Do Disease Management Programs for Patients With Coronary Heart Disease Make a Difference? Experiences of Nine Practices

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Objective: To observe the experience of 9 practice sites in implementing provider-defined disease management programs for coronary heart disease patients.

Study Design: Observational study of provider-defined practice improvement programs.

Methods: Practices chose from a variety of interventions that included provider- and patient-based disease management tools. Data were collected at baseline, 6, and 12 months.

Results: Complete baseline, 6-month, and 12-month data were available for 586 patients (58% of the 1013 patients enrolled). Compared with baseline, 6-month data showed more patients whose total cholesterol was less than 200 mg/dL (56% to 76%; $P \leq .001$), whose low-density lipoprotein (LDL) cholesterol was less than 100 mg/dL (30% to 54%; $P \leq .001$), and whose high-density lipoprotein cholesterol was at least 35 mg/dL (75% to 81%; $P \leq .001$); who exercised rigorously for 30 minutes, 3 times a week (40% to 53%; $P \leq .001$); who used lipid medication (74% to 80%; $P \leq .01$); and who used aspirin (84% to 92%; $P \leq .001$). There were no significant improvements in triglyceride levels, blood pressure control, glycemic control among diabetes patients, smoking cessation, body mass index, and β-blocker use. The 12-month results were similar to the 6-month results. Sites with a practice coordinator had the highest number of patients achieving their LDL goal (72% to 89%).

Conclusions: There may be an opportunity to improve patient care by applying disease management principles with a variety of interventions. Dedicated personnel to help coordinate disease management programs may be critical to the success of such programs.

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Barriers to the appropriate identification and treatment of patients with coronary heart disease (CHD) continue to limit the application of current scientific knowledge. Despite a wealth of clinical trial data,[1-12] demonstrated economic benefit,[13-18] and expert panel guidelines,[19-22] intensive management of cardiac risk factors has not been completely embraced or consistently practiced by healthcare providers.[23-30]

Important national guidelines have been established for the prevention and treatment of cardiovascular disease. The National Cholesterol Education Program (NCEP) Adult Treatment Panel II (ATP II) guidelines, which were published in 1993, recently were replaced by new, more aggressive cholesterol guidelines issued in May 2001 by the ATP III panel.[19] The *Sixth Report of the Joint National Commission* (JNC VI), issued in 1997, contained clinical guidelines for the prevention, detection, evaluation, and treatment of high blood pressure that strongly encourage lifestyle modification[20] in addition to pharmacologic therapy for persons with hypertension. The 1995 American Heart Association/American College of Cardiology (AHA/ACC) guidelines provided evidence-based recommendations for broad-based risk factor reduction, including behavioral modifications and use of medications in CHD patients.[21] Since this study was conducted, the AHA/ACC guidelines for CHD patients have been updated.[22] Together, the NCEP ATP III, JNC VI, and AHA/ACC guidelines can assist providers with the management of CHD patients. The remaining challenge is how to translate and operationalize

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these guidelines in a cost-effective manner for the majority of CHD patients seen in everyday clinical practice.

THE TREATMENT GAP

Despite growing awareness of the importance of risk factor reduction and appropriate medications in the treatment of patients with CHD, adherence to NCEP and AHA/ACC guidelines remains poor. This lack of adherence has been best documented with regard to cholesterol-lowering and antihypertensive medications, but appears to be true for most AHA/ACC recommendations. For example, the American College of Cardiology Evaluation of Preventive Therapeutics (ACCEPT) study showed low rates of compliance with many of the AHA/ACC recommendations.[23] Other studies have shown a similar pattern of undertreatment of cholesterol levels in CHD patients.[24-30] The Quality Assurance Program, an analysis of 48 586 records of CHD patients across 140 medical practices in the United States, showed that less than one half (44%) of CHD patients had a chart-documented low-density lipoprotein cholesterol (LDL-C) test in the prior 12 months, 39% were on lipid-lowering therapy, and only 25% of had reached the LDL-C goal.[28] Further evidence of the CHD treatment gap was provided by a study of the National Registry of Myocardial Infarction 3 dataset, which showed that only 31.7% of patients with a previous myocardial infarction were discharged on lipid-lowering therapy.[30]

Although lack of treatment and undertreatment with lipid-lowering and other drugs are 2 important factors in explaining why so many CHD patients fail to achieve their target treatment goals, they are not the only factors. Even though physician and patient knowledge of behavioral risk factors for cardiovascular disease is widespread, the actual implementation of behavioral modification remains low.[24,31-33] Possible explanations for the lack of success in changing patient risk factors include physician time constraints in providing information, organizational constraints on providing patient education, and patient nonadherence with lifestyle changes and drug therapies.

