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The CorSolutions Medicare Coordinated Care Demonstration Program After One Year

Final Report

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Karen Sautter
Jennifer Schore
Randall Brown
Sherry Aliotta
Deborah Peikes
Sean Orzol

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U.S. Department of Health and Human Services
Centers for Medicare & Medicaid Services
Office of Research, Development, and Information
C3-19-07 Central Building
7500 Security Boulevard
Baltimore, MD 21244-1850

Project Officer:
Carol A. 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

CONTENTS ***(continued)***

Page

TABLES

TABLES *(continued)*

Table **Page**

EXECUTIVE SUMMARY

The Medicare Coordinated Care Demonstration (MCCD), mandated by the Balanced Budget Act of 1997, is testing 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 during 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 to 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, as well as analysis of Medicare and program-generated data. The next report series will focus on Medicare service use and costs over a longer time and will include all first-year enrollees.

This report describes CorSolutions' MCCD project. We first present an overview of the CorSolutions MCCD. We then address the following four questions: (1) Who enrolls in the program? (2) To what extent does the program engage physicians? (3) How well is the program implementing its approaches to improving patient health and reducing health care costs? and (4) What were enrollees' Medicare service use and costs during its first months of operation? Finally, we discuss the program's strengths and unique features, as well as potential barriers to program success.

Program Organization and Approaches. CorSolutions is a privately owned provider of disease management services located in Rosemont, Illinois (outside Chicago). The prototype for

its demonstration is its ongoing CHF management program, which CorSolutions reports has reduced hospital admissions and days by 50 and 60 percent, respectively, compared to other Medicare beneficiaries, as well as increasing use of beta blockers, producing high levels of patient and physician satisfaction, and improving quality of life. Key staff work in three locations. The recruitment team, which recruits physicians to participate, is in Houston, Texas. The patient enrollment team is in CorSolutions' service center just outside Philadelphia, Pennsylvania, and its disease managers also are in Philadelphia. Administrative staff, including the project director and financial staff, are in Rosemont.

CorSolutions has adopted three main approaches to improving patient health and reducing health care costs: (1) improving patient adherence to treatment recommendations, (2) improving communication and coordination between patients and physicians, and (3) improving provider practice. The program aims to improve patient adherence by teaching patients how to recognize and respond appropriately to symptoms and be better self-managers. The program seeks to improve communication between patients and physicians by teaching patients how to communicate more effectively with their physicians. Finally, the program aims to improve coordination and provider practice by comparing physician treatment plans with evidence-based guidelines and making suggestions when discrepancies are found.

Unlike any of the other MCCD demonstration sites, CorSolutions also is examining the effect of adding a prescription drug benefit to its intervention for patients who need help purchasing medications. Patients enrolling in the demonstration were randomly assigned to one of three groups: (1) the control group (three of every seven enrollees, or 42 percent), (2) a treatment group that received disease management services only (two of every seven enrollees, or 29 percent), or (3) a treatment group that received disease management services plus a drug benefit (two of every seven enrollees, or 29 percent). Patients assigned to the drug benefit arm of the treatment group are eligible for coverage of both cardiac and noncardiac prescription drugs if they do not already have insurance coverage for these benefits, if their income does not exceed 200 percent of the federal poverty level, and if they are not military veterans already entitled to coverage through the Veterans Administration.

Patient Identification. CorSolutions began enrolling patients in June 2002. The program requires that patients have had either a hospital discharge or an emergency room visit with a primary or secondary diagnosis of congestive heart failure (CHF) in the previous year. Patients must live in the Houston Metropolitan Statistical Area, although the program focuses on those in Harris County. As in all the MCCD demonstration programs, beneficiaries must also meet three CMS requirements: (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 originally recruited patients through their physicians. CorSolutions hired recruiters to identify potential physician participants and introduce them to the program. The recruiters searched Houston medical society directories to identify physicians. Recruiters made appointments with physicians to explain the program, and physicians who chose to participate signed written agreements with the program. After a physician signed the agreement, the physician's office staff generated lists of potentially eligible patients using information in their office billing system. Program staff then worked with physician office staff to determine if those

patients met the program's exclusion criteria. The physician reviewed referrals for program appropriateness.

Within the first six months, CorSolutions found that identifying patients through their physicians was inefficient, and the program began to recruit hospitals so it could use hospital lists to identify patients. During its first year, the program identified 97 percent of its enrollees by reviewing lists, provided by its 20 participating hospitals, of current CHF patients and CHF patients with hospitalizations during the past year. To recruit these hospitals, CorSolutions' regional director of operations sought approval from each hospital's privacy officer, sometimes consulting with representatives from each hospital's medical records, case management, quality management, and information systems departments. Hospital lists include those patients who meet CMS's insurance criteria and the program's diagnosis and hospitalization criteria. After verifying eligibility and recruiting patients' physicians, the program sends eligible patients a letter from their physician, which briefly explains the program. An enrollment specialist telephones the patient within seven days of receiving the letter and uses a script to explain the program in more detail. If the patient consents, the enrollment specialist sends the patient an informed consent form that the patient returns by mail. MPR then randomly assigns the patient to one of three groups, as described above.

Assessment, Care Planning, and Monitoring. A program disease manager and a Houston-based, Medicare-certified home health nurse conduct assessments for all treatment group members after enrollment. (CorSolutions uses a Web-based computer system called CorConnect that guides disease managers through the assessment, prompts disease managers to educate patients, and generates reports about patient outcomes and disease manager performance.) The disease manager's assessment covers demographics, medical history, current comorbid conditions, medications, quality of life, diet, exercise, current adherence to the physician's treatment plan, learning readiness, and literacy. The home health nurse conducts a physical examination, verifies the patient's medications, and assesses home safety. CorSolutions' CorConnect information and disease management system automatically generates a patient care plan. This is a teaching plan that has eight educational modules prioritized according to the assessment and the patient's preference. The program intended that physicians would meet with patients to discuss the care plan and that the program would pay the physicians to do so.

CorConnect allows disease managers to customize a monitoring schedule specifying the number and timing of calls according to care-planning goals, patient preference, and their own judgment. It also prompts them when it is time to call a patient. CorConnect customizes patient questions for each call based on the patient's health status, progress through the educational modules, and treatment plan adherence. Routine monitoring generally occurs every other week for the first few months. After the patient completes all educational modules, contact is reduced to once a month. The purpose of contact after all modules are complete is to see whether patients are taking their medications and progressing toward their goals (such as controlling their weight or exercising). Patients can telephone the on-call CorSolutions nurse 24 hours a day, seven days a week if they have questions or problems.

Staffing and Program Quality Management. Maintaining and improving care quality and ensuring that programs attain their goals both require that staff have adequate qualifications, training, and supervision and that management has the tools and support to monitor program

progress. CorSolutions MCCD disease managers must be registered nurses licensed in Texas and have five or more years of clinical experience in critical or coronary care. They also must be proficient in using computers and have good customer relations skills. CorSolutions conducts a three-week employee orientation that covers its policies and procedures, quality improvement processes, communication skills, and clinical guidelines, as well as patient behavior and social learning theories. Program disease managers also receive eight hours of MCCD-specific training. New disease managers then are paired with more experienced ones for another three weeks, after which they take on their own caseloads.

The disease manager clinical supervisor evaluates the performance of disease managers by (1) meeting monthly with individual disease managers to discuss performance; and (2) reviewing weekly reports that describe individual disease managers' productivity, including the patients' clinical measures and outcomes. The MCCD disease managers meet as a group every two weeks to discuss performance.

CorConnect generates program-level quarterly reports to monitor patient outcomes such as emergency room visits and hospital admissions for both cardiac and noncardiac events, use of beta blockers, daily sodium intake, smoking cessation, and New York Heart Association classification, as well as quality of life indicators, such as emotional health. The program director reviews these reports and shares the results with other project staff as appropriate.

WHO ENROLLS IN THE PROGRAM?

Program enrollment has been lower than anticipated. After one year of operation, the CorSolutions MCCD had enrolled 668 patients: 287 had been assigned to the control group, 191 to the treatment group arm without pharmacy benefits, and 190 to the treatment group arm with pharmacy benefits. This falls short of the program's first-year target of 1,750 beneficiaries. Staff attribute the enrollment shortfall to challenges in the patient identification process, lack of physician enthusiasm about participating, and patient refusal. After recognizing that its original approach to identifying patients did not work, the program made a major change to its patient recruitment process, moving responsibility for patient identification from physicians and their office staff to hospitals. This change markedly increased the average monthly enrollment rate in the CorSolutions MCCD.

To measure the proportion of eligible beneficiaries enrolling in the program and to describe their characteristics, the evaluation used Medicare enrollment and claims data to simulate CorSolutions MCCD eligibility criteria. The simulation showed that, during the program's first six months of operation, less than one percent of an estimated 13,220 eligible beneficiaries enrolled. The simulation did not distinguish, however, between beneficiaries served by physicians and hospitals with whom the program had referral agreements and those in the program's service area who did not. Thus, the number of eligible nonparticipants who were aware of the program is likely to be far smaller.

Program participants differed from nonparticipants in age and gender but were similar in race and Medicaid eligibility (Table 1). Participants were more likely than nonparticipants to be

TABLE 1

CHARACTERISTICS OF CORSOLUTIONS MCCD PARTICIPANTS AND ELIGIBLE NONPARTICIPANTS DURING FIRST SIX MONTHS OF PROGRAM INTAKE
(Percent, Except As Noted)

	Participants[a]	Eligible Nonparticipants
Age		
Younger than 65	17.9	11.9
65 to 74	41.4	33.6
75 to 84	32.1	37.7
85 or older	8.6	16.8
Male	48.2	39.9
Nonwhite	34.6	29.4
Medicaid Buy-In for Medicare A or B	20.4	25.5
Medical Conditions Treated in Past Two Years		
Cancer	17.6	20.5
CHF[b]	98.1	88.2
Coronary artery disease	91.2	75.6
Chronic obstructive pulmonary disease	66.0	54.8
Diabetes	54.1	46.9
Dementia (including Alzheimer's disease)	5.0	1.1
Stroke	39.6	37.1
Peripheral vascular disease	17.0	14.8
Renal disease	25.8	14.3
Total Number of Conditions	4.1	3.5
Hospital Admission in Past Year	85.5	73.4
Hospital Admission in Past Month	13.2	13.7
Total Medicare Reimbursement per Month (Dollars)	$2,660	$1,942
Number of Beneficiaries	**162**	**13,119**

Source: Medicare Enrollment Database and National Claims History.

Note: For participants, the intake date is their date of enrollment. For eligible nonparticipants, it is September 15, 2002, the midpoint of the six-month enrollment period covered by the participation analysis.

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

[b]Not all eligible nonparticipants are shown as having CHF, despite it being CorSolutions' target condition, because the standard definition used by the evaluation to measure CHF differs from that used by the program. Similarly, some participants and eligible nonparticipants are shown as having dementia, despite it being one of CorSolutions' exclusion criteria, because the standard definition used by the evaluation to measure dementia for all MCCD programs contains different ICD-9 codes than those used by CorSolutions.

male (48 versus 40 percent) and less likely to be age 85 or older (9 versus 17 percent). However, roughly two-thirds of each group were white, and between a fifth and a quarter were dually eligible for Medicare and Medicaid.

