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The Georgetown Medicare Coordinated Care Demonstration Program After One Year

Final Report

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Karen Sautter
Jennifer Schore
Randall Brown
Arnold Chen
Deborah Peikes
Sean Orzol

Submitted to:

Centers for Medicare & Medicaid Services
Office of Strategic Planning
C3-20-17
7500 Security Boulevard
Baltimore, MD 21244

Project Officer:
Carol Magee

Submitted by:

Mathematica Policy Research, Inc.
P.O. Box 2393
Princeton, NJ 08543-2393
Telephone: (609) 799-3535
Facsimile: (609) 799-0005

Project Director:
Randall Brown

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CONTENTS

Page

CONTENTS *(continued)*

Page

TABLES

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 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 program 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.

Here we describe Georgetown University Medical School's Medicare Coordinated Care Demonstration Project, which is called the "Mind $_{My}$ Heart" program and serves patients with congestive heart failure (CHF). After presenting an overview of Mind $_{My}$ Heart, the following four questions are addressed: 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 its 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 Goals. Georgetown University Medical School, located in Washington, DC, is operating its demonstration program in partnership with MedStar Health, a large, nonprofit, community-based health care organization in the Baltimore-Washington area. MedStar owns Georgetown University Hospital and Washington Hospital Center, the hospitals from which Mind $_{My}$ Heart is primarily recruiting patients. Georgetown developed Mind $_{My}$ Heart based in part on its experience with "MyCareTeam," an interactive, Web-based diabetes management tool which enabled participants in a pilot study to lower their blood glucose levels. Mind $_{My}$ Heart key staff—including the executive program director, care manager supervisor, care managers, and care manager associate—are located in an office in downtown Washington, DC. The principal investigator and medical director are based on the Georgetown University campus, which is a few miles away from the program office.

Georgetown has adopted two main approaches to improving CHF patient health and reducing health care costs: (1) improving patient adherence to treatment recommendations, and (2) improving communication and coordination among patients and physicians. The program seeks to improve patient adherence by teaching patients how to be better self-managers and by tracking patient health status on a daily basis using a home monitoring device. The program aims to improve communication and coordination by teaching patients when to seek care and how to communicate more effectively with their doctors.

The program has limited expectations for physicians beyond approving patients' participation, reviewing home monitoring trend reports, and being responsive to care managers' telephone calls. The program does not explicitly aim to change physicians' clinical practice; it does, however, provide feedback on individual patients' medication regimens when necessary.

Patient Identification. Georgetown, which began enrolling patients in June 2002, requires that patients have had a hospital discharge with a diagnosis of congestive heart failure (CHF) within the previous year. Participants must also live within 25 miles of the center of the District of Columbia. During its first year, the program identified over 90 percent of its enrollees from hospital discharge and inpatient lists from its two primary participating hospitals. Each hospital provides Georgetown with a list of patients who meet CMS's insurance and the program's diagnosis and hospitalization criteria. A care manager or the care manager supervisor contacts each patient's primary care physician to assess the physician's willingness to participate in the program and ask his or her permission to enroll the patient. If the physician consents, the care manager contacts the patient and requests a home visit. The care manager then meets with the patient to discuss the project, explain and obtain informed consent, and randomize the patient to the treatment or control group.

Originally, the program had hoped to recruit heavily from physicians in the Georgetown University Hospital faculty practice, but the practice was dismantled when Georgetown University sold its hospital to MedStar. MedStar's purchase of Georgetown University Hospital, however, made it possible for the program to forge a relationship with Washington Hospital Center. Many physicians at both hospitals know the program's medical director and/or the principal investigator, which may increase their willingness to participate in the demonstration. The medical director regularly communicates with his peers to increase program visibility. More recently, the program joined the local chapter of the Heart Failure Society to increase visibility among physicians. The care manager supervisor spends two or three days on-site at Washington

Hospital Center to solicit the participation of physicians who practice there. The principal investigator and program director have made several presentations at physician meetings. The program also distributes promotional materials such as brochures, posters, flyers, pens, and notepads to physicians and other potential referral agents.

Assessment, Care Planning, and Monitoring. Each treatment group member receives a comprehensive, in-home assessment of physical health, functional status, cognition, mood, social support systems, pain, nutrition, environment, and risk of falls. The assessment usually takes five or six one- to two-hour visits to complete, with the visits usually spread over 10 to 12 days. From the assessment, the care manager develops an individualized care plan for each patient in consultation with the program's multi-disciplinary team, which includes all program staff, a clinical pharmacist, a nutritionist, and a social worker. The care manager meets in person with the patient's primary care physician to get the care plan approved. The care plan is documented in Canopy, a commercial Web-based case management system. The program also uses a Web-based records system developed by Georgetown's Imaging Science and Information System Center to document patient contacts and generate data for the evaluation.

The Mind $_{My}$ Heart program uses a telephonic home monitoring device for all its patients (at a cost of $80 per patient per month), in addition to more traditional monitoring by care managers. Patients transmit their vital signs (for example, weight and blood pressure) to the program on a daily basis. These values are electronically compared to parameters set by their physicians. If monitor readings are outside those parameters, the monitoring system flags the result, and the care manager follows up with the patient to determine if the patient should seek care. Home-monitoring trends are tracked and reported to the patient's physician at a frequency requested by the physician. Care managers also assess the patient's progress toward care plan goals and conduct education by telephoning them (or by visiting them at home, if necessary) at a frequency based on their assessed risk of hospitalization. While care managers are in the process of assessing a patient, the patient is considered to be at the highest risk level and receives primarily home visits. After assessment, all patients receive at least one home visit every six months. At the second-highest level of risk, patients receive weekly phone calls. Patients at the lowest level of risk receive a telephone call at least every one to two months.

Staffing and Management of Program Quality. 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 Mind $_{My}$ Heart care managers must be baccalaureate-prepared registered nurses. After three care managers left Mind $_{My}$ Heart, the program learned that care managers also need to have community nursing experience in order to organize patients in a setting that is inherently much less organized than a hospital. The program has since hired three new care managers with community nursing experience. All care managers are required to undergo a competency assessment upon hiring and a six- to eight-month probationary orientation, during which they receive training and manage a small caseload under the supervision of a more experienced care manager and the care manager supervisor. After orientation, care managers receive ongoing training through conferences and seminars provided by the program's participating hospitals and other organizations. The care manager supervisor evaluates care manager performance by attending home visits or monitoring telephone calls with each care manager, and randomly checks care plans for completeness.

The program primarily monitors its approach to patient care through regular staff meetings. During these meetings, staff discuss their approach and sometimes suggest changes to the program's practice model. In addition, administrators generate a limited number of reports with which to review program quality. For example, the program generates reports of contact data to see if patients receive the number of telephone calls appropriate for their risk level. The program also monitors enrollment by tracking patients through the enrollment process using an Excel spreadsheet.

WHO ENROLLS IN THE PROGRAM?

Program enrollment has been much lower than anticipated. After one year of operation, Mind $_{My}$ Heart had enrolled 53 patients in its treatment group and 54 in its control group, falling far short of the program's first year target of 730 enrollees. Staff attribute the enrollment shortfall to difficulty identifying eligible patients and to a high patient refusal rate.

To gain another perspective on the proportion of eligible beneficiaries enrolling in the program, and to describe their characteristics, the evaluation simulated the Mind $_{My}$ Heart eligibility criteria using Medicare enrollment and claims data. This simulation showed that during the program's first six months of operation, less than one percent of an estimated 8,540 eligible beneficiaries enrolled in Mind $_{My}$ Heart. The analyses did not distinguish between beneficiaries receiving care from facilities upon which the program focused in its first year (Georgetown University Hospital and Washington Hospital Center) and other beneficiaries in the program's service area. Thus, the number of eligible nonparticipants who might truly have had access to the demonstration is probably smaller. Of 234 eligible beneficiaries the program actually identified during its first 16 months, more than 55 percent agreed to participate.

Program participants were more likely than eligible nonparticipants to be male and to be nonwhite (Table 1). Two-thirds were male, compared with 43 percent of eligible nonparticipants, and 38 percent were non-white (versus 25 percent of eligible nonparticipants). Ninety-five percent of participants and all eligible nonparticipants had a hospitalization in the year prior to enrolling and both groups had monthly Medicare expenditures that averaged about $2,400 over this period. (We used September 15, 2002, the midpoint of the six-month enrollment period for this analysis, as a pseudo-enrollment date for nonparticipants.) In addition, 26 percent of participants were hospitalized in the month before intake as compared with 15 percent of nonparticipants.

When developing the cost estimate for this program's Medicare waiver application, MPR estimated that Medicare costs would average $3,476 per month for control group members during the demonstration period. Actual program enrollees were less costly, averaging $2,424 per month during the year prior to enrollment, despite their having been hospitalized during that year. This is likely due to differences in the methodologies used for the two estimates. Estimates of waiver costs are based on spending over the year immediately following a hospitalization (consistent with Georgetown's original intent to enroll patients while they are still in the hospital), whereas the participant costs are measured over the year prior to enrollment,

TABLE 1

CHARACTERISTICS OF MCCD PARTICIPANTS AND ELIGIBLE NONPARTICIPANTS
(PERCENT, EXCEPT AS NOTED)

	Participants[a]	Eligible Nonparticipants[b]
Age		
Younger than 65	0.0	0.0
65 to 84	83.4	76.6
85 or older	16.7	23.4
Male	64.3	42.7
Non-White	38.1	25.4
Medicaid Buy-In for Medicare A or B	14.3	13.8
Medical conditions treated in last two years		
Congestive heart failure	97.6	92.7
Coronary artery disease	95.2	79.3
Diabetes	50.0	44.9
Chronic obstructive pulmonary disease	47.6	54.6
Hospital discharge in last year	95.0	100.0
Hospital discharge in last month	26.2	15.4
Total Medicare reimbursement per month (dollars)	$2,424	$2,410
Number of beneficiaries	**42**	**5,122**

Source: Medicare Enrollment Database and National Claims History.

[a] Participants who do not meet CMS's insurance payer and coverage requirements for the demonstration or who had invalid HIC numbers on MPR's enrollment file are excluded from this table because we could not obtain Medicare data for them. Beneficiaries who are members of the same household as a research sample member are included.

[b] Due to a coding error, this table inadvertently excludes eligible nonparticipants who resided in Washington, DC. Our projections indicate that adding the DC residents would increase the number of eligible nonparticipants by 26 percent. This error will be corrected in the next report.

which included a hospitalization at any time during the year. Due to complications and early readmissions, the average Medicare costs for a patient during the first few months immediately after a hospitalization are substantially greater than those later in the year. In addition, the waiver estimates are projected future costs, so they include costs associated with deaths, while the participant costs are measured before enrollment, and thus do not include any beneficiaries who died over the period for which costs are measured.

Preliminary analysis of the program's first 35 annual patient surveys indicate that patients are very satisfied with the program. There was no voluntary disenrollment during the first six months of the program.

TO WHAT EXTENT DOES THE PROGRAM ENGAGE PHYSICIANS?

Mind My Heart envisions a cooperative, as opposed to a collaborative, relationship between care managers and physicians. Care managers strive to supplement physicians' efforts in medically managing their patients through care management activities and home monitoring. As such, program expectations for physicians are limited to (1) approving patient participation, (2) specifying home-monitoring parameters and frequency of trend reporting, and (3) responding to care managers' phone calls about out-of-range monitoring results and adverse events for specific patients.

Mind My Heart has adopted three strategies to promote cooperation from physicians. First, care managers conduct patient-specific, in-person case conferences with all physicians within a few months of patient enrollment; this is done to introduce themselves, share the patient's care plan, and ask the physician to set home-monitoring parameters. Physicians are paid $100 for the case conference, although some physicians have declined this payment because they view their participation simply as part of providing good patient care, for which they are already paid. Second, the program provides physicians with trend reports of home-monitoring results on a monthly basis, before patient appointments, and when care managers feel physicians should be made aware of a worrisome trend. Finally, Mind My Heart requests that physicians allow care managers to change the dosage of medications under specified circumstances (for example, increase dosage of a prescribed diuretic when a patient experiences fluid retention); staff, however, report that only about a fifth of physicians agree to such requests. Efforts to engage physicians appear to have succeeded within the program's expectations. Physicians have cooperated in approving patients for participation, and some physicians have begun referring more of their patients to the program.

Although it is not the program's explicit goal to change providers' clinical practice, its multi-disciplinary team seeks to provide feedback to individual physicians about each patient's medications (including over-the-counter drugs and vitamins/supplements) and diet when they enroll. Care managers present this information to physicians during the case conference. The recommendations are tactfully made to physicians in order to provide them with more information on which to base medical management decisions and to remind them of CHF guidelines. After a year of operation, staff believed that participating physicians were highly satisfied with the support being provided by the program.

HOW WELL IS THE PROGRAM IMPLEMENTING TASKS TO ACHIEVE ITS GOALS?

