

A Managed Care Organization's Use of Integrated Health Management to Improve Secondary Prevention of Coronary Artery Disease

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Objective: To evaluate the effect of a managed care organization's multifactorial intervention program in optimizing secondary prevention of coronary artery disease (CAD).

Study Design: Retrospective observational analysis of claims-based data of health plan members with CAD receiving 1 or more prescriptions per year of any of the following classes of medications used for secondary prevention of CAD: lipid-lowering agents, angiotensin-converting enzyme (ACE) inhibitors, or angiotensin receptor blockers (ARBs) and β -blockers.

Methods: Claims-based data of members from 2000 to 2004 were analyzed to discover trends in the use of medications for secondary prevention of CAD. χ^2 Test of proportion was used to determine whether the changes in the annual medication use rates were statistically significant.

Results: The annual medication use rates improved consistently throughout each year of the study period. From 2000 to 2004, the medication use rates increased for lipid-lowering agents (from 55% to 71%), ACE inhibitors or ARBs (from 44% to 55%), and β -blockers (from 36% to 47%). Changes in all 3 indicators were statistically significant at $P < .001$.

Conclusions: An integrated multifactorial approach is essential in addressing the underutilization of therapies available for secondary prevention of CAD. Managed care organizations are in a unique position to optimize the use of evidence-based pharmacological and behavioral therapies to effectively prevent and treat the underlying pathophysiology of CAD in member populations.

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The American Heart Association has estimated that 71.3 million Americans (approximately 1 in 4 persons) have at least 1 form of cardiovascular disease (CVD) and that 13.2 million of those with CVD have coronary heart disease.¹ Coronary heart disease is the single largest killer of American men and women and causes 1 of every 5 deaths in the United States. An American will experience a coronary event approximately every 26 seconds, and someone will die of it about every minute. Coronary heart disease exerts a significant burden on the economy, costing an estimated \$142 billion in direct and indirect expenditures in 2005. In 2002, an estimated 6.8 million inpatient cardiovascular operations and procedures were performed in the United States. The American Heart Association predicts that the epidemic of CVDs will continue for years to come because of the alarming increase in unattended risk factors in younger generations. Despite the magnitude of this problem, efforts to prevent or treat CVDs remain inadequate.

BACKGROUND

To prevent a first occurrence and recurrent episodes of ischemic coronary events, pharmacological therapies play an important role. Individual medications such as antiplatelet agents, statins, β -blockers, angiotensin-converting enzyme (ACE) inhibitors, and angiotensin receptor blockers (ARBs) are proven to be effective in secondary prevention of coronary artery disease (CAD).²⁻⁷ When coprescribed, many of these agents demonstrate an additive effect, and the benefits increase significantly.^{8,9} Despite the strong beneficial effect of these agents, secondary preventive therapies continue to be underused. Several articles in the literature point out that healthcare providers are missing valuable opportunities in secondary prevention of CAD with regard to the prescription of statins, β -blockers, and ACE inhibitors.¹⁰⁻¹⁵ The evidence for underutilization of life-saving medications in secondary prevention of CAD is further supported by analyses using administrative data sets. A medical record audit of 16 of 58 890 outpatients who had CAD or congestive heart failure showed that among 16 603 patients with congestive heart failure only 50% were taking an ACE inhibitor and only

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26% of those achieved the recommended target dosage.¹⁶ A subgroup analysis that examined 48 586 medical records of patients with CAD demonstrated that only 44% of patients had documented low-density lipoprotein cholesterol testing in the previous year, 39% were receiving lipid-lowering agents, and 25% had reached low-density lipoprotein cholesterol goals.

