

Use of an Automated Pharmacy System and Patient Registries To Recruit HMO Enrollees for an Influenza Campaign

ORIGINAL ARTICLE

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OBJECTIVE. To develop methods to identify, recruit, and vaccinate HMO enrollees at increased risk for influenza-related complications as part of a comprehensive influenza campaign.

SETTING. Group Health Cooperative (GHC) is a large, membership-governed, managed care organization that serves 395,000 members in the Puget Sound area.

APPROACH. An automated pharmacy system and patient data registries were used to identify enrollees with chronic illness. Enrollees with chronic illness and all enrollees 65 years of age and older were considered “high-risk” enrollees to be recruited for vaccination. Postcard reminders coupled with a publicity and education campaign were used to recruit high-risk enrollees to special influenza clinics.

RESULTS. Our approach identified 2.5% of children (persons < 18 years of age) and 10.5% of adults (persons 18 to 65 years of age) as chronically ill and thus at high risk for influenza-related complications. Most high-risk children were identified through prescriptions for steroids, autonomic inhalers, or both or because they were enrolled in the asthma registry. Most high-risk adults were identified because of prescriptions for steroids, insulin, or oral hypoglycemic agents; because they had received pneumococcal vaccine; or because they were enrolled in the diabetes registry.

Influenza coverage rates for all seniors (persons \geq 65 years of age) increased from 34% in 1984 to more than 72% in the 1996–1997 campaign year. Coverage rates were much lower for high-risk children (36%) and adults (46%).

CONCLUSIONS. Influenza coverage rates can still be substantially improved for adults younger than 65 years of age and children at high risk for influenza-related complications.

Systematic approaches to the implementation of clinical preventive services are an important national priority,^{1–3} and immunization remains one of the most cost-effective ways to improve the health of the population. Among seniors, receipt of influenza vaccine has been associated with lower rates of hospitalization;^{4,5} lower rates of respiratory infection; and among nursing home residents, lower mortality rates.^{6,7} Influenza vaccine is strongly recommended “for any person greater than 6 months of age who, because of age or underlying medical condition, is at increased risk for complications of influenza.”⁸ This includes adults and children with chronic disorders of the pulmonary or cardiovascular systems, immunocompromising conditions, systemic cancer, renal failure, or diabetes. National health objectives for the year 2000 include vaccination of at least 60% of persons at risk for severe influenza-related illness. Current national coverage rates are estimated to be about 55% for seniors and about 30% for high-risk adults and children.⁸

The abstract of this paper is available at ecp.acponline.org.

Through the implementation of an organized, systematic, annual campaign, influenza coverage rates for seniors (persons > 65 years of age) at Group Health Cooperative (GHC) increased from 34% in 1984 to more than 72% in the 1996–1997 campaign year, and coverage rates for all high-risk enrollees (chronically ill enrollees younger than 65 years and all seniors) increased to more than 60%. This article reviews the key elements and strategies involved in identifying and recruiting high-risk enrollees for an annual influenza campaign. Estimates of the population at risk for influenza-related complications, influenza coverage rates, and future directions in the improvement of the campaign are also discussed.

Methods

Setting

Group Health Cooperative is a large, membership-governed, managed care organization. It serves more than 680,000 members in Washington State, approximately 395,000 of whom are in the Puget Sound area. Comprehensive care is delivered in the Puget Sound region through GHC's own facilities, which include 30 area medical centers, 6 specialty centers, 1 hospital, and 1 skilled nursing facility. Group Health Cooperative provides primary, specialty, hospital, home health, and inpatient skilled nursing care on a prepaid basis. It became an affiliate of Kaiser Permanente in 1997.

Algorithm for Identifying High-Risk Enrollees: Seniors and Chronically Ill Persons

Consistent with national recommendations,¹ all seniors at GHC are targeted for the influenza campaign. They are identified through computerized enrollment files located at a central registry. Members 2 to 64 years of age with chronic pulmonary or cardiovascular immunocompromising conditions, systemic cancer, renal failure, or diabetes are also targeted for the campaign.

To identify adults and children with these chronic disorders, the immunization subcommittee of the committee on prevention established an internal review group. This group, which consists of pharmacists, primary care providers, and infectious disease experts, has designed a system that identifies, through the use of an automated pharmacy system and patient data registries, enrollees with chronic disorders that may be associated with increased risk for influenza-related complications. **Figure 1** shows the hierarchical algorithm for identifying high-risk enrollees. First, the automated pharmacy system is checked to assess prescription drug use. If the criteria established in the pharmacy database are not met, the asthma, diabetes, and heart care registries are checked. Finally, receipt of pneumococcal vaccine is checked.