Improving Patient Adherence. Improving patient adherence to treatment recommendations is the primary approach Mind My Heart is taking to improve patient health. The program supports this approach by teaching patients to recognize symptoms and self-manage. Mind My Heart has developed a flexible, individualized educational intervention supported by a disease-specific curriculum; written, visual, and aural materials; and community resources (such as diabetic education classes offered at local hospitals). Home monitoring allows care managers to assess whether their teaching has been effective, encourages patients to be more adherent, and provides opportunities for reinforcement of education concepts such as self-management. The program also assesses teaching effectiveness by tracking adverse events, observing patient behavior, and informally reassessing patients every six months. If a patient is

not learning (or does not adhere to the recommended regimen), the care manager will revise her approach or consult the multi-disciplinary team for alternative strategies.

Improving Communication and Coordination. Another of the program's approaches to improving patient health is to teach patients to communicate more effectively with their physicians. Care managers use the results of home monitoring to help patients learn when they should seek their physician's advice. When an out-of-range reading occurs, the care manager calls the patient and explains why it might be necessary for the patient to schedule an appointment (that is, tells the patient what symptoms warrant further attention). Care managers usually do not intervene on behalf of their patients, but they will schedule a doctor's appointment if a patient finds it difficult to do so. Care managers also educate patients about how to interact with their physician during appointments, so as to make the best use of their visit, by reviewing an educational pamphlet on communication with them, modeling the proper way to communicate with their physician, and giving them a trend report to share with their physician. Communication between care managers and physicians is primarily formal and includes case conferences and regular trend reports.

Care managers seek to make patient care better coordinated by tracking adverse events (such as hospitalizations) through home monitoring. If a patient does not record his or her vital signs or has an abnormal reading and cannot be reached by phone, the care manager calls the patient's emergency contact person. Care managers present the event to the multi-disciplinary team, which develops recommendations about preventing the event from recurring. If the care manager learns that a patient has been hospitalized, while the patient is still in the hospital, the care manager will confer with the discharge planner to ensure that the patient receives appropriate care after being released from the hospital. The care manager also telephones the patient's physician to report the event, as well as any new medications the patient is taking that might affect the patient's CHF treatment.

Increasing Access to Services. Although increasing access to services is not a major focus of the program, Mind $_{My}$ Heart aims to remove barriers to increased adherence and coordination by purchasing goods and services for low-income people on a temporary basis. For patients whose family income is at or below twice the federal poverty level, the program makes available limited funds through its "Flexible Benefits Fund" to pay for medical transportation, CHF medications, and medical equipment. The care manager associate refers qualified patients to local transportation or equipment sources and follows up with patients to make sure they receive these services. For patients who qualify for prescription drugs, the Fund is used only to support patients while care managers help them find a more permanent solution (such as a pharmacy assistance program). Almost no patients needed assistance from the Fund during the first six months of the program.

WHAT WERE ENROLLEES' MEDICARE SERVICE USE AND COSTS?

There are too few enrollees on whom data are available to develop even preliminary estimates of the short-term effect of the Mind $_{My}$ Heart program on Medicare service use and costs (11 treatment patients and 10 control patients during the first four months of intake). Average Medicare reimbursements for the 11 treatment group patients, exclusive of demonstration costs, were $867 ($434 per month) during the first two months after enrollment—

a very low amount for CHF patients. Average costs were quite high over this period—$7,329 ($3,665 per month) for the 10 control group patients, reflecting the unusually high costs of one patient. (The control group mean for the two-month period drops to $746, $373 per month, when this patient is excluded from the control group.)

CONCLUSION

Program Strengths and Unique Features. Georgetown's Mind $_{My}$ Heart program has many of the features that previous research has shown to be associated with effective care coordination:

- The program has ***enrolled patients with high expected health care costs*** because it targets patients hospitalized for CHF with some CHF-related disability. The program uses enrollment reports to help refine their approach to patient identification.

- Care managers administer a ***comprehensive, in-person assessment*** and develop individualized care plans in consultation with the program's multi-disciplinary team. Care managers use the care plan to guide telephone monitoring contacts and patient progress toward goals.

- The program ***monitors patients' daily vital signs*** using a telephonic home monitoring device. When a patient's vital signs are outside the parameters set by his or her physician, the care manager will contact the patient.

- The program's educational intervention is based on a ***disease-specific curriculum*** and is ***customized to individual patients' needs***. Care managers assess whether patients have understood educational messages by tracking home monitoring data and adverse events, observing patient behavior, and informally reassessing patients every six months.

- The program ***facilitates communication and coordination among patients and physicians*** by using home monitoring readings to teach patients when to contact their doctor. Care managers call the physician to provide an update when a patient's condition changes or an adverse event occurs.

- The care managers are ***highly educated and experienced community nurses***. Each care manager also receives extensive training during orientation, using both a didactic approach and mentorship. The care manager supervisor and program director regularly evaluate care manager performance.

- The program ***seeks cooperation from physicians*** by conducting formal case conferences, providing physicians with regular home monitoring trend reports, and asking physicians for permission to change the dosage of patient medications under specified circumstances. Physicians have been cooperative and satisfied with the program.

- The program ***pays for medical transportation, medications, and durable medical equipment*** for qualified low-income patients. The program also pays for home monitoring equipment.

- The program does not provide financial incentives to staff to achieve particular outcomes or program goals. It does, however, ***pay physicians $100*** for participating in case conferences. A few physicians have declined this payment because they view participating as good patient care.

Potential Barriers to Program Success. Mind $_{My}$ Heart's primary challenge is to enroll enough patients to achieve some scale economies and be able to demonstrate the program's effect on outcomes. The program appears to be the "Cadillac" of care coordination, given its use of home monitoring, the multi-disciplinary team, and funds for support services and medications. All these features make it a relatively expensive program ($320 per member, per month); thus, to be budget-neutral, it will need to reduce the need for hospitalizations by a substantial proportion. It is unclear, however, whether the program could deliver all this care well if it had achieved its first-year target enrollment of 365 treatment group members. (For example, could the program assess more than 10 patients per week, on average, and provide its intervention at the same time?) On the other hand, without more patients, Mind $_{My}$ Heart may not reach the economies of scale that would allow the program to break even, given the high fixed cost of running such a program and the need to have adequate caseloads to keep care managers fully engaged.

Obviously, it is too early, and samples too small, to draw any inferences about program impacts. For all sites, savings in hospitalizations and other expensive Medicare services will have to be large enough, not only to cover direct program fees, but also any higher Part B expenses incurred as care managers refer treatment patients for Medicare-covered services that may contribute to better short-term or long-term outcomes for enrollees.

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 with Medicare fee-for-service coverage. Fifteen programs are participating in the demonstration sponsored by the Centers for Medicare & Medicaid Services (CMS). The programs—hosted by organizations as diverse as hospital systems, disease management providers, and retirement communities—are serving patients in 17 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, it 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 its approaches to improving patient health and reducing health care costs? What were enrollees' Medicare service use and costs during its first months of operation? The report concludes with a discussion of the program's strengths and unique features, as well as potential barriers to program success.

This report describes the Georgetown University Medical School's Medicare Coordinated Care Demonstration Project, called "Mind $_{My}$ Heart."[2] Georgetown, located in Washington, DC,

[1]The CMS Medicare Case Management Demonstration for Congestive Heart Failure and Diabetes Mellitus is also part of the MPR evaluation. Appendix Table A.1 lists all demonstration programs and locations.

[2]For a more detailed description of the Georgetown demonstration's implementation plans and early experiences, see Sautter et al. (2004).

is operating its demonstration program in partnership with MedStar Health, a large, nonprofit, community-based health care organization in the Baltimore–Washington, DC area. Mind My Heart, which began enrollment in June 2002, enrolls Medicare beneficiaries with congestive heart failure (CHF).

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, as well as in-person interviews conducted about six months later. For each program, one of three MPR implementation team members conducted the telephone and in-person interviews using semi-structured protocols covering 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 program 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 specific issues of importance to each program. The structure of the protocols will also make synthesizing findings across programs more efficient. MPR staff reviewed written materials each program provided, including the program's proposal to CMS, its operational protocol, materials it provided to patients and physicians, and the forms used in its operation. (Appendix Table A.2 contains a full list of documents reviewed for this report.) This analysis also includes an examination of data each program collected specifically for the evaluation, describing care coordinator contacts with patients, patient disenrollment, and any goods 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 Mind $_{My}$ Heart's 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 June and December 2002, they (1) lived in the program's service area, (2) were enrolled in Medicare Parts A and B, (3) had Medicare as the primary payer, (4) were not in a Medicare managed care (Medicare + Choice) plan, and (5) met the program's target diagnosis and service use requirements (described in detail in Appendix B). The midpoint of the six-month enrollment period examined in this analysis—September 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 either receive the program intervention in addition to their regular Medicare benefits or to receive only their regular Medicare benefits as usual. 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 program during its first four months. The second compares treatment and control group means for each calendar

month after program 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 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 programs 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 MIND $_{MY}$ HEART

Program Organization and Relationship to Physicians. Georgetown University Medical School, located in Washington, DC, is operating the Mind $_{My}$ Heart demonstration in partnership with MedStar Health, a large, nonprofit, community-based health care organization in the Baltimore-Washington area. MedStar owns Georgetown University Hospital and Washington Hospital Center, the hospitals from which Mind $_{My}$ Heart primarily recruits patients.[3] Mind $_{My}$ Heart, in part, grew out of Georgetown University's experience with telemedicine applications, particularly with "MyCareTeam," an interactive, Web-based disease management tool to monitor people with diabetes. MyCareTeam allows patients and their practitioners access to monitoring results and alerts them to out-of-range readings, upcoming tests, and doctor appointments. The system also allows the patient and their practitioner to communicate through a Web-based messaging system. Over six months, several MyCareTeam study participants showed decreased blood glucose levels, compared to baseline measurements. In addition to telemedicine experience, Georgetown developed Mind $_{My}$ Heart based on its experience managing chronically ill patients at Georgetown University Hospital.

Mind $_{My}$ Heart key staff—including the executive program director, care manager supervisor, care managers, and care manager associate—are located in an office in downtown Washington, DC. The principal investigator and medical director, who are on staff at the medical school, are based on the Georgetown University campus, which is a few miles away

[3]Georgetown University Hospital previously had been owned by the demonstration host, but Georgetown University sold the hospital to MedStar in July 2000.

from the program office. After nine months of operation, the program had 3.1 full-time equivalent care managers spread across four staff. The program anticipates care manager caseloads of 50 to 55 patients each.

Originally, the program hoped to recruit heavily from physicians in the Georgetown University Hospital faculty practice, but the practice was dismantled when Georgetown University sold its hospital to MedStar Health. However, MedStar's purchase of Georgetown University Hospital allowed the program to forge a relationship with Washington Hospital Center. Although physicians at both hospitals are unfamiliar with the program's director and the care managers, some of them know the medical director and/or the principal investigator. The medical director, who has patients in the program, regularly communicates with his peers to increase program visibility. More recently, the program joined the local chapter of the Heart Failure Society of America to increase visibility among physicians. To solicit the participation of physicians who practice there, the care manager supervisor spends two or three days on-site at Washington Hospital Center. The principal investigator and program director have made several presentations at physician meetings. The program also distributes promotional materials, such as brochures, posters, flyers, pens, and notepads, to physicians and other potential referral agents. (See Appendix C for examples of these materials: the physician brochure and fact sheet, and a letter from Thomas Scully, the CMS administrator during the first year of the demonstration.)

Primary Approaches. Georgetown has adopted two main approaches to improving patient health and reducing health care costs: (1) improving patient adherence to treatment recommendations, and (2) improving communication and coordination among patients and physicians. The program seeks to improve patient adherence by teaching patients how to be better self-managers and by monitoring patient health status daily using a home monitoring device. The program aims to improve communication and coordination by teaching patients to

manage their own care (for example, when to seek care and how to more effectively communicate with their doctor). As a means of removing barriers to greater adherence and coordination, the program purchases goods and services for low-income people, when necessary.

The program has limited expectations for physicians beyond approving patients' participation, reviewing home monitoring trend reports, and being responsive to care managers' telephone calls. The program does not explicitly aim to change physicians' clinical practice; it does, however, provide feedback on individual patients' medication regimens when necessary.

Target Criteria and Patient Identification. Patients in the Mind $_{My}$ Heart program must have had a hospital discharge in the last year with a primary or secondary diagnosis of CHF and must be classified on the New York Heart Association scale as Class II, III or IV (that is, have mild to severe difficulty in performing daily living activities).[4] Participants must live within a 25-mile radius of the center of the District of Columbia. (This includes the District of Columbia, Virginia's Arlington or Fairfax counties or the city of Alexandria, or Maryland's Montgomery or Prince George's counties.) As in all 16 demonstration programs, beneficiaries must meet CMS's insurance payer and coverage requirements for the demonstration: (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 excludes those patients who: are younger than 65,[5] have a life expectancy of less than six months, have primary liver failure or end-stage renal disease requiring dialysis, reside permanently in a skilled nursing or intermediate care facility, or do not have a telephone line (which is required for its home monitoring device). Also excluded are patients with conditions that would impair active participation—such as inability to give

[4]All patients who provide informed consent are assessed for New York Heart Association classification by a care manager prior to randomization.