Addressing the shortcomings in secondary prevention of CAD can produce significant clinical outcomes among patients. The Scandinavian Simvastatin Survival Study¹⁷ showed that secondary prevention for patients with CAD by means of lipid-lowering therapy using 20 to 40 mg/day of simvastatin resulted in improved clinical outcomes. During a median follow-up period of 5.4 years, there were 189 coronary deaths (8.5%) in the placebo group and 111 coronary deaths (5%) in the simvastatin group, while 622 patients (28%) in the placebo group and 431 patients (19%) in the simvastatin group had 1 or more major coronary events. These represent 42% and 32% reductions in the relative risks of coronary deaths and major coronary events, respectively. In addition to the benefits in coronary risk reduction, the Scandinavian Simvastatin Survival Study¹⁸ showed that simvastatin therapy in patients with CAD reduced hospital admissions for acute CVD (including revascularization procedures) by 26%, the mean length of hospital stay by 10%, and the number of hospital days by 34% compared with the placebo group.

Multifactorial Approach

Managed care organizations (MCOs) have an important ethical obligation to improve the quality of care that their members receive. Increasingly, MCOs have initiated quality improvement programs to enhance the quality of care provided to members with chronic diseases. Among 6 commercial health plans in the state of Hawaii, the Hawaii Medical Service Association (HMSA) is the largest MCO and is an independent licensee of the BlueCross BlueShield Association. It has a membership of more than 700 000, representing more than half of the state's population.

In an effort to improve the quality of care and health outcomes in members with CAD, the HMSA has put into place a multifactorial approach that optimizes members' and providers' adherence to guidelines for secondary prevention of CAD. One of the primary objectives of this approach is to maximize the use of pharmacological therapy in secondary prevention for members with CAD. The main components of the HMSA's multifactorial intervention program are its disease management programs, practitioner and hospital performance incentive system, CAD-specific clinical practice guidelines, and value-added services for healthcare providers.

The specific programs intended for members with CAD and their healthcare providers are described herein:

Disease Management Programs. The HMSA operates 6 disease management programs, collectively known as Care Connection, to help members with chronic diseases lead healthy and productive lives. These programs are run in collaboration with Healthways, a leading provider of comprehensive health and care support programs and services. Among these disease management programs, Cardiac Care Connection targets members with CAD and congestive heart failure. It was initiated in 2000, and more than 10 000 members with CAD are under active management. Cardiac Care Connection is a comprehensive program that addresses all levels of care, including prevention, self-care, and outpatient services, along with extensive collaboration and coordination with members' healthcare providers. Members receive regular health educational mailings, telephone reminders, and support from clinicians. These clinicians help members understand their laboratory test results, medications, and effect of lifestyle choices on their disease progression and symptoms. The program also serves physicians by providing them with educational information such as newsletters, medication reports, and guidelines for care flowsheets. In addition, provider services managers, nurses, and dietitians visit the physicians and their office staff to provide information about the program, offer physician practice support, and collaborate on care coordination for members. Case managers also follow up with members when they are hospitalized to provide support, assist with care coordination, and ensure that they are followed up closely when discharged from the hospital.

Performance Incentive System. The HMSA was one of the first health plans in the nation to initiate a pay-for-performance program in a preferred provider organization setting. The performance incentive system rewards the participating practitioners and hospitals that maintain a high level of patient care and service according to evidence-based practice guidelines.

The Practitioner Quality and Service Recognition program was developed in collaboration with Health Benchmarks, Inc, and initiated in 1998 to reward Hawaii's healthcare practitioners for the quality medical care they provide to their patients. As a pay-for-performance program, the Practitioner Quality and Service Recognition initiative translates accepted industry practices into standards that can be objectively measured through analyses of claims data and other verifiable criteria. More than 2400 participating physicians, psychologists, and optometrists (about 84% of those eligible) are enrolled in the Practitioner Quality and Service Recognition program. Three criteria pertaining to secondary

prevention of CAD that are used in determining the awards for providers are the following: (1) the use of lipid-lowering agents, (2) the use of ACE inhibitors or ARBs, and (3) the use of β -blockers. The mean amount of money awarded to providers participating in the Practitioner Quality and Service Recognition program is approximately \$4800, and the largest award amounts to \$16 000.

