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The Health Quality Partners Medicare Coordinated Care Demonstration Program After One Year

Final Report

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EXECUTIVE SUMMARY

The Medicare Coordinated Care Demonstration, mandated by the Balanced Budget Act of 1997, is testing a range of models aimed at improving the care of chronically ill beneficiaries with Medicare fee-for-service coverage. Fifteen programs are participating in the demonstration sponsored by the Centers for Medicare & Medicaid Services (CMS). Mathematica Policy Research, Inc. (MPR) is evaluating the demonstration using both implementation analysis and impact analysis based on a randomized design. This report is one of a series that will describe each program during its first year and will provide estimates of its impact on Medicare service use and costs during the first six months of program operation.

Research over the past decade suggests that successful care coordination usually has several features. These include ***effective patient identification***, ***highly qualified staff***, ***physician buy-in***, and ***financial incentives*** aligned with program goals. Successful programs also offer a well-designed, structured intervention that typically includes:

- A multifaceted assessment whose end product is a ***written care plan*** that can be used to monitor patient progress and that is updated as the patient's condition changes
- A process for providing ***feedback to care coordinators, program leaders, and physicians*** about patient outcomes
- Patient ***education*** that combines the provision of factual information with techniques to help patients change self-care behavior
- Procedures for integrating fragmented care, facilitating communication among providers, and, when necessary, arranging for community services

The ultimate purpose of this report series is to assess the extent to which demonstration programs have these features, as well as describe early enrollees in the programs and their Medicare service use and costs during the first few months after enrollment. Information for the report comes from telephone and in-person contacts with program staff, and analysis of Medicare and program-generated data. The next report series will focus on Medicare service use and costs over a longer time and will include all first-year enrollees.

This report describes Health Quality Partners' Medicare Coordinated Care Study (MCCS). After presenting an overview of Health Quality Partners' program, the report addresses the following questions: Who enrolls in the program? To what extent does the program engage physicians? How well is the program implementing its approaches to improving patient health and reducing health care costs? What were enrollees' Medicare service use and costs during the program's first months of operation? Thereafter follows a discussion of the program's strengths and unique features, as well as potential barriers to program success.

Program Organization and Approaches. Health Quality Partners, a provider of wellness and care management services in eastern Pennsylvania, began as the care management team of

PennCARE, a for-profit managed care contractor. PennCARE developed the prototype for the MCCS under contract to Aetna U.S. Healthcare's commercial and Medicare + Choice health plans. Under the prototype program, participants' health care costs were nine percent lower than their costs before entering the program. In July 2001, PennCARE spun off Health Quality Partners as an independent not-for-profit organization.

The Health Quality Partners MCCS operates from the organization's Doylestown, Pennsylvania, headquarters and from its offices in the nearby Doylestown Hospital Wellness Center, for which Health Quality Partners provides some services under contract. The program's leadership includes a medical director, project manager, and a care management supervisor. The program's care coordinators (called care managers) work from both offices, but often see patients in the patients' homes or in their physicians' offices. The care management supervisor oversees the enrollment staff who work from the program's Doylestown office.

To obtain patient referrals, the program built on its existing relationships with physicians associated with the PennCARE hospital network. During its first year, it focused on the physicians affiliated with Doylestown Hospital who are familiar with the program staff from their work with the prototype program and from Health Quality Partners' other contract work with the hospital. The program's management meets frequently with network physicians to elicit their support and obtain their feedback about the program. However, the physicians' role in the intervention is limited to responding to care managers' questions and allowing abstraction of patients' medical records.

The program's two primary approaches to improving patient health and reducing hospital use and costs are (1) to improve patient self-care and adherence to treatment recommendations, and (2) to promote better communication and coordination between patients and providers. The program's intervention educates patients about the need to make lifestyle changes and perform self-care activities by tailoring education to each patient's needs and readiness to change. The program also improves communication and coordination by helping patients to advocate for their own care needs.

Patient Identification. The Health Quality Partners MCCS began enrolling patients in April 2002. Patients must have asthma, coronary artery disease, diabetes, heart failure, hyperlipidemia, or hypertension and be likely to use high-cost health care services in the near future to participate. As in all the demonstration programs, beneficiaries also must meet three criteria to be in Health Quality Partners' MCCS: (1) be enrolled in Medicare Parts A and B, (2) not be in a Medicare managed care plan of any kind, and (3) have Medicare as their primary payer. The program identifies patients primarily from lists of eligible patients generated by the offices of physicians in eastern Pennsylvania who were associated with the PennCARE hospital network and have agreed to participate in the program. The physicians review the lists to confirm that the patients are suitable for the program. The program then sends eligible, suitable patients a letter describing the program that is printed on their physician's letterhead and signed by the physician or the physician office practice. The program's enrollment staff follow up the letters with telephone calls in which they invite patients to an information session. At these sessions, the program's care managers explain the program; administer the Sutter Health Questionnaire to determine patients' risk of hospitalization, emergency room use, falls, and adverse events; and obtain patients' informed consent.

Patient Assessment, Care Planning, and Monitoring. Based on the results of the Sutter Health Questionnaire, the program stratifies patients into three risk levels. The program tailors assessments, care planning, monitoring, and its interventions to each risk group. In its first six months of operations, the program enrolled eight patients in its moderate-risk group, 61 patients in the high-risk group without geriatric frailty, and 35 patients in the high-risk group with geriatric frailty. Moderate-risk patients primarily receive education about their conditions and recommended self-care strategies. High-risk patients without geriatric frailty receive education and other interventions, such as help arranging needed services to promote clinical stability and eliminate barriers to self-care. High-risk patients with geriatric frailty require immediate clinical management with education and self-care interventions added as they stabilize. Care managers develop individualized care plans for high-risk patients. Depending upon patients' needs, the care managers conduct monitoring contacts by telephone, or in-person in the patients' home or their physicians' offices. All patients receive monitoring at least monthly and more often as needed. Although the program does not repeat the initial assessment, the care managers reassess key health and functional status measures during each patient contact.

Staffing and Program Quality Management. Maintaining and improving care quality and ensuring that programs attain their goals both require that staff have adequate qualifications, training, and supervision and that management has the tools and support to monitor program progress toward its goals. The MCCS program's care managers must be registered nurses with at least five years' experience in a clinical specialty area relevant to the program, and some experience in community nursing. New care managers receive structured training and use role-playing to practice their interactions with patients. The care management supervisor reviews the care plans of new care managers and randomly reviews selected care plans for all care managers on an ongoing basis.

Health Quality Partners has developed a continuous quality improvement process to monitor and improve its program. It uses a Microsoft Access database to track care manager contacts with patients and record data on patient's clinical outcomes. Quality improvement focuses on program operations, the program's intervention, and provider relations. Health Quality Partners plans to survey both patients and physicians regarding their satisfaction with the program but has not yet begun to do so. The program generates a number of reports from its information system, which it uses to monitor the care managers' productivity and the clinical effectiveness of its intervention.

WHO ENROLLS IN THE PROGRAM?

The program staff worked hard to meet their target of enrolling 738 beneficiaries in the first year of operation. By April 2003, however, the program had enrolled only 223 treatment and 220 control group patients. The staff attributed this shortfall to a lack of staffing resources for recruiting activities and a high refusal rate among eligible patients. After moving the responsibilities for patient recruitment and enrollment from the care managers to a dedicated enrollment staff, the program reached its recruitment target four months later.

To gain another perspective on the proportion of eligible beneficiaries enrolling in the program and to describe their characteristics, the evaluation simulated the program's eligibility criteria using Medicare enrollment and claims data. The simulation showed that there were 85,435 beneficiaries who met the eligibility criteria, 142 of whom enrolled in the MCCS during the program's first six months of operations. (The time lag associated with processing Medicare claims data precluded the use of longer reference period for this report.)

Compared to eligible nonparticipants, program participants were more likely to be age 75 to 84 (49.3 percent versus 41.2 percent), less likely to be nonwhite (0.4 percent versus 4.9 percent), and less likely to be receiving Medicaid benefits (2.7 percent versus 5.5 percent) (Table 1). Participants were about as likely as eligible nonparticipants to have several chronic conditions targeted by the program, including coronary artery disease, congestive heart failure, or diabetes. Participants and eligible nonparticipants were equally likely to have had a hospitalization in the year prior to enrolling (18 percent versus 17 percent). (The evaluation used July 2002, the midpoint of the six-month enrollment period used in this analysis, as a pseudo-enrollment date for nonparticipants.) However, participants' total Medicare expenditures averaged $468 per month in the year before enrollment, while nonparticipants averaged $355 per month. This difference in expenditures is statistically significant, as a result of differential payment for Medicare Part B services. These costs are substantially below the U.S. average for Medicare beneficiaries.

While enrollees had somewhat higher preenrollment average costs than nonparticipants, their costs are lower than anticipated. The Medicare waiver application for the MCCS estimated that Medicare costs would average $644 per month for eligible beneficiaries who did not participate in the program.

The program staff believe that patients are highly satisfied with the MCCS program. They have surveyed some patients participating in their weight loss intervention and have received very favorable comments. Patients are expected to remain in the program until the end of the four-year demonstration. No participant disenrolled voluntarily or lost program eligibility during the first six months of operations.

TO WHAT EXTENT DOES THE PROGRAM ENGAGE PHYSICIANS?

The MCCS program seeks to develop strong relationships between physicians and care managers and to demonstrate the benefits of care management to physicians. The program expects that physicians will refer their patients as appropriate, respond to care managers' questions and recommendations concerning their patients, permit access to patients' medical records, and provide office space (if available) for care managers to visit patients.

The program uses several techniques to promote collaboration with physicians. It identifies physician preferences with regard to (1) the method used to identify potentially eligible patients, (2) tailoring of the letter that is sent to patients introducing the program, and (3) the medium care managers use to convey questions and information to them. The care managers are assigned to the patients from specific offices so that they form close working relationships with those physicians. Finally, the program's medical director meets regularly with the physicians to obtain

Table 1

Characteristics of MCCS Participants and Eligible Nonparticipants During First Six Months of Program Intake (Percent, Except as Noted)

	Participants[a]	Eligible Nonparticipants
Age at Intake		
Younger than 65	0.0	0.0
65 to 74	41.6	46.3
75 to 84	49.3	41.2
85 or older	9.1	12.6
Female	63.3	64.5
Nonwhite	0.4	4.9
Medicaid Buy-In for Medicare A or B	2.7	5.5
Medical Conditions Treated in Past Two Years		
Coronary artery disease	38.5	36.7
Congestive heart failure	11.7	14.3
Diabetes	26.8	25.8
Chronic obstructive pulmonary disease	20.7	22.0
Hospital Admission in Past Year	18.3	16.5
Hospital Admission in Past Month	1.9	2.1
Total Medicare Reimbursement per Month (Dollars)	$468	$355
Number of Beneficiaries	**221**	**85,293**

Source: Medicare Enrollment Database and National Claims History.

Note: For participants, the intake date used in this table is the date of enrollment. For eligible nonparticipants, it is July 15, 2002, the midpoint of the six-month enrollment period covered by the participation analysis.

[a]Participants who do not meet CMS's Medicare requirements for the demonstration or who had invalid Health Insurance Claim (HIC) numbers on MPR's enrollment file are excluded from this table because Medicare service use data were not available. Participants who are members of the same household as a research sample member are included above, but are not part of the research sample.

their input into the operation of the program. It appears that physicians are responding to these efforts to build collaboration. They have referred a large number of patients, and many have made office space available to the care managers. The program staff report that physicians are becoming more comfortable with care management concepts and have begun to trust the care managers' recommendations.

Health Quality Partners' approach to care management does not emphasize improving physician's clinical practice. However, care managers call physicians if they believe that a specific patient's care is not being provided according to nationally recognized clinical practice guidelines. The staff noted that some physicians were initially shocked to have care managers recommend a change in a patient's medical regimen. These physicians have now come to accept and even appreciate the care managers' recommendations. The program staff hope that physicians will find working with the care managers does not increase burdens on their time.

HOW WELL IS THE PROGRAM IMPLEMENTING KEY INTERVENTION APPROACHES?

Improving Patient Adherence. Improving patient adherence to medical regimens is one of two major approaches that the MCCS program has taken to improve patient health. The program teaches patients to improve their self-management skills and ability to communicate with their physicians. The program's education intervention is based on assessing patients' willingness to make behavioral changes, then gearing education to these stages of readiness. The program uses disease-specific curricula that it tailors to the risk level and readiness of each patient. The format of teaching differs by risk level. Moderate-risk patients receive education in group classes. All high-risk patients receive one-on-one teaching during routine monitoring calls with the care managers and through educational materials, including written information and visual aids for patients with low literacy levels. The disease-specific curricula cover disease etiology, including signs and symptoms and their relationship to the patient's behaviors; proper use of medications; nutrition, physical activity, and weight loss; preventive care; self-care skills; when to call the care manager or physician; strategies for coping with chronic illness; and the availability of community-based resources.

Care managers receive formal training in how to provide patient education. They learn how to assess patients' readiness to make behavioral changes and to present material in small increments so that patients are not overwhelmed with information. The care management supervisor also teaches the patient education curricula to the care managers as it should be taught to patients. The care managers determine if patients understand educational messages by listening to the patients describe their activities and behaviors or by asking patients directly about what they have learned. If a patient is cognitively impaired, the care manager will include a caregiver in the teaching process. The program has designed nonwritten materials specifically to help patients with low literacy levels understand the information it is trying to convey. During the first six months of operations, more than 90 percent of the 104 treatment group patients had at least one program contact in which a care manager provided disease-specific education or explanation of medications, and more than 65 percent had contacts that included the explanation of tests or procedures.

Improving Communication and Coordination. The program's other major approach to improving patient health is to improve communication and coordination between patients and physicians. The program focuses this aspect of its intervention on teaching patients to advocate and take responsibility for their own care. The program also uses several other strategies to improve communication, including assigning care managers geographically to work with patients from particular physician offices, tailoring communications to physician preferences,

and educating patients to communicate with their physicians by prompting patients to ask questions of their physicians and request needed care. Each care manager contact with a patient generates a patient encounter report that is sent to the physician by mail, fax, or e-mail. Care managers convey urgent information to physicians by telephone or in-person.

The care managers interact with patients in a variety of ways to improve the coordination of their health care. The program has had to rely on patients' self-reports to alert it when they are hospitalized or have other adverse events. At the start of the program, it was difficult for patients to remember to communicate this information to their care managers, but as the program has progressed both patients and their families are now alerting the care managers when these events occur. The care managers often encounter patients who have complicated medication regimens, appear to be taking inappropriate doses or medications, or are taking redundant medications. The care managers communicate directly with the prescribing physician(s) to resolve polypharmacy issues. More than 65 percent of patients enrolled during the first six months of the program had contact with care managers during which the care managers explained tests or procedures, and approximately 35 percent had contacts in which the care managers provided emotional support.

WHAT WERE ENROLLEES' MEDICARE SERVICE USE AND COSTS?

The evaluation provides preliminary estimates of the effect of the Health Quality Partners MCCS program on Medicare service use and costs but cautions that these estimates may not reflect the true effects of the program over a longer period. During the first two months after enrollment, total Medicare Part A and B expenditures were $1,145, on average, for the treatment group (excluding demonstration payments) and $723 for the control group. A t-test of the $422 difference in expenditures between the two groups was insignificant at the 10 percent level ($p = 0.453$). This difference appears to come not from differences in the rate of hospitalizations, but from a greater proportion of treatment group patients who used outpatient hospital and physician services. It is too soon to tell whether this early difference in the use of Part B services will result in improved patient health and reductions in the use of more expensive Medicare Part A services. Care coordination programs such as Health Quality Partners' may increase the use of services in the short term as they address unmet patient needs. However, Health Quality Partners' MCCS has attracted a population with a lower than expected hospitalization rate and it may have difficulty achieving offsetting reductions in hospital costs.

CONCLUSION

Program Strengths and Unique Features. The Health Quality Partners MCCS program appears to have many of the features associated with effective care coordination:

- The program targets patients with asthma, heart failure, coronary artery disease, diabetes, hypertension, or hyperlipidemia—diagnoses typically associated with high health care costs.
- Physicians have willingly referred their patients to the program and have provided the program with signed letters printed on their own letterhead that encourage patients to

participate. Enrollment has been steady, with no patients voluntarily disenrolling over the first six months.

- Patient assessments are structured and individualized and care plans are updated during each patient contact. Contacts, which occur at least every month, allow the care managers to provide education, identify changes in patients' conditions, and determine if patients are progressing toward care plan goals.

- A variety of reporting tools help the care managers to gauge the progress of individual patients and the program managers to determine if quality care is being provided to program patients and if overall program goals are being met.

- Patient education is structured, but it is customized to each patient's assessed stage of readiness to make behavior changes. Education provides factual information about patients' specific conditions, as well as incremental approaches to behavior change. The care managers adapt their approach to teaching patients with literacy, language, or vision problems by using visual aids to convey information.

- Care managers make care less fragmented by communicating frequently with patients and physicians, helping physicians to follow clinical practice guidelines, and teaching patients to communicate more effectively with their providers and to manage their care more proactively.

- The program arranges for home-delivered meals, transportation, and home health services to help patients better manage their health, as well as assisting some in applying for pharmaceutical assistance programs.

- Care managers are all registered nurses with at least five years' of clinical experience, including disease-specific specialty training and community-based nursing, such as home health or hospice nursing. The program appears to have hired nurses who can work autonomously and who can confidently interact with physicians.