[5] After March 23, 2004, the program began including patients under the age of 65.

informed consent or inability to use the home monitoring device (because, for example, they have severe mental impairment or dementia and do not have a responsible caregiver). Finally, patients' primary care physicians must consent to their participation.

The program primarily identifies potential participants from hospital discharge and current inpatient lists from its participating hospitals. During the program's first year, the primary participating hospitals were Georgetown University Hospital and Washington Hospital Center.[6] Each hospital provides the program a list of patients who meet the program's diagnosis and hospitalization screening criteria. Hospital records also provide information about whether the patient has Medicare A and B and whether Medicare is the primary payer but do not indicate whether the patient is in managed care. In addition, Washington Hospital Center allows the program's care manager supervisor to directly view their patient information system when she is on-site. The program then verifies Medicare eligibility for each patient by checking the Common Working File. A care manager or the care manager supervisor contacts the patient's primary care physician to ask for permission to enroll the patient. If the physician consents, a care manager contacts the patient to request a home visit to discuss the project, explain and obtain informed consent, and verify New York Heart Association classification. If the patient consents, the care manager submits the patient's information to MPR for random assignment. The care manager does this using a laptop computer while in the enrollee's home, with the intent of allaying patient suspicions over the validity of the random assignment process. The program tracks the status of potential enrollees using a referral intake form and records the result of the

[6]The program partnered with Providence Hospital and Fort Lincoln Family Medicine to identify patients during the second half of their first year.

eligibility screening process in an Excel spreadsheet (see Appendix C for the referral intake form).

Although the program has identified most of its patients (roughly 93 percent) by reviewing lists provided by hospitals, it has also received a small number of direct referrals from physicians, hospital staff, community organizations, social service agencies, and individuals. As of October 2003, the program estimated that about 7 percent of all enrollees were referred directly to the program primarily by physicians and hospital staff. In order to generate physician referrals, the program uses an "infected physician" approach—that is, the care manager supervisor contacts patients whose physicians are familiar with the program and who seem satisfied with its results. The program also has made presentations to several community organizations and social service agencies (such as the Visiting Nurse Association), although these organizations have not generated many new enrollees so far.

The program has advertised Mind $_{My}$ Heart in local newspapers to generate self-referrals. The program ran an advertisement in the *Washington Post* Health Section six times over two three-week periods in late 2002 and early 2003. The advertisement also appeared in a local newspaper (the *Senior Beacon*) targeting Washington, DC elderly on a monthly basis since March 2003.[7] The program reports that the advertisements generated about 70 inquiries and resulted in 14 enrollees (see Appendix C for the advertisement). Program staff have also made presentations at senior apartments and centers.

[7]The *Washington Post* advertisement ran on October 22 and 29, and November 5, 2002, and February 18 and 25, and March 4, 2003. Each three-week advertising period cost the program $5,500. The program has run the advertisement continually in the *Senior Beacon* since March 2003, at a cost of $500 per month. The program also ran a story about Mind $_{My}$ Heart in the April 2003 installment of the *Senior Beacon,* along with the advertisement.

Assessment, Care Planning, and Monitoring. Following random assignment to the treatment group, each patient is assigned a care manager according to where patients live. The care manager performs an assessment for each patient in person in the patient's home. The assessment process is lengthy and time-intensive, usually requiring five or six one- to two-hour visits to complete; these visits are usually spread over a period of 10 to 12 days. The program uses standard assessment tools, such as the Minnesota Living with Heart Failure Questionnaire and the Mini-Mental State Examination, to ascertain physical health, functional status, cognition, mood, risk of falls, and social support systems. The program also administers tools developed in-house that evaluate pain, nutrition, and environment (see Appendix C for the program's pain assessment tool). Care managers record the results of the assessment on paper and enter those results in a Web-based record system developed for Mind $_{My}$ Heart by Georgetown's Imaging Science and Information System Center, referred to as the "online assessment tool." The online assessment tool calculates the scores of the individual assessment tools. The care manager then enters the scores into Canopy, a commercial Web-based case management system that the program uses to develop care plans, document patient contacts, and generate data for the evaluation.

Between June and December 2002, the first six months of program operation, only 41 patients enrolled, 20 of whom were randomly assigned to the Mind $_{My}$ Heart treatment group (Table 1). Among those patients, 80 percent (16 of 20) had at least one contact for assessment; among those contacted for assessment, 88 percent had their first contact within one week of random assignment. The program's goal is to begin assessing all newly enrolled patients within one week of random assignment. However, the program deliberately put off some assessments

TABLE 1

CARE MANAGER CONTACTS WITH PATIENTS DURING FIRST SIX MONTHS

Number of Patients Enrolled[a]	20
Number of Patients with at Least One Care Manager Contact	16
Total Number of Contacts for All Patients	363
Average Number of Contacts per Patient, Among Those Contacted	22
Number of Care Managers Contacting Patients[b]	5
Among Those Patients with at Least One Contact:	
Percentage of contacts care manager initiated	89.0
Percentage of contacts in person at patient's residence	32.5
Percentage of contacts by telephone	67.2
Percentage of contacts in person elsewhere	0.3
Of all Patients Enrolled, Percentage with Assessment Contact	80.0
Among Those Patients with an Assessment, Percentage of Patients Whose First Assessment Contact Is:	
Within a week of random assignment	87.5
Between one and two weeks of random assignment	6.3
More than two weeks after random assignment	6.3
Of All Patients Enrolled, Percentage of Patients with Contacts for:	
Routine patient monitoring	55.0
Providing emotional support	45.0
Monitoring abnormal results[c]	80.0
Providing disease-specific or self-care education	80.0
Explaining tests or procedures	45.0
Explaining medications	80.0
Identifying need for non-Medicare service	0.0
Identifying need for Medicare service	0.0
Monitoring services	35.0
Average Number of Patients Contacted per Care Manager	3.2
Average Number of Patient Contacts per Care Manager	72.6

Source: Georgetown program data received January 2003 and updated July 2003. Covers six-month period beginning June 5, 2002 and ending December 1, 2002.

[a]Number of patients enrolled in the treatment group as of December 1, 2002.

[b]During the first 15 months of the program, three care managers quit due to what program staff speculate was their lack of community nursing experience and thus, unreasonable expectations of their program roles. Three more care managers joined the program after their departures.

[c]Contacts for out-of-range home monitoring readings.

during the first six months because there was only one care manager to manage the program's entire caseload.[8] Care managers also delayed the assessment when patients presented acute problems that required immediate attention during the home visit in which the patient was randomized.

The program reassesses patients every six months and after life-altering events, such as the death of a spouse, hospitalization, a serious fall, or the onset of an unexpected financial burden. The care manager does not, however, re-administer all the initial assessment tools, only those specific to the patient's current condition, based on the care manager's judgment.

The care manager presents a summary of the assessment to the program's multi-disciplinary team to seek recommendations for developing the care plan (see Appendix C for multi-disciplinary team summary sheet). Thereafter, the multi-disciplinary team reviews care plans on an annual and as-needed basis (for example, after a hospitalization or death of a spouse). The multi-disciplinary team includes all program staff, a clinical pharmacist, a nutritionist, and a social worker. The multi-disciplinary team reviews all new enrollees and suggests how the care manager might address their needs. In addition, when a patient reports an adverse event, the team works together to determine the best approach to preventing a reoccurrence.

The care manager develops an individualized care plan for the patient, based on the assessment using a Canopy template (see Appendix C for an example of the care plan). Care plans are developed immediately following the assessment; the program's goal is to complete the care plan within four weeks of random assignment. The plan includes personalized goals for

[8]During the first 15 months of the program, three care managers quit due to what program staff speculate was their lack of community nursing experience and thus, unreasonable expectations of their program roles. Three more care managers joined the program after their departures.

treatment adherence and lifestyle changes and standard interventions, which will be used to address the patient's problems (for example, nutrition education for a malnourished patient). The care manager meets in person with the primary care physician to get the plan approved and to discuss allowable ranges for home-monitoring statistics a few weeks after home monitoring has begun.[9]

The program monitors patients both through the use of a home monitoring device and through regular contact with care managers, the frequency of which is based on an assessment of patient need. The program uses the HomMed Sentry Monitoring System to collect and analyze patient vital signs such as weight, pulse, blood pressure, oxygen saturation, and temperature on a daily basis.[10] Care managers install the monitor in the patient's home after the assessment and care plan are completed and instruct the patient how to use it. At a scheduled time each day, patients are prompted by the HomMed device to take their vital signs and answer two subjective questions about their health status.[11] The HomMed device automatically transmits the collected data through a pager (or a phone line as backup) to the HomMed central monitoring station in the program office. The care managers review these readings and record them on paper.[12] The care managers send trend reports of monitoring readings to patients' physicians on a monthly basis,

[9]Vital sign parameters are preset following assessment according to default measures built into the HomMed device. The care manager presents the first few weeks of monitoring data to the physician during the case conference, at which time the physician specifies the acceptable ranges of vital signs for that patient.

[10]The program pays for the installation and maintenance of the home-monitoring equipment, which costs $80 per unit per month to maintain.

[11]The questions are: "Are you experiencing more difficulty breathing today, compared to a normal day?" and "Are you more tired today compared to a normal day?"

[12]Since August 2003, Georgetown has contracted with the Visiting Nurse Association to review home monitoring device readings on the weekends, to reduce the burden on the care managers and program costs.

before scheduled patient appointments, and when trends in readings emerge that the care manager feels the physician should be aware of (for example, a gradual increase in blood pressure). If a patient does not record his or her vital signs, the care manager calls the patient or the emergency contact person to make sure an adverse event has not occurred. When a patient's vital signs are outside of parameters established by the physician, the care manager calls the patient and asks him or her to re-test. If the reading is valid and diverges markedly from the physician's specified parameters, the care manager calls the patient's physician to report the problem. In rare instances when a patient's physician and the on-call physician is unavailable, the care manager consults the program's medical director to determine whether any urgent action is required until the patient's physician can be contacted. The program's medical director has not had to handle any disagreements between care managers and physicians. However, the medical director did have to contact one physician about a patient with a run-away blood pressure because the physician was being unresponsive to the care manager.

The frequency and mode of contact between the care manager and the patient is based on the patient's designated care coordination level (that is, the risk of hospitalization or emergency room admission, as judged by the patient's care manager). While care managers are in the process of assessing a patient, the patient is considered to be at the highest risk level and receives primarily home visits. After assessment, all patients receive at least one home visit every six months. At the second highest level of risk, patients receive weekly telephone calls. Patients at the lowest level of risk receive a telephone call every month or at least every two months. Home visits can be more frequent if the care manager senses a change in cognitive status while talking with the patient on the telephone, or if a life-altering event or hospitalization occurs.

During monitoring contacts, care managers conduct patient education, reassess the patient's status, and evaluate the patient's progress toward meeting the care plan goals. Care managers

schedule the next telephone "visit" with the patient during the contact, unless abnormal home monitoring results warrant an unscheduled call. Care managers use a phone assessment form to guide and document the telephone contact (see Appendix C for the care management phone assessment form). During home visits, care managers verify information relayed by the patient during telephone visits. For example, patients may indicate that they can do their own personal care; but when a care manager makes a home visit, she might observe that the patient has not been conducting personal care as well as he or she had claimed.[13]

Care managers also make home visits, as needed, to adjust or repair the HomMed monitor. After a year of operation, program staff reported that it was easy for patients to disturb the settings on the monitor or break the device, and difficult for patients to reset or fix it on their own. For example, a relative visiting a patient tried to help the patient use the monitor, but ended up breaking the blood pressure cuff. Between January and April 2004, 11 percent of all home visits (15 out of 139) were made to repair the HomMed monitor. To reduce the cost and burden associated with home visits made by care managers to fix the monitors, the program reduced the care managers' role in recruiting patients and shifted that responsibility to the care manager supervisor.

During the first year of operation, a small number of patients chose to discontinue using the home monitoring device but remained in the program.[14] Patients withdrew from home monitoring primarily because they found it disruptive to their lives (for example, they did not want to be reminded every day that they had CHF, or they did not want to use the monitor every

[13]The program has not had any patients who are away from the service area for substantial periods of time ("snowbirds").

[14]As of December 2003, 6 patients had withdrawn from home monitoring out of the 58 treatment group patients who had enrolled.

day because they found it intrusive).[15] Georgetown did not disenroll these patients; rather, care managers had patients continue to have their vital signs measured regularly, if not daily—for example, by going to a local pharmacy to measure their blood pressure or by measuring them with low-tech devices.[16] Care managers then call them on a weekly basis to get the readings and visit them in their homes once a month. Most patients who discontinued using the monitor did so after using the device for three to four months.

In addition to patients withdrawing from home monitoring, the program has received complaints about the HomMed device. Informally, one wheelchair-bound patient complained that his handicap made it difficult to use the HomMed device scale, which is not designed for chair-bound patients. However, some patients report a seated weight to overcome this barrier. Physicians have also complained that blood pressure measured by the HomMed monitor is always 8 to 10 mm Hg higher than that measured in their office. The program reports this is due to the technical method used by the HomMed device to measure blood pressure or the blood pressure cuff not fitting a patient properly. Staff also mentioned that patients sometimes monitor their blood pressure before taking medication, whereas office monitoring occurs after medication is taken. Staff report that the question about fatigue asked by the monitor also is sometimes problematic in identifying true alerts. For example, one 73-year-old patient always answered yes to that question, triggering an alert, explaining: "I'm 73 years old! Of course, I'm always tired."