Recognition of these barriers to change has led to a variety of programs and interventions aimed at increasing the number of patients with comprehensive treatment plans and facilitating patient compliance with the overall plan. Secondary prevention programs to date have used several different approaches, including small classes, individual counseling in combination with drug therapy, physician reminders, cardiac rehabilitation programs, and other forms of disease management activities aimed at process improvement. Evidence exists that such programs can lead to modest improvements in behavioral risk factors and reduce cardiovascular morbidity and mortality.[34-39] In recognition of the value of such programs, the American Heart Association initiated a program called "Get with the Guidelines" to encourage healthcare providers and hospitals to systematically ensure that all patients discharged from the hospital with CHD receive appropriate treatment.[40]

This study was undertaken to observe the experience of 9 clinical practices in implementing provider-defined disease management programs. These programs were designed to assist healthcare providers in following the AHA/ACC guidelines for treatment of CHD patients, to help increase the proportion who are screened for cardiovascular risk factors, receive appropriate treatment, and attain lipid goals. Features of the programs that may have helped to improve care were examined to better inform decision-makers contemplating the initiation or review of such programs.

METHODS

Settings

Nine geographically dispersed practice sites were chosen to participate in this study based on their willingness to implement a provider-defined disease management program. Sites included 3 cardiology clinics, 2 managed care clinics, 2 academic clinics, and 2 internal medicine clinics (See the Acknowledgments for a list of investigators and practice sites.) Each site was provided with a small grant for study-related expenses such as data collection. Specific disease management materials were provided to sites, if they requested, as part of their intervention.

Practice Coordinators

Of the 9 sites, 6 reported that they had practice coordinators whose role in the study was to identify and enroll patients into the program, collect baseline and follow-up data, and provide educational counseling to patients. The other sites used office staff, as available, to assist with these functions.