The automated pharmacy system is the primary source used to identify enrollees with chronic disorders.⁹ Each year, the internal review committee identifies all prescription drugs that may indicate chronic conditions associated with an increased risk for influenza-related complications. The current identification algorithm contains 483 drugs, 72 of which were added to the algorithm before the 1998–1999 campaign. Enrollees receiving one or more of these drugs during a 12-month period are identified and targeted for the influenza campaign.

To identify enrollees who may be at increased risk for influenza-related complications but are not receiving prescriptions associated with chronic disorders, information from the asthma, diabetes, and heart care roadmap systems is accessed. Roadmap areas have been established at GHC to offer a more thorough and systematic framework for disease prevention and treatment of groups of enrollees who have the same condition. Roadmap areas include tobacco use, heart conditions, pregnancy, breast disease, diabetes, depression, asthma, immunization, HIV and AIDS, and senior health.

Receipt of pneumococcal vaccine within the past 5 years is also included as a criterion to identify enrollees with chronic disorders. Pneumococcal vaccine is currently available to all GHC enrollees free of charge. An aggressive identification and recruitment campaign for pneumococcal vaccine has not been implemented at GHC. Late in 1997, the immunization subcommittee recommended that all enrollees at increased risk for pneumococcal-related complications be targeted to receive pneumococcal vaccine during the fall 1998–1999 immunization campaign.

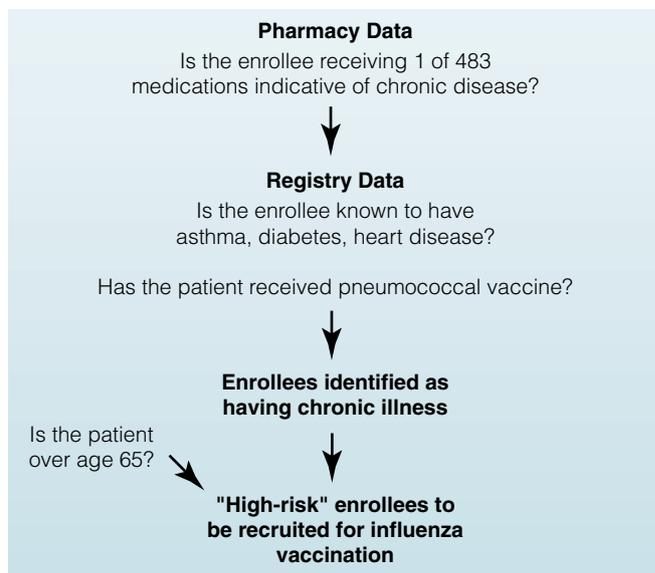


FIGURE 1. Algorithm used to identify Group Health Cooperative enrollees at high risk for influenza-related complications.

After enrollees are identified through use of the procedures specified above, each area medical center (AMC) receives a list of the targeted high-risk enrollees that receive care at their clinic. Clinical staff at the AMCs review this list and make final recommendations for the addition or removal of enrollees to be targeted for the influenza campaign. In this way, AMCs play a vital role in checking the accuracy and validity of the enrollees selected by the algorithm.

Recruitment Procedures—Influenza Campaign

Table 1 shows the three major components of the influenza campaign: provider and patient education, targeted recruitment, and special immunization clinics.

The educational component was developed to provide consistent messages to enrollees and providers about the need for and delivery of vaccinations. Articles and announcements appear in GHC's internal newsletters; primary care clinic newsletters; and *Northwest Health*, a magazine sent to all enrollees. Internal newsletters remind and encourage medical staff, nurses, and other health care providers to talk to enrollees about the importance of immunizations. Each fall, *Northwest Health* publishes an article on influenza that contains current facts on and recommendations for influenza vaccination. Included in all publicity efforts is a telephone number for a central resource line, where responses to enrollees' and providers' questions are available.

To augment the publicity effort, an educational self-help pamphlet, "Colds, Influenza and You: A Guide to Taking Care of Yourself at Home," is made available to enrollees and is distributed throughout the AMCs. This brochure provides information on colds and influenza and promotes self-care skills with the goal of reducing visits and calls to medical centers. Pharmacies at each of the centers also provide influenza informa-

tion, in the form of a "tear-off sheet" titled "About the Influenza Vaccine," to enrollees picking up or refilling prescriptions for medications.