- Physicians are supportive of the program but play a modest role in the intervention. Physicians have helped the program identify eligible patients and have responded to care managers about specific patient problems. The program tries to minimize burden on physicians.

Potential Barriers to Program Success. Health Quality Partners also faces a potential barrier to the success of its demonstration program. It has enrolled patients who are healthier than planned. Although the program wanted to target moderately to severely ill beneficiaries, program participants are no more likely than the average Medicare beneficiary to be hospitalized in a given year (a 20 percent chance). Enrolling relatively healthy beneficiaries may make it difficult to reduce their need for hospitalization in a short followup period. In addition, enrolled participants have preenrollment Medicare expenditures that are somewhat lower than anticipated. If postenrollment Medicare costs are as low as preenrollment costs, the program will need to generate larger than expected savings to cover its program fees.

INTRODUCTION

The Medicare Coordinated Care Demonstration, mandated by the Balanced Budget Act of 1997, is testing a range of models aimed at improving the care of chronically ill beneficiaries who have Medicare fee-for-service coverage. Fifteen programs are participating in the demonstration, which is sponsored by the Centers for Medicare and Medicaid Services (CMS). The programs are hosted by organizations as diverse as hospital systems, disease management vendors, and retirement communities and serve patients in 16 states and the District of Columbia. Mathematica Policy Research, Inc. (MPR) is evaluating the national demonstration, through both impact and implementation analyses.[1]

This report is one of a series that will describe each program during its first year of implementation and provide preliminary estimates of its impact on Medicare service use and costs. First, the report briefly describes the data and methodology used in this series of reports and presents an overview of the program that is the focus of this report. It then addresses the following questions: Who enrolls in the program? To what extent does the program engage physicians? How well is the program implementing approaches to improving patient health and reducing healthcare costs? What were enrollees' Medicare service use and costs in the first six months in operation? The report concludes with a discussion of the program's strengths and unique features, as well as potential barriers to success.[2]

This report describes Health Quality Partners' Medicare Coordinated Care Study (MCCS). Health Quality Partners is a provider of wellness and care management services located in

[1]Lovelace Health System's CMS Medicare Case Management Demonstration for Congestive Heart Failure and Diabetes Mellitus is also part of the MPR evaluation. Appendix Table A.1 lists the host for each demonstration program in the evaluation, as well as each program's service area and target diagnoses.

[2]For a more detailed description of Health Quality Partners' plans for demonstration implementation and its early experiences, see Archibald and Schore (2003).

eastern Pennsylvania. The Health Quality Partners MCCS began enrolling patients in April 2002 and targets Medicare beneficiaries with heart disease, asthma, diabetes, hypertension, or hyperlipidemia.

DATA SOURCES AND METHODOLOGY

Implementation Analysis. The evaluation's implementation analysis uses information gathered during telephone interviews with program staff conducted approximately three months after the program began enrolling patients and in-person interviews conducted approximately six months later. For each program, one of three MPR implementation team members conducted the telephone and in-person interviews using semistructured protocols. The protocols covered the following topics: organization and staffing; targeting and patient identification; program goals; care coordination activities (such as assessment, patient education, and service arranging); physician attitudes toward the program and interventions with physicians; quality management; record keeping and reporting; and financial monitoring. Use of the protocols ensured that each interviewer collected as consistent a set of information for each program as possible, while allowing the interviewer to explore issues of specific importance to each program. The structure of the protocols also makes synthesizing findings across programs more efficient. MPR staff also reviewed written materials provided by each program, including its proposal to CMS, its operational protocol, materials it gave to patients and physicians, and forms used in its operation. (Appendix Table A.2 contains a full list.) This analysis also includes an examination of data each program collected specifically for the evaluation describing care coordinator contacts with patients, patient disenrollment, and services the program purchased for patients during its first six months of operation.

Participation Analysis. The evaluation uses Medicare claims and eligibility data to estimate the number of beneficiaries in the Health Quality Partners MCCS service area who were

eligible for the program and the percentage who actually enrolled during the program's first six months of operations. Beneficiaries are identified as eligible if, for any month between April and October 2002 (the program's first six months of operations), they (1) lived in the program's catchment area, (2) were enrolled in Medicare Parts A and B, (3) had Medicare as their primary payer, (4) were not in a Medicare managed care (Medicare + Choice) plan, and (5) met the program's target diagnosis and utilization requirements (described in detail in Appendix B). The mid-point of the six-month enrollment period examined in this analysis—July 15, 2002—is used as a pseudo-enrollment date for nonparticipants; the actual enrollment date is used for participants. Participants and eligible nonparticipants were then compared with respect to demographic characteristics, diagnoses, and utilization histories to determine the extent to which participants are typical of the pool of eligible beneficiaries.

Impact Analysis. This report also presents early impact estimates based on key study outcomes. The evaluation's impact analysis is based on the random assignment of consenting, eligible Medicare beneficiaries to receive either the program intervention in addition to their regular Medicare benefits, or their regular Medicare benefits alone. Comparison of outcomes for the two groups will yield unbiased estimates of the impact of care coordination. Disenrollees are not excluded from the analysis sample because doing so would introduce unmeasured, preexisting differences between the treatment and control groups that random assignment is meant to avoid.

The report provides two types of comparisons of estimated treatment and control group means for Medicare-covered service use and costs. The first uses outcomes measured over the first two months after random assignment for beneficiaries who enrolled in the project during its first four months. The second compares treatment and control group means for each calendar

month after project startup, using all sample members enrolled through the end of each month, to observe any trends in treatment-control differences over time.

In this report, the impact of the program's intervention is estimated as the simple difference in mean outcomes between treatment and control patients. T- and chi-squared tests are used to establish whether differences are statistically significant. The next round of site-specific reports will use regression analysis to adjust for any chance baseline differences between the two groups that arose despite random assignment. (Appendix B describes in more detail the methods used to obtain Medicare data, construct variables, and choose analysis samples.)

The treatment-control comparisons presented in this report may not reflect the true long-term impacts of the program, for several reasons. First, the comparisons are based on a relatively small sample (only patients enrolling during the first four months of program operations). Second, the outcomes are measured too soon after patient enrollment to expect projects to be able to have sizable impacts. (The timetable for the evaluation's first report to Congress defined the observation period for this report.) Third, program interventions may change over time as staff gain more experience with the specific patients they have enrolled. Finally, if programs change their eligibility criteria or the type of outreach they conduct, they may enroll different types of patients over time.

Despite these shortcomings, the treatment-control differences are presented to provide some limited feedback to the programs on how the two groups compare. Later analyses will examine Medicare service use and cost impacts over a longer time and will include all enrollees during the program's first 12 months. These analyses will also examine patient outcomes based on telephone interviews with treatment and control group members. Interview-based outcomes include the receipt of preventive health services, general health behaviors, self-management,

functioning, health status, and satisfaction with care, as well as disease-specific behaviors and health care.

OVERVIEW OF THE HEALTH QUALITY PARTNERS MCCS

Program Organization and Relationship to Physicians. Health Quality Partners, in Doylestown, Pennsylvania, began as the medical management team for PennCARE, a for-profit managed care risk contractor formed by 11 hospitals in eastern Pennsylvania with a network of 3,000 physicians. PennCARE developed the prototype disease and case management program for the MCCS under contract to Aetna U.S. Healthcare's commercial and Medicare+Choice health plans. Between 1999 and 2001, approximately 500 patients participated in the Aetna program. PennCARE's own analysis of the program showed a savings of nine percent compared to costs of care before participation. PennCARE spun off Health Quality Partners as an independent not-for-profit organization in July 2001.

Key program staff includes a medical director (Health Quality Partners' president and chief executive officer), project manager (Health Quality Partners' vice president of health design services), physician office coordinator (Health Quality Partners' director of operations and special projects), care management supervisor, and care managers (the title this program gives to its care coordinators). The medical director is directly involved in program operations, fielding calls from physicians, and conducting biweekly staff meetings to discuss clinical guidelines and physician relations. The project manager designed the intervention and is responsible for its implementation. The physician office coordinator is responsible for recruiting physicians to participate in the program and maintaining good communication with the physicians and their office staff. Early in the program, the care managers were heavily involved in patient enrollment. As the program's caseload grew, however, the care managers needed to devote more time to patient care. Thus, the care management supervisor took over the responsibility for

patient enrollment, and the project manager has the overall responsibility for the design and implementation of the intervention; program monitoring and reporting; and supervision of the program's clinical, administrative, and enrollment staff. At full enrollment, the program planned to have about five full-time-equivalent care managers (including the care management supervisor). The MCCS program is based in Health Quality Partners' Doylestown office.

The program has tried to build on its previous relationships with providers to facilitate implementation of the demonstration. During the first year, the program focused on physicians associated with the PennCARE hospital network and, in particular, on those based at Doylestown Hospital, where it has a contract to provide wellness services. Many of these physicians are familiar with the program staff from their work with the prototype program under PennCARE and from Health Quality Partners' current contract work. To gain support for the demonstration, the program's medical director made presentations at physician group meetings, and the program staff had follow-up meetings with interested groups or individual physicians.

Primary Approaches. The program focuses on improving patient health and reducing hospital use and costs by (1) improving patient self-care and adherence to treatment recommendations, and (2) promoting better communication and coordination among patients and providers. The program's intervention educates patients about the need to make specific lifestyle changes and undertake self-monitoring activities, and it provides them with the skills and tools they need to do so. The program tailors education to each patient's specific needs and stage of readiness to change. The program also helps patients communicate better with their physicians, including prompting their physicians to revise treatments to conform to established guidelines when necessary. It also helps patients organize and schedule their care. Physicians' role in the intervention is limited to responding to care managers' questions and allowing abstraction of patients' medical records.

Target Criteria and Patient Identification. Patients in the Health Quality Partners MCCS program must live in eastern Pennsylvania; be at moderate to high risk for high cost health care service use, and have at least one of the following conditions: asthma, heart failure, coronary artery disease, diabetes, hypertension, or hyperlipidemia. The program excludes patients with a variety of comorbid conditions and those not capable of participating in the intervention.[3] In addition, beneficiaries participating in any of the demonstration programs must be enrolled in Medicare Parts A and B, must not be in a managed care organization, and must have Medicare as their primary payer.

The Health Quality Partners MCCS identifies patients primarily from lists of eligible patients provided by physicians who have agreed to participate in the program. If the physician's office has a searchable information system, the program helps the physicians' office staff to generate a list of patients with the appropriate diagnoses. Otherwise, it helps the office staff to generate such a list manually. The physicians then review the lists to identify patients suitable for the program. The program then checks Medicare eligibility on Medicare's Common Working File and previous participation in Health Quality Partners' programs in their own records. Next, it sends patients a letter signed by their physicians and written on the physicians' letterhead inviting them to participate.[4] (The letters are sent in batches of 30 to 80.) Potential participants are invited to contact the program for more information. The program's enrollment staff contacts patients who do not respond to the letter, explains the program to them, and determines whether they are interested in participating. Interested patients are invited to

[3]Appendix B lists the program's exclusion criteria. The program uses patient self-report to identify the presence of condition-based exclusionary criteria. Thus, it is possible for patients with excluded conditions or criteria to enroll in the program if they misreport information on their health status.

[4]Appendix C contains a sample letter.

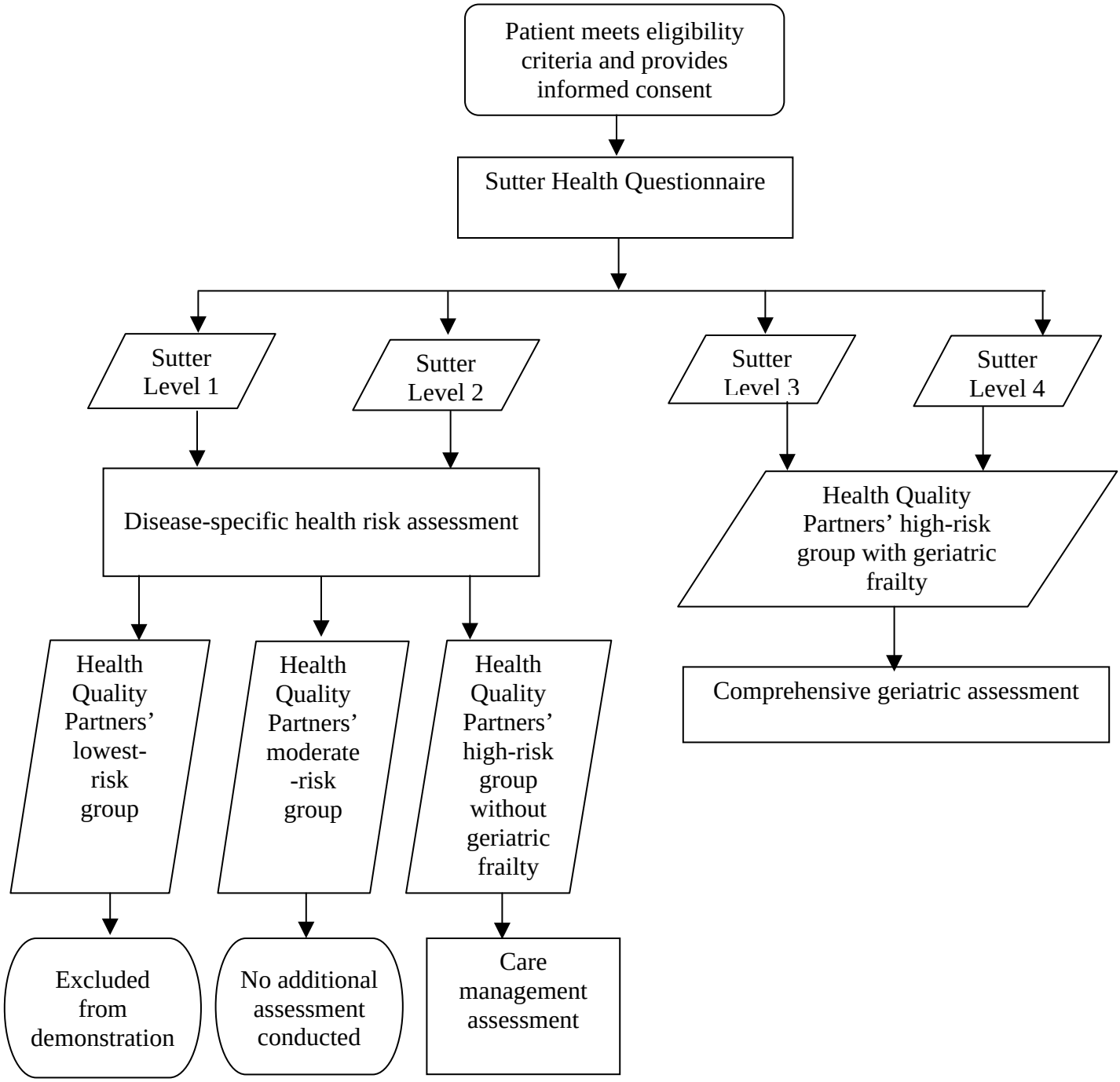
information sessions during which care managers explain the program and obtain informed consent from those who wish to participate.[5]

Before random assignment, the program administers the Sutter Health Questionnaire, a validated geriatric risk assessment, to all consenting patients to determine their risk of hospitalization, emergency room use, falls, and other adverse events (rated from 1 to 4, with 4 being the highest risk) (Figure 1). Those at Sutter Levels 1 or 2 also then receive the program's disease-specific health risk assessment (either in person during the information session or by telephone), which the program uses to stratify patients into three groups. The lowest-risk group (for whom target medical conditions are well controlled and who have no condition-specific knowledge deficits) is excluded from the demonstration. The next risk group consists of patients who are medically well controlled but who require some disease-specific information, lifestyle and behavior change counseling, and self-care education. The program refers to these patients as their "moderate-risk" group. The next risk group consists of patients who have one or more chronic conditions that are not well controlled and require collaborative medical management (that is, medication initiation or adjustments, close medical monitoring, and followup), extensive self-care education, or have complicating psychosocial needs. The program refers to these patients as their "high-risk without geriatric frailty" group. The primary intervention for this group and the moderate-risk group is disease management. Patients identified as Sutter Levels 3 or 4 are automatically assigned to the program's "high-risk with geriatric frailty" group and receive an in-person comprehensive geriatric assessment if they are randomly assigned to the treatment group. High-risk patients with geriatric frailty typically have multiple medical, social,

[5]Appendix C contains the Health Quality Partners MCCS consent form.

FIGURE 1

PROCESS OF PATIENT RISK STRATIFICATION AND LEVEL OF CARE ASSESSMENT



and functional problems that require significant caregiver and social supports. The intervention for this group is primarily care coordination.

Nearly all patients who enrolled during the first year were identified from lists generated by 18 primary care physician groups affiliated with Doylestown Hospital. (A few patients referred themselves.) Although Doylestown Hospital has a network of 300 affiliated physician groups, after a year, the program was still getting a large number of referrals from these 18 practices. At the time of our in-person interviews, the program had temporarily stopped making presentations to new physician groups so that it could process all of the referrals it had received. Despite the ample pool of potentially eligible patients in its original service area, the program's medical director was considering expanding north to continue nurturing relationships with physicians in the Lehigh Valley. The program also tried some direct marketing to beneficiaries, but had little response from this (Appendix C contains a patient brochure). Thus, the lists generated by physicians are the primary source of patient referrals, and most of the patients enrolled have been in the high-risk without geriatric frailty group. (The program had expected, based on its managed care experience, to enroll more patients at moderate risk and high risk with geriatric frailty.)