Patient Identification and Assessment

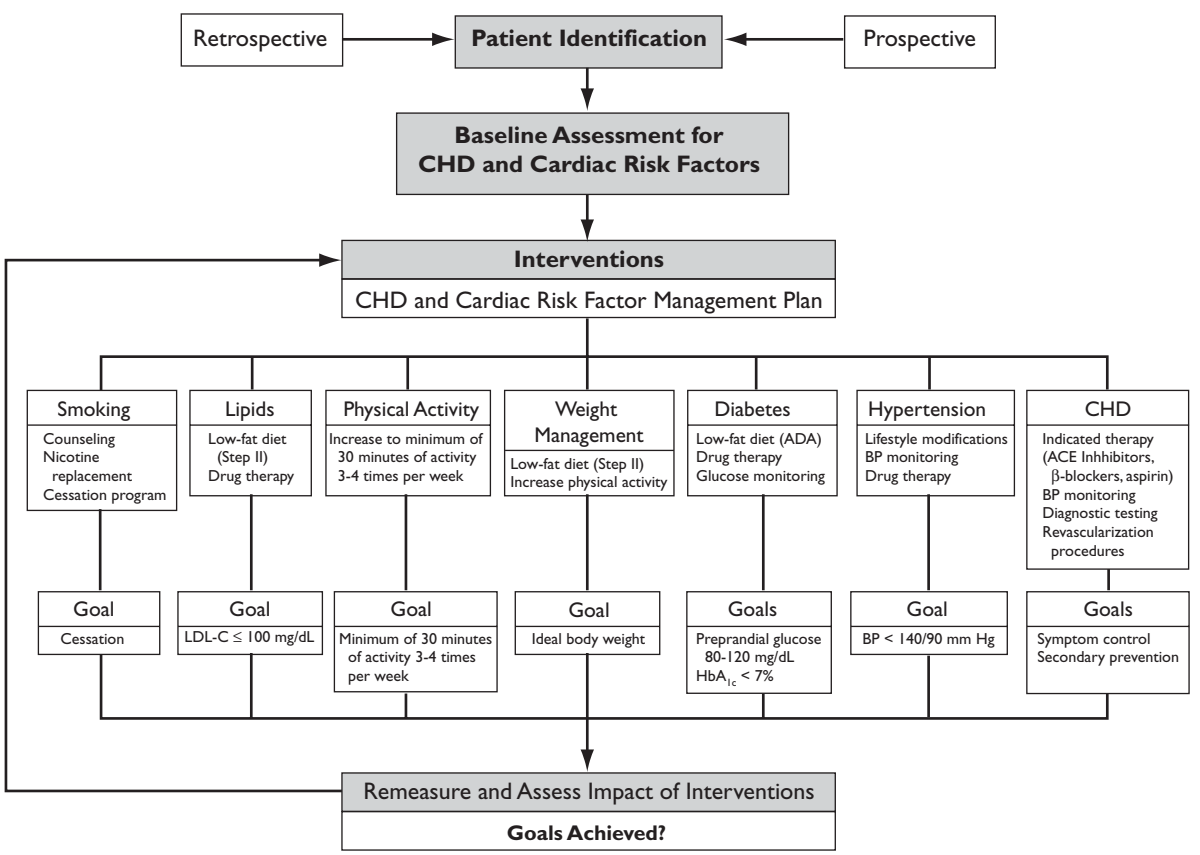
Sites were requested to identify adult patients with CHD either prospectively or retrospectively, depending on individual site capabilities. Prospective identification was done by identifying recently hospitalized patients with a diagnosis of CHD or by screening patients when they were seen in the office. For prospective identification, sites were encouraged to enroll patients consecutively. Retrospective identification was performed by analyzing administrative data for patients with *International Classification of Diseases, Ninth Revision (ICD-9)* diagnostic codes, *Current Procedural Terminology* (CPT) procedure codes, and diagnosis-related groups consistent with CHD. For retrospective patient identification, sites were encouraged to select a random sample of patients. Most sites enrolled patients prospectively. There was no predefined limit on the number of patients each site could enroll.

To determine baseline values, initial data collection was performed by sites for each patient during the enrollment process (but before initiation of the intervention) by review of electronic patient records or medical charts, or through patient interview. Baseline variables included demographic variables (ie, age, sex, marital status, education level), medication use (ie, β-blockers, other antihypertensive medications, lipid-altering medications, diabetes medications, aspirin), clinical values (ie, lipid panel, glycosylated hemoglobin [HbA_{1c}], blood pressure, body mass index [BMI]), and other variables (ie, smoking status, physical activity level).

Interventions and Guidelines

Although practice sites were strongly encouraged to use treatment guidelines based on NCEP ATP II[41] and the AHA's *Guide to Comprehensive Risk Reduction for Patients with Coronary and Other*

Figure. Care Process Algorithm



ACE indicates angiotensin-converting enzyme; ADA, American Diabetes Association; BP, blood pressure; CHD, coronary heart disease; LDL-C, low-density lipoprotein cholesterol; HbA_{1c}, glycosylated hemoglobin.

Vascular Disease,[21] no protocol-defined care was dictated. A treatment algorithm for risk factor reduction and lipid lowering was developed before initiation of the program and was provided to the sites as a resource (**Figure**).

The implementation plan, including the specific materials to be used for each intervention, was determined by each site. With the range of materials provided, interventions could have been targeted to address a few or all of the cardiac risk factors. Each site determined and documented its implementation plan and the specific set of resources to be used for all of its enrolled patients. Examples of interventions used in this program are listed in **Table 1**.

Table 1. Examples of Intervention Materials

Patient Intervention Materials

- *Educational booklets on the following topics:* Proper eating, smoking cessation, diabetes management, heart failure, high blood pressure, coronary heart disease, hospital discharge guide, and exercise.
- *Letters to patients from provider:* Sample letters for healthcare professionals to send to patients to encourage follow-up visits and monitoring of progress.
- *Sample newsletters to patients:* Sample newsletters that can be given to patients to motivate and encourage compliance while providing helpful hints and diet suggestions.
- *Patient diary:* Booklet to record progress including vital signs, lipid levels, medications, and weight.
- *Phone calls to patients:* Sample scripts used to (1) classify patients according to probability of compliance and (2) track progress toward reducing risk factors.
- *LDL-C goal card:* A handy reminder to help focus attention on patient lipid levels and NCEP ATP II goals.