[15]To prevent "monitor fatigue" (tiring of the daily commitment to monitoring), the program allows patients to take a break (for example, a weekend) from monitoring when vital signs have been consistently within range.

[16]In April 2004, the program decided to purchase bathroom scales and blood pressure cuffs for patients who withdraw from electronic monitoring. The program anticipates this equipment will cost $120 to $130 per patient.

Of the 20 treatment group patients enrolled during the first six months of operation, 16 patients had at least one contact with a case manager. Those patients averaged 22 contacts during this period. Case managers initiated almost all contacts (89 percent), and most contacts (67 percent) were conducted by telephone. Although many of these contacts were for assessment (given that it takes five or six contacts per enrollee to complete an assessment), just over half (55 percent) of enrollees had a contact for routine monitoring. The majority of patients (80 percent) had a contact for monitoring abnormal results captured by the HomMed device. Just under half (45 percent) had at least one contact in which they received emotional support (Table 1).

Staffing and Management of Program Quality. Maintaining and improving quality and ensuring 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. Mind $_{My}$ Heart care managers must be baccalaureate-prepared registered nurses. After three care managers left Mind $_{My}$ Heart, the program learned that care managers also need to have community nursing experience in order to organize patients in a setting that is inherently much less organized than a hospital. The program has since hired three new care managers with community nursing experience.

Newly hired care managers are required to undergo a competency assessment and a six- to eight-month orientation upon hiring. New care managers complete a self-assessment of their current skill level in areas relevant to the intervention. The case management supervisor reviews the self-assessment and prioritizes orientation training for the new care manager. Orientation topics include: (1) an overview of demonstration procedures and policies, (2) management of CHF, (3) management of the geriatric patient, (4) patient/caregiver education, (5) utilization of community resources, (6) addressing special situations (such as death, abuse, or a change in

mental status), (7) documentation, (8) operation of the home monitoring device, and (9) safety and infection control. New care managers are on a trial basis during the orientation period, during which they manage a small caseload followed closely by a more experienced care manager and the care manager supervisor. The experienced care manager, care manager supervisor, and new care manager meet weekly during orientation to discuss the new employee's progress and reevaluate training needs. After orientation, care managers receive ongoing training through conferences and seminars offered by the program's participating hospitals and other organizations. For example, care managers participated in a program at Washington Hospital Center about CHF and diabetes. They also participated in a long-distance learning program offered by the American Society on Aging about community issues related to the elderly. Care managers also receive training by members of the multi-disciplinary team during weekly meetings or as a workshop. For example, care managers attended a workshop on basic nutrition for the elderly and cardiac patients taught by the program's nutritionist.

The program evaluates care manager performance in several ways. At the end of orientation, the care manager supervisor or an experienced care manager evaluates care manager performance by attending home visits with each care manager. During these visits, the care manager supervisor or senior care manager observes the care manager's assessment and teaching skills. After orientation, the care manager supervisor randomly checks care plans in Canopy for completeness and asks care managers to justify the care coordination level of a random selection of patients. In addition, the program director and care manager supervisor examine patient contact data collected for the evaluation to determine if care managers are providing the appropriate type and amount of care to their patients (for example, did the care manager make the appropriate number of home visits?).

The program evaluates its approach to patient care during its weekly staff meetings, which include the program director, care manager supervisor, care managers, and care manager associate. At these meetings, staff discuss their approach and sometimes suggest changes to their practice model. For example, it was through staff meeting discussion that the program decided to shift more enrollment responsibilities to the care manager supervisor to enable care managers to make home visits to repair the home monitoring devices.

The program generates several reports to monitor the effectiveness of its intervention. The program uses Canopy to generate reports of contact data to determine whether resources are being used appropriately for all patients. For example, the program might look for patients who receive more telephone calls than other patients in their care coordination level. The program would then look at the patient's record to see if those calls were warranted, and if so, how to address that patient's needs more efficiently. The program also monitors enrollment by tracking referred patients through the enrollment process using an Excel spreadsheet. As mentioned, the program uses the HomMed system to generate trend reports of home monitoring readings by patient and sends them to physicians on a monthly basis, before patient appointments, and when trends emerge which the care manager feels the physician should be aware of.

Georgetown surveys patients enrolled in the program for a year about their satisfaction with the program and quality of life. The program originally planned to survey patients every six months, but once the program began operating, staff found they did not have the resources to implement the survey that frequently. The program had also planned to survey physicians to monitor their satisfaction with Mind $_{My}$ Heart, but are re-examining these plans since the evaluation is already conducting a physician survey. Although the program has a formal procedure for documenting and responding to complaints, after a year of operation it had not received any complaints from either physicians or patients.

WHO ENROLLS IN THE PROGRAM?

Program enrollment has been much lower than anticipated. Staff attribute the enrollment shortfall to difficulty identifying eligible patients and to a high patient refusal rate. Mind $_{My}$ Heart appears to have enrolled patients with high health care expenditures and the intended rate of hospitalization but whose care is nevertheless not quite as costly as that assumed in the program's demonstration waiver application. Staff report that patients are satisfied with the program; program data show no voluntary disenrollment among the 107 enrollees during its first six months.

Enrollment After One Year. After one year of operation, Mind $_{My}$ Heart had enrolled 53 patients in the demonstration treatment group and 54 in the control group (MPR weekly enrollment report, the week ending June 8, 2003). This falls far short of the program's target of 730 beneficiaries within a year. Enrollment fell short of program expectations, in part because the recruitment process identified many patients who were not eligible. Of the 361 patients whom the program tracked through the enrollment process between June 2002 and October 2003, 127 (or 35 percent) were ineligible for the program. (Another roughly 2,800 patients were identified during the period as potentially eligible for the program, but their eligibility status was not tracked.) Of the remaining 234 eligible patients, 58 (25 percent) refused to participate, 46 (20 percent) could not be contacted, and 130 (56 percent) enrolled in the program. However, almost all patients who agreed to a home visit subsequently agreed to participate.

Percent of Eligible Beneficiaries Participating. To gain another perspective on the appeal of the program to beneficiaries, the evaluation simulated the program's eligibility criteria using Medicare enrollment and claims data to estimate the percent of eligible beneficiaries who chose to participate in Mind $_{My}$ Heart. (Appendix B contains a detailed description of the simulation.) This simulation resulted in 8,540 beneficiaries eligible for the program between June and

December 2002, the program's first six months of operation. That is, they lived in the program's service area, were not in Medicare managed care, and met the program's diagnostic and service use eligibility criteria.[17] During the same six months, 27 "eligible" beneficiaries enrolled in the demonstration (about 0.3 percent of the 8,540 eligible beneficiaries).[18] (See Tables B.2 and B.3.)

Comparison of Participants and Eligible Nonparticipants. According to an analysis of Medicare enrollment data, program participants and eligible nonparticipants differed in terms of race and sex but otherwise were demographically similar. Program participants were more likely than eligible nonparticipants to be male or non-white, a distinctively higher proportion than seen in other MCCD programs (Table 2). Sixty-four percent of participants were male, compared to 43 percent of nonparticipants. Thirty-eight percent of participants and 25 percent of nonparticipants were non-white. Just under 15 percent of both groups were dually eligible for Medicaid and Medicare.

[17]Between June and December 2002, 363,051 beneficiaries were living in the program's service area. Of those, 79,072 (22 percent) would have been ineligible because they did not meet one of CMS's demonstration-wide criteria. Of the remaining 283,977 beneficiaries who met these criteria, 8,540 (3 percent) also met the program's diagnostic and service use criteria at some point during the six-month intake window, and they had none of its exclusion criteria (to the extent they could be simulated with the Medicare data). (See Table B.2.)

[18]In fact, 43 beneficiaries actually enrolled in the program during its first six months. When estimating the participation rate, the evaluation excludes enrollees with incorrect Health Insurance Claim (HIC) numbers on MPR's enrollment file, and those who did not meet the Medicare demonstration-wide criteria or the program's geographic, diagnostic, utilization, or exclusion criteria (as measured with Medicare data). These enrollees were excluded from the participation analyses in order to use a consistent definition of eligibility for the numerator and denominator of the ratio. (Beneficiaries with invalid HIC numbers may well be eligible, but the beneficiaries' Medicare data could not be obtained to assess that, so they were excluded. The HIC numbers have since been corrected.) This leaves 27 known *eligible* participants. Most of the reduction was due to failure to meet the hospitalization criterion or to meet one of the exclusion criteria. The comparison of participants to eligible nonparticipants in Table 2, however, excludes only participants with invalid HIC numbers and those who did not meet Medicare demonstration-wide requirements, leaving 42 participants. Thus, the comparison more closely reflects the differences between all actual participants and those who were eligible to participate but did not.

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)	77.5	78.6	
Younger than 65	0.0	0.0	
65 to 74	28.6	32.5	
75 to 84	54.8	44.1	
85 or older	16.7	23.4	
Male	64.3	42.7	***
Nonwhite	38.1	25.4	*
Original Reason for Medicare: Disabled or ESRD	9.5	8.0	
State Buy-In for Medicare Part A or B	14.3	13.8	
Newly Eligible for Medicare (Eligible Less than Six Months)	0.0	0.0	
Enrolled in Fee-for-Service Medicare 6 or More Months During Two Years Before Intake	100.0	100.0	
Medical Conditions Treated During Two Years Before Month of Intake[b]			
Coronary artery disease	95.2	79.3	**
Congestive heart failure	97.6	92.7	
Stroke	33.3	39.2	
Diabetes	50.0	44.9	
Cancer	33.3	27.1	
Chronic obstructive pulmonary disease	47.6	54.6	
Dementia (including Alzheimer's disease)	9.5	0.5	***
Peripheral vascular disease	19.1	20.9	
Renal disease	21.4	18.2	
Total Number of Diagnoses (number)	4.1	3.8	
Days Between Last Hospital Admission and Intake Date[b]			
0 to 30	26.2	15.4	*
31 to 60	19.1	13.8	
61 to 180	31.0	35.8	
181 to 365	19.1	35.0	**
366 to 730	2.4	0.0	***
No hospitalization in past two years	2.4	0.0	***

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	4.8	2.1	
0.1 to 1.0	28.6	53.4	***
1.1 to 2.0	35.7	26.0	
2.1 to 3.0	11.9	11.1	
3.1 or more	19.1	7.3	***
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]			
Part A	$1,687	$1,743	
Part B	$736	$667	
Total	$2,424	$2,410	
Distribution of Total Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]			
$0	0.0	0.0	
$1 to 500	7.1	10.1	
$501 to 1,000	14.3	20.8	
$1,001 to 2,000	35.7	25.8	
More than $2,000	42.9	43.3	
Number of Beneficiaries	**42**	**5,122**	

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 September 15, 2002, the midpoint of the six-month enrollment period examined.

Due to a data-coding error, this table excludes Washington, DC from the catchment area used to define eligible nonparticipants (the error did not affect participants). The next report will correct this error.

[a]Participants who do not meet Medicare coverage and payer 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.

[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.

TABLE 2 *(continued)*

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*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.

Participants were more likely than nonparticipants to have certain diagnoses. For example, 98 percent of participants had been treated for congestive heart failure—Georgetown's target diagnosis—during the two years prior to enrolling. In addition, 95 percent had been treated for coronary artery disease. Among nonparticipants, these rates were 93 percent and 79 percent, respectively.[19] Participants were also more likely to have dementia—10 percent, compared with less than 1 percent of nonparticipants.

During the year prior to enrollment, 95 percent of participants had a hospitalization, and participants had monthly Medicare reimbursement of $2,424. A comparable share of eligible nonparticipants had a hospitalization (100 percent), and their average monthly reimbursement was similar: $2,410. Twenty-six percent of participants had a hospitalization in the month before intake, compared with 12 percent of nonparticipants. This high number of recent hospitalizations reflects the fact that the program's primary method of identifying patients is through hospital lists.

When developing the cost estimate for Georgetown's waiver application, MPR estimated that Medicare reimbursements would average $3,476 per month for eligible beneficiaries who did not participate in the program. Actual program enrollees had substantially lower costs during the year prior to enrollment—$2,424 per month—despite their having been hospitalized during that year. Only 42 observations on participants are available, so the difference could be due somewhat to chance. However, it is clearly due partly to two systematic differences in the methodology used for each estimate. First, the lower cost estimate was based on spending over the year *immediately* following a hospitalization (to reflect Georgetown's original plan to enroll

[19]Not all participants or eligible nonparticipants are shown as having CHF in Table 2 because the standard definition used by the evaluation to measure CHF for all MCCD programs contains different ICD-9 codes than those used by Mind $_{My}$ Heart.

patients while they were still in the hospital), whereas the participant costs are measured over the year prior to enrollment, which included a hospitalization at any time during the year. The average Medicare costs for a patient during the first few months immediately after a hospitalization are substantially greater than those later in the year due to complications and readmissions. This difference in timing leads to waiver cost estimates that exceed the actual preenrollment costs of patients who enrolled. Second, because the waiver cost follows people prospectively, it includes costs associated with deaths, while the participant costs are measured before enrollment, and so do not include any beneficiaries who died during the interval over which costs were measured. Costs for such beneficiaries typically are far greater than those for other beneficiaries.