Assessment, Care Planning, and Monitoring. All patients receive the Sutter Health Questionnaire before randomization. Based on the results of the questionnaire (and for some patients, an additional disease-specific health risk assessment), Health Quality Partners stratifies its patients into three levels of care and offers different interventions to each group. The intervention for moderate-risk patients consists of education and lifestyle and behavior change counseling. High-risk patients without geriatric frailty receive patient education and other interventions to: promote optimal medical management in accordance with evidence-based care guidelines; assure clinical stability; and eliminate barriers to self-care. High-risk patients with

geriatric frailty require immediate clinical management with education and self-care interventions added as they stabilize. Following random assignment, the program tailors assessment, care planning, and monitoring to the patient's risk level.

High-risk patients with geriatric frailty receive a comprehensive geriatric assessment (see Appendix C) in person, at home, and with the patient's primary caregiver present, if possible. The assessment may last up to two hours and require more than one visit to complete. The assessment describes the patient's immediate and longer-term health needs in detail. It also may include information abstracted from the patient's physician's office chart. The program tries to complete these assessments (which are documented in the patient's hard-copy medical record) within two weeks of random assignment. The program sends the initial assessment with recommendations to the patient's physician for inclusion in the physician's medical record for that patient. In its first six months of operation, Health Quality Partners' demonstration enrolled 35 patients in its high-risk with geriatric frailty treatment group (Table 1). All these patients received an assessment contact (to administer the comprehensive geriatric assessment), with 77 percent of patients having this contact within two weeks of enrollment.

Based on the assessment summary, care managers develop an individualized, problem-focused care plan, which is not a separate document, but a summary of the assessment. The care plan addresses medical and educational needs, home safety issues, care manager interventions, physician interventions, and patient goals for self-care and behavior change. It does not include time frames in which goals should be accomplished; rather, it is modified, as needed, at every patient contact. The patient receives a written list of goals and instructions as appropriate.

High-risk patients with geriatric frailty are monitored by telephone or in-person visit at least every four weeks (and more frequently as needed) until their medical conditions stabilize and care needs are met. (Monitoring often is more frequent just after assessment.) Care managers

TABLE 1

CARE COORDINATOR CONTACTS WITH PATIENTS
DURING FIRST SIX MONTHS

	Patient Risk Level		
	High Risk with Geriatric Frailty	High Risk without Geriatric Frailty	Moderate
Number of Patients Enrolled[a]	35	61	8
Number of Patients with at Least One Care Coordinator Contact (percent)	35 (100)	61 (100)	8 (100)
Total Number of Contacts for All Patients	271	460	41
Average Number of Contacts per Patient, Among those Contacted	8	8	5
Number of Care Coordinators Contacting Patients[b]	5	5	4
Among Those Patients with at Least One Contact:			
Percentage of contacts care coordinator initiated	94.8	93.9	92.7
Percentage of contacts by telephone	61.3	63.3	80.5
Percentage of contacts in person at patient's residence	35.8	0.7	0.0
Percentage of contacts in person elsewhere	3.0	36.1	19.5
Of All Patients Enrolled, Percentage with Assessment Contact	100.0	95.1	37.5
Among Those Patients with an Assessment, Percentage of Patients Whose First Assessment Contact Is:			
Within a week of random assignment	40.0	41.4	33.3
Between one and two weeks of random assignment	37.1	39.7	0.0
More than two weeks after random assignment	22.9	19.0	66.7
Of All Patients Enrolled, Percentage of Patients with Contacts for:			
Routine patient monitoring	94.3	78.7	62.5
Providing emotional support	54.3	31.1	0.0
Providing disease-specific or self-care education	100.0	93.4	75.0
Explaining tests or procedures	60.0	67.2	62.5
Explaining medications	97.1	90.2	75.0
Monitoring abnormal results	31.4	44.3	12.5
Identifying need for non-Medicare service[c]	14.3	1.6	0.0
Identifying need for Medicare service	8.6	4.9	0.0
Monitoring services	17.1	16.4	12.5
Average Number of Patients Contacted per Care Coordinator	7.0	12.2	2.0
Average Number of Patient Contacts per Care Coordinator	54.2	92.0	10.3

TABLE 1 *(continued)*

Source: Health Quality Partners program data received November 2002 and updated January 2003. Covers six-month period beginning April 30, 2002 and ending October 26, 2002.

[a]Number of patients enrolled in the treatment group as October 26, 2002.

[b]Includes the program's four care managers and the care management supervisor.

[c]Includes assistance applying for public programs.

begin the intervention by addressing immediate problems (for example, pain management, depression, or, for diabetics, glucose control) and then move on to longer-term goals such as education and behavior change.

All the 35 high-risk patients with geriatric frailty enrolled in the program's first six months had at least one contact with a care manager, and the average high-risk patient had approximately eight care manager contacts (Table 1). The care managers initiated most (95 percent) of these contacts, and many (61 percent) of the contacts were by telephone. During these contacts, all patients (100 percent) received disease-specific or self-care education, and nearly all (97 percent) had contacts to explain medications. Many high-risk patients with geriatric frailty also had contacts in which the care managers provided emotional support or identified needs for Medicare or non-Medicare covered services.

High-risk patients without geriatric frailty receive a comprehensive disease-specific assessment (see Appendix C for the cardiovascular assessment) that builds on the basic disease-specific assessment conducted before random assignment. It is conducted in person, usually in the physician's office, but occasionally in the patient's home or program offices, and may require more than one visit. Again, the program tries to complete these assessments, which are documented on paper, within two weeks of random assignment. In its first six months of operation, Health Quality Partners enrolled 61 patients in its high-risk without geriatric frailty treatment group (Table 1). Of these patients, 95 percent had an assessment visit (to administer the comprehensive disease-specific assessment), with 81 percent of patients having these visits within two weeks of randomization.

For high-risk patients without geriatric frailty, care managers work with patients to develop individualized care plans, which focus on getting the tests suggested by clinical guidelines and bringing clinical indicators into acceptable ranges through behavior change. The program sends

physicians a summary of the assessments with evidence-based recommendations and copies of the initial care plans. Patients receive written lists of mutually agreed-upon goals and instructions. Care managers follow up with these patients at least every four weeks (more frequently, if the care managers think it is needed) by telephone until medical problems have stabilized and problem areas have been addressed. The care managers adjust the care plan with each contact as needed.

Of the 61 high-risk patients without geriatric frailty enrolled in the first six months, all had at least one care manager contact, and the average moderate-risk patient had eight care manager contacts (Table 1). The care managers initiated most (94 percent) of the contacts with these patients, and 63 percent of these contacts were by telephone. The types of contacts that high-risk patients without geriatric frailty had with care managers were similar to those for high-risk patients with geriatric frailty. Among high-risk patients without geriatric frailty, 93 percent had contacts for disease-specific or self-care education, 67 percent had contacts for explaining tests and procedures, and 90 percent had contacts for explaining medications. However, fewer high-risk patients without geriatric frailty had contacts to provide emotional support (31 percent) or to identify needs for non-Medicare (2 percent) or Medicare-covered services (5 percent).

Moderate-risk patients do not receive any assessment other than the disease-specific health risk assessment (see Appendix C) conducted before random assignment, nor do they have a formal written care plan.[6] Rather, the program focuses on addressing knowledge deficits in these patients by referring them to education classes with the goal of helping patients to make needed behavior changes. Care managers follow up with moderate-risk patients periodically until they

[6]While moderate-risk patients do not receive an additional initial assessment after randomization, they do have periodic, focused reassessments.

have achieved their education or clinical goals or attained the highest level of knowledge the care manager believes is possible.

In its first six months of operation, the program enrolled eight moderate-risk treatment group patients. Again, all these moderate-risk patients had at least one care manager contact, but the average patient had five contacts—a number lower than for high-risk patients with or without geriatric frailty but consistent with the program's intervention. Care managers initiated most (93 percent) of the contacts with moderate-risk patients, and 81 percent of these were by telephone. The reasons for contact with the care manager were different for moderate-risk patients than for high-risk patients. Fewer moderate-risk patients had contacts for disease-specific education or explaining medication. No moderate-risk patients had contacts in which the care manager provided emotional support or identified needs for non-Medicare or Medicare-covered services (Table 1).

Because patients are randomly assigned within risk levels determined at enrollment, they retain these levels for the duration of program participation; however, when the patient meets clinical and educational care plan goals, the program moves the patient from "active" to "longitudinal" status. Monitoring for patients in longitudinal status is monthly, and it is almost exclusively by telephone. This monitoring focuses on maintaining clinical and educational achievements. Patients return to active status and more frequent monitoring if their conditions worsen or status changes, necessitating a visit or intensification of monitoring contacts.

During monitoring contacts, the care managers provide education, assess key components of the patient's health and functional status, determine if the patient has any new health or service needs, and monitor the provision of community-based services (if used). The care managers do not follow a set script during these calls, but they complete a structured encounter form for each

contact (see Appendix C). The program's Microsoft Access database reminds the care managers when patients are due to receive monitoring contacts.

Staffing and Program Quality Management. Health Quality Partners requires its care managers to be registered nurses (preferably baccalaureate or masters-prepared) with at least five years' experience in a clinical specialty area relevant to the program and some experience in community nursing. The program hires at this level to ensure that the care managers can work autonomously and interact confidently with physicians. The project manager commented that they need several months' lead-time to identify and hire new care managers because, while many nurses are interested in these positions, few meet the program's requirements. The program does not have a dedicated social worker, but the project manager is an experienced, master's-level social worker and thus is able to assist the care managers.

The care management supervisor, medical director, and project manager use structured teaching and role-playing techniques to train new care managers. Training covers disease-specific clinical guidelines for the program's target conditions and principles of geriatrics. The care management supervisor uses a checklist to track new care managers' progress during training (see Appendix C for a copy of the checklist). The care managers shadow the care management supervisor as she interacts with patients. Then the care management supervisor observes the care managers' contacts with patients until they are ready to manage patients on their own. The care management supervisor reviews the assessment and care plan of each new care manager's first 10 patients with each target condition (heart failure, diabetes, etc.) and reviews a sample of patients thereafter. In bi-weekly meetings, the medical director, care management supervisor, and care managers conduct case reviews of difficult or randomly selected cases. In addition to regular case review meetings, the staff have a bi-weekly meeting

that includes guideline updates by the medical director and continuing education for the care managers.

Health Quality Partners has developed a continuous quality improvement process to monitor and improve its program. Quality improvement focuses on three areas: (1) program operations, (2) the program intervention, and (3) provider relations. The program uses a Microsoft Access database, developed by PennCARE as a medical management tool, to record the data it needs for its quality improvement activities, such as a log of care manager contacts with patients and clinical outcomes data collected from medical records reviews.[7]

The program monitors its operations using reports that profile the patient enrollment process, patient caseloads, patient contact frequency, billing, and completeness of Sutter Health Questionnaires. For example, the program can generate reports to monitor the care managers' productivity. The program's management used these reports to identify problems with time management. In addition, the program generated reports from enrollment data that helped to identify that the program had a backlog of referred patients waiting to be contacted. As a result, enrollment responsibilities were transferred from the care managers to a dedicated enrollment staff. In addition, the care management supervisor looks over all patient information before randomization to review the level of care determination and check the demographic, Sutter Health Questionnaire, and disease-specific assessment data for completeness. These data are critical to make sure the patient is placed in the appropriate level. The program tries to get operations data to its project manager and care management supervisor as soon as possible to rapidly identify and correct problems.

[7]Much of the program's patient-level data, such as assessments, care plans, and monitoring encounter forms, are maintained as paper documents.

To monitor the effectiveness of its intervention, the program collects data from patients' medical records. In summer 2003, the program began to conduct medical record reviews on both treatment and control group patients covering the two-year period before randomization and plans to continue reviews every six months in the period after randomization. The program is using these data to create individual patient profiles that graph patients' progress toward clinical goals. The program provides these profiles to the care managers, who share them with the patients. The program also aggregates the medical records data to monitor both process of care measures (such as the number of patients receiving influenza vaccinations) and clinical outcomes (such as blood pressure and blood sugar control).

Health Quality Partners also will survey program patients regarding their satisfaction with the program and quality of life. In addition, the program uses weekly case reviews to monitor the quality of its intervention. The case reviews provide each care manager with clinical input from the other care managers, the care management supervisor, and the medical director.

The program will conduct a survey to monitor physician satisfaction with the demonstration's services. In addition, the medical director, enrollment coordinator, and project manager frequently contact physician practices to assess the practices' experiences in program participation and gain feedback. This allows the program to work with the physicians to improve the intervention.

The program has had few complaints from either physicians or patients. Complaints from physicians go to the medical director, while complaints from patients go to the project manager or care manager supervisor. The program does not use a complaint form, but it does track the resolution of complaints.

WHO ENROLLS IN THE PROGRAM?

The program staff worked hard to meet their enrollment targets. By the end of the first year of operation (April 2003), however, the program had only enrolled approximately two-thirds of its year one target population of 738 beneficiaries.[8] The program staff attributed this shortfall to a lack of staffing resources for recruiting activities and a high refusal rate among eligible patients. The program made major changes to its enrollment processes, moving responsibility for patient recruitment and enrollment from the care managers to a dedicated enrollment coordinator. Although program participants and nonparticipants are fairly similar in their demographic characteristics and rates of hospitalization, it appears that the program has enrolled patients whose preenrollment Medicare costs were somewhat lower than expected. The staff report that patients seem satisfied with the program, and no patients had disenrolled in the first six months of operation.

Enrollment After One Year. After one year of operation, the Health Quality Partners MCCS had enrolled 223 patients in the treatment group and 220 in the control group (MPR Weekly Enrollment Report, week ending May 4, 2003).[9] This falls short of the program's target of enrolling 738 beneficiaries within a year. Although the program had many patient referrals from area physicians, it had a shortfall in enrollment because more patients than expected declined to attend the informational sessions and thus to enroll.

The program's experience in the managed care environment did not prepare it for the task of patient enrollment. The staff had underestimated the time and number of contacts required to enroll a patient. At the start of the demonstration, the care managers made recruiting calls to

[8]The program reached its target enrollment in August 2003.

[9]The program did not have an estimate of the size of the pool of Medicare beneficiaries in the area from which it might enroll. Thus, we cannot say what percent of the estimated number of beneficiaries the program enrolled.

potential patients and conducted informational sessions. As their caseloads grew, the care managers found it increasingly difficult to do these activities while managing their patients. To address this problem, the program designated the care management supervisor to oversee the enrollment staff and direct patient outreach and recruitment activities. It also hired several part-time staff to make telephone calls to potential participants to follow up on the letters sent to introduce the program and schedule patients to attend information sessions.

Before the start of the program, the medical director had expected that 50 percent of patients would agree to participate. However, staff reported that, of the eligible patients referred to the program by their physicians, only 32 percent agreed to participate. The program did not track patients' reasons for declining to participate from the beginning of the study, but it has begun to do so. The most common reason beneficiaries give for declining is that they feel they do not need the services the program provides. Another reason for beneficiaries' nonparticipation is that they do not respond to the program's letters or telephone calls. Staff reported, however, that nearly all of the patients who agreed to attend the information sessions enrolled in the program.

To address the high refusal rate, the program asked physicians to take a more active role in encouraging their patients to participate. It asked physicians who had referred a large number of patients, but who had had many patients decline to participate, to talk to these patients about the program. It hoped that these patients would reconsider the program if their physicians discussed the program's benefits with them. However, these physicians said they did not have the time during a brief office visit to discuss the program. (The program staff now agree that it was unrealistic to believe that physicians could take on this role.) Instead, these physicians have agreed to allow the program to send another letter to patients who have declined to participate (see Appendix C). The program has just begun to send these letters and is not yet able to judge their effectiveness.

As noted, program staff also recently began to ask patients why they were not interested in participating in the program. The program's management believed that, by understanding patients' reasons for refusal, they could improve the program's enrollment rate. The program hired a marketing consultant to review the program's patient recruitment process. The consultant suggested that the program identify potential participants' doubts and concerns and develop specific responses to them. The consultant trained the care managers and enrollment staff to really listen to what potential participants said and to address their specific concerns. Although the program staff have not analyzed data to evaluate this strategy, they believe that it has been successful in increasing patient enrollment.

Percent of Eligible Beneficiaries Participating. To gain another perspective on the proportion of eligible beneficiaries enrolling in the program and to describe their characteristics, the evaluation simulated the program's eligibility criteria using Medicare enrollment and claims data. (Appendix B contains a detailed description of the simulation.) The simulation identified 85,435 beneficiaries as eligible for the program between April and October 2002, the program's first six months of operation (see Table B.4). That is, they lived in the program's service area, had fee-for-service Medicare coverage, and met the program's clinical eligibility criteria.[10] During the same six months, 228 beneficiaries enrolled in the demonstration (less than one percent of the 85,435 eligible beneficiaries).[11]

[10]Between April and October 2002, 307,922 Medicare beneficiaries were living in the program's service area. Of those, 108,472 (35 percent) would have been ineligible for the program because they were in managed care, did not have both Medicare Part A and B, or Medicare was not their primary payer. Of the remaining 199,450 beneficiaries who met these insurance criteria, 85,435 (43 percent) also met the program's diagnostic criteria and had none of its exclusion criteria (to the extent they could be simulated with the Medicare data).