Provider Intervention Materials

- *Care process algorithm:* Based on NCEP ATP II and AHA/ACC national guidelines. Detailed algorithm and flowchart to assist with treatment of CHD and other high-risk patients, emphasizing cardiovascular risk factor reduction.
- *CHD treatment and cardiac risk factor reduction algorithm:* Based on AHA/ACC national guidelines. Detailed algorithm and flowchart to assist with treatment and risk factor reduction for CHD patients.
- *Cholesterol-lowering algorithm:* Based on NCEP ATP II national guidelines. Detailed algorithm and flowchart to assist with cholesterol lowering for CHD patients.
- *AHA/ACC guideline pocket card:* Pocket-sized, laminated summary of AHA/ACC national guidelines to help remind providers of recommendations for managing patients to goal.
- *NCEP ATP II guideline pocket card:* Pocket-sized, laminated summary of NCEP ATP II national guidelines to help remind providers of recommendations for managing patients to goal.
- *Cardiovascular risk factor flow sheet:* Flow sheet to track progress with cardiovascular risk factor reduction program. Highlights areas where patient is at risk and allows overview of progress in cardiovascular risk factor reduction.
- *Reminder stickers for patient charts:* Handy reminders that can be placed on patient charts to remind providers of NCEP ATP II goals and thereby help providers track a patient's progress in getting to goal and improve a patient's risk factor status.

AHA/ACC indicates American Heart Association/American College of Cardiology; CHD, coronary heart disease; LDL-C, low-density lipoprotein cholesterol; NCEP ATP II, National Cholesterol Education Program Adult Treatment Panel II.

Data Collection

Each practice site collected data on all process indicators. Data were collected on forms designed for the study and provided to each site. The form included sections on patient risk factor history (ie, smoking status, diabetes, weight and height to calculate BMI, family history), comorbidities, diagnostic tests (ie, lipid profile, glucose, electrocardiogram), and CHD treatment regimen (list of cardiovascular medications). Measurements collected at approximately 6 and 12 months included the following:

- Tobacco use status: Tobacco use and cigarette smoking status were determined, including prior smoking history and current consumption.
- Lipids: A lipid profile—including total cholesterol, LDL-C, high-density lipoprotein cholesterol (HDL-C), and triglycerides—was generally obtained fasting (ie, patients had no food for at least 9 hours before sampling). Administration of lipid-modifying medications also was noted. If a lipid profile had been performed no more than 3 months before enrollment, the tests could be used as baseline values.
- Activity level: This was calculated as minutes per day and days per week.
- Height and weight: These were used to calculate BMI.
- Use of aspirin.
- Use of β-blocker therapy.
- Blood pressure.
- Blood glucose and HbA_{1c} for patients with diabetes mellitus.

Follow-up Survey With Practice Coordinators

At the conclusion of the study, a brief 12-question telephone survey was conducted with 5 of the 9 prac-

tice sites by one of the authors (GJW). The remaining 4 sites were not surveyed because they did not have a practice coordinator during the study, or they had lost their coordinator by the time the survey was conducted. Across the 5 sites, 7 individuals involved in program or study coordination were surveyed (6 nurses and 1 exercise physiologist). The 12 open-ended questions covered topics such as the major drivers of success, obstacles to program implementation, useful tools, additional resources desired, ways of announcing the program to patients, lessons learned, future use of program tools, and program success rating.

Statistical Analysis

Baseline characteristics of the patients were compared with those of the adult CHD patients in the National Health and Nutrition Examination Survey (NHANES III). This is a nationally representative survey of the US population conducted by the National Center for Health Statistics from 1988 to 1994.

Differences between baseline and 6 months and between baseline and 12 months were computed. The statistical significance of these differences baseline was assessed by using 2-sided chi-square statistical tests. The main outcome measure was the proportion of patients with an LDL-C value of less than 100 mg/dL at 6 and 12 months compared with the proportion at baseline. Secondary measures included other lipid profile parameters, cardiovascular risk factors, and current medications.

