton, MD, personal communication, June 11, 2002). This exceeds the Healthy People 2000 goal of 60%.

The total estimated cost of the program for the 2000 season was $95,347, divided between the DOH (estimated cost of personnel time, $5,460; vaccine and supplies, $16,050) and the hospital (estimated cost of personnel time, $30,500; vaccine and supplies, $43,337). The 2001–2002 season costs were proportionate and also included the development of a common electronic patient database used by both entities. Revenues (combined DOH and hospital) were $56,630 in 1999–2000 and $116,833 in 2000–2001.

**TABLE**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital clinics</td>
<td>200</td>
<td>710</td>
<td>740</td>
<td>790</td>
</tr>
<tr>
<td>Hospital inpatients</td>
<td>10</td>
<td>119</td>
<td>198</td>
<td>154</td>
</tr>
<tr>
<td>Immediate Care Center</td>
<td>0</td>
<td>2,881</td>
<td>6,716</td>
<td>9,605</td>
</tr>
<tr>
<td>Hospital employees</td>
<td>500</td>
<td>765</td>
<td>894</td>
<td>1,174</td>
</tr>
<tr>
<td>Corporate Health Services</td>
<td>2,000</td>
<td>3,119</td>
<td>2,251</td>
<td>2,648</td>
</tr>
<tr>
<td>Stamford DOH</td>
<td>4,677</td>
<td>4,965</td>
<td>4,189</td>
<td>4,100</td>
</tr>
<tr>
<td>Total</td>
<td>7,387</td>
<td>12,559</td>
<td>14,988</td>
<td>18,471</td>
</tr>
</tbody>
</table>

DOH = Department of Health.

**FIGURE 1.** Total number of patients receiving influenza vaccination during a 6-year period through March 2004. These data include updated information from two additional seasons, 2002–2003 and 2003–2004, not represented in the 4-year data presented in the table.

**FIGURE 2.** Impact of the influenza vaccination program on emergency department visits for all respiratory diagnoses.

**FIGURE 3.** Impact of the influenza vaccination program on emergency department visits for exacerbations of chronic obstructive lung disease.
DISCUSSION

Since 1963, the Advisory Committee on Immunization Practices and the CDC have recommended annual vaccination against influenza for elderly individuals and individuals at high risk for severe complications from influenza. It has recently been included as a covered benefit for Medicare beneficiaries. Furthermore, formal vaccination programs result in lower rates of illness, job absenteeism, and visits to physicians’ offices even for healthy adults. Yet, public support has been suboptimal.

Improved outreach has been recommended for improving vaccination rates in multiple settings. Physicians’ offices, hospitals, and long-term–care facilities are examples of traditional settings of limited effectiveness. The work environment, adult centers, pharmacies, and immediate care centers represent opportunities for outreach using less traditional settings. These have been successful. Reducing missed opportunities where the patient, the healthcare professional, and the vaccine are already together, most notably in hospitals, is also important. Standing orders have helped in this setting. Other effective interventions include computer tracking, patient checklists, and chart reminders. Letters to patients, clients, or beneficiaries to remind them of the need to receive influenza vaccination have been highly successful. Studies show that almost every type of intervention to increase immunization is effective.

Our project moved beyond hospital borders and the usual role of an acute care facility and used many of the approaches demonstrated to be successful by others when conscientiously implemented. We drew on the public health experience and joined forces with our DOH. The collaborative approach was unique, although the methods were proven, and demonstrated what could be accomplished when agencies work together for the benefit of the community. Special effort was made, in addition, to distribute vaccine to retirement communities, the corporate community, schools, and the homebound. Our effort ultimately vaccinated 16% of the entire community and 75% of the elderly. The entire effort was revenue neutral.

The campaign has become an annual performance improvement project and has worked successfully for the past three influenza seasons. Improved access, convenience, and low cost have made it attractive to the community. It has reduced emergency department visits for influenza-related conditions, but unfortunately has had no demonstrable impact on inpatient volume or deaths from influenza and pneumonia. Continued efforts must be made to seek additional opportunities to promote awareness of the need for flu vaccination, to eliminate barriers, and to further increase our vaccination rates.

The program should serve as a model for other community hospitals that wish to work creatively with the public health authorities. The potential for impact on community health is enormous in its ability to reduce morbidity and mortality from influenza and pneumonia. This program can easily be replicated because it requires only the motivation and organization of healthcare professionals. All other resources already exist within the community.

REFERENCES