[11]We could not assess the eligibility of about one-third of the 228 beneficiaries who enrolled in the program during its first six months. If we exclude enrollees for whom reported HIC numbers appeared to be incorrect, and those who did not meet the geographic, insurance, diagnostic, or program exclusion criteria that we measured using Medicare data, this leaves 142 eligible participants. When we compare participants to eligible nonparticipants in Table 2, however, we only exclude participants for whom HIC numbers appeared to be incorrect, and those who did

Comparison of Participants and Nonparticipants. An analysis of Medicare enrollment and claims data highlights a few demographic differences between program participants and nonparticipants. Although the average age of both groups is 76, participants are more likely to be between age 75 and 84 (Table 2). There are fewer nonwhite participants and somewhat fewer participants receiving Medicaid benefits (as reflected by state buy-in) than nonparticipants. In addition, a larger percentage of participants are newly enrolled in Medicare, although the percentage of new beneficiaries was small in both groups.

The Medicare claims data also show that participants were about as likely as eligible nonparticipants to have several chronic conditions. During the two years before enrolling, 39 percent of participants had been treated for coronary artery disease, 12 percent for congestive heart failure, and 27 percent for diabetes, all target diagnoses for the program (Table 2). Interestingly, 24 percent of participants but only 4 percent of nonparticipants had been treated for cancer in the two-year period examined. This difference between the two groups may reflect variations in the method used to identify beneficiaries for the comparison. While Health Quality Partners relies on patient self-report to identify and exclude all beneficiaries with cancer (except skin cancer), our comparison analysis excluded all beneficiaries with a claim for any ICD-9 code for cancer (except skin cancer). It may also be that many enrollees had been treated for cancer in the past and are receiving long-term followup, so that office visits are coded with cancer-related ICD-9 codes.

Although preenrollment hospitalization rates are similar for participants and nonparticipants, the nonparticipant group had lower expenditures for Medicare services. Approximately 2

(continued)

not meet the insurance requirements established by CMS, leaving 221 participants. This is because we wish the comparison to reflect differences between actual participants and those who might have participated.

TABLE 2

CHARACTERISTICS OF ALL PARTICIPANTS AND ELIGIBLE NONPARTICIPANTS DURING THE FIRST SIX MONTHS OF PROGRAM ENROLLMENT
(Percentages, Unless Otherwise Noted)

	Demonstration Participants (Treatments and Controls)[a]	Eligible Nonparticipants
Age at Intake		
Average age (in years)	75.8	75.9
Younger than 65	0.0	0.0
65 to 74	41.6	46.3
75 to 84	49.3	41.2**
85 or older	9.1	12.6
Male	36.7	35.5
Nonwhite	0.4	4.9***
Original Reason for Medicare: Disabled or ESRD	1.4	4.8**
State Buy-In for Medicare Part A or B	2.7	5.5*
Newly Eligible for Medicare (Eligible Less than Six Months)	0.5	0.0***
Enrolled in Fee-for-Service Medicare 6 or More Months During Two Years Before Intake	96.4	98.9***
Medical Conditions Treated During Two Years Before Month of Intake[b]		
Coronary artery disease	38.5	36.7
Congestive heart failure	11.7	14.3
Stroke	21.1	17.8
Diabetes	26.8	25.8
Cancer	23.5	3.8***
Chronic obstructive pulmonary disease	20.7	22.0
Dementia (including Alzheimer's disease)	0.0	0.0
Peripheral vascular disease	8.5	9.5
Renal disease	0.5	3.1**
Total Number of Diagnoses	1.5	1.3**
Days Between Last Hospital Admission and Intake Date[b]		
No hospitalization in past two years	72.3	73.9
0 to 30	1.9	2.1
31 to 60	0.9	1.8
61 to 180	6.1	6.3
181 to 365	9.4	6.3*
366 to 730	9.4	9.6

TABLE 2 *(continued)*

	Demonstration Participants (Treatments and Controls)[a]	Eligible Nonparticipants
Annualized Number of Hospitalizations During Two Years Before Month of Intake[b,c]		
0	72.8	74.2
0.1 to 1.0	19.3	19.7
1.1 to 2.0	5.2	4.6
2.1 to 3.0	1.9	0.9
3.1 or more	0.9	0.7
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]		
Part A	$233	$184
Part B	$235	$171***
Total	$468	$355*
Distribution of Total Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]		
$0	0.0	1.7*
$1 to 500	81.7	82.7
$501 to 1,000	7.5	6.8
$1,001 to 2,000	4.7	4.9
More than $2,000	6.1	3.9
Number of Beneficiaries	**221**	**85,293**

Source: Medicare Enrollment Database and National Claims History File.

Note: The intake date used in this table is the date of enrollment for participants. For eligible nonparticipants, the intake date is July 15, 2002, the midpoint of the six-month enrollment period examined.

[a]Participants who do not meet CMS's demonstration-wide requirements for the demonstration or had an invalid HIC number on MPR's enrollment file are excluded from this table because we do not have Medicare data showing their reimbursement in the fee-for-service program. Members of the same households as the research sample members are included.

[b]Calculated among beneficiaries with six or more months in Medicare fee-for-service in the two years before intake. (See Note, above, concerning intake date definition.)

[c]Calculated as 12 x (number of hospitalizations during two years before month of intake) / (number of months eligible). For example, if a beneficiary was in fee-for-service all 24 months and had two hospitalizations during that time, they would have one hospitalization per year [(12 x 2) / 24]. If another beneficiary was in fee-for-service eight months during the previous two years, and had two hospitalizations during those eight months, they would have [(12 x 2) / 8], or three hospitalizations per year. The estimate of the proportion with no hospitalization in the two years before the month of intake may differ slightly from the proportion with no hospitalization in the two years before the date of intake because the two measure slightly different periods. Someone enrolled on September 20, 2003, whose only hospitalization in the preenrollment period occurred on September 5, 2003, would not be counted as hospitalized during the 24 months before the month of intake. Conversely, someone hospitalized on September 25, 2001, would be captured in the measure defined by month of enrollment, but not in the measure based on the day of enrollment.

*Difference between participants and eligible nonparticipants significantly different from zero at the .10 level, two-tailed test.

**Difference between participants and eligible nonparticipants significantly different from zero at the .05 level, two-tailed test.

***Difference between participants and eligible nonparticipants significantly different from zero at the .01 level, two-tailed test.

percent of participants had a hospitalization in the month before program enrollment, and 18 percent had a hospitalization in the year before enrollment (Table 2). The proportion of nonparticipants with a hospitalization in these time periods is similar—2 and 17 percent, respectively. However, participants' Medicare expenditures average $468 per month in the year before enrollment, while nonparticipants' Medicare expenditures averaged $355 per month. This difference in expenditures is statistically significant for Medicare Part B services and overall, arising from the higher incidence of patients with costs over $2,000 per month. This difference in turn may be due to the higher proportion of participants with cancer.

The Medicare expenditure analysis also shows that average preenrollment costs for enrollees are well below the postenrollment costs that were expected before program startup. When developing the cost estimate for the demonstration waiver application, MPR estimated that Medicare costs would average $644 per month for eligible beneficiaries who did not participate in the program, based on the eligibility criteria supplied by the program noted earlier.[12] The program has enrolled patients whose preenrollment health expenditures—$468 per month—were lower than this. This difference may be due to the fact that preenrollment costs include no one who died in that preenrollment year. Alternatively, the program may be enrolling a less expensive mix of patients than had been anticipated.

Satisfaction and Voluntary Disenrollment. Staff believe that patients are highly satisfied with the program, and many have been eager to enroll to help the government improve Medicare for others. The program plans to conduct a patient satisfaction survey but has not yet set a

[12]The waiver cost estimates did not assume that eligible beneficiaries with a preenrollment hospitalization would be any more or less likely to enroll in the program than eligibles without hospitalizations. Thus, no such assumptions about case mix explain the difference between these projections and participants' actual preenrollment Medicare expenditures.

timetable for doing so. It has, however, surveyed patients who have completed the program's 16-week weight loss program. These patients are highly satisfied with this aspect of the program. They report that they learned things about portion sizes and nutrition labels that they did not know before and learned about behavioral triggers for overeating. They also like the social support the program provides. As for the MCCS program as a whole, the program staff report that participants appear to like having a nurse who is interested in them and who has the time to listen to them.

Patients may stay in the Health Quality Partners MCCS for the duration of the demonstration (that is, until April 2006). During its first six months of operation, the program enrolled 104 treatment group patients, but because enrollment started slowly, just over half (57 percent) had been enrolled for 10 weeks or less at the end of this period. During the first six months of operations, no participants disenrolled voluntarily or lost program eligibility (Table 3). The staff report that the program's disenrollment rate (for all reasons) is approximately 1 percent, significantly less than the 20 percent they had anticipated.

TO WHAT EXTENT DOES THE PROGRAM ENGAGE PHYSICIANS?

While the importance to program success of engaging eligible beneficiaries is self-evident, engaging physicians also is critical. Care coordinators must develop trusting, collaborative relationships with primary care physicians for physicians to feel comfortable communicating important information to them about their patients (for example, medication changes, new problems identified during office visits, or areas for additional patient education). Good communication also is important so that physicians feel that information they get from the care coordinators (for example, regarding problems in the home environment that affect patients' health, functional deficits that patients do not tell physicians about, or reminders about providing preventive care) is credible and warrants their attention. A trusting, respectful relationship will

TABLE 3

DISENROLLMENT FOR PATIENTS ENROLLED DURING FIRST SIX MONTHS

Number of Patients Enrolled[a]	104
Length of Enrollment as of October 26, 2002 (Percentage of Patients Enrolled)	
10 weeks or less	56.7
11 to 20 weeks	32.7
21 or more weeks	10.6
Mean Length of Enrollment (Weeks)	10
Number of Patients Who Disenrolled	0

Source: Health Quality Partners program data received November 2002 and updated January 2003. Covers six-month period beginning April 30, 2002, and ending October 26, 2002.

[a]Number of patients ever enrolled in the treatment group through October 26, 2002.

also facilitate care coordinators' access to physicians when urgent problems arise, and it will make communication and coordination across medical care providers easier (Chen et al. 2000). Moreover, to increase acceptance of care management among physicians in general, care coordinators need to engage physicians.

The Health Quality Partners MCCS program seeks to develop strong relationships between physicians and care managers and to demonstrate the benefits of care management to physicians. The program's structure and processes appears to support these goals. However, the program does not expect to change physicians' clinical practice patterns.

Collaboration. Physicians have a small but important role in the Health Quality Partners MCCS program. As was true of the prototype program, staff believe they must minimize the burden they place on physicians, because care management is new to many physicians and they want them to have a positive experience with it. The program expects that physicians (or their office staff) will (1) generate lists of potentially eligible patients and review them for program appropriateness, (2) respond to care managers' questions and recommendations concerning specific patients, (3) allow medical records abstraction for participating patients, and (4) provide office space (if available) for care managers' patient visits. Initially, the program did not expect physicians to have time to promote the program to their patients during routine office visits. Because of high patient refusal rates, however, in January 2003, the program began to ask all physicians to more actively promote the program by briefly describing it and explaining that it might help the patient. Staff believed that the physicians might be willing to do this because several of them had noted that they could see how the program had benefited their patients. After several months of trying to get physicians to promote the program, however, the program staff realized that the physicians really did not have time to take on this role.

The program has taken several steps to promote collaboration with physicians. It tailors some components to physician preferences. These include the method for identifying patients, the introductory letter sent to patients and signed by physicians, and ongoing communication with the care managers. It tries to assign the care managers to specific physician offices so that each physician will need to interact with only one care manager. The care managers often see patients in physicians' offices, so they can interact with the physicians in person. While co-location was initially done for the convenience of the patient and care manager, it created an opportunity for face-to-face contact between care managers and physicians that physicians have reacted to positively. Finally, the medical director and other staff meet with the physicians to maintain the relationships that they created during their earlier PennCARE care management program.

Collaborations between physicians and care managers have developed steadily over the first year of operations. The physicians have been providing a more than adequate number of patient referrals and have been interacting well with the care managers. The program has begun to abstract participants' medical records data, and the physicians have cooperated well with this process. When the physicians have space available, they have allowed the care managers to see program participants in their offices. A significant number of moderate- and low-risk patients see their care manager in their physicians' offices.

Although physicians were familiar with program's managers from the PennCARE prototype, the care managers, most of whom were not involved in the prototype, have needed to build physician trust patient by patient. For example, one care manager had recommended a medication change to a physician, but the physician resisted. When the medical director intervened, it turned out that the physician did not know about the medication the care manager suggested. After discussion with the medical director, the physician changed the medication, and

the patient's condition improved. The physician now has great respect for the care manager. Physicians also have begun to ask the program for reminders so that they can directly refer new patients for enrollment.

The staff noted that some physicians called the program's medical director after the care managers had recommended a change in a patient's medical regimen. However, they also said that these physicians, while initially shocked that a care manager would suggest changing a medication, have come to accept and even appreciate the care managers' recommendations. The medical director has been instrumental in helping to overcome physician objections to the care managers' intervention. He helps them to recognize that the care managers are attempting to work collaboratively. He believes that the physicians are responding positively to the care managers' suggestions.

Improving Practice. Health Quality Partners' approach to care management does not emphasize globally improving physician practice. In their prototype program, the staff provided formal feedback to physicians about whether their practice patterns adhered to recommended clinical practice guidelines. However, they eliminated this component from the demonstration because they feared it may have led physicians to change the way they care for control group patients. The staff believe that most physicians in the area practice according to recommended guidelines, but they do work with physicians on a patient-by-patient basis to optimize each patient's medical management, informing the physician when specific patients are not receiving care according to published guidelines.

Rather than trying to improve physician practice in general, the program would like physicians to recognize the benefits of care management for their patients. The staff hope that patients' clinical, functional, and quality-of-life outcomes will demonstrate the program's effectiveness. Moreover, by showing physicians that they can work with the care managers

without increasing burdens on their time, the program staff hope that physicians will see the value of care management.

HOW WELL IS THE PROGRAM IMPLEMENTING KEY INTERVENTION APPROACHES?

Improving Patient Adherence. Improving patient adherence to medical regimens is a major goal of the Health Quality Partners MCCS program. The program has developed a structured patient education intervention as a way to achieve this goal. Patient education seeks to improve patients' self-management skills and ability to communicate with their physicians.

Health Quality Partners' education intervention is based upon Prochaska and DiClemente's (1982) transtheoretical model of behavior change.[13] The model is new to the program's care managers, but the program staff who have worked in Health Quality Partners' wellness programs have used it extensively and are training the other care managers on how to use it. The care managers try to identify the root causes of patient behaviors and barriers to behavior change. They determine the patient's stage of readiness to change, then adapt their interventions to the patient's needs. For example, if a patient needs to begin an exercise program, the care manager will not tell the patient he or she needs to begin exercising for 20 minutes a day, three days a week. Instead, if the care manager finds that the patient is in the contemplation stage, she may ask the patient to look at his or her athletic shoes once a week or to count the number of times he or she thought about exercise. The care managers periodically reassess patients' motivation and

[13]This model describes behavior change as consisting of six stages: (1) precontemplation—no intention of taking action to change a behavior within the next six months, (2) contemplation—intends to take action within the next six months, (3) preparation or determination—intends to take action within the next 30 days and has taken some behavioral steps in this direction, (4) action—has changed overt behavior for less than six months, (5) maintenance—has changed overt behavior for more than six months, and (6) termination—overt behavior permanently changed.

goals for behavior change. The program applies this behavior change model to patients at all risk levels.

To promote better self-management, the program uses disease-specific core curricula that it tailors to the needs of each patient (see Appendix C). The format of patient teaching differs by risk level. Moderate-risk patients receive education in group classes given either by Health Quality Partners staff (for cardiovascular diseases) or by Doylestown Hospital staff (for diabetes).[14] These classes focus on improving patients' understanding of the disease processes, methods of taking medications correctly, and improving self-care and self-monitoring skills. They also give the patients clearly understandable information about available community resources.

Care managers provide education to high-risk patients with and without geriatric frailty during routine monitoring calls and through educational materials they give to patients. The program developed its own written materials, such as booklets, pamphlets, and information sheets. It also developed flip charts and other visual aids that the care managers use to reinforce the concepts presented in written materials and to teach patients with low literacy levels. For example, the care managers have a rack of test tubes each containing a quantity of fat equivalent to that found in common foods such as butter, cream cheese, and salad dressing. This helps patients with low literacy levels to understand the fat content of foods.

Teaching usually starts with a discussion of the patient's medications, then moves on to particular conditions. The disease-specific curricula cover (1) disease etiology, including signs and symptoms and their relationship to the patient's behaviors; (2) proper use of medications; (3)

[14]The program does not have any moderate-risk participants whose primary diagnosis is asthma. However, it does have a teaching curriculum for this condition and would likely provide one-on-one education for any such patients.

nutrition, physical activity, and weight loss; (4) preventive care; (5) self-care skills; (6) when to call the care manager or physician; (7) strategies for coping with chronic illness; and (8) the availability of community-based resources. To further facilitate patient self-care, the program coordinates referrals for blood pressure monitors, glucose meters, and scales to patients who need them. Care managers involve a patient's caregiver when appropriate. For example, when a care manager teaches a patient with heart failure about the need to limit sodium intake, she will involve the spouse, if the spouse prepares the patient's meals. The care managers look for "teachable moments" when they believe patients are receptive to information. However, the care managers acknowledge that, when a patient has acute clinical needs, those needs come before patient education.