Targeted recruitment begins before the influenza season. All high-risk enrollees receive a postcard from their primary care clinic with information about the upcoming influenza season, informing them that a safe, effective vaccine for influenza is available and that the medical staff recommends immunization (except for those with contraindications). All physicians practicing at the AMCs are listed on the postcard. The postcard identifies the dates, times, and locations of the influenza clinics and indicates that no appointment is necessary for an influenza vaccination. At the end of January, all targeted enrollees who have not received an influenza vaccination (as assessed through the automated information system) receive a postcard reminder stating that "Your GHC physician strongly recommends this vaccine" and asks the enrollee to come in to be immunized.

The final component of the campaign is special influenza clinics, which are organized at the AMC level and are offered during a 4- to 8-week period in the fall. The availability of these clinics is advertised through the postcard, which usually includes a schedule of both day and evening immunizations. During this time, some primary care clinics offer immunizations at off-site locations in the community, such as churches and activity centers, to improve access.

Measurement of Receipt of Vaccination

To assess compliance with GHC's immunization guidelines, information on all vaccinations, including those for influenza, exists in the automated information system.⁹ This computerized system was implemented in March 1991 and provides a mechanism for the on-line recording of information on every vaccination given, including the date of vaccination, the manufacturer of the vaccine, the lot number of the vaccine, the site of administration of the vaccine, and the name of the person giving the vaccination.

The immunization database was developed on an IBM 3090 mainframe because this computer is accessible throughout GHC at terminals in every clinic and emergency department. A mainframe program was written to 1) allow entry of data on vaccinations, 2) change vaccination entries, 3) create a complete listing of all vaccinations and changes for each patient, and 4) create a summary reflecting correct entries on vaccination for a given patient. At the AMC level, several computers are available to physicians, nurses, and other staff and are linked by a clinic-based local area network and file server. The vaccination status of individual patients can be accessed through this system and compared with cur-

TABLE 1
Components of the Influenza Campaign

Provider and patient education
Articles in provider and patient publications
Central resource phone line Self-help pamphlet, "Colds, Influenza and You: A Guide to Taking Care of Yourself at Home"
Targeted recruitment
Postcard sent to all high-risk enrollees
Enhanced access
Special influenza clinics

rent vaccination guidelines that are accessible in the guideline warehouse portion of the system.

Results

Table 2 shows the number of enrollees identified by our algorithm as being chronically ill. Most of the chronically ill children were identified through prescriptions for anti-inflammatory drugs or autonomic drugs (the drugs in these therapeutic classes that identified the most enrollees were beclomethasone and albuterol, respectively). More than 55% of chronically ill adults identified through the pharmacy algorithm were identified through their use of two major classes of drugs: diabetic drugs (32.7%) and anti-inflammatory drugs (glucocorticoids) (23.8%). Autonomic drugs (such as β -blockers) also accounted for a large proportion of adults identified

through the pharmacy system. Seniors (who were already classified as being at high risk on the basis of age) were most likely to be further classified as chronically ill through their use of cardiac and diabetic drugs.

When the information from the patient data registries was added to that obtained from the identification algorithm, the number of high-risk children identified increased about 25%. Most of this increase resulted from adding the question on asthma to the algorithm. Adults not previously identified through the pharmacy system were most likely to be identified through receipt of pneumococcal vaccine or through the diabetes roadmap registry. More than 10,000 seniors who had not been classified as chronically ill through prescription drug use or roadmap registry information were identified because they had received pneumococcal vaccine in the past 5 years.

TABLE 2
Group Health Cooperative Enrollees Identified as Chronically Ill

VARIABLE	AGE 0 TO 17 YEARS	AGE 18 TO 64 YEARS	AGE 65 YEARS AND OLDER
Automated pharmacy system, n (%)			
Antibiotics	39 (2)	924 (5)	175 (1)
Anti-inflammatory drugs (glucocorticoids)	783 (42)	4085 (24)	2277 (15)
Autonomic drugs (β -blockers, β -agonists)	591 (32)	2404 (14)	1558 (10)
Cardiac drugs*	31 (2)	1235 (7)	4712 (30)
Insulin or oral hypoglycemic agents	123 (7)	5616 (33)	3924 (25)
Inhalers	193 (10)	237 (1)	199 (2)
Other	118 (6)	2690 (16)	2692 (17)
Subtotal	1878	17,191	15,537
Patient data registries, n (%)			
Diabetes roadmap	26 (4)	2699 (33)	1574 (10)
Heart disease roadmap	1 (0)	2025 (24)	2105 (14)
Pneumococcal vaccination	134 (20)	3513 (42)	11,587 (76)
Asthma	509 (76)	55 (1)	2 (0)
Subtotal	670	8292	15,268
Total patients identified as chronically ill, n	2548	25,483	30,305
Total enrollee population, n	100,162	242,740	52,846
Percentage of enrollee population identified as chronically ill, %	2.5	10.5	57.3

*Includes antiarrhythmic agents, digitalis glycosides, disophramides, procainamides, quinidines, and vasodilator nitrates.