RESULTS

Patient Baseline Characteristics

Demographics of the patient population are reported in **Table 2**. Enrolled patients tended to be older, white males with heart disease. Table 2 also shows the demographic characteristics of persons with CHD in the US population, as determined by NHANES III.

The average patient age and the percentage of male patients enrolled in this study were somewhat higher than comparable values for the adult CHD population from NHANES III (64 y vs 56 y; 69.3% vs 48.2%). Differences between the demographics of the study population and the general US population of persons with CHD may be partly explained by the fact that study population patients were seeking care for their conditions at the time of study enrollment.

Table 2. Demographics of Study Population Compared With US Population With Coronary Heart Disease

Characteristic	Study Population* (n = 586)	US CHD Population† (n = 9 382 782)
Mean age, y (range)	64 (28-87)	56 (20-90)
% Male	69.3	48.2
% White	76.5	85.6
% Married	75.9	67.1
% College education	55.3	25.3

*Baseline, 6-month, and 12-month data were available for these patients.
†Data were from the National Health and Nutrition Examination Survey III (1988-1994), for persons age 20 years and older.
CHD indicates coronary heart disease.

Of the 1013 patients with baseline data, 6- and 12-month follow-up results were available for 586 patients (58%). At baseline, the 2 groups (ie, patients with and without follow-up data) had similar LDL-C, HDL-C, and triglyceride values, and similar proportions of men and women. There were small differences at baseline between those who completed the study and those who did not with respect to age (63.5 y vs 61.7 y; $P = .01$), total cholesterol (206.1 vs 195.9 mg/dL; $P = .04$), glucose (111.9 vs 126.2 mg/dL; $P < .001$), and current smoking status (9.8% vs 15.8%; $P = .01$).

Interventions Used by Sites

Practice sites chose to use a variety of patient intervention resources (**Table 3**). Of the 8 available provider intervention resources available to sites, the most commonly used were the CV risk factor flow sheet, the NCEP ATP II cholesterol-lowering algorithm, the AHA/ACC guideline pocket card, and the NCEP ATP II guideline pocket card. Of the 6 available patient interventions, the most commonly used were educational booklets and scripted phone calls to patients. The second most common patient resource, used by 7 of the 9 sites, was the patient diary. All other patient interventions were used by at least 5 of the 9 sites.

Clinical Measures

At 6 and 12 months, there were significant increases in the percentage of patients on lipid ther-

apy (**Table 4**). However, the treatment rate for patients with a LDL-C value above the treatment threshold (>130 mg/dL) did not increase significantly. The percentage of patients on aspirin, already high at baseline, increased significantly by 12 months. Approximately one half of all patients were taking β-blockers, a rate that did not change during the study period. Significant increases at 6 months and 12 months compared with baseline were seen in the percentage of patients attaining the LDL-C goal (Table 4). Significant improvements from baseline also were found for HDL-C (at 6 months), total cholesterol (at 6 and 12 months), and triglycerides (at 12 months). At baseline, roughly 4 in 10 patients with diabetes had a HbA_{1c} value greater than 7% (Table 4). There were no significant changes in the percentage of patients with diabetes who had a HbA_{1c} value greater than 7%.

Other Cardiovascular Risk Factors

Two thirds of the study patients had a blood pressure reading lower than 140/90 mm Hg at baseline (Table 4). Although this rate improved slightly at 6 and 12 months, the improvements were not significant. Forty percent of patients reported that they engaged in physical activity at least 3 times per week and for at least 30 minutes per session. There were significant improvements in the level of physical activity at 12 months compared with baseline. Nearly all patients (90%) were nonsmokers. This percentage did not change during the study period. Despite improvements in risk factors such as increased