At the time of our in-person interviews, the program was adding a new component to its intervention. Many of the program's patients are overweight or have difficulty managing their stress levels. From its experience providing wellness services at Doylestown Hospital's Health and Wellness Center, Health Quality Partners has adapted its weight loss and stress management programs to serve demonstration patients. The program now offers a 16-week, evidence-based, group weight loss program that incorporates lifestyle and behavior changes. Patients who complete the program can join a weight maintenance support group. The program also offers a five-week stress management program based on mind-body relaxation techniques. These programs are open to patients at all risk levels and are held at the program's Doylestown office, the Health and Wellness Center, community church facilities, and—when space allows—in participating medical practices.

Patient teaching and reinforcement of educational concepts are major components of the program's intervention. Among the 104 treatment group patients enrolled in the Health Quality Partners' MCCS program during its first six months, more than 90 percent had received at least

one contact for self-care or disease-specific education or to explain a medication, and 65 percent had received at least one contact to explain a test or procedure (Table 1).

The care managers determine if patients understand educational messages by listening to patients describe their activities and behaviors or by asking patients about what they have learned, if the patients do not bring it up. If a patient is not progressing as planned, the care manager will reassess the patient's stage of readiness to change and adapt interventions appropriately. For example, a patient's care plan goal may be to begin walking regularly for exercise. If the care manager initially assessed the patient to be at the preparation phase (that is, intending to take action in the next 30 days), but the patient does not appear to be making any progress toward beginning to exercise, then the care manager may decide to reassess the patient's motivational readiness or to initiate another intervention associated with their current behavioral stage. If this is so, the care manager may change the patient's goal—for example, get the patient to start to think about when or where he or she might be able to walk. The care manager may also contact the patient's physician to determine if the patient's medical regimen can be modified to make it easier to follow. If the patient has a cognitive impairment that is a barrier to learning, the program will move the patient from group education to one-on-one education with a care manager (if the patient was in the moderate-risk group) and will involve a caregiver in the education process. The program does not have any patients who are not English speakers. If such a patient were to enroll, the program would likely enlist the help of a family member to act as the patient's translator.

The care managers receive formal training in how to provide patient education. They learn how to assess patients' readiness to make behavioral changes and how to present material in small increments so that patients are not overwhelmed with information. The care management supervisor teaches the patient education curricula to the care managers as it should be taught to

patients. In addition, the care management supervisor observes the care managers as they conduct group education classes and offers her feedback.

In summary, Health Quality Partners has implemented a comprehensive, structured patient education intervention based on a formal health behavior change model that assesses the readiness of individual patients to learn and improve self-management. The format of patient teaching differs by risk level. The program's disease-specific curricula emphasize improving patients' self-care skills and ability to communicate effectively with their physicians. The care managers use visual aides to communicate concepts to patients who may not be able to use written materials because of literacy, language, or visual problems. The program formally teaches care managers to provide patient education. The care managers gauge the success of their teaching by listening to and observing whether patient self-management and communication skills have improved. The data collected from medical record abstraction (for example, weight, blood pressure, or lipid levels) will help the program quantify the effectiveness of its education intervention.

Improving Communication and Coordination. Improving communication and coordination between patients and providers, which can improve both provider practice and patient adherence, is a major focus of Health Quality Partners' care management approach. The program's approach to this goal is to teach patients to advocate for their own care, but the program uses several strategies to improve communication and coordination. First, the care managers are assigned geographically to work with patients from particular physicians' practices. This way, each physician interacts with only one care manager, allowing them to develop a closer working relationship. This relationship is strengthened by the care managers' frequent visits to the physicians' offices, where they often conduct patient assessment and monitoring visits.

A second strategy to improve communication is the program's willingness to tailor its mode of communication to physicians' preferences. Each care manager contact with a patient generates a patient encounter report that is sent to the physician. The disease-specific routine encounter reports contain information on the patient's use of health care services, functional status, medications, pain, symptoms, and overall health status. The care managers will mail, fax, or e-mail these reports to the physicians. However, urgent information is conveyed by telephone or in person.

A third strategy is that the care managers try to educate patients to communicate with their physicians by prompting patients to ask questions of their physicians based on what they have learned in their interactions with the care managers. The care managers encourage patients to ask for necessary preventive care and to prompt their physicians for condition-specific care recommended by clinical practice guidelines. In addition, the care managers teach patients to recognize signs and symptoms and to call their physician or care manager when needed. The program gives each patient a refrigerator sheet listing emergency phone numbers and reasons why the patient should contact their physician or care manager. While not all patients may be able to advocate for their own care in this way, the program staff believe this type of self-advocacy is an important skill that patients need to manage their own care.

If the care manager believes that a specialty physician would better handle the patient's care, the care manager will make a recommendation for a specialist referral to the patient's primary care physician and explain the reason for the recommendation. When appropriate, the care manager also may give the information about specialist referrals directly to the patient. In addition, the care manager may suggest that the patient get a second opinion if the physician appears to be promoting a particular course of action that is not evidence-based.

A fourth strategy to improve communication and coordination is that the care managers try to ensure that patients are receiving medical care in a timely, less fragmented way. As previously discussed, the care managers encourage patients to prompt their physicians for needed care, to understand what care they need when, and to communicate basic information about the care they receive from one physician to the other physicians they may be seeing. If the patient is not capable of taking on this role, the care manager will assume responsibility. However, the care manager will try to identify a caregiver who can assume this role over the long term.

The care managers interact with patients across a variety of settings and facilitate communication and coordination with health care providers in each of these settings. The program does try to track patient hospitalizations and emergency room visits, but it has to rely on patient and family reports of these events. The staff attempted to set up a system with Doylestown Hospital to notify them when a patient was admitted or seen in the emergency room. However, they have not been able to get this notification process working because the hospital staff did not have time to take on this additional responsibility. If the program staff learn that a patient has been hospitalized while the patient is still in the hospital, they talk with the discharge planners to provide background and input about the patient, as well as to determine if the patient has new education or service needs as a result of the hospitalization. Similarly, if the patient is admitted to a skilled nursing facility, the care manager coordinates with the facility's nursing staff to arrange for needed services after the patient's discharge. The care managers coordinate with home health nurses to determine when and how the care manager should become involved in the patient's care. The program acknowledges that patient contact with home health providers may be intense in the days after hospital or skilled nursing facility discharge. The program staff do not want to overburden the patient by immediately scheduling contacts with the care manager.

The care managers often encounter polypharmacy issues among program patients. In such situations, the care managers contact the patient's physicians directly, rather than encouraging patients to handle this issue with the physicians themselves. The care manager and physician will resolve any difficulties with the patient's medication schedule and the care manager will help the patient to develop a strategy to manage the schedule.

Issues of conflicting physician recommendations occur less frequently. When they do arise, the care manager will speak with the physicians to understand whether there actually is a conflict and why. Then she will help the patient to obtain additional information to resolve the conflict and make an informed decision regarding which course of action to take.

Health Quality Partners has developed an approach to increasing communication and coordination that combines teaching patients to advocate for their own care and promoting efficient interactions between the care managers and physicians. The care managers teach patients to improve their own communication skills and to coordinate their own care. The care managers improve their own communication with physicians and other providers by using formal and informal reports as well as frequent face-to-face contact. Attempts to coordinate communication across the spectrum of care are made more difficult by a lack of timely information.

Increasing Access to Services. Increasing access to services is not a major focus of the Health Quality Partners MCCS program, but the care managers will refer patients to, or arrange for, many community-based services. However, the care managers commented that many of their patients either did not need such services or already had them in place. Among those patients needing services, the most common needs are meals-on-wheels, transportation, and home health.

The care managers also said that many of their patients have difficulty paying for their medications. Many patients have relied on sample medications from their physicians or have tried to stretch their prescriptions by taking their medications on alternate days. The care managers help patients to apply for Pennsylvania's Pharmaceutical Assistance Contract for the Elderly (PACE) program or for Veterans Administration benefits.

During its first six months of operations, the program did not purchase any support services for patients.[15] Few patients (approximately six percent of program patients overall) received help from a care manager who referred them to, or arranged for, Medicare- or non-Medicare-covered services. Among all program patients, approximately sixteen percent had contacts during which care managers monitored the receipt of such services.

WHAT WERE ENROLLEES' MEDICARE SERVICE USE AND COSTS?

The evaluation provides preliminary estimates of the effect of the Health Quality Partners MCCS on Medicare service use and costs but caution that these estimates do not necessarily indicate the true effects of the program over a longer period. Due to lags in data availability, it is only able to analyze an early cohort of enrollees (those enrolling during the first four months of program operation) and to observe their experiences during their first two months in the program. Estimates are also preliminary because they include patients' experiences during the program's first six months of operation, when staff may have been fine-tuning the intervention, and because the program may enroll patients with different characteristics over time. Finally, the sample is very small, with just over 50 patients in each group.

[15]In the data it sends the evaluation, the program does not track the distribution of scales, blood pressure monitors, or glucose monitors that it has purchased for patients' home use.

Total Medicare Part A and B expenditures for the treatment group, exclusive of demonstration costs, were $1,145, on average, during the first two months after enrollment, compared with $723 for the control group (Table 4). This treatment-control difference of $422, or 58 percent, although sizable, is not statistically significant at the 10 percent level (p=0.453), given the small sample size. Treatment group members also had a higher rate of hospitalization over the observation period (7.8 versus 1.9 percent, or four people in the treatment group and one person in the control group) and more than twice as many hospitalizations, but again the differences are not statistically significant and therefore may be due to chance, given the very small sample size. A significantly greater proportion of the treatment group, however, uses outpatient hospital services (53 versus 32 percent) and physician and other Part B services (98 versus 87 percent). Treatment group patients also averaged about two more physician (or other Part B) visits than their control group counterparts (six versus four).[16] The program's intervention encourages patients to receive routine testing and monitoring of their conditions. Moreover, the program's initial assessments may uncover unmet care needs. Thus, an increase in the use of outpatient (or inpatient) services is not surprising. During the early months of program operations, reductions in hospital and emergency room use are not expected since it seems too soon for the program to have dramatically affected patient health. However, increases in these services could occur if care managers feel that patients need, but are neglecting to seek, such treatment, or if the increase in physician visits leads to identification of problems requiring a hospital stay. The fees paid to Health Quality Partners by Medicare for care coordination

[16]As would be expected with random assignment, the treatment and control groups were statistically similar prior to randomization. Thus, these post-enrollment differences in Medicare service use and costs do not appear to be due to preexisting differences between the two groups on observed characteristics. (See Appendix B.)

TABLE 4

MEDICARE-COVERED SERVICE USE DURING THE TWO MONTHS AFTER THE MONTH OF RANDOMIZATION, FOR EARLY ENROLLEES

	Treatment Group	Control Group	Difference[a]
Inpatient Hospital Services			
Any admission (percent)	7.8	1.9	6.0
Mean number of admissions	0.10	0.04	0.06
Mean number of hospital days	0.55	0.30	0.25
Emergency Room Services			
Any emergency room encounters (percent)			
Resulting in admission	3.9	1.9	2.1
Not resulting in admission	0.0	3.7	–3.7
Total	3.9	5.6	–1.6
Mean number of emergency room encounters			
Resulting in admission	0.04	0.02	0.02
Not resulting in admission	0.00	0.04	–0.04
Total	0.04	0.06	–0.02
Skilled Nursing Facility Services			
Any admission (percent)	2.0	1.9	0.1
Mean number of admissions	0.02	0.02	0.00
Mean number of days	0.16	0.13	0.03
Hospice Services			
Any admission (percent)	0.0	0.0	0.0
Mean number of days	0.00	0.00	0.00
Home Health Services			
Any use (percent)	2.0	0.0	2.0
Mean number of visits	0.27	0.00	0.27
Outpatient Hospital Services[b]			
Any use (percent)	52.9	31.5	21.5**
Physician and Other Part B Services[c]			
Any use (percent)	98.0	87.0	11.0**
Mean number of visits or claims	6.3	3.9	2.4**
Mortality Rate (percent)	0.0	1.9	–1.9
Total Medicare Reimbursement[d]			
Part A[e]	$600	$320	$280
Part B	$545	$403	$142
Total	$1,145	$723	$422
Reimbursement for Care Coordination[f]	$227	$0	$227***
Number of Beneficiaries	**51**	**54**	

TABLE 4 *(continued)*

Source: Medicare National Claims History File.

Note: Sample includes those enrolled during the first four months of program operations. Participants were excluded from this table if they had an invalid HIC number on MPR's enrollment file, were identified as a member of the same household as a research sample member, or did not meet Medicare coverage and payer requirements (defined as having Medicare as a secondary payer, being in Medicare managed care plan, or not having Part A and Part B coverage) during the month of randomization. Patient-months were excluded if the participant did not meet the above Medicare coverage and payer requirements that month, or had died in a previous month.

"Percents with any medical encounter type" are the percent of treatment or control group members who have at least one encounter of a particular type; "mean numbers of medical encounter types" are the average number of encounters of a particular type per treatment or control group member.

[a]The direction of the treatment-control difference does not by itself signify whether the program is "effective." That is, for some outcomes a statistically significant negative difference (such as lower hospitalization rates for the treatment group than for the controls) suggests that the program is working as intended. However, a positive difference for other outcomes, such as number of physician visits, does not necessarily mean the program is ineffective or having adverse effects, because the program may encourage patients to see their physician more regularly for preventative care or to obtain recommended laboratory tests for their target conditions than they would have in the absence of the demonstration.

Due to rounding, the difference column may differ slightly from the result when the control column is subtracted from the treatment column.

[b]Includes visits to outpatient hospital facilities as well as emergency room visits that do not result in an inpatient admission. Laboratory and radiology services are also included.

[c]Includes diagnostic laboratory and radiology services (including pathologist and radiologist services) from nonhospital providers, suppliers and devices, mammography, ambulance, covered medications, blood, and vaccines.

[d]Does not include reimbursement for care coordination services provided by demonstration programs.

[e]Includes reimbursement for inpatient, skilled nursing facility, hospice, and all home health care (including that paid under Medicare Part B). Excludes reimbursement for care coordination services provided by demonstration programs.

[f]This is the average amount paid to the program as recorded in the Medicare claims data for the two months following randomization. The difference between the recorded amount and two times the amount the program was allowed to charge per-member-per-month may reflect billing errors, delays, or payment adjustments for patients who disenrolled.

*Difference between treatment and control groups significantly different from zero at the .10 level, two-tailed test.
**Difference between treatment and control groups significantly different from zero at the .05 level, two-tailed test.
***Difference between treatment and control groups significantly different from zero at the .01 level, two-tailed test.

services, which averaged $227 over the first two months, increase the treatment-control difference in average costs from $422 to $649 over this period.[17]

The evaluation also examined monthly trends in treatment-control differences from April through September 2002, the first six months of program operation (Table 5). The sample enrolled each month is only large enough to draw inferences during the last two months, during which treatment group patients incurred higher Medicare expenditures than the control group and had the same number or more hospitalizations. None of these differences is statistically significant.

It is too soon to tell whether these early increases in Medicare Part B service use will ultimately result in improved patient health and statistically significant reductions in hospitalization, emergency room use, and costs. Care coordination programs such as that of Health Quality Partners may increase the use of Part B services, and perhaps hospitalizations as well, in the short term, as care managers identify and address unmet needs. The use of these services may prevent or delay the need for more expensive Part A services in the longer term, thus lowering overall costs. However, programs such as the MCCS, which may have attracted a population with a low hospitalization rate without the program, may have difficulty achieving offsetting reductions in hospital costs.

CONCLUSION

Research during the past decade suggests, but is by no means conclusive, that successful care coordination programs have many features. These features include effective patient

[17]The per patient per month fee the program charges is $130 for high-risk patients, $110 for moderate-risk patients, and $50 for low-risk patients, or $260, $220, and $100 over the two-month period. The $227 average over the two months represents the mix of patients served.

TABLE 5

MONTHLY MEDICARE SERVICE USE FOR PARTICIPANTS WHO ENROLLED DURING THE FIRST SIX MONTHS OF PROGRAM OPERATIONS

	Group	Apr 02	May 02	Jun 02	Jul 02	Aug 02	Sep 02
Cumulative Enrollment Through Month End	Treatment	2	8	13	33	55	79
	Control	3	9	14	30	55	77
Mean Number of Beneficiaries Enrolled Who Meet Medicare Coverage and Payer Requirements and Are Alive That Month	Treatment	2	8	13	33	53	77
	Control	3	9	14	29	54	76
Average Medicare Reimbursement During the Month[a]	Treatment	$174	$113	$1,117	$691	$272	$527
	Control	$49	$484	$145	$152	$239	$394
Average Reimbursement for Care Coordination During the Month[a,b]	Treatment	$120	$113	$112	$111	$113	$113
Whether Admitted to Hospital This Month[a] (Percentage)	Treatment	0.0	0.0	15.4	6.1	1.9	3.9
	Control	0.0	11.1	0.0	0.0	1.9	1.3
Treatment - Control Difference[c]							
Average Medicare Reimbursement[a]		$125	–$371	$972	$539	$33	$134
Average Reimbursement for Medicare plus Care Coordination[a]		$245	–$258	$1,084	$650*	$146	$247
Percentage Hospitalized[a]		0.0	–11.1	15.4	6.1	0.0	2.6

Source: Medicare National Claims History File.