Participants appeared to have been in poorer health than eligible nonparticipants. Eighty-six percent of participants had a hospitalization in the year before enrolling. Participants had high rates of several chronic conditions, with 98 percent having been treated in the previous two years for CHF, which is the program's target condition. (When assessing eligibility, CorSolutions relies on diagnosis information reported by patients and their physicians. The evaluation identified two beneficiaries who had no claims for the CHF-related conditions targeted by the program in the two years before random assignment.) In addition, 91 percent of participants were treated for coronary artery disease, 66 percent for chronic obstructive pulmonary disease, 54 percent for diabetes, 40 percent for stroke, and 26 percent for renal disease. As a result, participants had monthly Medicare expenditures that averaged $2,660 over this period. In contrast, a lower percentage (73 percent) of nonparticipants had been hospitalized, and they had a lower rate of many chronic conditions: 88 percent had diagnoses that the evaluation uses to define CHF for all programs (the rest had the additional diagnoses CorSolutions uses to define CHF), 76 percent had coronary artery disease, 55 percent had chronic obstructive pulmonary disease, 47 percent had diabetes, 37 percent had a history of stroke, and 14 percent had renal disease. As a result, nonparticipants' monthly Medicare spending averaged $1,942 during the year. (September 15, 2002, was used as a pseudo-enrollment date for nonparticipants; it is roughly the midpoint of the six-month enrollment period considered here.)

When developing the cost estimate for the program's waiver application, MPR estimated that Medicare costs would average $2,078 per month for control group members during the demonstration period. As noted, costs for actual program enrollees averaged $2,660 during the year before enrollment. Thus, it appears that the program has enrolled patients who have costs somewhat higher than expected.

Although the program has not yet surveyed patients about their satisfaction with the program, anecdotally, staff believe that patients are very satisfied with it. Voluntary disenrollment during the first six months of the demonstration was minimal. Only seven patients asked to be disenrolled from the MCCD for unrecorded reasons.

TO WHAT EXTENT DOES THE PROGRAM ENGAGE PHYSICIANS?

The CorSolutions MCCD is promoted to physicians as a tool to support them in making decisions about patient care. The program aims to supplement the physicians' knowledge about their patients and encourage their cooperation with disease managers when problems arise with specific patients. The program expected physicians to (1) meet with newly enrolled treatment group patients to discuss their role in the program, and (2) review quarterly patient care summaries.

CorSolutions has adopted two primary strategies to engage physicians. First, disease managers telephone physicians quarterly to discuss individual patients (and as needed in the interim). During the quarterly calls, they review summaries describing the care provided by

physicians and the medications they prescribed. Physicians are paid $50 per patient per teleconference; they are paid $30 per patient for the ad hoc calls. Second, the program assigns a specific disease manager to each participating physician. This provides physicians with a point person to handle MCCD issues. Despite these strategies, efforts to engage physicians appear to have met with limited success. Staff report that only a few physicians have actively encouraged their patients to enroll in the program and advocated the program to their peers. Furthermore, physicians have not been as responsive to disease managers as expected. Staff report that fewer than half the physicians participate in all quarterly teleconferences, although all respond to calls to discuss specific patient problems. Staff attribute the low participation in quarterly teleconferences to the many demands on physicians' time.

A primary goal of the CorSolutions MCCD is to improve physician practice. The program provides physicians with a summary of heart failure treatment guidelines as part of its welcome packet when they agree to participate. After the assessment, CorConnect automatically compares the patient's medications and medical treatment received to evidence-based guidelines, which may, in turn, produce suggestions for physicians for changes. These recommendations appear in the patient care summary the program sends physicians for each patient and are discussed during the quarterly teleconferences. The program uses patients' self-reports to track physicians' prescribing patterns for medications such as vasodilators and beta blockers. After a year of operation, staff believe that physicians were somewhat satisfied with the program. Consistent with staff reports, program data show that only about half (47 percent) of patients' physicians were paid for participating in conference calls during the first six months of operation. If physicians had been actively engaged in the program, participation in these calls should have been closer to 75 percent, since three-quarters of patients enrolled during the first six months had been in the program for more than a month.

HOW WELL IS THE PROGRAM IMPLEMENTING KEY INTERVENTION APPROACHES?

Improving Patient Adherence. Improving patient adherence to treatment recommendations is a major goal of the CorSolutions MCCD program. To accomplish this, disease managers deliver a highly structured education intervention developed by CorSolutions. The intervention focuses on CHF, but it also addresses comorbidities common to CHF patients (such as diabetes) and helps patients make related lifestyle changes (such as stopping smoking or increasing exercise). Education topics are presented in eight modules: (1) disease etiology, (2) signs and symptoms, (3) improvement in self-care skills, (4) adherence, (5) medication management, (6) smoking cessation, (7) healthy eating, and (8) physical activity and stress management. Disease managers determine whether patients understand educational messages by listening to them describe their activities and behaviors and asking them about what they have learned and how they would react to hypothetical scenarios. If the program finds that a patient is not learning, the disease manager works with the patient and the caregiver/family to identify barriers to education and develop strategies to address them.

Among the 99 patients enrolled in the program during the first six months of operation, 68 percent had received at least one contact for self-care or disease-specific education. Although no patients had a contact during which a disease manager explained tests or procedures, 66 percent

had one during which the disease manager explained medications. The proportion of treatment group patients having a contact during which the disease manager explained medications was smaller for those receiving the prescription drug benefit than for those without it (61 versus 72 percent).

Improving Communication and Coordination. The program also seeks to improve patient health by teaching patients to communicate more effectively with their physician and coordinate their own care. Disease managers help patients develop a list of questions to ask their physician during appointments. Following the appointment, the disease manager reviews the physician's answers to the questions with the patient to ensure understanding of the treatment plan and to clarify how the patient can adapt these recommendations to his or her lifestyle. Disease managers do not usually make doctor's appointments for their patients. Instead, they encourage patients to make medical appointments and help them identify and eliminate barriers to making those appointments.

Disease managers play a direct role in improving coordination, however, by sending physicians quarterly patient-specific summaries that contain recommended medication treatment changes based on a comparison of the patient's medication regimen with CHF guidelines. The disease manager then schedules a call with the physician to review the summary. During the call, the disease manager also may remind the physician that a patient is due for a test or preventive care or may report a change in patient health status or symptoms that need attention. During routine monitoring, disease managers use CorConnect to review each patient's medications to assess polypharmacy and potential drug interactions. If the disease manager identifies problems in the patient's regimen—for example, more than one prescription for the same (or similar) medications or contraindications for some medication—he or she will immediately alert the patient's physician by telephone and note the issue in the patient's next care summary.

Disease managers also track patients' adverse events (primarily hospitalizations) in CorConnect and work with physicians, patients, and caregivers to prevent reoccurrences. Because disease managers usually hear about adverse events from patients or caregivers, they may not learn of an event until some weeks after it occurs. Nevertheless, the disease manager works with the patient and the caregiver to determine why the event occurred and develops a plan to prevent it from happening again. The event is also noted in the patient care summary and discussed with the physician during the quarterly teleconference. If issues result from the event that the disease manager feels the physician should be aware of sooner—for example, a patient being started on new medications by a specialist while in the hospital—the disease manager will contact the physician for that purpose.

Increasing Access to Services. Although CorSolutions can refer patients to a wide variety of services, increasing access to services is not a major focus of the program. The program also pays for a few goods and services—such as pillboxes, scales, and home health visits (beyond the initial assessment visit)—if a patient needs but cannot afford them. CorSolutions' social workers have access to a national database of resources organized by zip code, and they refer patients to needed services that disease managers identify during routine monitoring (or, in some cases, they arrange the services for the patient).

As noted, patients assigned to the prescription drug benefit arm of the treatment group can receive coverage for both cardiac and noncardiac prescription drugs if they qualify. During its first six months of operation, however, CorSolutions purchased prescription drugs for only 4 of the 49 patients in the prescription drug benefit group because few patients lacked coverage and met the low-income criteria. Patients who are in the nonprescription drug arm of the treatment group, or who are in the drug arm but not qualified for the benefit, but who are having difficulty affording their medications, receive help from a CorSolutions social worker in applying to local medication assistance programs. A disease manager also may contact a patient's physician for drug samples or to ask the physician to allow substitution of a less costly generic version for a brand-name medication to reduce the patient's out-of-pocket expenses.

WHAT WERE ENROLLEES' MEDICARE SERVICE USE AND COSTS?

This report presents preliminary estimates of Medicare service use and costs for the CorSolutions MCCD for those enrolled during the first four months of program intake. The follow-up period (the first two full months after random assignment) is too short to draw inferences about the true effects of the MCCD over a longer period. The percentage of the 54 treatment group members in this analysis who were hospitalized during the two-month period is slightly lower than the percentage of the control group (14.8 versus 16.7 percent), but the difference is not statistically significant ($p = 0.83$). Total Medicare costs for the 54 treatment group members in this analysis, exclusive of demonstration costs, were $3,812, on average, during the first two months after enrollment ($1,906 per month), compared to $3,324 ($1,662 per month) for the 37 beneficiaries in the control group. This difference of $488 ($244 per month, or 15 percent) is not statistically significant ($p = 0.77$) and reflects the presence of two high-cost individuals in the treatment group. The treatment-control difference in costs increases by $750 over the first two months, from $488 to $1,238, when one takes into account the CMS per-member per-month program payment. It is too soon to tell whether these early increases in Medicare costs ultimately will result in improved patient health and reduced hospital service use and total costs.

CONCLUSION

Program Strengths and Unique Features. The CorSolutions MCCD appears to have many of the features research has shown to be associated with effective care coordination.

- The program targets patients recently hospitalized for CHF and, as a result, has ***enrolled patients with high health care costs*** in the year before enrolling compared to waiver estimates. The program improved enrollment by identifying patients by reviewing hospital census lists rather than through physicians.
- Disease managers administer, by telephone, a ***comprehensive assessment customized to each patient*** by CorConnect, supplemented by home health nurse visits. CorConnect automatically generates the patient care plan.

- CorConnect ***generates several reports*** for program staff to review the performance of disease managers and the effectiveness of the intervention in terms of patient outcomes. The system compares medications and preventive care received recently to evidence-based guidelines and generates summary reports for physicians to improve provider practice.

- The program focuses on teaching patients how to better adhere to treatment recommendations, to be better self-managers, and to communicate more effectively with their physicians. CorConnect provides an adaptable structure for the program's educational intervention based on learning and behavior theories.

- The program ***reduces care fragmentation and facilitates communication*** between providers and patients by teaching patients how to manage their own care, addressing conditions that commonly co-exist with CHF, and referring patients to support services.

- The program also ***pays for cardiac and noncardiac prescription drugs*** for low-income patients without coverage of their own who randomized to the prescription drug benefit treatment group. Few patients were eligible for the benefit during the program's first six months, however.

- The disease managers are experienced ***registered nurses*** who receive orientation and ongoing training in behavior and learning theory, among other topics.

- The program asks that ***physicians introduce patients to the program***, which they have done. It planned on conducting quarterly and ad hoc teleconferences with physicians and providing physicians with regular patient progress reports.

- Finally, although the program does not provide financial incentives to staff to achieve particular outcomes or program goals, it does ***pay physicians $50*** per patient for participating in quarterly teleconferences and $30 per patient for ad hoc teleconferences.

Potential Barriers to Program Success. The CorSolutions MCCD program contains no obvious barriers to success. However, the results for the first six months suggest that savings in hospitalizations and other expensive Medicare services will have to be large to cover direct program fees. Since the enrollees are more expensive than planned, this may be easier to accomplish than expected. CorSolutions can cover the direct program fees by a reduction in expenditures smaller than 20 percent, the number originally used for its waiver estimates.

A potential concern for the program is the lack of physician responsiveness to disease managers. Since fewer than half of physicians participate in the "required" quarterly teleconferences, it seems that many physicians are not cooperating with disease managers to the extent hoped for. The financial incentive apparently is not enough to entice physicians to actively participate in teleconferences. The lack of participation is not surprising, since disease managers had no relationship with physicians before the demonstration and have never met. Furthermore, each physician has only a few MCCD patients. That physicians are not active participants in teleconferences may also suggest that they are not reading the patient care

summaries, which contain guideline-recommended treatment suggestions. If the lack of communication between disease managers and physicians persists, the program may not succeed in changing many physician practice patterns.