The algorithm resulted in the targeting of 2.5% of children and 10.5% of adults for the influenza campaign. It also shifted almost 60% of GHC's seniors into a chronic illness category. Seniors (both chronically ill and well seniors) accounted for 65% (52,846 of 80,877) of all persons targeted by the influenza campaign.

Campaign recruitment and immunization strategies implemented in the 1996–1997 influenza year resulted in an overall vaccination rate of 63.7% for all high-risk groups. **Figure 2** shows that chronically ill and well seniors had the highest coverage rates, whereas chronically ill adults and children had much lower coverage rates (46% and 36%, respectively).

Discussion

We have described the procedures that we use to identify, recruit, and vaccinate high-risk groups for influenza. The algorithm that we have developed results in the targeting of about 10% of adults for our fall influenza campaign. In contrast, fewer than 3% of GHC's 100,000 children meet the criteria for high-risk status and are targeted for the campaign. To our knowledge, no other published information would allow us to compare these results with those of other attempts to identify the percentage of the general population (adults and children) that might be targeted in an influenza campaign. Informal discussions with others who are conducting vaccine-related research in HMO settings suggest that a figure of 10% for adults may be reasonable. A similar figure was derived from some preliminary work with a proposed Health Plan Employer Data Information Set (HEDIS) measure for the assessment of pneumococcal coverage for adults.¹ However, that work is in the preliminary stages and the criteria for identifying the population at increased risk for pneumococcal-related complications differ slightly from

the criteria used to identify the group at high risk for influenza-related complications.

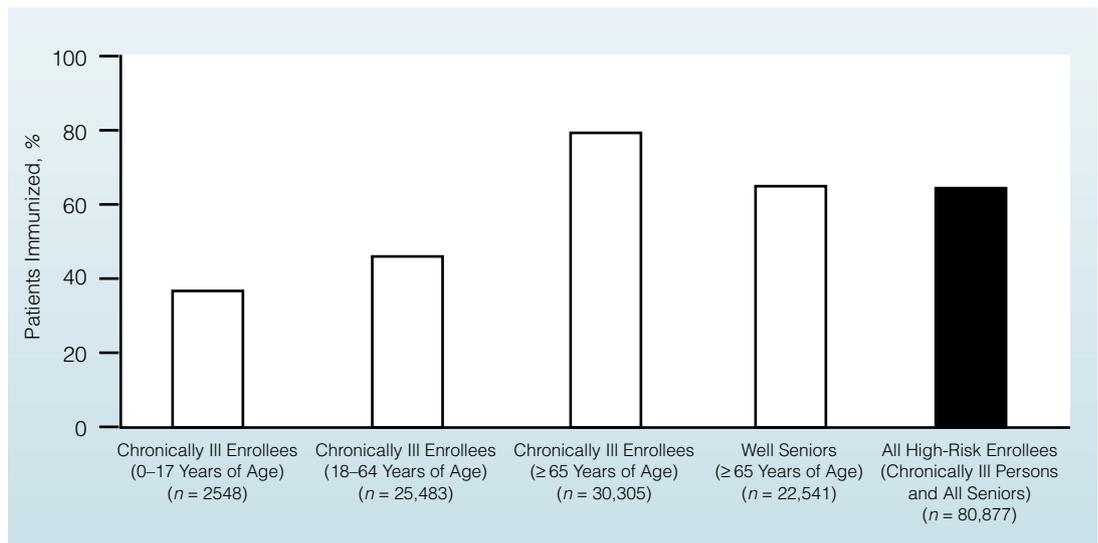
When we used the algorithm developed for identifying high-risk adults and children to identify high-risk seniors, more than half of the population was considered to be at increased risk for influenza-related complications. All seniors are already targeted, but the additional criteria allow us to focus on a subgroup of our population that is at risk for influenza-related complications because of both age and the presence of chronic illnesses.