[a]Participants were excluded if they died in a previous month or failed to meet the Medicare coverage and payer requirements during the month of randomization or the month examined—that is, if they were in a Medicare managed care plan, had Medicare as a secondary payer, or did not have both Part A and Part B coverage. Participants were also excluded entirely from this table if they had an invalid HIC number on MPR's enrollment file.

[b]This is the average amount paid to the program as recorded in the Medicare claims data. The difference between the recorded amount and the program's approved per-member-per-month fee may reflect billing errors, delays, or payment adjustments for patients who disenrolled.

TABLE 5 *(continued)*

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[c]The direction of the treatment-control difference does not by itself signify whether the program is "effective." That is, for some outcomes a statistically significant negative difference (such as lower hospitalization rates for the treatment group than for the controls) suggests that the program is working as intended. However, a positive difference for other outcomes, such as number of physician visits, does not necessarily mean the program is ineffective or having adverse effects, because the program may encourage patients to see their physician more regularly for preventative care or to obtain recommended laboratory tests for their target conditions than they would have in the absence of the demonstration.

*Difference between treatment and control groups significantly different from zero at the .10 level, two-tailed test.
**Difference between treatment and control groups significantly different from zero at the .05 level, two-tailed test.
***Difference between treatment and control groups significantly different from zero at the .01 level, two-tailed test.

identification, a well-designed and structured intervention, highly qualified staff, physician buy-in, and financial incentives aligned with program goals.

First, to generate net savings over a relatively short period, effective programs tend to target high-risk people. These people may include those with recognized high-cost diagnoses such as heart failure, but also those with prevalent geriatric syndromes such as physical inactivity, falls, depression, incontinence, misuse of medications, and undernutrition (Rector and Venus 1999; and Fox 2000).

Second, successful programs tend to have a comprehensive, structured intervention that can be adapted to individual patient needs. One key feature is a multifaceted assessment whose end product is a written care plan that can be used to monitor patient progress toward specific long- and short-term goals and that is updated and revised as the patient's condition changes (Chen et al. 2000). Another key feature is a process for providing aggregate- and patient-level feedback to care coordinators, program leaders, and physicians about patient outcomes (Chen et al. 2000). Another critical aspect is patient education that combines the provision of factual information with techniques to help patients change self-care behavior and better manage their care, as well as addressing affective issues related to chronic illness (Williams 1999; Lorig et al. 1999; Vernarec 1999; Roter et al. 1998; and Aubry 2000). Finally, successful programs tend to have structures and procedures for integrating fragmented care and facilitating communication among providers, to address the complexities posed by patients with several comorbid conditions, and, when necessary, to arrange for community services (Chen et al. 2000; Bodenheimer 1999; and Hagland 2000).

The third and fourth characteristics that have been associated with successful programs are having highly trained staff and having actively involved providers. Strong programs typically have care coordinators who are baccalaureate-prepared nurses or who have case management or

community nursing experience. They also tend to have the active support and involvement of patients' physicians (Chen et al. 2000; and Schore et al. 1999).

Finally, periodic feedback during the demonstration period can motivate providers and care coordinators and enable the program to modify or intensify the intervention if it appears that it is not having the expected effect on intermediate or ultimate outcome indicators. Financial incentives can help encourage physicians and program staff to look for creative ways to meet patient goals and reduce total health care costs (Schore et al. 1999).

Program Strengths and Unique Features. The Health Quality Partners MCCS program appears to have many of the features associated with effective care coordination:

- The program targets moderate- to high-risk patients with asthma, heart failure, coronary artery disease, diabetes, hypertension, or hyperlipidemia—diagnoses typically associated with high health care costs. Although the program has been enrolling more moderate-risk patients than it had anticipated, it may still achieve savings to the Medicare program if it can prevent the condition of these moderate-risk patients from deteriorating over the four-year demonstration period.
- Physicians have been willing to participate in the program and refer their patients. Physicians also assist in patient recruitment by providing the program with signed letters printed on their own letterhead that encourage patients to participate. The program did not reach its target enrollment for the first year of the demonstration, but enrollment has been steady and no patients have disenrolled voluntarily.
- The program appears to have an efficient process to identify patients that is generating more referrals than they are able to follow up on. Physicians' offices generate lists of eligible patients, physicians review each patient for the appropriateness of referral, and the program sends patients an invitation letter signed by their physician.
- Patient assessment and care planning are structured and individualized for each patient. Care plans are updated as needed during each patient contact. Patient monitoring contacts occur at least every month but are more frequent as needed. Monitoring contacts allow the care managers to provide education, identify changes in patients' conditions and determine if patients are progressing toward their care plan goals.
- The program has created reporting tools used by the care managers to gauge the progress of individual patients and by the program directors to determine the quality

of care provided to program patients and whether overall program goals are being met.

- Patient education is structured, but it is customized to each patient's assessed stage of readiness to make behavior changes. Education provides factual information about patients' specific conditions, as well as incremental approaches to behavior change. The care managers adapt their approach to teaching patients with literacy, language, or vision problems by using visual aids to convey information. The care managers assess whether patients understand the educational concepts presented by listening to their descriptions of their behaviors and activities. If patients do not appear to understand the material presented or are not able to act on it, the care managers will reassess patients' readiness to change and adapt their interventions accordingly.

- The program has arranged for (but not paid for) home-delivered meals, transportation, and home health services to help a small percentage of their patients to better manage their health and has assisted some in applying for pharmaceutical assistance programs.

- Care managers are all registered nurses with at least five years' of clinical experience, including disease-specific specialty training and community-based nursing, such as home health or hospice nursing. The program appears to have hired nurses who can work autonomously and who can confidently interact with physicians.

- Physicians are supportive of the program but play a modest role in the intervention. Physicians have been cooperative in helping program identify eligible patients. However, once patients are enrolled, the program only expects physicians to respond to care managers about specific patient problems. The program elicits physicians' preferences as to how the care managers will contact them and generally seeks not to increase physician burden.

- Care managers improve coordination of care and patient-physician communication by communicating frequently with patients and physicians, notifying physicians when specific patients are not receiving care that is consistent with clinical practice guidelines, and teaching patients to communicate more effectively with their providers and to manage their care more proactively. To the extent that the program succeeds in this and is able to educate patients about what care they need, communication and coordination should improve. Care managers are assigned geographically to work with patients from particular physicians' practices and develop a working relationship with physicians by often conducting patient assessment and monitoring visits in the physician's office. Each patient encounter by the care manager generates a formal communication to the physician by mail, fax, or e-mail.

Potential Barriers to Program Success. Health Quality Partners also faces barriers to the success of its demonstration program:

- The program relies on patients' self-reports to determine if they have been hospitalized or seen in the emergency room. This information is often incomplete and reported after the fact. This limits the program's ability to identify the causes of adverse events and respond appropriately.

- Health Quality Partners does not provide physicians with financial incentives for their participation in the demonstration. However, because physicians appear to be willing to refer without payment, and since the program requests so little of physicians after patients enroll, this might not be a barrier to success.

- The program has enrolled patients who are healthier than planned. Although the program wanted to target moderate- to high-risk beneficiaries, program participants were no more likely than the average Medicare beneficiary to be hospitalized in the year before enrollment (a 20 percent chance). Enrolling relatively healthy beneficiaries may make it difficult to reduce their need for hospitalization in a short follow-up period.

- Because they are healthier than expected, participants' Medicare expenditures are lower than anticipated. For the waiver application, MPR estimated that Medicare expenditures would average $644 per month for eligible beneficiaries. Health Quality Partners has enrolled beneficiaries with average monthly expenditures of $468 before enrollment. The program will need to generate a greater percentage reduction in costs than expected to cover its program fees of $130 for high-risk patients, $110 per month for moderate-risk patients, and $50 per month for low-risk patients.

Plans for the Second Site-Specific Report. MPR will prepare a second report on Health Quality Partners' MCCS activities during its second and third years of operation that will focus more heavily on program impacts based on survey and claims data. That report also will describe changes made to the program over time and the reasons for those changes, as well as staff impressions of program successes and shortcomings. The report is due in mid-2005.

REFERENCES

Archibald, Nancy, and Jennifer Schore. "The Early Experience of the Health Quality Partners Case Management Program." Princeton, NJ: Mathematica Policy Research, Inc., August 2003.

Aubry, Barbara. "Bolstering Disease Management Programs." *Healthplan*, July-August 2000, pp. 11-12.

Bodenheimer, Thomas. "Disease Management—Promises and Pitfalls." *New England Journal of Medicine*, vol. 340, no. 15, April 15, 1999, pp. 1202-1205.

Brown, Randall, Deborah Peikes, Eric Schone, Nazmul Khan, Arnie Aldridge, and Lucy Lu. "Waiver Cost Estimates for the Medicare Coordinated Care Demonstration." Princeton, NJ: Mathematica Policy Research, Inc., August 31, 2001.

Chen, Arnold, Randall Brown, Nancy Archibald, Sherry Aliotta, and Peter Fox. "Best Practices in Coordinated Care." Princeton, NJ: Mathematica Policy Research, Inc., February 29, 2000.

Fox, Peter. "Screening: The Key to Early Intervention for High-Risk Seniors." *Healthplan*, November-December 2000, pp. 56-61.

Hagland, Mark. "Integrating Disease Management." *Healthplan*, January-February 2000, pp. 43-46.

Lorig, Kate, David Sobel, Anita Stewart, et al. "Evidence Suggesting That a Chronic Disease Self-Management Program Can Improve Health Status While Reducing Hospitalization." *Medical Care*, vol. 37, no. 1, 1999, pp. 5-14.

Prochaska, James, and Carlo DiClemente. "Transtheoretical Therapy Toward a More Integrative Model of Change." *Psychotherapy: Theory, Research and Practice*, vol. 19, no. 3, 1982, pp. 276-287.

Rector, Thomas, and Patricia Venus. "Judging the Value of Population-Based Disease Management." *Inquiry*, vol. 36, summer 1999, pp. 122-126.

Roter, Debra, Judith Hall, Rolande Merisca, et al. "Effectiveness of Interventions to Improve Patient Compliance." *Medical Care*, vol. 36, no. 8, 1998, pp. 1138-1161.

Schore, Jennifer, Randall Brown, and Valerie Cheh. "Case Management for High-Cost Medicare Beneficiaries." *Health Care Financing Review*, vol. 20, no. 4, summer 1999, pp. 87-102.

Vernarec, Emil. "Health Care Power Shifts to the People." *Business and Health: The State of Health Care in America 1999*, pp. 8-13.

Williams, Mark. "Chronic Care Clinics: Why Don't They Work?" *Journal of the American Geriatric Society*, vol. 47, no. 7, July 1999, pp. 908-909.

APPENDIX A

ADDITIONAL TABLES

A.1 DEMONSTRATION PROGRAMS PARTICIPATING IN THE EVALUATION

A.2 LIST OF DOCUMENTS REVIEWED FOR THIS REPORT

TABLE A.1

DEMONSTRATION PROGRAMS PARTICIPATING IN THE EVALUATION

Host Organization	Organization Type	Service Area	Targeted Diagnoses
Avera Research Institute/Avera McKennan Hospital and University Health Center	Hospital	49 counties in South Dakota and 22 contiguous counties in Minnesota, Nebraska, and Iowa	CHF
Carle Foundation	Integrated delivery system	11 counties in east central Illinois and 2 counties in west central Indiana	Heart conditions Diabetes Chronic lung disease
CenVaNet	Provider of care coordination services owned by hospitals and physicians	Richmond, Virginia, metropolitan area	Heart conditions Diabetes Chronic lung disease Cerebrovascular disease
Charlestown Retirement Community	Part of Erickson Retirement Communities	2 retirement communities in the Baltimore, Maryland, metropolitan area[a]	Heart conditions Diabetes COPD
CorSolutions	Provider of disease management services	Harris, Fort Bend, Bruzoria, and Montgomery counties, Texas (Houston area)	CHF
Georgetown University Medical School	Academic institution in partnership with Medstar, owner of Georgetown University Hospital and Washington Hospital Center	Washington, DC, and parts of Maryland and Virginia	CHF
Health Quality Partners	Provider of quality improvement services	Four counties in eastern Pennsylvania	Heart conditions Diabetes Asthma Moderate to severe hyperlipidemia or hypertension
Hospice of the Valley	Hospice	Maricopa County, Arizona (greater Phoenix)	CHF COPD Cancer Neurological conditions

TABLE A.1 *(continued)*

Host Organization	Organization Type	Service Area	Targeted Diagnoses
Jewish Home and Hospital Lifecare System	Long-term care provider, in partnership with the medical practices of St. Luke's and Mt. Sinai hospitals as referral sources	Manhattan and the Bronx, New York City	Heart conditions Diabetes Chronic lung disease Cancer Liver disease Stroke or other cerebrovascular disease Psychotic disorder Major depressive or anxiety disorder Alzheimer's or other cognitive impairment
Lovelace Health Systems	Integrated delivery system	Albuquerque metropolitan statistical area (Bernalillo, Valencia, and Sandoval counties in New Mexico)	CHF Diabetes
Medical Care Development	Consortium of 17 Maine hospitals hosted by a health services research organization	Rural areas of Maine	Heart conditions
Mercy Medical Center/North Iowa	Hospital	Rural areas of Iowa	CHF Chronic lung disease Liver disease Stroke Vascular disease Renal failure
QMed	Provider of disease management services	2 counties in northern California	CAD
Quality Oncology, Inc.	Provider of disease management services	Broward and Dade counties, Florida	Cancer
University of Maryland Medical School	Academic institution	Baltimore, Maryland, metropolitan area, two counties in western Maryland, four in eastern Maryland, and two in Pennsylvania	CHF
Washington University School of Medicine	Academic institution in partnership with American Healthways, a disease management services provider	St. Louis, Missouri, metropolitan area	No specific diagnoses targeted[b]

TABLE A.1 *(continued)*

Note: Each program's service area and targeted diagnoses refer to its first year of operations.

Heart conditions may include congestive heart failure (CHF); coronary artery disease (CAD); atrial fibrillation; and ischemic, hypertensive, or other heart diseases. Chronic lung disease includes asthma and chronic obstructive pulmonary disease (COPD). Neurological conditions include stroke, Alzheimer's disease, Parkinson's disease, and amyotrophic lateral sclerosis.

[a]Charlestown added a third retirement community in April 2003.

[b]Washington University uses an algorithm developed by its demonstration partner, American Healthways, to target Medicare beneficiaries who are likely to become clinically unstable and to require hospitalization during the next 12 months.

TABLE A.2

DOCUMENTS REVIEWED FOR THIS REPORT

PennCARE's proposal submitted to the Health Care Financing Administration (dated October 10, 2000)[a]

Initial letter of invitation to potential patients*

Second letter of invitation to potential patients*

MCCD informed consent for participation and authorization to use and disclose personal health information*

Letters sent to treatment and control group participants after randomization

Letter sent to participants upon disenrollment

Flow diagrams*
- MCCD verbal consent and eligibility determination
- MCCD risk stratification
- MCCD randomization
- Health Quality Partners coordinated care program process flow

Reports generated at the program level
- Health Quality Partners MCCD patients randomized by month
- Health Quality Partners MCCD referral summary by office
- Health Quality Partners MCCD intervention patients by level

Reports generated at the care manager level
- Health Quality Partners MCCD case load summary – patients by care manager

Health Quality Partners referral form and ICD-9 codes for physicians

Health Quality Partners brochure for potential patients*

Sutter Health Questionnaire

Initial assessment – geriatric*

Initial assessment – cardiovascular (comprehensive disease-specific assessment)*

[a]PennCARE spun-off Health Quality Partners as a separate business unit in July 2001.

Health Quality Partners disease-specific health risk assessment*

Health Quality Partners geriatric encounter form*

Health Quality Partners cardiovascular patient encounter form*

Health Quality Partners training checklist – care managers*

Health Quality Partners cardiovascular education plan*

* Included in Appendix C of this report.

APPENDIX B

METHODS USED TO ANALYZE PARTICIPATION AND PROGRAM IMPACTS

This appendix describes the methods and data sources used to analyze participation and treatment-control service use and reimbursement differences using Medicare data.

A. METHOD FOR CALCULATING PARTICIPATION RATE AND PATTERNS

We measured the proportion and types of beneficiaries attracted to the program by calculating the participation rate and patterns. The participation rate was calculated as the number of beneficiaries who met the program's eligibility criteria and actually participated during the first six months of the program's operations, divided by the number who met the eligibility criteria. The six-month window spanned 179 days, from April 30, 2002, through October 26, 2002. We explored patterns of participation by comparing eligible participants and eligible nonparticipants, noting how they differed on demographics, reason for Medicare eligibility, and costs and use of key Medicare services during the previous two years.

1. Approximating Program Eligibility Criteria

We began by identifying the program's eligibility criteria, reflecting CMS's insurance coverage and payer criteria for all programs and Health Quality Partners' specific criteria. CMS excluded beneficiaries from the demonstration who were not at risk for incurring full costs in the fee-for-service setting because they (1) were enrolled in a Medicare managed care plan, (2) did not have both Part A and B coverage, or (3) did not have Medicare as their primary payer.