Satisfaction and Voluntary Disenrollment. Preliminary results of the program's first 35 annual patient surveys indicate that patients are very satisfied with the program. When patients were asked whether they were satisfied with the program overall, their responses (measured on a 5-point scale) averaged 4.5. Several patients reported how much they liked or were helped by program staff. For example, one patient said, "I like the people in the program…. they're lovely and nice. It helps me a lot when they give me a call." Other patients liked using the home monitoring device. As one patient reported, "It's very helpful…I know when my vitals are below norm." A few patients, however, reported dissatisfaction with the HomMed device. For example, two patients reported that the monitor sometimes continues to prompt them even if they have already recorded their vitals for the day. Still, most patients said they like the program and would encourage other people with heart problems to take part in the program. One patient even sent the program a Valentine card (see Appendix C). Staff members believe that the program works best for those patients who are motivated to change but who lack an adequate support system.

Patients may stay in the Mind My Heart program for the duration of the demonstration (that is, until June 2006). Among the 20 patients receiving the Mind My Heart intervention who enrolled over the first six months of operation, 12 patients had been enrolled 10 weeks or less, while only 2 patients had been enrolled 21 or more weeks during those six months. No patients voluntarily disenrolled during the first six months of the demonstration (Table 3).

TO WHAT EXTENT DOES THE PROGRAM ENGAGE PHYSICIANS?

While the importance to program success of engaging eligible beneficiaries is self-evident, the importance of engaging physicians may be less so. Care managers must develop trusting, collaborative relationships with primary care physicians in order 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) and to feel that information they get from the care managers is credible and warrants their attention (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). A trusting, respectful relationship will also facilitate care managers' access to physicians when urgent problems arise, and it will facilitate communication and coordination across medical care providers (Chen et al. 2000). Moreover, to increase acceptance of care management among physicians in general, care mangers of course need to engage physicians.

Mind My Heart is promoted to physicians as a management tool that will help them make more informed decisions about patient care, as well as make their care delivery more efficient. Beyond sending physicians regular home-monitoring reports, the Mind My Heart program does not expect physicians to collaborate with care managers. Rather, the program seeks to supplement physicians' medical management of their patients through care management

TABLE 3

DISENROLLMENT FOR PATIENTS ENROLLED DURING FIRST SIX MONTH

Number of Patients Enrolled[a]	20
Length of Enrollment as of December 1, 2002 (Percentage of Patients Enrolled)	
10 weeks or less	60.0
11 to 20 weeks	30.0
21 or more weeks	10.0
Mean Length of Enrollment (Weeks)	10.5
Number of Patients Who Disenrolled	1
Number Who Disenrolled Because:	
Patient died	0
Patient lost program eligibility[b]	1
Patient initiated disenrollment	0
Number Disenrolling:	
Within a week of random assignment	0
Between 1 and 4 weeks	0
Between 5 and 12 weeks	1
More than 12 weeks	0

Source: Georgetown program data received January 2003 and updated July 2003. Covers six-month period beginning June 5, 2002 and ending December 1, 2002.

[a]Number of patients ever enrolled in the treatment group through December 1, 2002.

[b]Patients can lose program eligibility for the following reasons: joined a managed care plan, entered a skilled- or intermediate-nursing facility, developed primary liver disease or end-stage renal disease requiring dialysis, or moved out of the program's service area.

activities and encourage cooperation with care managers from physicians when problems arise. Although it is not the program's explicit goal to change providers' clinical practice, the program's multi-disciplinary team will provide feedback on individual patients' medication or other treatment regimen when they deem it necessary.

Relationship Between Physicians and Care Managers. The relationship between care managers and physicians that the Mind $_{My}$ Heart program strives for can best be described as cooperative, as opposed to collaborative. One of the core principles of Mind $_{My}$ Heart is to make

physician practice more efficient by providing physicians with timely medical information in an unobtrusive manner. The program seeks not to burden the physician unnecessarily with care management activities, since it is the care manager's role to supplement the physician's efforts in medically managing his or her patient. Program expectations for physicians, therefore, are limited to (1) approving patient participation, (2) specifying home monitoring parameters and frequency of trend-reporting, and (3) responding to care managers' telephone calls about out-of-range monitoring results and adverse events for specific patients. The program also requests that physicians provide care managers with standings orders to change the dosage of some medications.

Georgetown has adopted three primary strategies to promote cooperation from physicians: (1) conducting formal case conferences for each patient, (2) providing physicians with regular home-monitoring trend reports, and (3) requesting orders to allow care managers to change patients' medication dosage in specified situations. Care managers conduct patient-specific, in-person case conferences with all physicians within a few months of patient enrollment. They use the case conference to introduce themselves and describe the program's care plan, highlighting patient information that the physician might not be aware of that would affect the medical management of his or her patient's CHF (for example, psychosocial issues). Because the conference does not occur until the patient has been enrolled for two or three months, the care manager can present home-monitoring results for that period and ask the physician to set monitoring parameters that will serve as levels that will trigger alerts to the care manager for further followup. The program may also request a second case conference with the physician if circumstances arise which the care manager believes might affect the patient's CHF treatment. For example, a care manager initiated a second case conference for a patient who had been

discharged from the hospital with several medications, about which the patient's primary caregiver was confused. Physicians are paid $100 for each case conference.

In addition to case conferences, the program engages physicians by providing them with trend reports of home monitoring results on a monthly basis, before self-reported patient appointments, and when care managers feel physicians should be made aware of a worrisome trend (see Appendix C for the HomMed trend report). The report contains the patient's medications, diagnoses, monitoring parameters, and all readings taken that month. Each daily entry indicates whether the patient's vital signs were outside the parameters set by the physician and how the care manager followed up on these alerts.

Georgetown also requests that physicians allow care managers to change the dosage of medications under specified circumstances (for example, increase the dosage of a prescribed diuretic when a patient experiences fluid retention). This request was added to Mind $_{My}$ Heart over the course of the program's first year because staff wanted to be more proactive in helping patients learn to be better self-managers, since physicians often tell patients to change diuretic dosage on their own if they gain weight. Staff report, however, that only 15 to 20 percent of the physicians they work with agree to these requests. While staff cite unfamiliarity of new physicians with care managers or patient self-sufficiency as reasons for physicians not providing orders, it would appear that most physicians were unwilling to cede this level of control.

Beyond getting physicians to provide medication orders, efforts to engage physicians appear to have succeeded within the program's limited expectations. Physicians have cooperated in approving patients for participation, and some physicians have begun referring more of their patients to the program. Staff reported that a few (one or two) physicians have even turned down payment for case conferences because "they felt this was something they should do for their patients." Program staff report that 80 percent of physicians are responsive to care managers'

phone calls. To engage the remaining 20 percent of physicians who are not responsive to care managers, the program employs three strategies. First, the care manager will follow up the phone call with a letter describing the care manager's concern. If that approach does not work, the care manager will give the patient his or her trend report to show the physician at a scheduled appointment. Finally, when other methods fail, the medical director will call the physician. As mentioned, the medical director has rarely intervened in this manner.

Improving Practice. Mind $_{My}$ Heart seeks to make clinical practice more efficient by providing physicians with home monitoring results, notifying them when patients have adverse events and making their patients better able to manage their CHF. It does not explicitly seek to change physician's clinical practice because the program believes most participating physicians are aware of CHF guidelines and generally follow them. However, the program does evaluate physician practice on a case-by-case basis through its multi-disciplinary team, which reviews each patient's medications (including over-the-counter drugs and vitamins/supplements) and diet when they enroll. The care manager will present the multi-disciplinary team's recommendations to the physician during the case conference. The recommendations are provided tactfully, with the intention of giving physicians more information on which to base medical management decisions consistent with CHF guidelines. Care managers may also periodically suggest medication changes to physicians based on changes in a patient's health status. However, care managers do not routinely check that physicians are using CHF guidelines.

As noted, the program had not yet conducted its physician survey, but staff had anecdotal evidence indicating that physicians—especially those with patients who had shown improvement—were highly satisfied with the support being provided by the program, For example, several physicians have reported how happy they are that their patients are being hospitalized less often. Staff also reported that the number of physicians who give patients

instructions about what to do when their weight increases has risen dramatically since the beginning of the program, which staff say reflects the usage of trend reporting.

HOW WELL IS THE PROGRAM IMPLEMENTING KEY INTERVENTION APPROACHES?

Improving patient adherence to treatment recommendations is the primary approach Mind My Heart is taking to improve patient health. The program supports this approach by teaching patients to recognize symptoms and self-manage. Improving communication and coordination among patients and their physicians is an important, related goal. The program supports this approach by teaching patients how to communicate with their doctor, explaining when it is appropriate to make appointments with their doctor, and following up with patients to make sure care is received.

Improving Patient Adherence. Improving patient adherence to treatment is the primary goal of Mind My Heart. In order to help patients adhere more closely to their treatment regimens, care managers educate patients and their family or caregivers to better understand CHF and how to manage its symptoms on their own. The education intervention focuses on CHF, but it also addresses co-morbidities (such as asthma, COPD, and diabetes) and lifestyle issues (such as weight management and physical activity).

Care managers use Mind My Heart's assessment to identify educational needs, although no specific instrument is used to determine educational needs. Education covers several key areas: CHF-specific knowledge; co-morbidities and their relationship to CHF; medications, nutrition, activity, and rest; lifestyle changes, family and caregiver concerns such as stress and finding respite; utilization of medical and community resources; financial considerations; and future planning. Care managers develop a teaching plan geared to the individual patient's learning needs. The teaching plan is input to Canopy as part of the care plan. The care managers follow a

standard education curriculum based on the American Heart Association's pamphlet, "Living With Congestive Heart Failure," and the Heart Failure Society's video, "What You Should Know About Heart Failure." Care managers have several pamphlets, books, and audio- and videotapes available to them which cover a variety of topics (for example, nutrition and exercise) that enable them to customize patient education. The program uses a readability assessment tool to characterize the grade level at which all materials are written (see Appendix C). Care managers provide most of the patient education during monitoring visits and calls, but they also refer some patients to diabetic education offered by participating hospitals.

The program does serve some patients who have cognitive deficits, as well as patients with low literacy. For patients with cognitive deficits, the program educates the patient's caregiver. The program had not served any non-English speaking patients after one year of operation.

All care managers are seasoned nurses, many with direct experience teaching patients in the community setting. In addition, all care managers receive training on how to provide patient education during their orientation, particularly from members of the multi-disciplinary team. For example, the program's nutritionist presented sessions to care managers about how to teach patients about their diet. Care managers also learn how to educate patients from observing senior care managers provide education. Care managers also attend patient education seminars and presentations given by local organizations and participating hospitals. For example, care managers attended a seminar on how to educate patients with low literacy given by Washington Hospital Center.

The program assesses whether teaching has been effective by tracking home-monitoring data and adverse events, observing patient behavior, and informally reassessing patients every six months. First, care managers examine trends in home monitoring to determine whether patients are "getting the message." For example, if a patient re-tests himself or herself when an

abnormal reading occurs, the care manager believes the patient has begun to recognize symptoms; similarly, if a patient has fewer home-monitoring alerts or adverse events, the care manager concludes that education has been effective. Care managers also report that home monitoring provides patients with an incentive to self-monitor and adhere to treatment because "they know [the care manager] will call them if they don't." Second, care managers look for changes in patients' behavior (either directly observed or self-reported) to assess whether education has been effective. For example, after instructing a patient on the relationship between sodium and CHF, a care manager might ask the patient what he or she ate for lunch during their next contact in order to assess whether the patient had learned from the dietary recommendations. Finally, the program repeats parts of the assessment every six months, the results of which are reviewed by the multi-disciplinary team and used to reevaluate patients' educational needs.

If the program finds that a patient is not learning, the care manager will adapt the care plan to reflect the patient's learning capability, sometimes revising patient goals. Care managers try hard not to set unrealistic or rigid educational goals for patients; rather, they adapt the care plan and the delivery of education based on what they feel patients can handle and on their learning style. The care manager may also consult the multi-disciplinary team during weekly meetings for alternative strategies. In some cases, the care manager revises the educational goals for the patient and examines how adding social support systems (for example, home health) might aid the patient in managing his or her health better.

Among the 20 patients enrolled in Mind $_{My}$ Heart during its first six months, the majority had received at least one contact for self-care or disease-specific education (80 percent of patients), and most had at least one contact during which the care manager explained medications

(80 percent). Almost half of the patients (45 percent) had at least one contact during which the care manager explained tests or procedures (Table 1).