INTRODUCTION

The Medicare Coordinated Care Demonstration (MCCD), mandated by the Balanced Budget Act of 1997, is testing 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 16 states and the District of Columbia. Mathematica Policy Research, Inc. (MPR) is evaluating the national demonstration through both impact and implementation analyses.[1]

This report is one of a series that will describe each program during its first year of implementation and provide preliminary estimates of its impact on Medicare service use and costs. The report first 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 CorSolutions' MCCD project, hereafter called the CorSolutions MCCD. CorSolutions is a privately held disease management company in Rosemont, Illinois (outside Chicago) that offers chronic disease management services to health plans and

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

employers. The CorSolutions MCCD program, 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 semistructured protocols. The protocols covered the following topics: organization and staffing; targeting and patient identification; program goals; care coordination activities (such as assessment, patient education, and service arranging); physician attitudes toward the program and 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 as possible for each program, while also allowing the interviewer to explore specific issues of importance to each program. The structure of the protocols also will 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 gave 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 that describe 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 the service area of the CorSolutions MCCD who were

eligible for the program and the percentage that actually enrolled during the program's first six months of operation. 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 their 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 receive either the program intervention in addition to their regular Medicare benefits or only their regular Medicare benefits as usual. Comparison of outcomes for the two groups will yield unbiased estimates of the impact of care coordination. We do not exclude disenrollees 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.

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 operation). 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 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.

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

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

OVERVIEW OF THE CORSOLUTIONS MCCD

Program Organization and Relationship to Physicians. CorSolutions is a privately held disease management company headquartered in Rosemont, Illinois (outside Chicago). It has registered nurse service centers in Chicago, Fort Lauderdale, Philadelphia, and Phoenix. CorSolutions has worked with more than 50,000 physicians and has had over 120 contracts with health plans, employers, and government agencies since 1994 (CorSolutions website 2004). The prototype intervention for the CorSolutions MCCD is its ongoing Cardiac Solutions[SM] program for heart failure, which uses the MULTIFIT system. MULTIFIT incorporates current evidence-based clinical practice guidelines from the American Heart Association/American College of Cardiology and the Heart Failure Society of America. CorSolutions has used the MULTIFIT system to manage more than 22,500 heart failure patients in commercial health and Medicare + Choice plans since 1995, and it reports achieving reductions in hospital admissions and days of 50 and 60 percent, respectively, compared to other Medicare beneficiaries. (CorSolutions uses the Medicare 5% file and its client files on Medicare + Choice beneficiaries to compare outcomes from its programs.) CorSolutions also reports increased use of beta blockers and improved quality of life among heart failure patients and high patient and physician satisfaction.

CorSolutions MCCD patients live in the Houston, Texas, area, and key program staff work in three locations. Management staff, including the project director and financial staff, work from CorSolutions' headquarters in Illinois. The physician recruitment team, which employs 9.25 full-time-equivalent recruiters, is in Houston, Texas. The patient enrollment team, including enrollment specialists and enrollment assistants, is located at CorSolutions' service center in Philadelphia, Pennsylvania. Its care coordinators, referred to as "disease managers,"

also are in the Philadelphia service center. In addition, the program has social workers at the Rosemont, Illinois, office. After operating for a year, the program had 11 disease managers on the MCCD staff. Ultimately, the program anticipates disease manager caseloads of 150 to 160 patients each when it reaches its target enrollment. All disease managers were on staff at CorSolutions before the demonstration began, and some have responsibilities for patients the company is serving under other contracts.

The MCCD project targets patients in the Houston, Texas, area and their cardiologists. CorSolutions hired recruiters to identify physicians of potential program participants and introduce their patients to the MCCD. The recruiters searched Houston medical society directories to identify physicians, then made appointments with them to explain the program and obtain their written consent to participate. Recruiters also meet with physicians of eligible patients identified through review of hospital lists. Physicians must sign a physician's agreement form to participate.

Primary Approaches. CorSolutions has adopted three main approaches to improving patient health and reducing health care costs: (1) improving patient adherence to treatment recommendations, (2) improving communication and coordination between patients and physicians, and (3) improving provider practice. The program aims to improve patient adherence by teaching patients how to recognize and respond appropriately to symptoms and be better self-managers. The program seeks to improve communication and coordination between patients and physicians by teaching patients how to communicate more effectively with their physicians. Finally, the program aims to improve provider practice by having disease managers make suggestions to the physicians for changes when they find discrepancies between their treatment plans and evidence-based guidelines.

Unlike any of the other MCCD demonstration sites, CorSolutions also is examining the effect of adding a prescription drug benefit to its intervention. Patients enrolling in the demonstration were randomly assigned to one of three groups: the control group (three of every seven enrollees or 42 percent), a treatment group that received disease management services alone (two of every seven enrollees, or 29 percent), or a treatment group that received disease management plus a drug benefit (two of every seven enrollees, or 29 percent). A patient assigned to the prescription drug benefit arm is eligible for coverage of both cardiac and noncardiac prescription drugs if he or she (1) does not already have supplemental prescription drug coverage, and (2) is currently not using appropriate medications due to financial constraints. CorSolutions relies on the disease managers to determine if financial constraints, rather than social problems or side effects, prohibit a patient from taking appropriate medications. Patients whose income exceeds 200 percent of the federal poverty level or are military veterans already entitled to benefits through the Veterans Administration are not eligible for the prescription drug benefit. CorSolutions uses a pharmacy benefits manager, the Pharmaceutical Care Network, to monitor patient eligibility for the benefit, administer the benefit, and reimburse retail pharmacists. We describe the prescription drug benefit in more detail later.

Target Criteria and Patient Identification. Patients in the CorSolutions MCCD must have had either a hospitalization or an emergency room visit in the last year for primary or secondary CHF. Patients must live in the Houston, Texas, Metropolitan Statistical Area, although the program focuses on those in Harris County. As in all MCCD 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 (1) are waiting for, or have received, any kind of transplant; (2) receive dialysis; (3)

live in an extended-care facility or are in hospice; (4) receive regular inotropic intravenous treatments (such as dobutamine infusions for end-stage heart failure); (5) are undergoing active cancer treatment; or (6) are being treated for AIDS. The program also planned to exclude patients participating in any other CMS demonstration or disease management programs, although they were not aware of any other such programs when the MCCD began.

The program originally recruited patients through their physicians. As mentioned, the program uses local staff to recruit physicians into the program. After a physician signed the agreement to participate in the MCCD, physician office staff generated lists of potentially eligible patients using information contained in their office billing system. Program staff indicated that, in some cases, physician office staff did not have the capability to identify eligible patients in a systematic manner, often because they did not have an automated system. In these cases, a program implementation specialist (typically, a cardiac nurse) visited the physician's office and helped the staff identify referrals by performing manual chart reviews. Program staff then worked with physician office staff to determine if any patients met the program's exclusion criteria. The physician reviewed referrals for program appropriateness.

Because identifying patients through physicians was time-consuming, in mid-2003, the program began to recruit hospitals in order to identify patients. To identify potential participants, the program reviews current inpatient lists and lists of CHF patients during the past year provided by its 20 participating hospitals. To recruit these hospitals, CorSolutions' regional director of operations sought approval from each hospital's privacy officer, sometimes consulting with representatives from each hospital's medical records, case management, quality management, and information systems departments. The time frame from first contact to getting the first list from a hospital ranged from 60 days to 15 months. Most delays in getting approval were due to hospitals' limited resources to be able to give attention to the approval process

because of competing priorities—for example, some hospitals were undergoing review by the National Committee for Quality Assurance (NCQA). Hospitals that were approached but declined to participate sometimes did so because they were implementing their own disease management program and viewed the demonstration as competition. Only one hospital declined to participate because of Institutional Review Board concerns.

Each hospital provides CorSolutions with a list of patients who meet CMS's insurance criteria and the program's diagnosis and hospitalization criteria. CorSolutions' implementation specialists check these lists for eligibility before the patients are referred to the CorSolutions' Welcome Center at the Philadelphia service center. Enrollment assistants at the Welcome Center verify Medicare eligibility and send the patient an introductory letter. The letter refers to the patient's physician by name and briefly explains the demonstration, emphasizing that a CorSolutions nurse will be working with the patient's physician if the patient is randomly assigned to receive the intervention. An enrollment specialist telephones patients within seven days of sending the letter. Using a script, the enrollment specialist describes the program, solicits the eligible patient's participation, and seeks verbal consent to participate. If the patient verbally consents, the enrollment assistant sends him or her an informed consent form with a cover letter and return mailer.[2] After the patient returns the informed consent form to the Welcome Center, MPR randomly assigns the patient to one of three groups: (1) the treatment group with prescription drug benefit, (2) the treatment group without prescription drug benefit, or (3) the control group.

Although the program has identified nearly all its patients (roughly 97 percent) by reviewing lists provided by participating hospitals, it has received a small number of direct referrals from

[2] In July 2004, CorSolutions contracted with a vendor organization to provide these call center services.

physicians. After a year of operation, the program estimated that physicians directly referred about 2.5 percent of all enrollees.

During its first year, the program received few self-referrals (less than one percent of all referrals). CorSolutions has marketed the MCCD program to beneficiaries in a limited way. A Houston-area television news program interviewed physician recruitment staff, and an article about the MCCD appeared in the *Houston Chronicle* newspaper. More recently, the program decided to expand efforts to directly market the MCCD to patients by preparing a brochure to display in physicians' offices and senior centers.

Assessment, Care Planning, and Monitoring. After random assignment, the program assigns patients with the same physician to a single disease manager. All treatment group patients receive an assessment upon entry into the program. Both a disease manager and a Houston-based, Medicare-certified home health nurse conduct the assessment. The disease manager performs a telephone assessment using a standardized assessment tool embedded in CorConnect, CorSolutions' Web-based computer system. CorConnect prompts disease managers to ask patients questions using sophisticated branching logic, thus tailoring the assessment to each patient. All assessments, however, cover demographics, medical history, current comorbid conditions, medications, quality of life, diet, exercise, current adherence to the physician's treatment plan, learning readiness, and literacy. The disease manager then obtains the patient's verbal consent for a home health visit. The home health nurse performs a physical assessment that focuses on the cardiovascular system. The home health nurse also looks at and verifies patients' medications and assesses the patient's home environment for safety. While in

the patient's home, the home health nurse calls the disease manager to report this information, which the disease manager then inputs to CorConnect.[3]

CorSolutions identified home health agencies to work with by looking in the Houston area for agencies that could handle a high volume of visits. The agencies are paid per visit by directly billing CorSolutions. CorSolutions does not pay for home health visits beyond the assessment.

Every quarter, disease managers use the SF-8 questionnaire to formally reassess patients' physical and emotional health status. The disease managers also may repeat parts of the assessment tool during routine monitoring calls if they feel it necessary. They also reassess a patient after a hospitalization or change in condition and may call a home health nurse to visit the patient under these circumstances. All reassessment results are documented in CorConnect.

Between June and December 2002, the first six months of program operation, 99 patients enrolled and had been randomly assigned to the CorSolutions MCCD treatment group (Table 1). Among all patients enrolled, 85 percent of patients had at least one contact for assessment. Among those contacted for assessment, most patients (70 percent) received an assessment within a week of random assignment. The program's goal is to assess all newly enrolled patients within three days of random assignment. The few delays in performing assessments usually were due to scheduling difficulties, such as patients' busy schedules.

CorConnect automatically generates a care plan for each patient based on the assessment. The care plan is a teaching plan with eight educational modules (discussed in more detail later in the report); the modules are prioritized based on the assessment and the patient's preference. The care plan is documented in CorConnect.

[3] As of May 2004, CorSolutions no longer required all newly enrolled patients to have an assessment by a home health nurse. The program conducted these assessments only when it could obtain a physician's order.