Table 3. Disease Management Resources Used and Site Characteristics, by Site

Tools	Site A	Site B	Site C	Site D	Site E	Site F	Site G	Site H	Site I
Patient interventions									
LDL-C goal cards	X	—	X	—	X	X	X	—	—
Letters to patient from doctor	X	—	X	—	—	X	X	—	X
Sample patient newsletters	X	X	—	—	X	X	X	—	X
Patient diary	X	X	X	X	—	X	—	X	X
Educational booklets	X	X	X	X	X	X	X	X	X
Phone calls to patients	X	X	X	X	X	X	X	X	X
Provider interventions									
Care process algorithm	X	—	—	X	—	X	—	—	—
CHD treatment and cardiac risk factor reduction algorithm	X	—	—	X	X	X	X	—	—
NCEP ATP II cholesterol-lowering algorithm	X	—	—	—	X	X	X	—	X
AHA/ACC guideline pocket card	X	—	—	X	X	X	X	—	X
NCEP ATP II guideline pocket card	—	—	X	X	X	X	X	—	X
Cardiovascular risk factor flow sheet	—	—	—	X	—	X	X	—	—
Reminder stickers for patient charts	—	—	X	—	—	—	—	—	X
Article reprints	X	—	—	—	—	—	X	—	—
Practice coordinator	X	X	—	X	X	—	—	X	X
No. with baseline and 6-mo data	95	112	9	80	81	29	40	73	169
Percent at LDL-C goal at baseline	31	51	33	30	44	33	29	37	19
Percent at LDL-C goal at 6 mo	80*	89*	33	72*	72*	30	64*	81*	74*

AHA/ACC indicates American Heart Association/American College of Cardiology; CHD, coronary heart disease; CV, cardiovascular; LDL-C, low-density lipoprotein cholesterol; NCEP ATP II, National Cholesterol Education Program Adult Treatment Panel II.
*$P \leq .05$.

Table 4. Differences in Measures at 6 Months and 12 Months

Measure	Baseline	6 Months	Absolute Difference (6 Month minus Baseline)	12 Months	Absolute Difference (12 Month minus Baseline)
Lipid profile (%)					
LDL-C < 100 mg/dL	29.9	53.9	24.0*	59.0	29.1*
Total cholesterol < 200 mg/dL	56.1	76.0	19.9*	80.3	24.2*
Triglycerides < 200 mg/dL	67.6	71.9	4.3	74.9	7.3†
HDL-C ≥ 35 mg/dL	75.1	81.2	6.1†	78.1	3.0
Cardiovascular risk factors					
% Blood pressure < 140/90 mm Hg	63.3	66.9	3.6	66.6	3.3
% Physical activity 30 min, 3 times per wk	39.8	53.4	13.6*	49.0	9.2*
% Nonsmoker	90.3	90.6	0.3	90.6	0.3
Mean BMI (kg/m^2)	28.4	29.5	1.1	30.2	1.8
% Diabetes patients with HbA_{1c} > 7%	41.7	36.5	–5.2	33.3	-8.4
Current medications (%)					
On lipid therapy	73.7	79.5	5.8†	81.4	7.7*
On lipid therapy if LDL-C was >130 mg/dL	84.4	86.7	2.3	86.2	1.8
On aspirin	84.3	92.0	7.7*	88.7	4.4†
On a β-blocker	54.4	53.2	–1.2	51.5	–2.9
On diabetes medications if HbA_{1c} was >7%	88.0	89.5	1.5	77.8	10.2

BMI indicates body mass index; HbA_{1c}, glycosylated hemoglobin; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol.
*$P \leq .01$.
†$P \leq .05$.

physical activity, changes in mean BMI levels were not statistically significant.

Follow-up Survey Results and Analysis

In the follow-up telephone survey of practice coordinators, coordinators believed that their presence facilitated patient recruitment, educational counseling, and patient motivation. Not surprisingly, these coordinators reported that one of the major obstacles to a more successful program was the lack of time available for patient contact, which often was limited to phone calls. Another obstacle coordinators noted was the lack of administrative support needed for disease management–related activities. When coordinators were asked what they would do differently if they were to conduct the program again, they noted that although personal contact was important in improving adherence with therapy, group support was valuable in fostering behavioral risk factor changes. On a scale of 1 (lowest) to 10 (highest), coordinators rated the success of their individual programs as 7.7 ± 0.4 (mean ± standard deviation).

Of the 6 practice sites with designated practice coordinators, all showed significant increases in the percentage of patients reaching the LDL-C goal at 6 months (Table 3). Of the 3 sites without designated coordinators, only 1 showed significant improvements in the percentage of patients reaching the LDL-C goal at 6 months. Sites with a coordinator had the highest number of patients achieving the LDL-C goal (72% to 89%) compared with sites without a coordinator (30% to 64%). Sites with coordinators also had more patients per site enrolled (mean = 102) than sites without coordinators (mean = 26). Neither the number of resources nor any specific resource was significantly associated with attainment of the LDL-C goal.