Mind $_{My}$ Heart appears to have implemented a patient education strategy that should result in improved patient adherence to treatment recommendations. The care managers are nurses who receive additional patient education training. The program's standardized curriculum can be customized to each patient based on his or her specific problems (including co-morbidities and lifestyle issues). Home monitoring allows care managers to assess whether their teaching has been effective and provides opportunities for reinforcement. If a patient is not learning, the care manager will consult other program staff or the multi-disciplinary team about alternative education strategies. Whether patients are actually taking in educational messages and changing their behavior will be more evident from the evaluation's analyses of patient and physician surveys and of Medicare claims data.

Improving Communication and Coordination. Another one of the program's approaches to improving patient health is to teach patients to communicate more effectively with their physicians and coordinate their own care. The program also aims to improve coordination by providing clinical information to physicians on a regular basis that will help them make better decisions about their patients' treatment.

Care managers use the results of home monitoring to help patients learn when to seek their physician's advice. When an out-of-range reading occurs, the care manager calls the patient and explains why it might be necessary for the patient to schedule an appointment (that is, symptoms that warrant further attention). Care managers usually do not intervene on behalf of their patients, but they will schedule doctor appointments if a patient is having difficulty doing it alone. For example, care managers reported that it is common practice in the District of Columbia for physician office staff to direct patients with non-emergency problems to the

emergency room when they cannot schedule an appointment that day. Care managers have been educating office staff about the program's goal of preventing emergency room visits and hospitalizations, and have suggested that next-day appointments for these patients would be sufficient.

Care managers also educate patients about how to communicate with their physician during appointments. All patients receive a pamphlet that discusses how to prepare for doctor's appointments and make the most of a doctor visit (see Appendix C, for an excerpt from "Tips for Good Communication"). In addition, care managers might model how to communicate with physicians over the telephone and often suggest patients make a list a questions to bring to their doctor. Care managers also give patients trend reports to share with their physician during appointments, to help patients begin a conversation with their doctor.

Care managers seek to better coordinate patient care by communicating timely, patient-specific information to physicians. First, as mentioned, care managers hold in-person case conferences with physicians, which occur shortly after the managers complete the initial patient assessment. Second, care managers regularly fax physicians trend reports of home monitoring readings under the following circumstances: (1) every month, (2) before scheduled office visits, and (3) when care managers feel trends in monitoring readings should be brought to the physician's attention. Finally, care managers contact physicians by telephone to report changes in patient health status or an adverse event.

The program also aims to make patient care more coordinated by discussing all new patients in a multi-disciplinary team each week. These meetings also provide an opportunity for care managers to seek advice from the team about difficult or complex patients and those patients who have just experienced adverse events. For example, a care manager consulted the multi-disciplinary team about a newly enrolled 76-year-old demented female with severe leg edema.

This patient had several co-morbidities, including diabetes, hypertension, and iron-deficiency anemia. Her assessment revealed that she was not taking any of her 12 medications and had an uninvolved caregiver. The multi-disciplinary team's pharmacist and the medical director made suggestions about the patient's drug regimen and the social worker made recommendations about how to improve the caregiver's involvement. The nutritionist also suggested dietary changes. After a year of the patient's enrollment in Mind $_{My}$ Heart, her blood sugars have improved and her leg edema has disappeared. The patient who, prior to the program, was hospitalized an average of three times per month, had only two admissions (both unrelated to CHF) since enrolling in the program. The patient's caregiver also became actively involved in her care.

Georgetown further seeks to make patient care more coordinated by tracking adverse events (that is, hospitalizations and emergency room visits) through home monitoring. If a patient does not record his or her vital signs or has an abnormal reading and cannot be reached by phone, the care manager calls the patient's emergency contact person.[20] In some cases, the patient or caregiver calls the care manager to report the event. All adverse events are tracked in Canopy. As mentioned, care managers present the event to the multi-disciplinary team, which develops recommendations about preventing the event from reoccurring. If the care manager learns that a patient has been hospitalized while the patient is still admitted, the care manager will get in touch with the discharge planner to ensure that the patient receives appropriate care after being released from the hospital. The care manager also contacts the patient's physician by telephone to report the event and any new medications the patient is taking that might affect the patient's CHF treatment.

[20] The emergency contact person is designated during the assessment process.

Mind $_{My}$ Heart has several features that help facilitate communication among patients and their physicians, the cornerstone of which is home monitoring. Abnormal home-monitoring readings provide care coordinators opportunities to teach patients those circumstances that indicate they should contact their doctor. Care managers intervene on behalf of their patients to make doctor appointments for patients who are having difficulty scheduling appointments on their own. Home monitoring alerts care managers to adverse events and prompt follow-up with the patient to prevent reoccurrences. Care managers keep physicians regularly informed of patient vital statistics by sending them monthly home monitoring trend reports. Finally, care managers also keep physicians updated by calling them when a patient's condition changes or an adverse event occurs.

Increasing Access to Services. Although increasing access to services is not a major focus of the program, Mind $_{My}$ Heart aims to remove barriers to increased adherence and coordination by purchasing medical care related goods and services for qualified low-income patients. The program has limited funds to pay for medical transportation, CHF medications, and medical equipment for patients whose family income is at or below twice the federal poverty level. The program refers to this as the "Flexible Benefits Fund." Care managers determine eligibility for the Fund by administering a financial need assessment using the most recent federal poverty guidelines. If a patient qualifies for transportation or equipment, the care manager associate refers the patient to local resources.

For patients who qualify for prescription drugs, the Fund is used only to support patients while the care managers search for a more permanent solution to address the patient's need (that is, for up to 90 days). There are several medication assistance programs that patients can apply for, and care managers help patients and their families/caregivers to apply for them. In the first year of the program, however, few patients needed to use the Fund for medications.

During the first six months of operation, the program paid for transportation for only one patient; however, it did not pay for prescription medications or durable medical equipment for any patients during that period.[21] Finally, care managers did not refer to, or arrange for, either Medicare-covered or non-Medicare covered services (Table 1).

WHAT WERE ENROLLEES' MEDICARE SERVICE USE AND COSTS?

This report provides preliminary estimates of the effect of Mind $_{My}$ Heart on Medicare service use and expenditures. These early estimates must be viewed with caution, as they are not likely to be reliable indicators of the true effect of the program over a longer period. Due to lags in data availability, analysis for this report included only an early cohort of enrollees (those enrolling during the first four months of program operation), and allowed observation of their experiences during their first two months in the program. The estimates thus include patients' experiences only during the program's first six months of operation, when staff still may have been fine-tuning the intervention. Moreover, the program may enroll patients with quite different characteristics over time.

During the first two full months after random assignment, total Medicare Part A and B reimbursements for the treatment group, exclusive of demonstration payment, were $867 ($434 per month), on average, compared with $7,329 ($3,665 per month) for the control group (Table 4). (The results for the first two full months after enrollment are presented, with the first partial

[21]During the *first year* of operation, the program paid for transportation for three patients and prescription medication for one patient.

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)	9.1	10.0	–0.9
Number of admissions	0.09	0.10	–0.01
Number of hospital days	0.27	1.50	–1.23
Emergency Room Services			
Any emergency room encounters (percent)			
Resulting in admission	9.1	0.0	9.1
Not resulting in admission	27.3	10.0	17.3
Total	36.4	10.0	26.4
Number of emergency room encounters			
Resulting in admission	0.09	0.00	0.09
Not resulting in admission	0.36	0.10	0.26
Total	0.45	0.10	0.35
Skilled Nursing Facility Services			
Any admission (percent)	0.0	0.0	0.0
Number of admissions	0.00	0.00	0.00
Number of days	0.00	0.00	0.00
Hospice Services			
Any admission (percent)	0.0	0.0	0.0
Number of days	0.00	0.00	0.00
Home Health Services			
Any use (percent)	0.0	30.0	–30.0
Number of visits	0.00	3.30	–3.30
Outpatient Hospital Services[b]			
Any use (percent)	90.9	70.0	20.9
Physician and Other Part B Services[c]			
Any use (percent)	100.0	100.0	0.0
Number of visits or claims	6.7	8.9	–2.2
	0.0	0.0	0.0
Mortality Rate (percent)			
Total Medicare Reimbursement[d]			
Part A[e]	$140	$5,623	–$5,483
Part B	$727	$1,707	–$980
Total	$867	$7,329	–$6,462
Reimbursement for Care Coordination[f]	$582	$0	$582
Number of Beneficiaries	**11**	**10**	

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.

[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) suggest 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.

No statistical tests were conducted given the very small sample sizes.

[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.

month excluded).[22] These costs are quite low for the treatment group (well below both their preenrollment cost per month and the Adjusted Average Per Capita Cost (AAPCC) rate paid to HMOs in Washington, DC) and quite high for the control group. The large treatment-control difference of $6,462, or 88 percent, is not statistically significant, due to the very small sample size, and reflects the presence of one very high-cost patient in the control group. (The control group mean for the two-month period drops to $746, or $373 per month, when this patient is excluded from the control group.) The CMS per-member, per-month payment to the program averaged $291, slightly less than the negotiated monthly rate of $320 (for months after the first month) because one treatment group member disenrolled.[23] The sample enrolled during the first four months is too small to allow the evaluation to draw even preliminary conclusions about early program effects.

The evaluation also examined monthly trends in treatment-control differences from June through December 2002, the first six months of program operation (Table 5). Again, the sample enrolled in each of these months is too small to draw inferences. The table is included only to demonstrate the types of analyses the evaluation will conduct in the future.

[22]Due to the small sample sizes, there were several preexisting differences between the treatment and control groups (Table B.6). These differences were significant at the 10 percent level. For the next report, we expect the two groups to be statistically similar as the number of enrollees grows.

[23]The per-member, per-month fee charged by the program is $360 for the first month, and $320 for subsequent months. Since Table 5 tracks the second and third month following intake, the care coordination costs would be $640 over the two-month period. The slightly lower means in Tables 5 and 6 resulted from lack of payment for the patient who disenrolled after losing program eligibility.

TABLE 5

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

	Group	Jun 02	Jul 02	Aug 02	Sep 02	Oct 02	Nov 02
Cumulative Enrollment Through Month End	Treatment	2	4	5	9	12	18
	Control	2	6	8	10	14	21
Number of Beneficiaries Enrolled Who Meet Medicare Coverage and Payer Requirements and are Alive that Month	Treatment	2	4	5	9	12	18
	Control	2	6	8	10	14	21
Average Medicare Reimbursement During the Month[a]	Treatment	$1,733	$1,409	$501	$478	$403	$1,007
	Control	$1,135	$6,329	$8,072	$3,078	$1,273	$2,054
Average Reimbursment for Care Coordination During the Month[a,b]	Treatment	$360	$340	$328	$298	$303	$316
Whether Admitted to Hospital This Month[a] (Percentage)	Treatment	0.0	25.0	0.0	0.0	0.0	11.1
	Control	0.0	16.7	12.5	10.0	7.1	23.8
Treatment - Control Difference[c]							
Average Medicare Reimbursement[a]		$598	–$4,920	–$7,572	–$2,601	–$869	–$1,047
Average Reimbursement for Medicare plus Care Coordination[a]		$958	–$4,580	–$7,244	–$2,303	–$566	–$732
Percentage Hospitalized[a]		0.0	8.3	–12.5	–10.0	–7.1	–12.7

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) suggest 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.

No statistical tests were conducted given the very small sample sizes.

CONCLUSION

Research over the past decade suggests, but is by no means conclusive, that successful care coordination has a number of features. These include effective patient 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. Key features include 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); and 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 to encourage physicians and program staff to look for creative ways both to meet patient goals and reduce total health care costs (Schore et al. 1999).

Program Strengths and Unique Features. Georgetown's Mind $_{My}$ Heart program appears to have almost all the features associated with effective care coordination:

- The program targets patients hospitalized for CHF with some CHF-related disability. As a result, it has ***enrolled patients with high expected health care costs***. The program uses enrollment reports to help refine their approach to patient identification.
- Care managers administer a ***comprehensive, in-person assessment*** to develop individualized care plans. To inform the care plan, care managers consult the program's multi-disciplinary team, which includes all program staff, a clinical pharmacist, a nutritionist, and a social worker. Care managers use the care plan to guide telephone monitoring contacts and patient progress toward goals.
- The program ***monitors patients' daily vital signs*** using a telephonic home monitoring device. When a patient's vital signs are outside the parameters set by their physician, the care manager will contact the patient. Patients also receive telephone calls and home visits at a frequency determined by their risk of hospitalization. Contact between care managers and patients following assessment is primarily by telephone.
- The program's educational intervention focuses on teaching patients to be better self-managers and to communicate more effectively with their physicians. The ***disease-specific curriculum can be customized to individual patients' needs*** and is supplemented with materials that address lifestyle issues and co-morbidities. Care managers also educate patients about how to communicate their needs to

their physician during office visits (for example, through modeling). Care managers assess whether patients have learned by tracking home monitoring data and adverse events, observing patient behavior, and informally reassessing patients every six months. If a patient is not learning, the care manager will revise her approach or consult program staff or the multi-disciplinary team.

- The program ***facilitates communication and coordination among patients and physicians*** through home monitoring. Abnormal readings provide care managers opportunities to teach patients when to contact their doctor, but also alert them to adverse events. Care managers call the physician to update him or her when a patient's condition changes or an adverse event occurs, as well as send home-monitoring trend reports monthly and before the patient's appointments. Care managers seek guidance from the multi-disciplinary team about patients who have just experienced an adverse event and follow up with discharge planners when patients are hospitalized, to ensure that the patient has the support he or she needs and that the patient understands the post-discharge self-care regimen.