Through the implementation of our annual influenza campaign, vaccination coverage rates for seniors increased from 34% in 1984 to more than 72% (79% for chronically ill seniors and 65% for well seniors) in the 1996–1997 campaign year.¹⁰ Vaccination coverage rates are relatively high for seniors, but they have not changed substantially in the past few years despite modest efforts to improve recruitment procedures. (These efforts consisted of increased emphasis on educating providers about the importance of influenza vaccination and the addition of follow-up postcard reminders.) In contrast, there still seems to be substantial room for improvement in coverage rates for high-risk adults and children.

Historically, we have spent most of our efforts identifying effective strategies for boosting coverage rates among seniors. These persons are clearly at risk for influenza-related complications; they are easy to identify; they tend to have the time to read, absorb, and understand educational materials; and they use AMC (outpatient) services regularly and therefore are exposed to many "recruitment" opportunities. In contrast, we have spent much less time developing and identifying recruitment strategies for high-risk adults and children.

We have found that follow-up postcard reminders are much less effective with adults than with seniors. However, we do not know whether this ineffectiveness

FIGURE 2. Influenza vaccination coverage rates in groups at high risk for influenza-related complications in the Group Health Cooperative 1996–1997 influenza campaign.



is related to, for example, the adults' belief that they will not get influenza, that the influenza vaccine does not work, or that they do not have time to get immunized. A similar evaluation¹¹ of the effectiveness of postcard reminders suggests that these reminders are effective only when they are paired with physician feedback. Although these authors¹¹ found this pattern for both seniors and adults, the importance of physician feedback is consistent with our earlier findings¹² that compliance with influenza vaccination is associated with the enrollee's belief that "my doctor wants me to get a shot."

In an effort to improve our understanding of the pharmacy algorithm, we are currently discussing the feasibility of a validation study to compare differences in use of the pharmacy-based system and use of an International Classification of Diseases code-based system to identify enrollees at high risk for influenza-related complications. With respect to the validity of the automated immunization system, previous research¹² suggests that vaccination rates are about 5% higher when automated information system data are augmented with patient self-reports and medical record information. We also plan, if additional resources become available, to do a cost-effectiveness study of the benefit of vaccinating our adult population (both well and chronically ill adults). Similarly, we plan to add cancer registry data to our algorithm. However, compared with the identification of drug prescriptions that are associated with influenza-related complications, the develop-

ment of an effective cancer algorithm to identify systemic cancer will probably be very challenging.

Finally, we continue to explore ways to improve influenza vaccination coverage rates among our senior population despite an appreciable increase in coverage levels in the past few years. Although the coverage rates are high, seniors still represent about half of the unvaccinated high-risk enrollees in our population.

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Take-Home Points

- National health objectives for the year 2000 include vaccination of at least 60% of persons at risk for severe influenza-related illness.
- Current national influenza vaccination coverage rates are estimated to be about 55% for seniors and about 30% for high-risk adults and children.
- An automated pharmacy system and patient data registries were used to identify enrollees (adults and children) at risk for influenza-related complications.
- Postcard reminders were used to recruit enrollees to special influenza clinics.
- In the 1996-1997 campaign year, 72% of seniors, 36% of high-risk children, and 46% of high-risk adults were vaccinated.

A call for papers: Helping Patients Make Decisions

The editors of *Effective Clinical Practice* are planning a special issue focusing on strategies to improve patient decision making. We will consider a very broad range of content areas including:

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- * What patients bring to the process (What are their perceptions of disease risk and treatment benefit?)
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- * End points (What constitutes a good decision?)
- * Tools (Evaluations of patient educational interventions, decision aids, videos, etc.)

Decisions may be about prevention, screening, diagnosis, or treatment. We are especially interested in original data assessing decisions about a specific disease.

Authors should submit manuscripts by April 15, 1999, to Editor, Effective Clinical Practice, VA Outcomes Group—111ECP, White River Junction, VT 05009.

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Mathematica Policy Research, Inc., is seeking to identify the best practices for patients who have chronic illnesses. These practices, which may include programs of case management, disease management, or geriatric evaluation and management, will serve as models for a federally funded demonstration of coordinated care in fee-for-service Medicare.

In conducting this study for the Health Care Financing Administration, Mathematica Policy Research welcomes comments on this search and nominations of coordinated care programs from health care organizations, providers, and other knowledgeable professionals. Currently functioning coordinated care programs developed by such entities as HMOs, home health agencies, community agencies, private insurers, commercial firms, and academic medical centers are eligible for consid-

eration. Programs must have documented evidence of cost savings or improved patient outcomes. For more information, please contact

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