Working in tandem with the Practitioner Quality and Service Recognition program is the HMSA's Hospital Quality and Service Recognition program. The Hospital Quality and Service Recognition initiative rewards participating hospitals that achieve specified performance standards based on the best practice guidelines, one of which is Get With the Guidelines established by the American Heart Association.¹⁹ Hospitals are awarded monies in relation to their adherence to secondary prevention measures, namely, aspirin therapy on discharge, statin therapy on discharge, ACE inhibitor therapy on discharge, β -blocker therapy on discharge, and smoking cessation counseling.

A third pay-for-performance initiative in the health maintenance organization setting, the Quality and Performance Program, serves more than 150 000 lives and provides monetary awards to health centers for adherence to secondary prevention in following CAD guidelines.

Clinical Practice Guidelines. The HMSA's provider advisory committees recommend or amend national treatment guidelines to best fit Hawaii's population, and more than 220 local physicians participate on these committees to help ensure quality and cost-effective healthcare for members. In an effort to maximize the effectiveness of secondary prevention of CAD, the HMSA has developed clinical practice guidelines since 2001 for prevention and treatment of CVDs that conform to those established by the American Heart Association and the American College of Cardiology.²⁰ These clinical practice guidelines are continually updated by incorporating feedback from participating providers and through consultation with the provider advisory committees and are disseminated annually to providers.

Value-added Services for Healthcare Providers. To provide physicians with support in their efforts to improve secondary prevention of CAD for their patients, the HMSA gives physicians reports concerning their prescribing of lipid-lowering agents, ACE inhibitors, and β -blockers. For each physician, the report includes the names of their patients who have CAD and 3 columns indicating whether these patients were taking each of the 3 types of medications. These reports use an algorithm similar to that used for the quality indicators in the Practitioner Quality and Service Recognition program. In addition, conferences are held for physicians that offer con-

tinuing medical education credits. At the meetings, experts review the literature on the importance of secondary prevention in patients with CAD, and physician-specific reports are distributed. Physicians who do not attend the meetings are mailed their reports.

We aimed to evaluate the effectiveness of the HMSA's multifactorial approach in secondary prevention for its members with CAD. Therefore, the following retrospective study was conducted.

METHODS

Study Design

A retrospective observational analysis of claims data was conducted to evaluate the effect of the HMSA's multifactorial approach on members' use of medications for the secondary prevention of CAD. The study included members of the HMSA aged 18 to 75 years who were continuously enrolled during the reporting year and who were identified as having CAD by satisfying at least 1 criterion from inclusion criteria A or from inclusion criteria B during the year before the reporting period through the end of the reporting period (the reporting period was 2000-2004).

Inclusion Criteria A (Evidence of Event). At least 2 diagnoses, on separate dates, of acute myocardial infarction, ischemic heart disease, old myocardial infarction, angina, chronic ischemic heart disease, or coronary artery bypass graft.

Inclusion Criteria B (Evidence of Intervention). (1) Status diagnosis of coronary artery bypass graft or percutaneous transluminal coronary angioplasty or (2) procedures for coronary artery bypass graft or percutaneous transluminal coronary angioplasty.

Quality Measures

Based on the inclusion criteria, a study group of members with established CAD was identified. Among them, the following 3 indicators of quality of care were measured:

Members Taking Lipid-lowering Agents. Those in the study group who filled 1 or more prescriptions for the following lipid-lowering agents during the reporting year: 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors, niacin preparations, and bile salt sequestrants.

Members Taking ACE Inhibitors or ARBs. Those in the study group who filled 1 or more prescriptions for any of the ACE inhibitors or ARBs during the reporting year.

Members Taking β -Blockers. Those in the study group who filled 1 or more prescriptions for any of the β -blockers during the reporting year.