- The care managers are ***baccalaureate-prepared registered nurses***, and all have vast nursing experience, particularly in the community setting. Each care manager also receives extensive training during orientation, using both a didactic approach as well as mentorship. The care manager supervisor and program director regularly evaluate care manager performance.

- The program seeks ***cooperation from physicians*** by conducting formal case conferences after patients have been enrolled in the program for two to three months, providing physicians with regular home-monitoring trend reports, and asking physicians for permission to change the dosage of patient medications under specified circumstances. Physicians have been cooperative in approving patients for participation and are generally responsive to care managers' telephone calls. Few physicians, however, have agreed to give care managers permission to adjust dosages.

- The program ***pays for medical transportation, medication, and durable medical equipment*** for qualified low-income patients. The program also pays for home monitoring equipment.

- The program does not provide financial incentives to staff to achieve particular outcomes or program goals. It does, however, ***pay physicians $100*** for participating in case conferences. A few physicians have declined this payment, however, because they view participating as simply part of providing good patient care, for which they are already paid.

Potential Barriers to Program Success. Mind $_{My}$ Heart's primary challenge is to enroll enough patients to achieve some economies of scale and still be able to demonstrate effects on outcomes. The program appears to be a "Cadillac" model of care coordination, given its use of

home monitoring, the multi-disciplinary team, and funds for support services and medications. All these features make it a relatively expensive program ($320 per member, per month); so it will need to reduce the need for hospitalizations by a substantial proportion to be budget-neutral. It is unclear, though, whether the program could deliver all this care well if it had achieved its first-year target enrollment of 365 treatment group members. (For example, could the program assess more than 10 patients per week, on average, and provide its intervention at the same time?) On the other hand, without more patients, Mind $_{My}$ Heart may not reach the economies of scale that would allow the program to break even, given the high fixed cost of running such a program and the need to have adequate caseloads to keep care managers fully engaged.

Obviously, it is too early and samples are too small to draw any inferences yet about program impacts. For all sites, savings in hospitalizations and other expensive Medicare services will have to be large enough not only to cover direct program fees, but also any higher Part B expenses incurred as care managers refer treatment patients for Medicare-covered services that may contribute to better short-term or long-term outcomes for enrollees.

Plans for the Second Site-Specific Report. Over the first two years of operation, a second report on MCCD activities will be prepared, which will focus more heavily on program impacts, estimated from both survey and Medicare claims data. This report, due in mid-2005, will describe changes made to the program over time and the reasons for those changes, as well as staff impressions of the program's successes and shortcomings.

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APPENDIX A

ADDITIONAL TABLES

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 county, 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

LIST OF DOCUMENTS REVIEWED FOR THIS REPORT

Georgetown Medicare Care Coordination Demonstration proposal; submitted to the Centers for Medicare & Medicaid Services, October 9, 2000.

Georgetown Medicare Demonstration Project Policy and Procedure Manual, October 9, 2003.

Georgetown Medicare Demonstration Project Quarterly Status Reports, August 2001 through January 2004.

Georgetown Project Referral List, October 20, 2003.

Team Meeting Minutes, November 19, 2003.

Annual Patient Survey Results, e-mail, February 18, 2004.

Assorted educational materials, including:

"Living with Heart Failure," pamphlet; American Heart Association, Publication No. 50-1475, April 2001.

"Talking with Your Doctor: A Guide for Older People," pamphlet; National Institute on Aging, NIH Publication No. 94-3452, September 2000.

"What You Should Know About Heart Failure," video; Heart Failure Society of America, 2002.

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.

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 June 5, 2002, through December 1, 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.

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 Georgetown University Medical School's (Georgetown's) specific criteria. CMS excluded beneficiaries from the demonstration who were not at risk for incurring full costs in the fee-for-service (FFS) 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 the primary payer.

In addition to the Medicare coverage and payer requirements, Georgetown 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 considered for the Georgetown demonstration, beneficiaries must have had a hospital discharge with a primary or secondary

TABLE B.1

ELIGIBILITY CRITERIA

Inclusion Criteria	Hospital discharge within past 12 months from a hospital within the service area with primary or secondary diagnosis of New York Heart Association Class II, III, or IV CHF. Patient's physician must agree to the referral. Codes: discharge DRG of 127 or ICD-9 Codes 428.0, 428.1, 428.9, 402.01, 402.11, 402.91, 404.01, 404.11, 404.91, 425.4
Exclusion Criteria	1. Under age 65 2. ESRD requiring dialysis 3. Expected life expectancy of less than 6 months 4. Live in a nursing home 5. No telephone line 6. Physician refuses 7. Primary hepatic failure 8. Inability to give informed consent ICD-9 Codes: 290-294, 330, 331, 570, 571
Providers/Referral Sources	Georgetown University Hospital, Washington Hospital Center, Providence Hospital, and Fort Lincoln Family Medicine. Physicians, nurses, and other healthcare providers, community agencies, and patient self-referral.
Geographic location	Washington, DC metropolitan area (District of Columbia, Prince George's County and Montgomery County in Maryland; Arlington County, Fairfax County, and Alexandria City in Virginia.) The service area is bounded by a circle with a radius of 25 miles from the Zero Milestone in Washington, DC.

We could approximate most of Georgetown's criteria using Medicare data with some exceptions. We implemented Georgetown's requirement that a patient must have *ever* had a primary or secondary diagnosis of CHF by examining whether a beneficiary had such an encounter at any point during the 30-month period beginning July 1, 2000, two years before enrollment began, and ending six months after enrollment started (December 31, 2002). We

were unable to observe the complete diagnostic history for beneficiaries who had not been in FFS Medicare during the full two years before the six-month enrollment window.[1] In addition, we did not limit eligible beneficiaries to people who had used specific hospitals or doctors who refer patients to the program, making our estimates potentially overstate the true number of people Georgetown would have approached about participating. To identify whether a beneficiary met the program's utilization (hospital discharge) or exclusion criteria at any point during the six-month enrollment window, we identified hospital discharges for the target diagnoses over an 18-month period starting July 1, 2001 and ending December 31, 2002. We could not measure NYHA classification, a measure of CHF severity, using claims data. We also could not fully approximate five of Georgetown's exclusion criteria using Medicare data: (1) life expectancy of less than six months, (2) residence in a nursing home, (3) no telephone line, (4) physician does not consent to participation, or (5) inability to give informed consent. Since we could not distinguish which beneficiaries with ESRD status required dialysis and which did not, all beneficiaries with ESRD were assumed to meet the exclusion criteria.

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

Medicare claims and eligibility data and data submitted by the program were used to identify participants and eligible nonparticipants. For all participants, we used the Medicare enrollment database (EDB) file to confirm the HIC numbers, name, and date of birth submitted by the program when beneficiaries were randomized. We identified potentially eligible

[1]Among the 42 beneficiaries 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, 5 percent were enrolled in Medicare FFS 12 or fewer of the previous 24 months before they enrolled in the demonstration; no participants were in FFS fewer than 6 of the 24 months before enrolling.

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, two years of Denominator records (2000-2001) and one year of HISKEW records (2002) were used to identify people living in the catchment counties at any time in the 2000-2002 period. HIC numbers of potentially eligible nonparticipants and all participants together formed a "finder file." The finder file was used to gather data on the beneficiary's state and county of residence during the six-month enrollment period, and obtain eligibility information from the EDB. Using this information, we limited the sample to people living in the catchment area 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.

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 June 2003, we requested Medicare claims from 2000 through 2002. We received all claims that were updated by CMS through March 2003. This allowed a minimum of a three-month lag between a patient's receipt of a Medicare-covered service in the last month we examined—December 2002—and the appearance of the claim on the Medicare files.[2]

[2]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-

Medicare claims and eligibility information were summarized as monthly variables from July 2000 through December 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, 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 (DME) 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.

(continued)
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.

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 September 15, 2002, or roughly the midpoint of the six-month enrollment window.

Defining Eligible Nonparticipants and Eligible Participants

We used target criteria information to pare down the group of beneficiaries who lived in the catchment area to those who met the program's eligibility criteria that 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 participation patterns.

Due to a data-coding error, we excluded the District of Columbia from Georgetown's catchment area used to define eligible nonparticipants (the error did not affect participants). This error will be corrected in the second site-specific report. For now, we used eligibility patterns in the four counties (Prince George's and Montgomery, Maryland; and Arlington and Fairfax, Virginia) and the city of Alexandria to simulate eligibility in the entire catchment area (including Washington, DC).

We identified 287,051 beneficiaries who lived in Georgetown's catchment area (excluding Washington, DC) at some point during the first six months of enrollment (Table B.2). We then excluded 62,519 beneficiaries (21.8 percent) who did not meet the insurance requirements set by CMS for participation in the

TABLE B.2

SAMPLE OF ALL ELIGIBLE BENEFICIARIES FOR PARTICIPATION ANALYSIS

Sample	Actual Sample Size Using 4 Counties and Alexandria City[a]	Projected Sample Size, Including DC[b]
Full Sample of Eligible Beneficiaries Who Live in Catchment Area One or More Months During the First Six Months of Enrollment	287,051	363,051
Minus those who:		
During six-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	–62,519	–79,072
Did not have the target diagnosis on any claim during the two years before the program started or during the six-month enrollment window	–189,777	–240,023
Did not have a hospitalization for the target condition during the 18 months from July 2001 through December 2002	–22,897	–28,959
Met at least one of the exclusion criteria during the 18 months from July 2001 through December 2002	–5,105	–6,457
Eligible Sample	**6,753[c]**	**8,540**

Note: Our calculations in column 1 erroneously excluded eligible nonparticipants from Washington, DC. Column 2 scales up the estimates from column 1 by assuming the proportion of eligibles in DC would be the same as in the surrounding areas actually used in the calculations.

[a]The four counties are Prince George's and Montgomery counties in Maryland, and Arlington and Fairfax counties in Virginia.

[b]This projection adds in the 76,000 Medicare beneficiaries who live in DC (2001 Medicare and Medicaid Statistical Supplement to the Health Care Financing review). We then assume that the proportions of eligible beneficiaries who do not meet the eligibility criteria in Washington, DC is similar to those in the rest of the catchment area.

[c]Tables 2 and B.4 also exclude beneficiaries if they did not have a hospitalization in the 12 months before intake (September 15, 2002, the midpoint of the six-month enrollment period, for eligible nonparticipants). This reduces the eligible sample to 5,149.

program during one or more months during the six-month enrollment window. Another 189,777 of the remaining beneficiaries (66.1 percent of all area beneficiaries) were dropped from the sample, since they were not treated for the target diagnosis the program identified as necessary for inclusion during the two years before the program began or during the first six months of enrollment. Sixty-six percent of the remaining beneficiaries (22,897 beneficiaries) did not meet the utilization requirements we measured during the 18 months from July 2001 through December 2002 (which includes the year before the program began, as well as the six-month enrollment window). Finally, 5,105 beneficiaries were identified as having at least one of Georgetown's exclusion criteria, leaving us with a sample of 6,753 beneficiaries in the service area eligible to participate in Georgetown's program. Using estimates of the number of beneficiaries who lived in the District of Columbia (76,000) and the same rates not meeting eligibility requirements, we estimated that a total of 8,540 area beneficiaries would have been eligible to participate in Georgetown's program.

Georgetown randomized 43 beneficiaries during the first six months of operation (Table B.3). Of these, one could not be matched to their Medicare claims data due to problems with their reported HIC number and was therefore excluded from the participation sample.[3] Georgetown randomized four beneficiaries who had an address on the EDB that was outside its catchment area. We excluded these cases from the participation analysis to maintain comparability to the eligible nonparticipant sample. All participants met CMS's insurance requirements for participation in the program during the month of intake. We also dropped one

[3]This number could arise because the beneficiary's reported HIC number was invalid or could not be used to obtain claims due to the way the Medicare files are created (described in footnote 2). The beneficiary may well be eligible, but we could not obtain the Medicare data to assess that; so the person was excluded. The beneficiary will be included in the next report.

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	21	22	43
Minus those who:			
Had an invalid HIC number on MPR's enrollment file	–0	–1	–1
Not in geographic catchment area during the month of intake	–1	–3	–4
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	–0	–0	–0
Did not have the target diagnosis on any claim during the two years before the program started or during the six-month enrollment window	–0	–1	–1
Did not have a hospitalization for the target condition during the 18 months from July 2001 through December 2002	–2	–3	–5
Met at least one of the exclusion criteria during the 18 months from July 2001 through December 2002	–4	–1	–5
Eligible Sample	**14**	**13**	**27**

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, not having a telephone line).

participant for not having at least one claim for the target diagnosis during the two years before the program began or the first six months of the program. Finally, five participants were dropped from the participation analysis because they met one of the program's exclusion criteria, and another five were dropped because they did not meet the utilization criteria during the 18-month period (July 2001 through December 2002). Thus, among the 43 participants randomized by Georgetown into the program, after exclusions, 27 were included in the participation analyses as eligible participants.