TABLE 1

DISEASE MANAGER CONTACTS WITH PATIENTS DURING FIRST SIX MONTHS

Number of Patients Enrolled[a]	99
Number of Patients with at Least One Disease Manager Contact	98
Total Number of Contacts for All Patients	879
Average Number of Contacts per Patient	9
Number of Disease Managers Contacting Patients[b]	76
Number of Patients in Contact with More than One Disease Manager	87
Among Those Patients with at Least One Contact:	
Percentage of contacts disease manager initiated	80.1
Percentage of contacts with home health nurse at patient's residence	5.8
Percentage of contacts by telephone	94.2
Of All Patients Enrolled, Percentage with an Assessment Contact	84.8
Among Those Patients with an Assessment, Percentage of Patients Whose First Assessment Contact Is:	
Within a week of random assignment	70.2
Between one and two weeks of random assignment	19.0
More than two weeks after random assignment	10.7
Of All Patients Enrolled, Percentage of Patients with Contacts for:	
Routine patient monitoring	99.0
Providing emotional support	0.0
Providing disease-specific or self-care education	67.7
Explaining tests or procedures	0.0
Explaining medications	65.7
Monitoring abnormal results	23.2
Identifying need for non-Medicare service	54.5
Identifying need for Medicare service	0.0
Monitoring services	17.2
Average Number of Patients Contacted per Disease Manager	1.1
Average Number of Patient Contacts per Disease Manager	9.6

Source: CorSolutions program data received January 2003 and updated July 2003. Covers six-month period beginning June 18, 2002, and ending December 14, 2002.

[a]Number of patients enrolled in the treatment group as of December 14, 2002.

[b]Includes the 11 disease managers who provide the intervention on a routine basis, as well as on-call nursing staff who service CorSolutions' toll-free hotline.

The program requires physicians to have an office visit with each patient to discuss the program and the patient's care plan and pays the physicians to do so. These meetings are meant to take place within 30 days of the physician receiving the patient's first progress report from the program, which is sent to the physician two weeks after the patient's enrollment. During the visit, the physician describes the demonstration, how disease management can help the patient, and the roles of the physician and CorSolutions staff in the demonstration. The physician then uses a CorSolutions checklist to document that these topics have been discussed. The physician and patient both sign the checklist, and the physician returns it to the program.

Routine monitoring generally occurs every other week for the first few months and monthly thereafter. CorConnect allows disease managers to customize a call schedule specifying the number and timing of calls according to care planning goals, patient preference, and their own judgment. It also prompts them when it is time to call a patient. CorConnect then customizes patient questions for each call based on the patient's health status, progress through the eight educational modules, and treatment plan adherence. After the patient completes all educational modules, monitoring contacts take place monthly. The purpose of contact after all modules are complete is to see whether patients are taking their medications and progressing toward their goals (such as controlling their weight or exercising). Between monitoring calls, patients can telephone the on-call CorSolutions nurse 24 hours a day, seven days a week if they have questions or problems. The on-call nurse is not necessarily the patient's disease manager but will have access to the patient's full program record on CorConnect. Patients who have access to

the Internet can also go to the CorSolutions website or email their disease manager if they have questions.[4]

All patients enrolled during the first six months of operation had at least one contact with a disease manager (or on-call nurse or home health nurse). Patients averaged nine contacts (Table 1). Roughly 80 percent were initiated by a disease manager. Ninety-four percent of contacts were conducted by telephone. (The rest were those conducted by home health nurses during assessment.) All patients had a contact for routine monitoring during the program's first six months. (The program did not consider any of these contacts to provide emotional support.)

As mentioned, CorSolutions uses the Pharmaceutical Care Network to administer its prescription drug benefit to eligible patients. The pharmacy benefit has no co-pays, and patients cannot refill a prescription until three-quarters of the time it would take to use the prescription has passed (for example, 25 days of a monthly prescription). The price of a prescription is limited—if a drug costs more than $250 retail or $750 mail order, it must receive a prior authorization. Patients learn about the features of the benefit by discussing it with their disease manager.

Staffing and Program Quality Management. Maintaining and improving care quality and ensuring that programs attain their goals both require that staff have adequate qualifications, training, and supervision and that management has the tools and support to monitor program progress. Disease managers must be registered nurses and, although the MCCD disease managers are in Pennsylvania, they must be licensed in Texas, in addition to having five or more

[4] The program has had a few patients who have been away from the Houston area temporarily or are in a skilled nursing facility. In these cases, telephone monitoring continues as usual. (The program disenrolls participants who are admitted to a skilled nursing facility for more than 60 days.)

years of clinical experience in such fields as critical or coronary care. In addition, all disease managers must be proficient in using computers and have appropriate customer relations skills.[5]

Before working on the demonstration, the disease managers participate in CorSolutions' on-site employee orientation and training program. This includes a three-week classroom training, during which disease managers attend sessions covering CorSolutions' policies and procedures; quality improvement processes (including confidentiality requirements); communication skills (such as telephone etiquette, engagement techniques, assurance, mirroring, and parroting); and clinical guidelines. CorSolutions disease managers also receive training on the behavior theories of Prochaska and the social learning theories of Bandura, both cornerstones of CorSolutions' disease management programs.[6,7] The disease managers also receive eight hours of MCCD-specific training. Following classroom training, new disease managers are paired with experienced ones for another three weeks, after which they take on their own caseloads. After this initial training, all CorSolutions disease managers receive up to two hours of company-wide ongoing training per week. This training covers a variety of topics, including CorConnect updates, clinical guideline changes, HIPAA and NCQA, and customer service skills. CorSolutions has a dedicated staff development manager to educate the disease managers and

[5] CorSolutions hired an agency to test all prospective nurse hires on computer and customer relations skills. However, the agency did not test the skills of current MCCD staff.

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

[7] Bandura's social learning theory emphasizes the capacity for self-directed change, which is strongly influenced by a person's confidence to undertake a behavior or task.

make sure they maintain their licensure requirements. CorSolutions reports it invests more than 160 hours a year in ongoing training for each disease manager.

The disease manager clinical supervisor evaluates the performance of disease managers in several ways. First, disease managers meet monthly with their supervisor to discuss individual performance (such as productivity and following protocols appropriately). Second, the supervisor uses CorConnect to generate reports (called "gap reports") that describe each disease manager's productivity on a weekly basis. Reports include the inbound and outbound call volume, amount of time spent on the telephone with patients, number of completed contacts, number of contacts due, number of disenrollments, number of patients prescribed an ACE inhibitor or beta blocker, and the number of emergency room visits, among other clinical indicators. The supervisor reviews these reports to see whether disease managers are educating patients with the required modules and the number of modules the disease manager completes per week or month their patients are enrolled. The supervisor may discuss these reports with individual disease managers if they are not meeting program standards. Finally, all the MCCD disease managers meet every two weeks to discuss team performance (quality indicators and productivity) during the previous week. In addition, a monthly service center meeting is held to recognize outstanding performance.

In addition to the weekly gap reports, CorConnect generates quarterly reports to monitor the effectiveness of the MCCD intervention. These reports present the same data as the weekly gap reports, but in aggregate form. The program director reviews these reports and shares their results with other project staff as appropriate.

WHO ENROLLS IN THE PROGRAM?

Program enrollment has been slower than anticipated. Staff attribute the enrollment shortfall to challenges in the patient identification process, lack of physician enthusiasm about

participating, and patient refusal. After recognizing that their original approach to identifying patients did not work, the program made a major change to its patient recruitment process, moving responsibility for patient identification from physicians and their office staff to hospitals. The program appears to have enrolled patients who have slightly higher preenrollment health expenditures than planned. Staff report that patients are highly satisfied with the program. Program data show that there has been minimal voluntary disenrollment.

Enrollment After One Year. After one year of operation, the CorSolutions MCCD had enrolled 668 patients: 287 had been assigned to the control group, 191 to the treatment group arm without pharmacy benefits, and 190 to the treatment group arm with pharmacy benefits (MPR weekly enrollment report, week ending June 22, 2003). This is less than half the program's target of 1,750 beneficiaries by the end of the first year (750 control group members, 500 treatment group members without drug benefit, and 500 treatment group members with drug benefit).

CorSolutions originally asked physicians to identify eligible patients by having office staff provide the program with patient lists. This approach did not identify as many eligible patients as the program expected, however—the program averaged fewer than 10 referrals per physician, rather than the 30 expected. CorSolutions found that using this approach to identify patients was time-intensive for physicians' office staff. In a busy practice, identifying eligible patients may not have been a priority for some physicians, perhaps because the MCCD was not compensating them for doing so.

CorSolutions also attributes the low rate of enrollment to physicians' lack of enthusiasm about participating in the program. It sometimes took recruiters four or five visits to a physician's practice to get the physician to agree to participate. Program staff report that, because there are many research projects in the Houston area for physicians to participate in that

offer career advancement and substantial monetary incentives, they may not have been interested in participating in a program that does not provide either benefit.

Another reason for the enrollment shortfall is a high patient refusal rate. The program anticipated it would enroll 58 percent of all eligible patients identified. As of May 2003, however, the actual yield was 14 percent. The program attributes the low yield primarily to a high patient refusal rate caused by several factors. Patients often throw away the materials the program sends to them, so the follow-up call from the enrollment specialist seems to come "cold." Staff also report that the toll-free Medicare hotline does not know about the program when patients call it; as a result, patients are afraid of losing their Medicare benefits by participating. Patients also refuse to participate because CorSolutions cannot guarantee they will receive the prescription drug benefit.

In response to these enrollment difficulties, the CorSolutions MCCD recruitment team began cultivating relationships with case managers and medical officers at local hospitals. The program encountered some difficulty recruiting hospitals to share their patient list because a few hospitals were starting their own disease management programs and viewed the MCCD as competition. After a year of program operation, however, 20 hospitals provided the program with lists of eligible patients. Six months after the program began using hospital lists to identify patients, the MCCD more than tripled its enrollment. Between November 2002 and the end of April 2003, the average monthly enrollment was 33 patients; between May 2003 and the end of October 2003, it was 109 patients.

Percent of Eligible Beneficiaries Participating. To measure the proportion of eligible beneficiaries enrolling in the program and their characteristics, 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 the CorSolutions MCCD. (Appendix B

contains a detailed description of the simulation.) This simulation resulted in 13,220 beneficiaries eligible for the MCCD between June and December 2002, the program's first six months of operation. That is, they lived in the program's service area, and they met CMS's demonstration-wide criteria and the program's diagnostic and service use criteria.[8] During the same six months, 101 "eligible" beneficiaries enrolled in the demonstration (about 0.08 percent of the 13,220 eligible beneficiaries).[9] (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 age and sex but were similar in race and Medicaid eligibility. Participants were younger, on average, than eligible nonparticipants and more likely to be male (Table 2). Only 9 percent of participants were older than age 85, compared to 17 percent of eligible nonparticipants. Forty-eight percent of participants were male, compared to 40 percent of nonparticipants. Both participants and nonparticipants were predominantly white (about two-thirds). Between 20 and 25 percent of participants and nonparticipants were dually eligible for Medicare and Medicaid.

[8] Between June and December 2002, 374,054 beneficiaries were living in the program's service area. Of those, 74,667 (20 percent) would have been ineligible because they did not meet CMS's demonstration-wide criteria. Of the remaining 299,387 beneficiaries who met these criteria, 13,220 (four 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.)

[9] In fact, 171 beneficiaries actually enrolled in the program during its first six months. When estimating the participation rate, the evaluation excluded enrollees with incorrect Health Insurance Claim (HIC) numbers on MPR's enrollment file and those who did not meet the CMS's demonstration-wide criteria or who did not meet the program's geographic, diagnostic, or service use criteria (as measured with Medicare data). These enrollees were excluded to use a consistent definition of eligibility for the numerator and denominator of the participation ratio. (Those with invalid HIC numbers may well be eligible, but their Medicare data could not be obtained to assess that, so they were excluded. Their HIC numbers have since been corrected.) This leaves 101 known *eligible* participants. Most of the reduction (nearly half) was due to not having had a hospitalization or an emergency room visit for CHF during the reference period for this analysis. This occurred because the program relied on patient's physicians to refer eligible patients. When comparing participants to eligible nonparticipants in Table 2, however, the evaluation excluded only participants with invalid HIC numbers and those who did not meet the demonstration-wide requirements, leaving 162 participants. Thus, the comparison more closely reflects differences between all actual participants and those who were eligible to participate but did not. (See Table B.3.)