Data Analysis

Claims-based data of members with documented CAD were used to measure the percentages of members who met the criteria of filling 1 or more filled prescriptions for lipid-lowering agents, ACE inhibitors or ARBs and β -blockers used in secondary prevention of CAD. Percentages of patients in compliance were tracked over time from 2000 to 2004. The denominator was the number of members with documented CAD who were continuously enrolled in the plan during the reporting year. The numerators for each category were the numbers of members who filled at least 1 prescription of the respective medications during the reporting year. χ^2 Tests of proportion for statistically significant changes were performed for each calendar year from 2000 to 2004.

RESULTS

Patient Characteristics

The **Table** summarizes the characteristics of the study population. Fifty-seven percent of the study population was between the ages of 40 and 64 years, while 41.2% were 65 years or older. Thirty-four percent were female. Fifty-five percent had a major or severe morbidity rating, measured using the Johns Hopkins University Adjusted Clinical Group Case-Mix System (<http://www.acg.jhsph.edu>). Ninety-one percent were in the fee for service plan, while 9.2% were in the health maintenance organization plan.

Changes in Quality Measures

The process outcomes demonstrated that the prescription rates for all 3 medications used in secondary prevention of CAD consistently improved from 2000 to 2004. The **Figure** shows the annual percentage changes in the prescription rates for these 3 medications during the reporting period. Use of lipid-lowering agents increased from 55% in 2000 to 71% in 2004 in a cross-sectional cohort consisting of a sample ranging from 12 421 to 13 408 members. Likewise, use of ACE inhibitors or ARBs increased consistently over time from 44% to 55% in a sample ranging from 12 421 to 13 408 members. Use of β -blockers also increased from 36% to 47% in a sample ranging from 12 407 to 13 394 members. Changes in each measure were statistically significant at $P < .001$ for each of the years during the study period.

DISCUSSION

Healthcare providers do not always consider secondary preventive therapy during a patient's hospital stay arising from an acute coronary event, missing an opportunity to improve

outcomes. The literature suggests that initiation of these therapies in the inpatient setting aids long-term compliance with these therapies.¹⁹ Practitioners lose a critical opportunity in secondary prevention of CAD by failing to provide patients with drug therapy during the important transition from hospital care to an outpatient setting. As a result, patients fail to receive medications intended for secondary prevention after an acute episode of CAD.

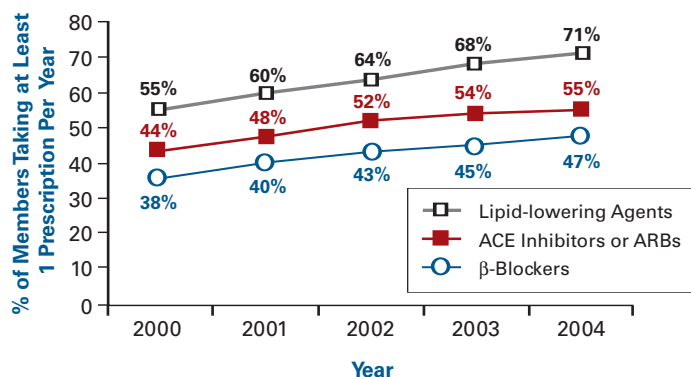
When patients are treated effectively using secondary prevention strategies, cardiovascular morbidity and mortality can be reduced in a population of patients with CAD. Managed care organizations are uniquely poised to provide their members with a multidisciplinary approach to improve the overall quality of healthcare. By optimizing secondary prevention of CAD, MCOs can expect fewer myocardial infarctions, revascularization procedures, hospitalizations, and deaths among their members.

Several MCOs have published their experience with programs to improve secondary prevention of CAD. The experience of United Healthcare of Illinois provides strong support for the effectiveness of intervention programs among its members with CAD.²⁰ The institution of secondary prevention programs and the establishment of diagnosis-related groups by United Healthcare of Illinois decreased hospitalization rates among these members by approximately 25%. In another

■ **Table.** Demographics of the Study Population

Characteristic	%
Age, y	
<40	2.0
40-64	56.8
≥65	41.2
Sex	
Male	66.4
Female	33.6
Morbidity level	
None	1.7
Minimum	2.2
Minor	10.8
Moderate	30.1
Major	24.4
Severe	30.8
Plan type	
Health maintenance organization	9.2
Fee for service	90.8