In addition to the Medicare coverage and payer requirements, Health Quality Partners applied program-specific criteria to identify the target population. Table B.1 summarizes these criteria, which were approved by CMS and by the Office of Management and Budget (Brown et al. 2001). The program confirmed these criteria in spring 2003. To be included in the program's demonstration, beneficiaries must have had in the past at least one diagnosis for one of the following conditions: asthma, diabetes, heart failure, hypertension, coronary artery disease, or

TABLE B.1

ELIGIBILITY CRITERIA

Inclusion Criteria	• Diagnosed with at least one of the following: asthma, diabetes, heart failure, hypertension, coronary artery disease, or hyperlipidemia • Physician approves participation ICD-9 Codes: Asthma- All 4 or 5digit codes starting with 493, Diabetes- All 4 or 5digit codes starting with 250, Congestive Heart Failure- All 4 or 5digit codes starting with 428 or 429, Hypertension- All 4 or 5digit codes starting with 401, 402 or 403, Coronary Artery Disease- All 5digit codes starting with 410 or 411 as well as all 4 digit codes starting with 413 or 414, Hyperlipidemia- All 4 digit codes starting with 272
Exclusion Criteria	Patients with any of the following diagnoses or conditions (per the beneficiary's self-report): • ESRD • Life expectancy of six months or less • Under age 65 • Organ transplant candidate • Cancer (other than skin) within past five years • Psychoses • Schizophrenia • HIV/AIDS • ALS • Huntingdon's disease • Alzheimer's disease • Dementia • A resident or planning to become a resident of a long-term care facility • Seasonal relocation outside of area for more than four weeks per year • Beneficiaries currently participating in another research study Health Quality Partners also excludes beneficiaries it assesses to be at low risk for future health service use and at low disease severity and beneficiaries who have previously received disease management or care coordination services through Health Quality Partners
Providers/Referral Sources	Physicians, other health care providers, and patient self-referrals
Geographic location	Bucks, Montgomery, Lehigh, and Northampton Counties, Pennsylvania

hyperlipidemia. In addition to these inclusion criteria, Health Quality Partners excludes beneficiaries who are at low risk of future health service use and who have the target conditions but are not moderately or severely ill. It assesses these factors using the Sutter Health Questionnaire and its own disease-specific assessments. Health Quality Partners also excludes beneficiaries who (1) have end-stage renal disease (ESRD); (2) have a life expectancy of six months or less; (3) are under age 65; (4) are an organ transplant candidate; (5) have cancer (other than skin cancer); (6) have a diagnosis of psychoses, schizophrenia, HIV/AIDS, ALS, Huntington's Disease, Alzheimer's Disease, or dementia; (7) are residents or plan to become residents of a long-term care facility; (8) seasonally relocate outside of the program's geographic area for more than four weeks out of the year; (9) currently receive or have previously received disease management or care coordination services from Health Quality Partners, or (10) currently participate in another research study. Health Quality Partners relies on patient self-reporting to screen for the exclusion criteria.

We used Medicare data to approximate most of Health Quality Partners' criteria, with some exceptions. We implemented Health Quality Partners' requirement that a patient must have had a diagnosis for one of the target conditions, by examining whether a beneficiary had an inpatient, outpatient hospital, or emergency room claim for such an encounter at any point during the 18-month period beginning May 1, 2001, one year before enrollment began, and ending six months after enrollment started (October 31, 2002). We used the same period to approximate whether beneficiaries met the program's medical exclusion criteria at the time of enrollment. We were unable to observe the complete diagnostic history for beneficiaries who had not been in fee-for-service Medicare during the full year before the six-month enrollment window.[1] We could not

[1]Among the 221 participants who enrolled in the first six months, who had valid Health Insurance Claim (HIC) numbers reported and who met CMS's insurance requirements at intake, 22.2 percent were enrolled in Medicare fee-

fully approximate seven of Health Quality Partners' exclusion criteria using Medicare data: (1) having ALS or Huntington's Disease,[2] (2) being a resident or planning on becoming a resident of a long-term care facility, (3) seasonally relocating outside of the program's geographic area for more than four weeks out of the year, (4) having a low-risk form of the target condition, (5) currently or previously receiving disease management or care coordination services from Health Quality Partners, (6) having a life expectancy of six months or less, or (7) currently participating in another research study.

2. Identifying Health Insurance Claim (HIC) Numbers and Records of Participants and All Beneficiaries

We used Medicare claims and eligibility data and data the program submitted to identify participants and eligible nonparticipants. For all participants, we used the Medicare Enrollment Data Base (EDB) file to confirm the HIC numbers, name, and date of birth submitted by the program when beneficiaries were randomized. We identified potentially eligible nonparticipants by identifying the HIC numbers of all Medicare beneficiaries who were alive and living in the catchment counties during the six-month enrollment window. Initially, three years of Denominator records (1999-2001) and one year of HISKEW records (2002) were used to identify people living in the catchment counties at any time in the 1999-2002 period. HIC numbers of potentially eligible nonparticipants and all participants together formed a "finder file." We used the finder file to gather data on the beneficiary's state and county of residence

(continued)
for-service 11 or less of the previous 12 months before they enrolled in the demonstration; 3.6 percent of participants were in fee-for-service less than 6 of the 12 months before enrolling.

[2]These two conditions could have been approximated but were inadvertently left off the exclusion criteria list when the data was processed. Because it is likely that only a small number of beneficiaries in the catchment area would have these conditions, our results are unlikely to be affected by this oversight.

during the six-month enrollment period and to obtain eligibility information from the EDB. Using this information, we limited the sample to people living in the catchment counties at any point during the six-month enrollment window. This finder file was also used to make a "cross-reference" file to ensure that we obtained all possible HIC numbers the beneficiary may have been assigned. This was done using Leg 1 of CMS's Decision Support Access Facility. At the end of this step, we had a list of HIC numbers for all participants, as well as all beneficiaries living in the catchment area during the six-month enrollment period.

3. Creating Variables from Enrollment and Claims Data

We obtained eligibility information from the EDB and diagnostic and utilization data from the National Claims History (NCH). All claims files were accessed through CMS's Data Extract System. At the end of February 2003, we requested Medicare claims from 1999 through 2002. We received all claims that were updated by CMS through December 2002. This allowed a minimum of a two-month lag between a patient's receipt of a Medicare-covered service in the last month we examined—October 2002—and the appearance of the claim on the Medicare files.[3]

Medicare claims and eligibility information were summarized as monthly variables from May 2000 through October 2002, for a total of 30 months. This enabled us to look at the eligibility status and the use of Medicare-covered services during any month in the two years before the program's start, to analyze participation in the first six months of program operation,

[3]Occasionally, the HIC number in the cross-reference file was not in the EDB file that we used. Because data from the EDB were needed for the analyses, such beneficiaries were dropped from the sample. One reason for differences between the HIC numbers in the EDB and cross-reference files was that the two files were updated at different times. CMS created the cross-reference file using the unloaded version of the EDB, which was updated quarterly. We extracted data using the production version of the EDB, which was updated every night.

and to analyze treatment-control differences in Medicare service use and reimbursement following enrollment.

The EDB file provided us the information with which to construct measures of beneficiaries' demographic characteristics (age, sex, race), dates of death, original reason for Medicare entitlement, Medicare managed care enrollment, Part A and B coverage, whether Medicare was the primary payer, and the state buy-in proxy measure for enrollment in Medicaid.

The Medicare claims data in the NCH files were used to construct measures of Medicare-covered service use and reimbursement by type of service (inpatient hospital, skilled nursing facility, home health, hospice, outpatient hospital, and physician and other Part B providers). When the services spanned months, the monthly variables were allocated based on the number of days served in that month as documented in the CLAIM FROM and CLAIM THRU dates. The length of stay for a month represented actual days spent in the facility in that month; costs were prorated according to the share of days spent in each month. Ambulatory visits were defined as the unique counts of the person-provider-date, as documented in the physician/supplier and hospital outpatient claims. Durable medical equipment reimbursements were counted in other Part B reimbursement. A small number of negative values for total Part A and Part B reimbursements during the past two years occurred for some of the demonstration programs. Any negative Part A and Part B amounts were truncated to zero. The few patients with a different number of months in Part A and Part B were dropped from the analysis of reimbursement in the two years before intake.

When we examined a beneficiary's history from the month during which they were randomized, we used the actual date of randomization for participants and a simulated date of randomization for nonparticipants, picked to be July 15, 2002, or roughly the midpoint of the six-month enrollment window.

4. Defining Eligible Nonparticipants and Eligible Participants

We used target criteria information to whittle the group of beneficiaries who lived in the catchment area down to those who met the program's eligibility criteria, which we could measure using the Medicare data. Tables B.2 and B.3 illustrate the exclusions used to identify the sample of eligible participants and nonparticipants used to analyze the participation rate.

We identified 307,922 beneficiaries who lived in Health Quality Partners' catchment area at some point during the first six months of enrollment (Table B.2). We then excluded 108,472 people (35.2 percent) who did not meet the insurance requirements set by CMS for participation in the program during one or more months during the six-month enrollment window. Another 38,762 of the remaining beneficiaries (12.6 percent of all area beneficiaries) were dropped from the sample, since they were not treated for one or more of the target diagnoses the program identified as necessary for inclusion during the 18 months from May 2001 through October 2002 (which includes the year before the program began, as well as the six-month enrollment window). Finally, 75,253 people were identified as having at least one of Health Quality Partners' exclusion criteria, leaving us with a sample of 85,435 beneficiaries in the four counties that we estimated would have been eligible to participate in Health Quality Partners' program.

Health Quality Partners randomized 228 beneficiaries who enrolled in the demonstration program during the first six months of operation (Table B.3). Of these, two people (less than one percent) could not be matched to their Medicare claims data due to problems with their reported

TABLE B.2

SAMPLE OF ALL ELIGIBLE BENEFICIARIES FOR PARTICIPATION ANALYSIS

Sample	Number
Full Sample of Eligible Beneficiaries Who Live in Catchment Area One or More Months During the First Six Months of Enrollment	307,922
Minus those who:	
During 6-month enrollment period, either (1) were always in a Medicare managed care plan, or (2) never had Medicare Part A coverage, or (3) never had Medicare Part B coverage, or (4) Medicare was not primary payer during one or more months	–108,472
Did not have one or more of the target diagnoses on any claim during the 18 months from May 2001 through October 2002	–38,762
Met at least one of the exclusion criteria during the 18 months from May 2001 through October 2002	–75,253
Eligible Sample	**85,435**

TABLE B.3

SAMPLE OF ELIGIBLE PARTICIPANTS FOR PARTICIPATION ANALYSIS

Sample	Treatment Group	Control Group	All
Full Sample of Participants Randomized During the First Six Months of Enrollment	115	113	228
Minus those who:			
Had an invalid HIC number on MPR's enrollment file	–0	–2	–2
Not in geographic catchment area during the month of intake	–1	–0	–1
In a Medicare managed care plan, or did not have Medicare Part A and B coverage, or Medicare is not primary payer during the month of intake	–3	–2	–5
Did not have one or more of the target diagnoses on any claim during the 18 months from May 2001 through October 2002	–0	–4	–4
Met at least one of the exclusion criteria during the 18 months from May 2001 through October 2002	–40	–34	–74
Eligible Sample	**71**	**71**	**142**

Note: The number of sample members reported as excluded at each point reflects *people in the previous line* who did not meet the additional eligibility criteria according to Medicare data. Thus, the table applied sequential criteria. The program actually used patient self-reports of diagnosis and service use. The total number of people who failed to meet a particular exclusion criterion may have been greater than the number reported in this table for program criteria that we could not fully assess using claims data (for example, reading level).

HIC numbers and were therefore excluded from the participation sample.[4] Health Quality Partners randomized one person who had an address on the EDB that was outside its county catchment area. We excluded this case from the participation analysis to maintain comparability to the eligible nonparticipant sample. We also excluded five participants who did not meet CMS's insurance requirements for participation in the program during the month of intake. We also dropped four beneficiaries for not having at least one claim for a target diagnosis during the 18-month period from May 2001 through October 2002. The largest share (34 percent), or 74 participants, were dropped from the participation analysis because the participants met one of the program's exclusion criteria during the same time period.[5] Thus, among the 228 participants randomized by Health Quality Partners into the program during its first six months of operations, after exclusions, 142 people are included in the participation analyses as eligible participants.

Health Quality Partners' participation rate for the first six months of enrollment is therefore calculated as the number of participants who met the eligibility requirements (142), divided by the number of eligibles who live in the catchment area (85,435), or 0.2 percent.

Table B.4 describes the characteristics of the 142 participants who were enrolled by Health Quality Partners during the first six months and who appear to meet their eligibility requirements, as measured in Medicare data, and the 85,293 eligible nonparticipants. This table is identical to Table 2 in the text, except that the participant sample has been restricted to the beneficiaries who meet the eligibility criteria according to Medicare claims data. As mentioned

[4]This number includes both beneficiaries with invalid HIC numbers reported and those whose claims we could not obtain when we extracted the files due to the way the Medicare files are created (described in footnote 4). Those with incorrect HIC numbers may well be eligible, but we could not obtain the Medicare data for them to assess that; so they were excluded. HIC numbers have since been corrected, and those beneficiaries will be included in the final report.

[5]As mentioned earlier, while we use Medicare claims to assess exclusion criteria, Health Quality Partners' uses patient self-reports. Of the 74 participants dropped from the participation analysis for meeting one of the program's exclusion criteria, 45 had a diagnosis of cancer.

TABLE B.4

CHARACTERISTICS OF ELIGIBLE PARTICIPANTS AND ELIGIBLE NONPARTICIPANTS DURING THE FIRST SIX MONTHS OF PROGRAM ENROLLMENT
(Percentages, Unless Otherwise Noted)

	Eligible Demonstration Participants (Treatments and Controls)[a]	Eligible Nonparticipants
Age at Intake		
Average age (in years)	75.0	75.9
Younger than 65	0.0	0.0
65 to 74	45.1	46.3
75 to 84	47.9	41.2
85 or older	7.0	12.6**
Male	28.2	35.5*
Nonwhite	0.7	4.9**
Original Reason for Medicare: Disabled or ESRD	0.7	4.8**
State Buy-In for Medicare Part A or B	4.2	5.5
Newly Eligible for Medicare (Eligible Less than Six Months)	0.70	0.01**
Enrolled in Fee-for-Service Medicare 6 or More Months During Two Years Before Intake	95.8	98.9***
Medical Conditions Treated During Two Years Before Month of Intake[b]		
Coronary artery disease	35.3	36.7
Congestive heart failure	10.3	14.3
Stroke	16.2	17.8
Diabetes	30.9	25.8
Cancer	3.7	3.8
Chronic obstructive pulmonary disease	22.1	22.0
Dementia (including Alzheimer's disease)	0.0	0.0
Peripheral vascular disease	8.1	9.5
Renal disease	0.0	3.1**
Total Number of Diagnoses	1.3	1.3
Days Between Last Hospital Admission and Intake Date[b]		
No hospitalization in past two years	76.5	73.9
0 to 30	0.7	2.1
31 to 60	0.0	1.8
61 to 180	7.4	6.3
181 to 365	7.4	6.3
366 to 730	8.1	9.6

TABLE B.4 *(continued)*

	Eligible Demonstration Participants (Treatments and Controls)[a]	Eligible Nonparticipants
Annualized Number of Hospitalizations During Two Years Before Month of Intake[b,c]		
0	76.5	74.2
0.1 to 1.0	16.2	19.7
1.1 to 2.0	4.4	4.6
2.1 to 3.0	1.5	0.9
3.1 or more	1.5	0.7
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]		
Part A	$193	$184
Part B	$225	$171***
Total	$418	$355
Distribution of Total Medicare Reimbursement per Month Fee-for-Service During One Year Before Intake[b]		
$0	0.0	1.7
$1 to 500	85.3	82.7
$501 to 1,000	5.2	6.8
$1,001 to 2,000	5.2	4.9
More than $2,000	4.4	3.9
Number of Beneficiaries	**142**	**85,293**

Source: Medicare Enrollment Database and National Claims History File.

Note: The intake date used in this table is the date of enrollment for participants. For eligible nonparticipants, the intake date is July 15, 2002, the midpoint of the six-month enrollment period examined.

[a]Participants who do not meet CMS's demonstration-wide requirements for the demonstration, or who had an invalid HIC number on MPR's enrollment file, are excluded from this table because we do not have Medicare data showing their reimbursement in the fee-for-service program. Members of the same households as the research sample members are included.

[b]Calculated among beneficiaries with six or more months in Medicare fee-for-service in the two years before intake. (See Note, above, concerning intake date definition.)

[c]Calculated as 12 x (number of hospitalizations during two years before month of intake) / (number of months eligible). For example, if a beneficiary was in fee-for-service all 24 months and had two hospitalizations during that time, they would have one hospitalization per year [(12 x 2) / 24]. If another beneficiary was in fee-for-service eight months during the previous two years, and had two hospitalizations during those eight months, they would have [(12 x 2) / 8], or three hospitalizations per year. The estimate of the proportion with no hospitalization in the two years before the month of intake may differ slightly from the proportion with no hospitalization in the two years before the date of intake because the two measure slightly different periods. Someone enrolled on September 20, 2003, whose only hospitalization in the preenrollment period occurred on September 5, 2003, would not be counted as hospitalized during the 24 months before the month of intake. Conversely, someone hospitalized on September 25, 2001 would be captured in the measure defined by month of enrollment but not in the measure based on the day of enrollment.

*Difference between eligible participants and eligible nonparticipants significantly different from zero at the .10 level, two-tailed test.

**Difference between eligible participants and eligible nonparticipants significantly different from zero at the .05 level, two-tailed test.