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)	72.1	74.8***
Younger than 65	17.9	11.9**
65 to 74	41.4	33.6**
75 to 84	32.1	37.7
85 or older	8.6	16.8***
Male	48.2	39.9**
Nonwhite	34.6	29.4
Original Reason for Medicare: Disabled or End Stage Renal Disease (ESRD)	29.0	21.0
State Buy-In for Medicare Part A or B	20.4	25.5
Newly Eligible for Medicare (Eligible Less than Six Months)	0.0	1.2
Enrolled in Fee-for-Service Medicare Six or More Months During Two Years Before Intake	98.2	97.8
Medical Conditions Treated During Two Years Before Month of Intake[b]		
Coronary artery disease	91.2	75.6***
Congestive heart failure	98.1	88.2***
Stroke	39.6	37.1
Diabetes	54.1	46.9*
Cancer	17.6	20.5
Chronic obstructive pulmonary disease	66.0	54.8***
Dementia (including Alzheimer's disease)	5.0	1.1***
Peripheral vascular disease	17.0	14.8
Renal disease	25.8	14.3***
Total Number of Diagnoses (Number)	4.1	3.5***
Days Between Last Hospital Admission and Intake Date[b]		
No hospitalization in past two years	11.3	14.4
0 to 30	13.2	13.7
31 to 60	15.1	9.6**
61 to 180	39.0	26.0***
181 to 365	18.2	24.1*
366 to 730	3.1	12.2***

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	11.3	16.1
0.1 to 1.0	33.3	38.6
1.1 to 2.0	25.2	25.8
2.1 to 3.0	13.8	10.9
3.1 or more	16.4	8.6***
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]		
Part A	$1,812	$1,301***
Part B	$848	$642***
Total	$2,660	$1,942***
Distribution of Total Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]		
$0	0.0	1.0
$1 to 500	14.5	25.3***
$501 to 1,000	18.2	19.7
$1,001 to 2,000	23.9	21.3
More than $2,000	43.4	32.8***
Number of Beneficiaries	**162**	**13,119**

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.

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

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

[c]Calculated as 12 x (number of hospitalizations during two years before month of intake) / (number of months eligible). For example, if a beneficiary was in fee-for-service all 24 months and had two hospitalizations during that time, that beneficiary 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, tht beneficiary 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)*

*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 considerably more likely than nonparticipants to have certain diagnoses. For example, 98 percent of participants had been treated for CHF—CorSolutions' target diagnosis—during the two years before enrolling.[10] In addition, 91 percent had been treated for coronary artery disease, 66 percent for chronic obstructive pulmonary disease, 54 percent for diabetes, and 26 percent for renal disease, compared to 76, 55, 47 percent, and 14 percent, respectively, for eligible nonparticipants. Substantial proportions of both groups also had been treated for stroke, cancer, and peripheral vascular disease. Participants had more chronic conditions, on average, than nonparticipants (4.1 versus 3.5 of the 9 conditions examined).

During the year before enrollment, 86 percent of participants had a hospitalization, and participants had monthly Medicare reimbursements of $2,660. A lower proportion of nonparticipants had a hospitalization (73 percent), and their average monthly reimbursement was lower ($1,942). This $718 difference is statistically significant at the one percent level. About 13 percent of both participants and nonparticipants had a hospitalization in the month before intake.[11] The high number of recent hospitalizations reflects the fact that reviewing hospital lists was the program's primary method of identifying patients during its first year.

When developing the cost estimate for CorSolutions waiver application, MPR estimated that Medicare reimbursements would average $2,078 per month for eligible beneficiaries who did not participate in the program. Actual program enrollees had somewhat higher costs during the year

[10] On Table 2, not all participants or eligible nonparticipants are shown as having CHF because the standard definition the evaluation used to measure CHF for all MCCD programs contains different ICD-9 codes than those used by CorSolutions. To assess eligibility, CorSolutions uses information reported by patients and their physicians. The evaluation identified two beneficiaries who did not have any claims for the CHF-related conditions targeted by the program in the two years before random assignment. In addition, some nonparticipants have dementia, despite it being one of CorSolutions' exclusion criteria—again, because the standard definition the evaluation used to measure dementia for all MCCD programs contains different ICD-9 codes than those CorSolutions uses.

[11] As noted, September 15, 2002, the midpoint of the six-month enrollment period used for this analysis, is used as a pseudo-date of enrollment for nonparticipants.

before enrollment—$2,660 per month. Thus, it appears that the program has enrolled patients who are about 30 percent more costly than planned.

Satisfaction and Voluntary Disenrollment. CorSolutions surveys patients enrolled in the program for a year about their satisfaction with the program and quality of life. (They do not plan a survey of physician satisfaction.) The program has a procedure for recording and responding to complaints; after a year of operation, however, it had not received any complaints about the program from either physicians or patients. Although the program does not have annual patient survey results available yet, anecdotally, staff believe that patients are very satisfied with the program. One patient's son wrote a thank-you letter to the program on behalf of his mother, an 86-year-old woman who had coronary artery disease, hypertension, and diabetes, in addition to CHF. He said that the program has not only addressed his mother's medication needs, but her mental needs as well. "In addition to enjoying her favorite activities again, there's a sparkle in Mother's eyes that can't be mistaken. She's at peace, she's comfortable, she's secure, not afraid anymore and has restored confidence that she can make it. Now, at the end of the month there's a small *plus* balance, instead of a fairly large *negative* balance."

Patients may stay in the CorSolutions program for the duration of the demonstration (that is, until June 2006). During the first six months of the program, most patients (39 percent) were enrolled for 11 to 30 weeks, and the mean length of enrollment was 9.5 weeks (Table 3). Voluntary disenrollment during the first six months of the demonstration was minimal. Seven patients asked to be disenrolled from the MCCD for unrecorded reasons. Four patients lost program eligibility for unrecorded reasons, and another two died.

TABLE 3

LENGTH OF STAY AND DISENROLLMENT FOR PATIENTS
ENROLLED DURING FIRST SIX MONTHS

Number of Treatment Group Patients Enrolled[a]	99
Length of Enrollment as of December 14, 2002 (Percentage of Patients Enrolled)	
5 weeks or less	24.2
6 to 10 weeks	36.4
11 to 30 weeks	39.4
Mean Length of Enrollment (Weeks)	9.5
Number of Patients Who Disenrolled	13
Number Who Disenrolled Because:	
Patient died	2
Patient lost program eligibility[b]	4
Patient initiated disenrollment	7
Number Disenrolling:	
Within a week of random assignment	4
Between 1 and 4 weeks	5
Between 4 and 12 weeks	3
12 or more weeks	1

Source: CorSolutions program data received January 2003 and updated July 2003. Covers six-month period beginning June 18, 2002, and ending December 14, 2002.

[a]Number of patients enrolled in the treatment group as of December 14, 2002.

[b]Patients can lose program eligibility for the following reasons: joining a managed care plan, moving into an extended-care facility or hospice, moving out of the service area, waiting for or have received a transplant, receiving dialysis, developing end-stage renal disease or heart failure, or beginning treatment for cancer or AIDS.

TO WHAT EXTENT DOES THE PROGRAM ENGAGE PHYSICIANS?

The importance to program success of engaging eligible patients is self-evident, but it also is critical to engage physicians. Disease managers must develop trusting, collaborative relationships with primary care physicians for physicians to feel comfortable communicating important information to them about their patients. (This information could include, for example, medication changes, new problems identified during office visits, or areas for additional patient education.) Good communication also is important for physicians to feel that the information they get from the disease managers is credible and warrants their attention. (This

information could include, for example, problems in home environment that affect patients' health, functional deficits patients do not tell physicians about, or reminders about providing preventive care.) A trusting, respectful relationship also will make it easier for case managers to reach physicians when urgent problems arise and will facilitate communication and coordination across medical care providers (Chen et al. 2000). Moreover, to increase acceptance of disease management among physicians in general, case managers would naturally need to engage physicians.

The CorSolutions MCCD is promoted to physicians as a tool to support them in making informed decisions about patient care rather than as an opportunity to develop a collaborative relationship between physicians and disease managers. The program sought to supplement physicians' knowledge of their patients during four teleconferences with disease managers each year and by encouraging them to contact disease managers when patient problems arose. In addition, the program sought to improve physician practice by providing them with evidence-based practice guidelines and using CorConnect to identify deviations from guidelines.

Relationship Between Physicians and Disease Managers. CorSolutions adopted two primary strategies to engage physicians after they have signed agreements to participate in the demonstration. These strategies are (1) assigning disease managers so that each physician deals with just one for all of his or her enrolled patients; and (2) sending the physicians written patient reports, then following up by formal teleconferences for each patient.

The program assigns a disease manager to each physician, who will care for all of that physician's patients who enroll in the program. This provides physicians with a point person to handle all MCCD issues. Since all contact between physicians and disease managers is by telephone, building relationships with physicians is likely to depend heavily on disease managers' telephone demeanor and ability to communicate their expertise to physicians in a

nonintrusive way. As mentioned earlier, CorSolutions only hires nurses who have appropriate customer relations skills and offers additional training to disease managers to hone their communication skills.

As a second approach to engaging physicians, disease managers conduct patient-specific teleconferences on a quarterly and ad hoc basis to review patient care reports. The two-page report, generated by CorConnect, gives the physician a concise summary of the following items: (1) clinical indicators that suggest potential problems (for example, high blood pressure); (2) recent events that affect the patient's CHF care (for example, hospitalization); (3) worsening symptoms; (4) problems with nonadherence to prescribed medication or lack of prescription for a recommended medication; (5) nonadherence to other treatment recommendations; and (6) patient outcomes (such as quality of life). The first patient care summary is sent to the physician within two weeks of the patient's enrollment and is followed up shortly thereafter by a telephone call to discuss the summary. Patient summaries are then sent to physicians every quarter, followed up by a telephone call to update the physician on the patient's progress and discuss potential problems raised in the patient summary. The program pays physicians $50 for each quarterly teleconference per patient and $30 for up to four additional ad hoc teleconferences per year that the physician or disease manager may request. Disease managers and physicians may discuss more than one patient during a single teleconference, however, if the physician has more than one patient in the program.

Efforts to engage physicians have not been as successful as the program expected. Staff report that only a few physicians have actively encouraged their patients to enroll in the program or have advocated the program to their peers. Physicians have met with patients when they first enroll. Physicians, however, have not been as responsive to disease managers as expected. The program reports that fewer than half the physicians participate in all quarterly teleconferences.

Staff report that, beyond the regular teleconferences, it is sometimes difficult for disease managers to communicate with physicians when necessary—for example, to report a hospitalization. Staff attribute this to the many demands on physicians' time.

Improving Practice. The CorSolutions' MCCD has the goal of improving physician practice. The program provides physicians with a summary of evidence-based heart failure treatment guidelines as part of its welcome packet when the physician agrees to participate. After the assessment, the CorConnect system automatically compares the patient's medications and medical treatment received to the guidelines embedded in the computer system. As mentioned earlier, any recommendations to change treatment to be more consistent with the guidelines appear in the patient care summary and are discussed during the quarterly teleconferences. The program also tracks physicians' prescribing patterns based on patient self-report and presents some of these prescribing patterns (such as the use of beta blockers) in the quarterly report.

After a year of operation, staff believe that physicians were somewhat satisfied with the program. Although the program has not surveyed physicians about their satisfaction with the program, anecdotally, staff report that some physicians view care management as an important resource for their patients. Program data, however, show that only about half (47 percent) of patients' physicians were paid for participating in conference calls during the first six months of operation (data not shown). If physicians had been actively engaged in the program, participation in these calls should have been closer to 75 percent, since three-quarters (76 percent) of patients enrolled during the first six months had been in the program for more than a month.