DISCUSSION

In this study, we observed provider-defined disease management programs across 9 practice settings to see whether there was an increase in the proportion of patients achieving AHA/ACC guideline–defined goals for CHD. In many respects, these programs documented reductions in cardiovascular risk factors among patients at high risk for recurrent cardiovascular events. The percentage of patients attaining the LDL-C goal of less than 100 mg/dL doubled during the 12-month period from less than one third of patients at baseline to nearly two thirds by the end of 12 months. Total cholesterol and triglyceride values also showed significant decreases. These changes may have been due to medication therapy supplemented by other behavioral changes (eg, physical activity, diet). However, more than 70% of patients were already on some form of lipid therapy at baseline.

Another modifiable risk factor, physical activity, showed positive changes during the study time period. Unfortunately, other modifiable risk factors such as blood pressure, BMI, and smoking status failed to demonstrate positive changes. It may be that blood pressure and BMI were difficult to modify or that practices did not focus on reducing these risk factors. Because the vast majority of patients (90%) were nonsmokers, it would have been very difficult to improve the nonsmoking rate in this population.

The design of this program allowed practice sites to choose from a variety of interventions and resources, both for patients and providers. Thus, it was not possible to attribute changes in risk reduction to any single intervention. Changes were most likely due to a complex interaction of patient behavioral changes and changes in physician practice patterns. Although risk reductions were noted, this study was not designed to determine changes in cardiac events or resource utilization (eg, hospitalizations).

The motivation of each patient was likely a key factor in the reduction of his or her own risk factors. Patients who participated in this program did so willingly after discussion with a healthcare provider at the site. Another driver of improvement seemed to be the presence of a coordinator rather than a specific resource or set of resources. The sites with a practice coordinator showed larger reductions in patient risk factors and also enrolled a larger number of patients. Thus, the use of dedicated personnel to help coordinate disease management programs as part of a clinical team may be critical to the implementation of disease management programs. It may be that the future longevity of disease management programs will only be ensured if disease management becomes an integral component of the healthcare system.[42] Case managers or possibly technology-based systems of patient contact may be components of such a system.

There are a number of limitations to this study. First, a large percentage of patients (42%) were lost to follow-up during the study. Although their baseline characteristics were similar to those of patients who completed the study, there is no way of knowing whether these patients also had results similar to those of patients with available follow-up data. Data were analyzed only for patients who had complete follow-up (per the study protocol). No assumptions can be made regarding the effects of the program on patients lost to follow-up. Another analytic approach would have been to include all patients in the analysis (intention-to-treat). However, the first step in program evaluation is to assess the potential benefit to participants; and in this study, patients with available follow-up data were the ones who appeared to benefit from the provider-defined interventions. Another limitation is the fact that there was no control group in this study. Last, physicians willingly participated in this study, knew they were expected to provide disease management counseling and resources, and also knew that the results of the study would be disseminated. It is difficult to estimate the impact of these factors on the results.

The experiences of these 9 practice sites appear to demonstrate an opportunity to improve patient care by use of disease management principles to promote best practices in the treatment of CHD patients. These results also highlight the variability of sites with regard to the ability to recruit patients into disease management programs, preference for the type of intervention, and the ability to track patient outcomes over time. The amount of improvement demonstrated correlated more with the dedication of each site to quality improvement than with any particular patient- or provider-centered intervention. Additional studies are needed to further evaluate optimal interventions to improve care of patients with CHD.

In summary, these provider-defined disease management programs generally displayed a positive impact on reducing cardiovascular risk factors in a group of patients at high risk for cardiac events. The most noteworthy findings are those showing the impact such programs can have on improving the number of patients that are screened, treated, and

treated to goal for cholesterol. Surprisingly, one of the most glaring treatment gaps for patients at risk for cardiac events is in cholesterol management.[28] It may be possible to close this gap substantially. However, efforts to change current practice will require a significant contribution of time and resources as well as commitment from healthcare leadership.

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