***Difference between eligible participants and eligible nonparticipants significantly different from zero at the .01 level, two-tailed test.

earlier, while we use Medicare claims to assess exclusion criteria, Health Quality Partners uses patient self-reports. Thus, Table B.4 contains significantly fewer participants than does Table B.2. Due to this, while most results are similar, we do observe some differences across the two tables.[6]

B. METHOD FOR CALCULATING TREATMENT-CONTROL DIFFERENCES

Sample sizes are too small, and the follow-up period too short, to estimate program impacts. Comparing the treatment and control groups on mean outcomes, however, provides an early indication of potential effects. The analysis draws on the data and the variables constructed for the participation analysis but is restricted to the program's participants (treatment group members and control group members). The cost of the intervention was estimated as the amount CMS paid Health Quality Partners for the treatment group patients, using G-coded claims in the physician claims file.

1. Treatment-Control Differences

We used two approaches to estimate treatment-control differences in Medicare-covered service use and cost outcomes. First, we estimated differences over a two-month follow-up period for all beneficiaries Health Quality Partners randomized during the first four months of

[6]Nonparticipants were identified as eligible if they met the target criteria at any time during the six-month enrollment window, as well as the two years before the window. When we calculated preenrollment use of Medicare services for nonparticipants, we measured use over the time before a pseudo-enrollment date fixed at three months after the program began enrollment (that is, the middle of the six-month window). As a result, for nonparticipants who became eligible based on service use in the latter three months of the six-month enrollment window, this method does not capture that service use. We tested the sensitivity of the findings to this approach. For the sensitivity test, we limited the eligible nonparticipants to those who met the diagnostic and service use criteria before their pseudo-enrollment date. This subsample of eligible nonparticipants had slightly higher reimbursements and service use than the sample shown in Tables 2 and B.4. For most programs, reimbursements for the eligible nonparticipants increased between 2 and 10 percent, and hospitalizations stayed the same or increased up to 10 percent.

enrollment. The four-month enrollment window covers April 30, 2002, through August 27, 2002. The follow-up time covered the two calendar months after the month of randomization. For example, for a beneficiary randomized on May 25, we examined outcomes in June and July.

Second, we estimated treatment-control differences by calendar month over the first six months of Health Quality Partners' enrollment to look at how cost-effectiveness might vary over the life of a program. One might expect programs to have little effect at first, since it takes time for patients to be assessed, the program to become fully functional, the patients to adopt case managers' recommendations, and these behavior changes to affect the need for health care. Analyzing costs by program month will allow us to examine such patterns. For each month from April 2002 through September 2002, we identified the patients who were enrolled in Health Quality Partners' coordinated care program and analyzed their Medicare-covered service use. For example, a person randomized in April would be present in April through September, provided that person is eligible and was alive through September.[7] Someone randomized in May would not be part of the calculations for April but would be included in May through September, again provided that the person is eligible during those months.

The sample used to analyze treatment-control differences in outcomes differs from that used to analyze participation. Like the participation analyses, we excluded from the analysis sample randomized individuals for whom we have an invalid HIC number, because we could not randomized individuals for whom we have an invalid HIC number, because we could not obtain their Medicare claims data. We also excluded those people who enrolled but were ineligible for the demonstration according to CMS's insurance criteria (as determined from data on the EDB). However, we also excluded beneficiaries flagged as a household member of a participant, since

[7]Patients were excluded as ineligible during months when we could not observe their full costs (when they were enrolled in a Medicare managed care plan for the full month).

they were not part of the research sample and thus were not used for the outcomes analysis.[8] In addition, in contrast to the participation analyses, participants who did not meet the program's target criteria according to the claims and EDB data were not excluded from the outcomes analyses. Given this, of the 118 people randomized in the first four months of Health Quality Partners' demonstration, the sample for analyzing treatment-control differences contained 105 people. For the six-month sample, 201, or 88 percent of the 228 randomized people, were included in the final sample (Table B.5). In addition to excluding beneficiaries, we excluded months during which we could not observe the beneficiaries' full costs in fee-for-service (described in footnote 8).

2. Integrity of Random Assignment

Eligible applicants to the program were randomly assigned to the treatment or control group. To assess whether random assignment successfully produced treatment and control groups with similar baseline characteristics, we used two-tailed t-tests and chi-squared tests to compare the two research groups. Table B.6 presents the baseline characteristics for both the four-month and the six-month sample.

As expected under random assignment, the treatment and control groups had similar characteristics in both the four- and six-month samples. There were statistically significant differences in two baseline characteristics for the four-month sample: (1) the proportion of beneficiaries who were treated for coronary artery disease in the two previous years, and (2) the proportion of beneficiaries who were treated for stroke in the two previous years. For the six-

[8]Household members were excluded from treatment-control comparisons to keep the two groups balanced. Household members were assigned to the same experimental status to avoid the contamination that might occur if one person in the household was in the treatment group and another was in the control group. As a result, we expected to find fewer household members in the control group than in the treatment group, since household members have less incentive to join the demonstration if they know a household member has already been assigned to the control group and they will not receive care coordination.

TABLE B.5

SAMPLES FOR TREATMENT-CONTROL COMPARISONS

	First Four Months	First Six Months
Number of beneficiaries who were randomized	118	228
Minus those who:		
Were members of the same household as research sample members	–9	–20
Had invalid HIC numbers on MPR's enrollment file	–1	–2
In a Medicare managed care plan, or did not have Medicare Part A and B coverage, or Medicare is not primary payer during the month of intake	–3	–5
Number of usable sample members	**105**	**201**

TABLE B.6

CHARACTERISTICS OF TREATMENT AND CONTROL GROUPS
IN THE RESEARCH SAMPLE ENROLLED DURING
THE FIRST FOUR MONTHS AND SIX MONTHS
OF PROGRAM ENROLLMENT

	Four-Month Sample			Six-Month Sample		
	Treatment Group	Control Group	Total Research Sample	Treatment Group	Control Group	Total Research Sample
Age at Intake						
Average age (in years)	76.4	77.2	76.8	75.9	75.8	75.9
Younger than 65	0.0	0.0	0.0	0.0	0.0	0.0
65 to 74	35.3	40.7	38.1	39.6	44.0	41.8
75 to 84	51.0	44.4	47.6	50.5	47.0	48.8
85 or older	13.7	14.8	14.3	9.9	9.0	9.5
Male	29.4	44.4	37.1	31.7	39.0	35.3
Nonwhite	0.0	0.0	0.0	0.0	1.0	0.5
Original Reason for Medicare: Disabled or ESRD	2.0	1.9	1.9	1.0	2.0	1.5
State Buy-In for Medicare Part A or B	2.0	3.7	2.9	2.0	3.0	2.5
Newly Eligible for Medicare (Eligible Less than Six Months)	2.0	0.0	1.0	1.0	0.0	0.5
Enrolled in Fee-for-Service Medicare Six or More Months During Two Years Before Intake	94.1	94.4	94.3	97.0	97.0	97.0
Medical Conditions Treated During Two Years Before Month of Intake[a]						
Coronary artery disease	54.2	35.3*	44.4	44.9	37.1	41.0
Congestive heart failure	18.8	15.7	17.2	11.2	14.4	12.8
Stroke	35.4	19.6*	27.3	25.5	20.6	23.1
Diabetes	25.0	33.3	29.3	25.5	28.9	27.2
Cancer	25.0	23.5	24.2	22.5	24.7	23.6
Chronic obstructive pulmonary disease	25.0	23.5	24.2	21.4	21.7	21.5
Dementia (including Alzheimer's disease)	0.0	0.0	0.0	0.0	0.0	0.0
Peripheral vascular disease	8.3	11.8	10.1	6.1	11.3	8.7
Renal disease	2.1	0.0	1.0	1.0	0.0	0.5

TABLE B.6 *(continued)*

	Four-Month Sample			Six-Month Sample		
	Treatment Group	Control Group	Total Research Sample	Treatment Group	Control Group	Total Research Sample
Total Number of Diagnoses (number)	1.9	1.6	1.8	1.6	1.6	1.6
Days Between Last Hospital Admission and Intake Date[a]						
No hospitalization in past two years	62.5	72.6	67.7	71.4	73.2	72.3
0 to 30	2.1	0.0	1.0	2.0	1.0	1.5
31 to 60	0.0	0.0	0.0	1.0	1.0	1.0
61 to 180	10.4	5.9	8.1	7.1	6.2	6.7
181 to 365	8.3	13.7	11.1	8.2	9.3	8.7
366 to 730	16.7	7.8	12.1	10.2	9.3	9.7
Annualized Number of Hospitalizations During Two Years Before Month of Intake[a,b]						
0	62.5	72.6	67.7	71.4	73.2	72.3
0.1 to 1.0	27.1	17.7	22.2	21.4	17.5	19.5
1.1 to 2.0	8.3	3.9	6.1	5.1	5.2	5.1
2.1 to 3.0	2.1	2.0	2.0	2.0	2.1	2.1
3.1 or more	0.0	3.9	2.0	0.0	2.1	1.0
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[a]						
Part A	$209	$331	$272	$170	$289	$229
Part B	$213	$223	$218	$226	$247	$237
Total	$422	$554	$490	$396	$536	$466
Distribution of Total Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[a]						
$0	0.0	0.0	0.0	0.0	0.0	0.0
$1 to 500	81.3	80.4	80.8	82.7	80.4	81.5
$501 to 1,000	10.4	5.9	8.1	8.2	7.2	7.7
$1,001 to 2,000	4.2	3.9	4.0	5.1	4.1	4.6
More than $2,000	4.2	9.8	7.1	4.1	8.3	6.2
Location During Program Intake Period						
Pennsylvania						
Bucks	76.5	77.8	77.1	71.3	84.0**	77.6
Lehigh	0.0	0.0	0.0	0.0	0.0	0.0
Montgomery	23.5	22.2	22.9	27.7	16.0**	21.9
Northampton	0.0	0.0	0.0	0.0	0.0	0.0
Outside catchment area	0.0	0.0	0.0	1.0	0.0	0.5
Number of Beneficiaries	**51**	**54**	**105**	**101**	**100**	**201**

Source: Medicare Enrollment Database and National Claims History File.

Notes: The intake date used in this table is the date of enrollment for participants. For eligible nonparticipants, the intake date is July 15, 2002, the midpoint of the six-month enrollment period examined.

Participants who do not meet CMS's demonstration-wide requirements, had an invalid HIC number on MPR's enrollment file, or were identified as a member of the same household as a research sample member were excluded from this table.

[a]Calculated among beneficiaries with six or more months in Medicare fee-for-service in the two years before intake. (See Note, above, concerning intake date definition.)

[b]Calculated as 12 x (number of hospitalizations during two years before month of intake) / (number of months eligible). For example, if a beneficiary was in fee-for-service all 24 months and had two hospitalizations during that time, they would have one hospitalization per year [(12 x 2) / 24]. If another beneficiary was in fee-for-service eight months during the previous two years, and had two hospitalizations during those eight months, they would have [(12 x 2) / 8], or three hospitalizations per year. The estimate of the proportion with no hospitalization in the two years before the month of intake may differ slightly from the proportion with no hospitalization in the two years before the date of intake because the two measure slightly different periods. Someone enrolled on September 20, 2003, whose only hospitalization in the preenrollment period occurred on September 5, 2003, would not be counted as hospitalized during the 24 months before the month of intake. Conversely, someone hospitalized on September 25, 2001, would be captured in the measure defined by month of enrollment, but not in the measure based on the day of enrollment.

ESRD = end-stage renal disease.

*Difference between treatment and control groups significantly different from zero at the .10 level, two-tailed test.

**Difference between treatment and control groups significantly different from zero at the .05 level, two-tailed test.

***Difference between treatment and control groups significantly different from zero at the .01 level, two-tailed test.

month sample, the only statistically significant differences were in the share of beneficiaries coming from two counties in Health Quality Partners' catchment area. We would expect this number of false-positive differences to occur by chance, given the number of characteristics examined. Thus, none of the differences in this small, early sample create any cause for concern.

3. Sensitivity Tests

To assess outcomes, we calculated Medicare-covered service use and cost in the two months after the month of randomization. For example, for an individual who was randomized in the month of May, we tabulated that person's outcomes in June and July. To examine whether our results were affected by not including costs and services that occurred closer to the randomization date, we conducted a sensitivity analysis examining outcomes for three months—during the month the individual was randomized, as well as the two months after randomization (Table B.7). Other than the number of Part B visits, which is insignificant in the three-month period and significant in the two-month period shown in Table 5, the results were similar to those for outcomes measured over the two-month period (text Table 5). Thus, the results are not sensitive to how the month of randomization is treated.

TABLE B.7

MEDICARE-COVERED SERVICE USE DURING THE MONTH OF RANDOMIZATION AND THE FOLLOWING TWO MONTHS FOR EARLY ENROLLEES

	Treatment Group	Control Group	Difference[a]
Inpatient Hospital Services			
Any admission (percent)	11.8	3.7	8.1
Mean number of admissions	0.14	0.07	0.06
Mean number of hospital days	0.63	0.46	0.16
Emergency Room Services			
Any emergency room encounters (percent)			
Resulting in admission	5.9	1.9	4.0
Not resulting in admission	2.0	3.7	–1.7
Total	7.8	5.6	2.3
Mean number of emergency room encounters			
Resulting in admission	0.06	0.04	0.02
Not resulting in admission	0.02	0.04	–0.02
Total	0.08	0.07	0.00
Skilled Nursing Facility Services			
Any admission (percent)	2.0	1.9	0.1
Mean number of admissions	0.02	0.02	0.00
Mean number of days	0.16	0.13	0.03
Hospice Services			
Any admission (percent)	0.0	0.0	0.0
Mean number of days	0.00	0.00	0.00
Home Health Services			
Any use (percent)	2.0	0.0	2.0
Mean number of visits	0.27	0.00	0.27
Outpatient Hospital Services[b]			
Any services (percent)	64.7	38.9	25.8***
Physician and Other Part B Services[c]			
Any use (percent)	100.0	94.4	5.6*
Mean number of visits or claims	8.1	6.2	1.9
Mortality Rate (percent)	0.0	1.9	–1.9
Total Medicare Reimbursement[d]			
Part A[e]	$690	$388	$301
Part B	$675	$638	$37
Total	$1,365	$1,027	$338
Reimbursements for Care Coordination[f]	$341	$0	$341***
Number of Beneficiaries	**51**	**54**	

Source: Medicare National Claims History File.

Note: Sample includes those enrolled during the first four months of program operations. Participants were excluded from this table if they had an invalid HIC number on MPR's enrollment file, were identified as a member of the same household as a research sample member, or did not meet Medicare coverage and payer requirements (defined as having Medicare as a secondary payer, being in Medicare managed care plan, or not having Part A and Part B coverage) during the month of randomization. Patient-months were excluded if the participant did not meet the above Medicare coverage and payer requirements that month or had died in a previous month.

"Percents with any medical encounter type" are the percent of treatment or control group members who have at least one encounter of a particular type; "mean numbers of medical encounter types" are the average number of encounters of a particular type per treatment or control group member.

[a]The direction of the treatment-control difference does not by itself signify whether the program is "effective." That is, for some outcomes a statistically significant negative difference (such as lower hospitalization rates for the treatment group than for the controls) suggests that the program is working as intended. However, a positive difference for other outcomes, such as number of physician visits, does not necessarily mean the program is ineffective or having adverse effects, because the program may encourage patients to see their physician more regularly for preventative care or to obtain recommended laboratory tests for their target conditions than they would have in the absence of the demonstration.

Due to rounding, the difference column may differ slightly from the result when the control column is subtracted from the treatment column.

[b]Includes visits to outpatient hospital facilities as well as emergency room visits that do not result in an inpatient admission. Laboratory and radiology services are also included.

[c]Includes diagnostic laboratory and radiology services (including pathologist and radiologist services) from nonhospital providers, suppliers and devices, mammography, ambulance, covered medications, blood, and vaccines.

[d]Does not include reimbursement for care coordination services provided by demonstration programs.

[e]Includes reimbursement for inpatient, skilled nursing facility, hospice, and all home health care (including that paid under Medicare Part B). Excludes reimbursement for care coordination services provided by demonstration programs.

[f]This is the average amount paid to the program as recorded in the Medicare claims data for the month of randomization and the two following months. The difference between the recorded amount and three times the amount the program was allowed to charge per-member-per-month may reflect billing errors, delays, or payment adjustments for patients who disenrolled.

*Difference between treatment and control groups significantly different from zero at the .10 level, two-tailed test.
**Difference between treatment and control groups significantly different from zero at the .05 level, two-tailed test.
***Difference between treatment and control groups significantly different from zero at the .01 level, two-tailed test.

APPENDIX C

TABLE C.1

SELECTED PROGRAM DOCUMENTS

Initial letter of invitation to potential patients

Second letter of invitation to potential patients

MCCD informed consent for participation and authorization to use and disclose personal health information

Flow diagrams
- MCCD verbal consent and eligibility determination
- MCCD risk stratification
- MCCD randomization
- Health Quality Partners coordinated care program process flow

Health Quality Partners brochure for potential patients

Initial assessment – geriatric

Initial assessment – cardiovascular (comprehensive disease-specific assessment)

Health Quality Partners disease-specific health risk assessment

Health Quality Partners geriatric encounter form

Health Quality Partners cardiovascular patient encounter form

Health Quality Partners training checklist – care managers

Health Quality Partners cardiovascular education plan