The program has not received complaints from physicians about the intervention. In fact, one physician said that the MCCD was the best program he had seen in more than 25 years of

practice. However, one physician did report that he felt the program criteria restricted many patients from participating who could benefit from the program and that the program should target other diseases.

HOW WELL IS THE PROGRAM IMPLEMENTING KEY INTERVENTION APPROACHES?

Improving patient adherence to treatment recommendations is the primary approach CorSolutions is taking to improve patient health. It supports this approach by teaching patients to better understand their disease and how to manage their conditions themselves. The program also hopes to improve patient health by improving communication and coordination between patients and their physicians. Disease managers aim to accomplish this by teaching patients how to communicate more effectively with their physicians, regularly communicating with physicians themselves, and following up with patients after adverse events.

Improving Patient Adherence. The focus of CorSolutions' MCCD intervention to improve adherence is on improving patient self-management. To accomplish this, disease managers deliver CorSolutions' own highly structured, computer-based education intervention. Education focuses on CHF, but it also addresses comorbidities (such as diabetes). Education is based on eight topic-specific modules: (1) disease etiology, (2) signs and symptoms, (3) improvement in self-care skills, (4) adherence, (5) medication management, (6) smoking cessation, (7) healthy eating, and (8) physical activity and stress management. Each module includes behavioral goals for the patient, suggestions for the disease manager about how to support the patient in meeting those goals, and criteria that define when the goal is met. During assessment, the patient prioritizes the order in which he or she wishes to discuss the modules. All modules are part of the CorConnect system, which prompts the disease manager with the appropriate module for each patient contact. This structured approach allows a different disease

manager to work through a module with a patient if his or her assigned disease manager is unavailable (for example, if the patient's disease manager is on vacation or out sick). Disease managers also can send patients module-specific written materials generated by CorConnect. At a minimum, every patient receives a goal-oriented guide to heart failure self-care developed by CorSolutions, a health calendar with tips and reminders, a quarterly newsletter, and a magnet with CorSolutions' hotline number. Disease managers also may refer patients to educational resources identified by a CorSolutions social worker—most commonly, diabetes classes, smoking cessation programs, and nutritional counseling. Although CorSolutions' social workers are in Philadelphia, their main priority is to develop and maintain a national database of resources in each geographic area the company serves, including Houston.

Although the educational intervention is highly structured, it can be adapted to learning differences. For patients with hearing or visual impairment, the program has special written materials, audio recordings, and Internet resources. For example, a legally blind patient used audio recordings on symptom recognition and dietary adherence to make needed lifestyle changes. In addition, about four percent of treatment group patients are non-English speakers.[12] The program has a bilingual disease manager on staff, but it also uses the AT&T language line to communicate with patients. The program has not served many illiterate patients or patients with cognitive deficits.

The disease managers each have between 6 and 10 years of experience in emergency room nursing, critical care, medical-surgical nursing, home care, and case management. CorSolutions does not provide a formal education to disease managers about how to educate patients. Rather,

[12] The program reports that, while Houston has a large population of Spanish speakers, most non-English-speaking patients do not find that nurse interaction by telephone improves their health. From a cultural perspective, they may be more comfortable in person with members of their own ethnic background and distrusting of people they do not know.

the structured intervention is based on learning theories so that the disease managers do not need extensive training in patient education. However, CorSolutions does provide disease managers with education on communication techniques such as engagement, mirroring, and parroting.

Disease managers determine whether patients understand educational messages by listening to them describe their activities and behaviors or by asking them questions about what they have learned, if the patients do not bring the topic up. Disease managers also review scenarios with patients and ask them how they would react. For example, if the teaching module covered the use of physician-prescribed sublingual nitrates to be used in an angina episode, the disease manager would review signs and symptoms of angina, proper administration of the medication, and recommendations for self-management during and after an episode. The disease manager would then formulate questions to test the patient's level of knowledge of the recommended information. Disease managers also evaluate patients' confidence level to determine how well a patient will be able to maintain a healthy lifestyle change or adhere to his or her physician's treatment plan. Patients are asked to rate their confidence on a scale of 1 to 10, and the disease manager uses the rating to revise patients' education plans. The program does track changes in patients' behavior, but on an individual basis, to adjust the modules patients work through rather than to look at trends in the patient population that the MCCD serves.

If the patient does not appear to be learning, the disease manager works with the patient and the caregiver/family to identify barriers to education and develop strategies to address them. One strategy is to identify a source of motivation for the patient so the patient will have an incentive for marking progress toward an educational goal. For example, a patient wanted to attend a rodeo but was experiencing fatigue and was unable to walk a small distance without having shortness of breath. The disease manager learned that the patient was not taking lasix as prescribed by her physician and was retaining fluid. The disease manager explained to the

patient that taking lasix would allow her to resume walking and enable her to attend the rodeo. The patient began taking lasix as prescribed, reducing her sodium intake, and exercising regularly, enabling her to attend the rodeo event. If a patient still seems to be having difficulty learning, the disease manager will revise his or her approach or notify the patient's physician, who will reinforce the educational concept during scheduled appointments.

Among the 99 patients enrolled in the program during the first six months of operation, 68 percent had received at least one contact for self-care or disease-specific education. Although no patients had a contact during which a disease manager explained tests or procedures, 66 percent had one during which the disease manager explained medications. The proportion of treatment group patients having a contact during which the disease manager explained medications was smaller for those receiving the prescription benefit than for those without it (61 versus 72 percent).

CorSolutions appears to have implemented a patient education strategy that is highly structured but adaptable to different patient learning needs. The education intervention is supported by the CorConnect system, which guides disease managers through the education modules and provides written patient education materials. CorConnect also generates reports to help disease managers assess whether patients are learning. Disease managers base needed changes in their educational approach on behavioral learning theories, as prompted by CorConnect, but will also call on the patient's physician to reinforce educational messages. Although the CorSolutions education intervention holds great promise for improving patient adherence, 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. As another way to improve patient health, the program teaches patients to communicate more effectively with their physicians and arrange for their own care. The program also aims to improve coordination by regularly communicating patient-specific information to physicians, following up with patients after they experience adverse events, and resolving polypharmacy issues.

Disease managers seek to improve communication between patients and physicians primarily by teaching patients how to communicate better with their physicians. Disease managers help patients develop a list of questions to ask their physician during appointments. Following the appointment, the disease manager reviews the physician's answers to the questions with the patient to ensure the patient understood those responses and to help the patient adapt these recommendations to his or her lifestyle. Disease managers do not usually intervene on behalf of their patients (for example, by making doctor's appointments for them when they are reluctant to do so). Rather, the disease manager helps the patient understand why the appointment is necessary, encourages the patient to make appointments, and helps the patient identify and eliminate barriers to following up on their care. For example, a 78-year-old newly enrolled patient taking nine medications told his disease manager that he did not make a follow-up appointment with his cardiologist after his last hospitalization, which had occurred four months earlier. The disease manager taught the patient the importance of followup and of adhering to treatment and encouraged him to call his physician. The disease manager also contacted the physician to inform him of this difficulty, and when the patient called the physician to check the instructions for his medications, the physician scheduled the patient for an appointment. The patient now routinely calls his physician to report new symptoms and has no difficulty scheduling followup when necessary.

To improve patient care coordination and to give the physician additional information upon which to base medical decisions, the program regularly sends the physician written patient summaries and follows up by telephone (as noted earlier). The summaries, based on a CorConnect-generated comparison of medications and medical treatment received with evidence-based guidelines, serve as reminders of needed preventive care, laboratory testing, and medication additions or changes. The summaries also note changes in patient health status or symptoms that need attention.

Disease managers also track patients' adverse events (primarily hospitalizations) and work with physicians, patients, and patients' caregivers to prevent reoccurrences. Disease managers rely on patients or their caregivers to report adverse events. The disease manager works with the patient and his or her caregiver to determine why the event occurred and develops a plan to prevent it from happening again. The disease manager documents the event in CorConnect and includes the length of stay, diagnosis codes, and the reason it occurred. The event is noted in the key findings section of the patient care summary and is discussed with the physician during the follow-up teleconference. If the patient's treatment plan has changed as a result of the event (for example, if the hospital has changed the patient's medications) the disease manager informs the physician immediately (rather than waiting for the next regularly scheduled quarterly teleconference).

Disease managers also assess patients for polypharmacy and adverse drug interaction issues. Using CorConnect, disease managers review each patient's medications during routine monitoring. If the disease manager identifies inconsistencies in the patient's regimen—for example, more than one prescription for the same (or similar) medications or contraindications for some medication—he or she will bring the issue to the attention of the patient's physician in the patient care summary. Similarly, if the disease manager notices a patient is not taking a

guideline-recommended drug, he or she sends the physician a letter asking whether the patient has any contraindications to that drug. During the first year of the demonstration, disease managers usually have found that the physician had prescribed the drug, but the patient was not taking it, or that the patient had a comorbid condition that prevented him or her from being prescribed the drug.

The CorSolutions MCCD has developed an approach to improving communication and coordination between patients and physicians that seeks to fill in the gaps between patients' scheduled visits. The disease managers support patients in asking their physicians more effective questions, in finding ways to make recommended behavior changes, and in becoming better self-managers. Written patient summaries and follow-up telephone calls are meant to alert physicians to important patient changes before office visits, as well as to make it more likely that medical care conforms to evidence-based guidelines. Disease managers must rely on patients to report adverse events, however, so their response to these events may not be very timely. More important, however, during the program's first year, a substantial proportion of physicians appear to have declined to participate in the program's planned quarterly conference calls, despite the fact that the program will pay them to do so. This may limit the program's ability to improve coordination (as well as provider practice), especially if physicians also do not read the program's patient summaries.

Increasing Access to Services. Although CorSolutions refers patients to a wide variety of services (or, if necessary, arranges services on their behalf), increasing access to services is not a major focus of the program. The program pays for a limited number of goods and services—such as pillboxes and scales—if a patient cannot afford them. CorSolutions' social workers, located in Rosemont, Illinois, have access to a national database of resources organized by zip

code, and they either arrange for patients to receive needed services identified by disease managers during routine monitoring or refer patients to these services.

As mentioned, the program is testing the effect of adding a prescription drug benefit to its intervention. Patients assigned to the prescription drug benefit arm of the treatment group can receive coverage for both cardiac and noncardiac prescription drugs if (1) they do not already have insurance coverage for these benefits, they are not veterans, and their incomes do not exceed 200 percent of the federal poverty level; and (2) their reason for not taking their medication is due to financial constraints, as determined by disease managers. Patients who are having difficulty affording their medications, who either are in the prescription drug benefit group but do not qualify for the benefit or were randomized to the nonprescription drug benefit group, receive help from a CorSolutions social worker in applying to local medication assistance programs. A disease manager may also contact a patient's physician for drug samples or to ask that generic substitution be allowed to reduce the patient's out-of-pocket costs.

During its first six months of operation, CorSolutions purchased prescription drugs for only 4 of the 49 patients in the prescription drug benefit group (eight percent) (Table 4). Only seven of the patients randomized to the prescription drug benefit group qualified to receive the benefit.[13] Most of the services that the program paid for were home health services rendered as part of the assessment process or that were used to check on a particular patient at the disease manager's request (for just under half the treatment group). About one-fourth (25 percent) received pillboxes paid for by CorSolutions, and a similar proportion (26 percent) had scales purchased for them. Disease managers identified the need for a non-Medicare service for just over half (55 percent) of patients (Table 1). Non-Medicare services for which disease managers

[13] Most patients randomized to the prescription drug benefit during the first six months were ineligible because they (1) were veterans, (2) had supplemental drug coverage, (3) or did not meet financial requirements.