■ **Figure.** Trends in the Rates of Appropriate Medication Use for Secondary Prevention of Coronary Artery Disease



ACE indicates angiotensin-converting enzyme; ARBs, angiotensin receptor blockers.

study, Goff et al¹¹ examined the effectiveness of a quality improvement program to increase the use of pharmacological therapies among patients with coronary heart disease in a network-model managed care setting. An analysis of claims data for more than 700 patients from 1999 to 2002 showed that medication use rates increased steadily over time from 38.5% to 44.3% for β-blockers and from 22.9% to 30.3% for ACE inhibitors; an exception was a decrease in statin use in the final year from 53.9% to 46.4%.

Although intervention programs aimed at improving secondary prevention of CAD vary in their effectiveness, researchers agree that multifaceted interventions are more likely to succeed than single strategies. Among combination strategies, those that focus on increased reimbursement for appropriate therapy seem to be more effective in improving adherence to performance measures than other methods such as centralized mailings of guideline summaries, performance feedback reports, and medical record reminders.²¹

Take-away Points

- The American Heart Association predicts an epidemic of cardiovascular diseases because of an alarming increase in unattended risk factors in younger generations.
- Lipid-lowering agents, angiotensin-converting enzyme inhibitors, and angiotensin receptor blockers are proven to be effective in secondary prevention of coronary artery disease (CAD).
- Managed care organizations should use a multifactorial approach that optimizes members' and providers' adherence to guidelines for secondary prevention of CAD.
- The multifactorial intervention program of the Hawaii Medical Service Association comprises disease management programs, a practitioner and hospital performance incentive system, CAD-specific clinical practice guidelines, and value-added services for healthcare providers.

The American Heart Association has launched Get With the Guidelines,¹⁹ an acute care hospital-based program that helps manage risk factors in patients with CAD and myocardial infarction. The HMSA has adopted the program's recommendations for patients in the general population identified as having CAD and has focused on the 3 components of lipid-lowering agent use, ACE inhibitor or ARB use, and β-blocker use. The HMSA's multifactorial programs enable its members to receive evidence-based appropriate pharmacological and behavioral interventions to stabilize and prevent or delay deterioration of CAD. Medication use rates in our study showed consistent increases every year from 2000 to 2004 in the 3 classes of medications (from 55% to 71% for lipid-lowering agents, from 44% to 55% for ACE inhibitors or ARBs, and from 36% to 47% for

β-blockers), suggesting the effectiveness of a multifaceted and integrated intervention program targeted at secondary prevention of CAD. In 2006, the HMSA's Health Plan Employer Data and Information Set performance ranked in the 90th percentile for CVD measures.

The primary limitation of our study is the use of administrative claims data, the validity of which may not be as robust as that of data in a controlled study. The absence of a control group of health plan members who were not part of the intervention program makes it difficult to determine to what extent the trend in medication use was due to the intervention or due to forces outside of the intervention. Measures for adherence to secondary prevention of CAD guidelines in this study represent a low threshold. They only required that a patient fill 1 or more prescriptions among target medications in a calendar year. A more stringent requirement would measure 80% medication possession ratios in the 3 therapeutic classes. Moreover, administrative claims data may underestimate medication use, as some members may receive samples from their physicians or medications through prescription benefits under a different insurer.

CONCLUSIONS

Although there is vast knowledge about the benefits of secondary prevention for patients with CAD, a large gap continues to exist between this knowledge and actual clinical practice. In addition to the need for clinician adherence to evidence-based clinical guidelines, patient compliance is a critical factor in successful secondary prevention of CAD. The success of multifactorial intervention programs

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designed for secondary prevention of CAD by MCOs has shown that healthcare provider adherence to treatment guidelines and patient compliance can be improved significantly. Although there is substantial improvement using this approach, the opportunity to improve outcome events remains.

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