Georgetown's participation rate for the first six months of enrollment is calculated as the number of participants who met the eligibility requirements (27), divided by the number of eligibles we estimated live in the catchment area (8,540), or 0.3 percent.

We next compare the preenrollment characteristics and service use of eligible participants and nonparticipants in Table B.4.[4] Table B.4 is identical to Table 2 in the text, except that the participant sample in Table B.4 has been restricted to the beneficiaries who meet the eligibility criteria according to Medicare claims data. Because almost 65 percent of the participants are included in this table, the results are similar to those in Table 2.

METHOD FOR CALCULATING IMPACTS

Sample sizes are too small, and the follow-up period too short, to estimate program impacts. However, the mean outcomes of the treatment and control groups are useful to examine as an indication of the health care needs of the early enrollees. The analysis draws on the data and the

[4]The sample in Table B.4 differs from that in Table B.2. Due to a data coding error, we also limit to eligible nonparticipants outside of D.C., for whom we have data. We further limit the sample of beneficiaries to those who met the target criteria (as measured using Medicare claims data) during the year before intake. The enrollment date used for eligible nonparticipants is chosen to be three months after the program began enrollment (that is, the middle of the six-month window). This results in 27 eligible participants and 5,122 eligible nonparticipants in Table B.4.

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)	77.2	78.6	
Younger than 65	0.0	0.0	
65 to 74	29.6	32.5	
75 to 84	51.9	44.1	
85 or older	18.5	23.4	
Male	59.3	42.7	*
Nonwhite	51.9	25.4	***
Original Reason for Medicare: Disabled or ESRD	11.1	8.0	
State Buy-In for Medicare Part A or B	14.8	13.8	
Newly Eligible for Medicare (Eligible Less than Six Months)	0.00	0.02	
Enrolled in Fee-for-Service Medicare Six or More Months During Two Years Before Intake	100.0	100.0	
Medical Conditions Treated During Two Years Before Month of Intake[b]			
Coronary artery disease	92.6	79.3	*
Congestive heart failure	100.0	92.7	
Stroke	22.2	39.2	*
Diabetes	51.9	44.9	
Cancer	29.6	27.1	
Chronic obstructive pulmonary disease	59.3	54.6	
Dementia (including Alzheimer's disease)	0.0	0.5	
Peripheral vascular disease	22.2	20.9	
Renal disease	11.1	18.2	
Total Number of Diagnoses	3.9	3.8	
Days Between Last Hospital Admission and Intake Date[b]			
0 to 30	33.3	15.4	***
31 to 60	14.8	13.8	
61 to 180	40.7	35.8	
181 to 365	11.1	35.0	***
No hospitalization in past two years	0.0	0.0	

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	3.7	2.1	
0.1 to 1.0	29.6	53.4	**
1.1 to 2.0	25.9	26.0	
2.1 to 3.0	18.5	11.1	
3.1 or more	22.2	7.3	***
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]			
Part A	$1,699	$1,743	
Part B	$692	$667	
Total	$2,391	$2,410	
Distribution of Total Medicare Reimbursement per Month Fee-for-Service During One Year Before Intake[b]			
$0	0.0	0.0	
$1 to 500	7.4	10.1	
$501 to 1,000	11.1	20.8	
$1,001 to 2,000	40.7	25.8	*
More than $2,000	40.7	43.3	
Number of Beneficiaries	**27**	**5,122**	

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 September 15, 2002, the midpoint of the six-month enrollment period examined.

Due to a data-coding error, this table excludes Washington, DC from the catchment area used to define eligible nonparticipants (the error did not affect participants). The next report will correct this error.

[a]Participants who do not meet Medicare coverage and payer 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.

[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.

TABLE B.4 *(continued)*

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*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.

variables constructed for the participation analysis, but is restricted to the program's participants (treatments and controls). The cost of the intervention was estimated as the amount CMS paid to Georgetown for the treatment group patients, using G-coded claims in the physician claims file.

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 people Georgetown randomized during the first four months of enrollment. The four-month enrollment window covers June 5, 2002 through October 2, 2002. The follow-up time covered the two calendar months after the month of randomization. For example, for a beneficiary randomized on June 25, we examined outcomes in July and August.

Second, we estimated treatment-control differences by calendar month over the first six months of Georgetown's 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 care 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 June 2002 through November 2002, we identified the patients who were enrolled in Georgetown's coordinated care program and analyzed their Medicare-covered service use. For example, a person randomized in June would be present in June through November, provided that person is eligible and alive in each month.[5] Someone randomized in July would not be part

[5] 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).

of the calculations for June but would be included in July through November, 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 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), because we would not have the claims data needed to measure their cost or service use. However, we also excluded beneficiaries flagged as a household member of a participant, since they were not part of the research sample and thus were not used for the outcomes analysis.[6] Also, 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 23 people randomized in the first four months of Georgetown's demonstration, the sample for analyzing treatment-control differences contained 21 people. For the six-month sample, 41, or 95 percent of the 43 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 FFS (described in footnote 5).

[6]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	23	43
Minus those who:		
Were members of the same household as research sample members	–1	–1
Had invalid HIC numbers on MPR's enrollment file	–1	–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	0	0
Number of Usable Sample Members	**21**	**41**

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.

Under random assignment, we expect the treatment and control groups to have similar characteristics if there is sufficient sample. Due to the small number of beneficiaries in both the four- and six-month samples, there were statistically significant differences in five baseline characteristics for the four-month sample: (1) the proportion of beneficiaries who were non-white; (2) the proportion of beneficiaries who in the previous two years were treated for diabetes,

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)	75.2	77.7		76.4	74.9	79.8	**	77.4
Younger than 65	0.0	0.0		0.0	0.0	0.0		0.0
65 to 74	54.6	20.0		38.1	50.0	9.5	***	29.3
75 to 84	36.4	60.0		47.6	45.0	61.9		53.7
85 or older	9.1	20.0		14.3	5.0	28.6	*	17.1
Male	63.6	80.0		71.4	60.0	66.7		63.4
Nonwhite	45.5	10.0	*	28.6	50.0	28.6		39.0
Original Reason for Medicare: Disabled or ESRD	18.2	10.0		14.3	10.0	9.5		9.8
State Buy-In for Medicare Part A or B	9.1	0.0		4.8	10.0	19.1		14.6
Newly Eligible for Medicare (Eligible Less than Six Months)	0.0	0.0		0.0	0.0	0.0		0.0
Enrolled in Fee-for-Service Medicare Six or More Months During Two Years Before Intake	100.0	100.0		100.0	100.0	100.0		100.0
Medical Conditions Treated During Two Years Before Month of Intake[a]								
Coronary artery disease	90.9	100.0		95.2	90.0	100.0		95.1
Congestive heart failure	100.0	100.0		100.0	100.0	95.2		97.6
Stroke	27.3	30.0		28.6	35.0	28.6		31.7
Diabetes	63.6	20.0	*	42.9	65.0	38.1	*	51.2
Cancer	27.3	40.0		33.3	30.0	33.3		31.7
Chronic obstructive pulmonary disease	36.4	30.0		33.3	40.0	57.1		48.8
Dementia (including Alzheimer's disease)	27.3	0.0	*	14.3	15.0	4.8		9.8
Peripheral vascular disease	9.1	30.0		19.0	15.0	23.8		19.5
Renal disease	45.5	10.0	*	28.6	35.0	9.5	*	22.0
Total Number of Diagnoses (number)	4.3	3.6		4.0	4.3	3.9		4.1

TABLE B.6 *(continued)*

	Four-Month Sample			Six-Month Sample			
	Treatment Group	Control Group	Total Research Sample	Treatment Group	Control Group		Total Research Sample
Days Between Last Hospital Admission and Intake Date[a]							
0 to 30	9.1	30.0	19.0	20.0	33.3		26.8
31 to 60	27.3	10.0	19.0	15.0	19.1		17.1
61 to 180	45.5	30.0	38.1	45.0	19.1	*	31.7
181 to 365	18.2	10.0	14.3	20.0	19.1		19.5
366 to 730	0.0	10.0	4.8	0.0	4.8		2.4
No hospitalization in past two years	0.0	10.0	4.8	0.0	4.8		2.4
Annualized Number of Hospitalizations During Two Years Before Month of Intake[a,b]							
0	0.0	20.0	9.5	0.0	9.5		4.9
0.1 to 1.0	18.2	20.0	19.0	30.0	28.6		29.3
1.1 to 2.0	27.3	40.0	33.3	35.0	33.3		34.1
2.1 to 3.0	27.3	10.0	19.0	15.0	9.5		12.2
3.1 or more	27.3	10.0	19.0	20.0	19.1		19.5
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[a]							
Part A	$2,353	$1,673	$2,029	$1,697	$1,697		$1,697
Part B	$828	$706	$770	$793	$687		$739
Total	$3,181	$2,379	$2,799	$2,490	$2,385		$2,436
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	0.0	20.0	9.5	0.0	14.3	*	7.3
$501 to 1,000	9.1	10.0	9.5	15.0	14.3		14.6
$1,001 to 2,000	18.2	30.0	23.8	35.0	33.3		34.1
More than $2,000	72.7	40.0	57.1	50.0	38.1		43.9
Location During Program Intake Period							
District of Columbia	18.2	30.0	23.8	35.0	33.3		34.1
Maryland							
Prince Georges	27.3	10.0	19.0	30.0	9.5		19.5
Montgomery	18.2	20.0	19.0	15.0	14.3		14.6
Virginia							
Arlington	9.1	0.0	4.8	5.0	4.8		4.9
Fairfax	9.1	10.0	9.5	5.0	14.3		9.8
Alexandria	0.0	10.0	4.8	0.0	4.8		2.4
Outside catchment area	0.0	30.0	* 14.3	5.0	14.3		9.8
Number of Beneficiaries	**11**	**10**	**21**	**20**	**21**		**41**

TABLE B.6 *(continued)*

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 September 15, 2002, the midpoint of the six-month enrollment period examined.

Participants were excluded from this table if they did not meet Medicare coverage and payer requirements for the demonstration, 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.

[a]Calculated among beneficiaries with six or more months in Medicare fee-for-service in the two years before intake.

[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.

(3) dementia, and (4) renal disease; and (5) the proportion of beneficiaries living outside Georgetown's catchment area. These differences were significant at the 10 percent level.

For the six-month sample, there were six statistically significant differences: (1) the average age of beneficiaries; (2) the proportion of beneficiaries between the ages of 65 to 74 and 85 or older; (3) the proportion of beneficiaries whose days between last hospital discharge and intake was 61 to 180 days; (4) the proportion of beneficiaries who in the previous two years were treated for diabetes, and (5) renal disease; and (6) the proportion of beneficiaries whose total Medicare reimbursement per month enrolled during the two years before the month of intake was between $1 to $500. We would expect some differences to occur due to small samples and the number of characteristics examined. Thus, none of the differences in this small, early sample create any cause for concern.

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 July, we tabulated the individual's outcomes in August and September. 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 home health services visits and the percent of patients who used any outpatient hospital services, which are significant at the 10 percent level in the three-month period and insignificant 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).

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)	18.2	30.0	–11.8
Number of admissions	0.18	0.50	–0.32
Number of hospital days	0.55	3.90	–3.35
Emergency Room Services			
Any emergency room encounters (percent)			
Resulting in admission	18.2	20.0	–1.8
Not resulting in admission	27.3	20.0	7.3
Total	36.4	30.0	6.4
Number of emergency room encounters			
Resulting in admission	0.18	0.40	–0.22
Not resulting in admission	0.45	0.30	0.15
Total	0.64	0.70	–0.06
Skilled Nursing Facility Services			
Any admission (percent)	0.0	0.0	0.0
Number of admissions	0.00	0.00	0.00
Number of days	0.00	1.50	–1.50
Hospice Services			
Any admission (percent)	0.0	0.0	0.0
Number of days	0.00	0.00	0.00
Home Health Services			
Any use (percent)	0.0	30.0	–30.0
Number of visits	0.00	7.40	–7.40
Outpatient Hospital Services[b]			
Any services (percent)	100.0	70.0	30.0
Physician and Other Part B Services[c]			
Any use (percent)	100.0	100.0	0.0
Number of visits or claims	10.1	15.3	–5.2
Mortality Rate (percent)	0.0	0.0	0.0
Total Medicare Reimbursement[d]			
Part A[e]	$372	$11,017	–$10,645
Part B	$1,291	$2,606	–$1,316
Total	$1,663	$13,624	–$11,961
Reimbursements for Care Coordination[f]	$909	$0	$909
Number of Beneficiaries	**11**	**10**	

TABLE B.7 *(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.

[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.

No statistical tests were conducted given the very small sample sizes.

[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.

APPENDIX C

SELECTED PROGRAM DOCUMENTS

Physician program brochure

Physician fact sheet

Physician recruitment letter from Thomas Scully

Referral intake form

Program advertisement

Pain assessment

Multi-disciplinary team summary sheet

Example care plan

Care management phone assessment form

Valentine card

HomMed trend report

SMOG readability assessment tool

“Tips for good communication” pamphlet excerpt