TABLE 4

GOODS AND SERVICES PURCHASED FOR PATIENTS
ENROLLED DURING FIRST SIX MONTHS

Number of Patients Enrolled[a]	99
Percentage of Patients for Whom Program Purchased:	
Home health, personal care, homemaker services, or respite care	48.0
Home/vehicle modification, safety device, or home monitoring equipment[b]	26.0
Medication reminder devices, set-up service, or review	25.0
Prescription drugs[c]	5.0

Source: CorSolutions program data received January 2003 and updated July 2003. Covers six-month period beginning June 18, 2002, and ending December 14, 2002.

[a]Number of patients enrolled in the treatment group as of December 14, 2002.

[b]The program purchased scales for patients who could not afford them when patients first enrolled in the program.

[c]Only 4 of the 49 patients in the prescription drug benefit arm received prescription drugs.

most often identified a need were durable medical equipment, home-delivered meals, and custodial care interventions.

WHAT WERE ENROLLEES' MEDICARE SERVICE USE AND COSTS?

This report provides preliminary estimates of the effect of the CorSolutions MCCD 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 during the program's first six months of operation only, when staff still may have been fine-tuning the intervention. Moreover, over time, the program may also enroll patients with quite different characteristics.

During the first two full months after enrollment, the percentage of the 54 treatment group members in this analysis who were hospitalized over the two-month period is slightly lower than

the percentage of the control group (14.8 versus 16.7 percent), but the difference is not statistically significant (p = 0.83). Total Medicare Part A and B reimbursements for the treatment group, exclusive of demonstration payment, were $3,812 ($1,906 per month), on average, compared to $3,324 ($1,662 per month) for the control group (Table 5). (The first two full months after enrollment exclude the first partial month.)[14] This treatment-control difference of $488, or 15 percent, is not statistically significant (p = 0.77) due to the small sample size (54 treatment group members and 37 control group members) and reflects the presence of two very high-cost individuals in the treatment group. The CMS per-member, per-month payment to the program averaged $375, slightly lower than the negotiated monthly rate covering the first nine months in the program of $437. This difference may have resulted from billing errors, payment delays, or payment adjustments for patients who disenrolled. The only statistically significant difference in service use observed was in the use of any physician or other Part B service use during the two months, which was 10 percentage points higher among the treatment group than the control group. However, this did not appear to affect Part B reimbursement, and 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 November 2002, the first six months of program operation (Table 6). Again, the sample enrolled in each of these months is too small to draw inferences. We include the table only to demonstrate the types of analyses the evaluation will conduct in the future.

[14]Due to the small sample sizes, there were several preexisting differences between the treatment and control groups (Table B.6). The most notable difference is that the treatment group had considerably lower average Medicare reimbursements in the year before intake ($2,707 less per month than the control group). For the next report, the two groups are likely to be statistically similar as the number of enrollees grows.

TABLE 5

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)	14.8	16.7	–1.9
Mean number of admissions	0.24	0.25	–0.01
Mean number of hospital days	2.00	1.72	0.28
Emergency Room Services			
Any emergency room encounters (percent)			
Resulting in admission	9.3	16.7	–7.4
Not resulting in admission	13.0	8.3	4.6
Total	20.4	19.4	0.9
Mean number of emergency room encounters			
Resulting in admission	0.13	0.19	–0.06
Not resulting in admission	0.15	0.08	0.06
Total	0.28	0.28	0.00
Skilled Nursing Facility Services			
Any admission (percent)	1.9	0.0	1.9
Mean number of admissions	0.02	0.00	0.02
Mean number of days	0.04	0.00	0.04
Hospice Services			
Any admission (percent)	0.0	0.0	0.0
Mean number of days	0.00	0.00	0.00
Home Health Services			
Any use (percent)	11.1	13.9	–2.8
Mean number of visits	1.39	1.78	–0.39
Outpatient Hospital Services[b]			
Any use (percent)	48.2	52.8	–4.6
Physician and Other Part B Services[c]			
Any use (percent)	96.3	86.1	10.2*
Mean number of visits or claims	9.9	9.1	0.8
Mortality Rate (percent)	0.0	2.7	–2.7
Total Medicare Reimbursement[d]			
Part A[e]	$2,161	$1,695	$466
Part B	$1,652	$1,629	$22
Total	$3,812	$3,324	$488
Reimbursement for Care Coordination[f]	$750	$0	$750***
Number of Beneficiaries	**54**	**37**	

TABLE 5 *(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 a Medicare managed care plan, or not having Part A and Part B coverage) during the month of randomization. Patient-months were excluded if the participant did not meet the above Medicare coverage and payer requirements that month or had died in a previous month.

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

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

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

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

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

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

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

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

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

TABLE 6

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	5	15	31	62	83
	Control	1	2	11	24	51	64
Mean Number of Beneficiaries Enrolled Who Meet Medicare Coverage and Payer Requirements and Are Alive That Month	Treatment	2	5	14	30	60	78
	Control	1	2	11	23	48	60
Average Medicare Reimbursement During the Month[a]	Treatment	$142	$2,655	$3,029	$2,174	$2,457	$1,644
	Control	$575	$2,567	$7,426	$2,101	$1,454	$1,747
Average Reimbursement for Care Coordination During the Month[a,b]	Treatment	$437	$437	$437	$422	$399	$396
Whether Admitted to Hospital This Month[a] (Percentage)	Treatment	0.0	20.0	21.4	10.0	13.3	12.8
	Control	0.0	50.0	27.3	13.0	4.2	8.3
Treatment – Control Difference[c]							
Average Medicare Reimbursement[a]		–$432*	$88	–$4,397	$73	$1,003	–$103
Average Reimbursement for Medicare plus Care Coordination[a]		$5	$525	–$3,960	$495	$1,402	$293
Percentage Hospitalized[a]		0.0	–30.0	–5.8	–3.0	9.2	4.5

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.

TABLE 6 *(continued)*

[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.

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

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

CONCLUSION

Research during the past decade suggests, but is by no means conclusive, that successful care coordination has many 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 they also may include those with prevalent geriatric syndromes such as physical inactivity, falls, depression, incontinence, misuse of medications, and undernutrition (Rector and Venus 1999; 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). Another key feature is a process for providing aggregate- and patient-level feedback to care coordinators, program leaders, and physicians about patient outcomes (Chen et al. 2000). Another critical feature is patient education that combines the provision of factual information with techniques to help patients change self-care behavior and better manage their care and that addresses affective issues related to chronic illness (Williams 1999; Lorig et al. 1999; Vernarec 1999; Roter et al. 1998; Aubry 2000). Finally, successful programs tend to have structures and procedures for integrating fragmented care and facilitating communication among providers, for addressing the complexities posed by patients with several comorbid conditions, and, when necessary, for arranging for community services (Chen et al. 2000; Bodenheimer 1999; 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; Schore et al. 1999).

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

Program Strengths and Unique Features. The CorSolutions MCCD appears to have almost all the features associated with effective care coordination. Its CorConnect software provides structure to all facets of the program's interventions.

- The program targets patients recently hospitalized for CHF and, as a result, has ***enrolled patients with high health care costs*** in the year before enrolling with slightly higher costs than estimated in its demonstration waiver. The program changed its patient identification strategy to one based on the review of hospital census lists when its original plan of identifying patients through individual physicians was unsuccessful.
- Disease managers administer, by telephone, a ***comprehensive assessment customized to each patient*** by CorConnect. Home health nurse visits supplement this assessment. CorConnect automatically generates the patient care plan, as well as customized monitoring call schedules and questions to guide each contact.
- CorConnect ***generates several reports*** for program staff to review the performance of disease managers and the effectiveness of the intervention in terms of patient outcomes. The system also compares medications and preventive care received recently to evidence-based guidelines and generates summary reports for physicians with the goal of improving provider practice.
- The program focuses on teaching patients how to better adhere to treatment recommendations, be better self-managers, and communicate more effectively with their physicians. CorConnect provides a structure for the program's educational

intervention that can be adapted to individual learning differences. The intervention is based on learning and behavior change theories that provide alternative teaching strategies if the disease manager's initial approach appears to be unsuccessful.

- The program ***reduces care fragmentation and facilitates communication*** between providers and patients by teaching patients how to manage their own care, addressing conditions that commonly co-exist with CHF, and referring patients to support services. CorConnect provides reminders of needed tests and preventive care and helps disease managers track hospitalizations and follow up with patients and physicians to prevent reoccurrences.

- The program ***pays for cardiac and noncardiac prescription drugs*** for qualified patients without coverage of their own who randomized to the prescription drug benefit treatment group. However, few patients were eligible for the benefit during the program's first six months.

- The disease managers are experienced ***registered nurses*** who receive orientation and ongoing training in behavior and learning theory, among other topics.

- The program asks that physicians introduce patients to the program, which they have done. It also planned on conducting formal teleconferences with physicians on a quarterly and ad hoc basis and providing physicians with regular patient progress reports.

- Finally, although the program does not provide financial incentives to staff to achieve particular outcomes or program goals, it does ***pay physicians $50*** per patient for participating in quarterly teleconferences and $30 per patient for ad hoc teleconferences.

Potential Barriers to Program Success. The CorSolutions MCCD program faces one primary barrier to success in improving physician practice patterns and care coordination: physicians are not as responsive to disease managers as originally envisioned. Fewer than half of physicians participate in the "required" quarterly teleconferences, in spite of program payment for such participation. That physicians are not active participants in teleconferences may also indicate that they are not reading the patient care summaries, which contain guideline-recommended treatment suggestions. It is unclear whether physicians feel they are simply too busy to talk to the disease managers about the few patients they have participating in the MCCD or whether their lack of familiarity with them and inability to meet them in person hampers the development of good working relationships.

Savings in hospitalizations and other expensive Medicare services will have to be large to cover relatively high program costs. Longer followup is needed to determine whether the program can reduce spending enough to cover program fees.

Plans for the Second Site-Specific Report. In mid-2005, we will prepare a second report, covering CorSolutions' activities during the first two years of operation. That report will focus more heavily on program impacts, estimated from both survey and Medicare claims data. It also will describe changes made to the program and the reasons for those changes, as well as staff impressions of the reasons for the program's successes and shortcomings.

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CorSolutions Website: http://www.corsolutions.com

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 Iowa, Minnesota, and Nebraska	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	Two retirement communities in the Baltimore, Maryland, metropolitan area[a]	Heart conditions Diabetes COPD
CorSolutions	Provider of disease management services	Fort Bend, Bruzoria, Harris, 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	The Bronx, Manhattan, and 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, Sandoval, 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	Two counties in northern California	CAD
Quality Oncology, Inc.	Provider of disease management services	Broward and Dade counties, Florida	Cancer
University of Maryland Medical School	Academic institution	Baltimore, Maryland, metropolitan area, two counties in western Maryland, four in eastern Maryland, and two in Pennsylvania	CHF
Washington University School of Medicine	Academic institution in partnership with American Healthways, a disease management services provider	St. Louis, Missouri, metropolitan area	No specific diagnoses targeted[b]

TABLE A.1 *(continued)*

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

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

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

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

TABLE A.2

LIST OF DOCUMENTS REVIEWED FOR THIS REPORT[1]

CorSolutions' Medicare Care Coordination Demonstration (MCCD) proposal; submitted to the Centers for Medicare & Medicaid Services, October 11, 2000.

CorSolutions Heart Failure High Risk Program Manual, June 2002.

CorSolutions Medicare Coordinated Care Demonstration Operations Manual, revised September 19, 2002.

CorSolutions Beneficiary Recruitment Challenges PowerPoint Presentation, March 2004.

Assorted patient education materials, undated.

Enrollment report, April 29, 2003.

[1] CorSolutions deemed these documents to be proprietary and, thus, they could not be included in this appendix.

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 18, 2002, through December 14, 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 CorSolutions' specific criteria. CMS excluded beneficiaries from the demonstration who were not at risk for incurring full costs in the fee-for-service setting because they (1) were enrolled in a Medicare managed care plan, (2) did not have both Part A and B coverage, or (3) did not have Medicare as the primary payer.

In addition to the Medicare coverage and payer requirements, CorSolutions 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 program's demonstration, beneficiaries must have had a hospital admission or an emergency room visit in the previous year for a primary or secondary diagnosis of heart failure. Along with the diagnosis

TABLE B.1

ELIGIBILITY CRITERIA

Inclusion Criteria	Hospital admission or ER visit in the previous year for primary or secondary diagnosis of heart failure. Codes: 428.xx, 398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.13, 404.91, 404.93 in any of the first 3 fields
Exclusion Criteria	Meets any of the eight criteria: 1. Nursing home resident 2. Hospice user 3. ESRD 4. Plans to move in next 6 months 5. HIV 6. Dementia 7. Transplant patient 8. Receiving continuous inotropic IV treatments
Providers/Referral Sources	Originally, selected cardiologists and primary care providers. In July 2003, turned to hospitals to provide lists of current and retrospective CHF patients
Geographic location	Houston, TX MSA (all counties in the MSA, but primary focus is the Houston area)

criteria, at the time of enrollment beneficiaries could not meet any of the following eight criteria: (1) be a resident of a nursing home, (2) be a hospice user, (3) have end stage renal disease (ESRD), (4) plan to move in the next six months, (5) have HIV, (6) have dementia, (7) be a transplant patient, or (8) receive continuous inotropic IV treatments.

We could approximate most of CorSolutions' criteria using Medicare data, with some exceptions. We implemented CorSolutions' requirement that a patient must have had the target condition, congestive heart failure (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). To

identify whether a beneficiary met the program's utilization (hospital admission or an emergency room visit for the target condition) or medical exclusion criteria, we examined hospital claims over an 18-month period starting July 1, 2001, and ending December 31, 2002. We were unable to observe the complete diagnostic history for beneficiaries who had not been in fee-for-service 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 CorSolutions would have approached about participating. We could not approximate three of CorSolutions' exclusion criteria using Medicare data: (1) nursing home resident, (2) plans to move in the next six months, and (3) receiving continuous inotropic IV treatments.

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

To identify participants and eligible nonparticipants, we used Medicare claims and eligibility data and data that the program submitted. 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 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.

[1] Among the 162 who enrolled in the first six months, who had valid Health Insurance Claim (HIC) numbers reported, and who met CMS's insurance requirements, 1.85 percent were enrolled in Medicare fee-for-service 6 or fewer of the previous 24 months before they enrolled in the demonstration; 6.2 percent of participants were in fee-for-service fewer than 12 of the 24 months before enrolling.

We used the finder file to gather data on the beneficiary's state and county of residence during the six-month enrollment period and to obtain eligibility information from the EDB. Using this information, we limited the sample to people living in the catchment area at any point during the six-month enrollment window. We also used this finder file 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) file. 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 December 2002. 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]

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, analyze participation in the first six months of program operation, and

[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-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.

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 the facility in each month. Ambulatory visits were defined as the unique counts of the person-provider-date, as documented in the physician/supplier and hospital outpatient claims. Durable medical equipment reimbursements were counted in other Part B reimbursement. A small number of negative values for total Part A and Part B reimbursements during the past two years occurred for some of the demonstration programs. Any negative Part A and Part B amounts were truncated to zero. The few patients with a different number of months in Part A and Part B were dropped from the analysis of reimbursement in the two years before intake.

When we examined a beneficiary's history from the month during which he or she was 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 whittle the group of beneficiaries who lived in the catchment area down to those who met the program's eligibility criteria, which we could measure using the Medicare data. Tables B.2 and B.3 illustrate the exclusions used to identify the sample of eligible participants and nonparticipants used to analyze participation patterns.

TABLE B.2

SAMPLE OF ALL ELIGIBLE BENEFICIARIES FOR PARTICIPATION ANALYSIS

Sample	Number
Full Sample of Eligible Beneficiaries Who Live in Catchment Area One or More Months During the First Six Months of Enrollment	374,054
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	–74,667
Did not have one or more of the target diagnoses on any claim during the two years before the program started or during the six-month enrollment window	–248,114
Did not have a hospitalization or Emergency Room visit for the target condition during the 18 months from June 2001 through December 2002	–30,319
Met at least one of the exclusion criteria during the 18 months from June 2001 through December 2002	–7,734
Eligible Sample	**13,220**

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	100	71	171
Minus Those Who:			
Had an invalid HIC number on MPR's enrollment file	–2	–0	–2
Were not in geographic catchment area during the month of intake	–6	–10	–16
Were in a Medicare managed care plan, or did not have Medicare Part A and B coverage, or Medicare was not primary payer during the month of intake	–5	–2	–7
Did not have one or more of the target diagnoses on any claim during the two years before the program started or during the six-month enrollment window	–1	–1	–2
Did not have a hospitalization or emergency room visit for the target condition during the 18 months from June 2001 through December 2002	–23	–7	–30
Met at least one of the exclusion criteria during the 18 months from June 2001 through December 2002	–7	–6	–13
Eligible Sample	**56**	**45**	**101**

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 use claims data to fully assess (for example, planning to move in the next six months).

We identified 374,054 beneficiaries who lived in CorSolutions' catchment area at some point during the first six months of enrollment (Table B.2). We then identified 74,667 people (20.0 percent) who did not meet the insurance requirements set by CMS for participation in the program during one or more months during the six-month enrollment window. Another 248,114 of the remaining people (66.3 percent of all area beneficiaries) were dropped from the sample, since they were not treated for any claims for one or more of the target diagnoses the program identified as necessary for inclusion during the two years before the program began or the first six months of enrollment. Fifty-nine percent of the remaining beneficiaries (30,319 people) did not meet the utilization requirements we measured (hospital admission or an emergency room visit for the target condition) during the 18 months from July 2001 through December 2002 (which includes a year before the program began, as well as the six-month enrollment window). Finally, 7,734 people were identified as having at least one of CorSolutions' exclusion criteria, leaving us with a sample of 13,220 beneficiaries we estimated would have been eligible to participate in CorSolutions' program.

CorSolutions randomized 171 beneficiaries who enrolled in the demonstration program during the first six months of operation (Table B.3). Of these, two people (about one percent) could not be matched to their Medicare claims data due to problems with their reported HIC numbers and were therefore excluded from the participation sample.[3] CorSolutions randomized 16 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. We also excluded seven participants who did not meet CMS's

[3] This number includes both beneficiaries with invalid HIC numbers reported and those whose claims we could not obtain when we extracted the files due to the way the Medicare files are created (described in footnote 2). Those with incorrect HIC numbers may well be eligible, but we could not obtain the Medicare data for them to assess that, so they were excluded. CorSolutions is working with MPR to correct HIC number inconsistencies, and we expect that those beneficiaries will be included in the final report.

requirements for participation in the program during the month of intake. We also dropped two beneficiaries for not having at least one claim for CHF and 30 for not meeting the utilization criteria.[4] Finally, 13 participants were dropped from the participation analysis because they met one of the program's exclusion criteria during the month of randomization. Thus, among the 171 participants randomized by CorSolutions into the program during its first six months of operation, after exclusions, 101 people are included in the participation analyses as eligible participants.

CorSolutions' participation rate for the first six months of enrollment is therefore calculated as the number of participants who met the eligibility requirements (101), divided by the number of eligibles who live in the catchment area (13,220), or 0.76 percent.

Table B.4 describes the characteristics of the 101 participants who were enrolled by CorSolutions during the first six months and who appear to meet CorSolutions' eligibility requirements, as measured in Medicare data, and the 13,119 eligible nonparticipants. This table is identical to Table 2 in the text, except that a slightly higher proportion of eligible demonstration participants had a disability or ESRD as the original reason for Medicare and, on average, had slightly higher Medicare reimbursement than all demonstration participants.[5]

[4] Because CorSolutions does not have access to claims data, it must rely on physician or patient self-reports of the utilization criteria. As a result, 30 beneficiaries enrolled in the first six months failed to meet our approximation of the utilization criteria.

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

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)	71.3	74.8***
Younger than 65	20.8	11.9***
65 to 74	39.6	33.6
75 to 84	29.7	37.7*
85 or older	9.9	16.8*
Male	47.5	39.9
Nonwhite	39.6	29.4**
Original Reason for Medicare: Disabled or ESRD	35.6	21.0***
State Buy-In for Medicare Part A or B	25.7	25.5
Newly Eligible for Medicare (Eligible Less than Six Months)	0.00	1.16
Enrolled in Fee-for-Service Medicare Six or More Months During Two Years Before Intake	99.0	97.8
Medical Conditions Treated During Two Years Before Month of Intake[b]		
Coronary artery disease	96.0	75.6***
Congestive heart failure	100.0	88.2***
Stroke	38.0	37.1
Diabetes	61.0	46.9***
Cancer	14.0	20.5
Chronic obstructive pulmonary disease	71.0	54.8***
Dementia (including Alzheimer's disease)	0.0	1.1
Peripheral vascular disease	19.0	14.8
Renal disease	23.0	14.3**
Total Number of Diagnoses	4.2	3.5***
Days Between Last Hospital Admission and Intake Date[b]		
No hospitalization in past two years	2.0	14.4***
0 to 30	12.0	13.7
31 to 60	21.0	9.6***
61 to 180	47.0	26.0***
181 to 365	18.0	24.1
366 to 730	0.0	12.2***

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	2.0	16.1
0.1 to 1.0	32.0	38.6
1.1 to 2.0	30.0	25.8
2.1 to 3.0	16.0	10.9
3.1 or more	20.0	8.6
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]		
Part A	$2,077	$1,301
Part B	$957	$642
Total	$3,034	$1,942
Distribution of Total Medicare Reimbursement per Month Fee-for-Service During One Year Before Intake[b]		
$0	0.0	1.0
$1 to 500	4.0	25.3
$501 to 1,000	19.0	19.7
$1,001 to 2,000	27.0	21.3
More than $2,000	50.0	32.8
Number of Beneficiaries	**101**	**13,119**

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.

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

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

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

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

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

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

TREATMENT-CONTROL DIFFERENCES

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

Method for Calculating 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 CorSolutions randomized during the first four months of enrollment. The four-month enrollment window covers June 18, 2002, through October 15, 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 CorSolutions' 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 disease 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 CorSolutions' 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 still alive and eligible in each month.[6] Someone randomized in July would not be part 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. As in 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). 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.[7] In addition, in contrast to the participation analyses, participants who did not meet the program's target criteria according to the claims and EDB data were not excluded from the outcomes analyses. Given this, of the 96 people randomized in the first four months of CorSolutions' demonstration, the sample for analyzing treatment-control differences contained 91 people. For the six-month sample, 161 people, or 94 percent of the 171 randomized people, were included in the final sample (Table B.5). In addition to excluding beneficiaries, we excluded months during which we could not observe the beneficiaries' full costs in fee-for-service (described in footnote 6).

[6] 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).

[7]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	96	171
Minus Those Who:		
Were members of the same household as research sample members	–0	–1
Had invalid HIC numbers on MPR's enrollment file	–2	–2
Were in a Medicare managed care plan, or did not have Medicare Part A and B coverage, or Medicare was not primary payer during the month of intake	–3	–7
Number of Usable Sample Members	**91**	**161**

Integrity of Random Assignment

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

As expected under random assignment, the treatment and control groups had similar characteristics in the six-month sample. The four-month sample is too small to draw statistically valid comparisons. There were several statistically significant differences between the proportions of treatments and controls in the six-month sample who (1) were age 85 and over at

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)	71.7	71.5		71.6	72.4	71.4		72.0
Younger than 65	18.5	13.5		16.5	16.3	20.3		18.0
65 to 74	44.4	46.0		45.1	43.5	39.1		41.6
75 to 84	25.9	40.5		31.9	28.3	37.7		32.3
85 or older	11.1	0.0	**	6.6	12.0	2.9	**	8.1
Male	46.3	56.8		50.5	43.5	53.6		47.8
Nonwhite	25.9	46.0	*	34.1	28.3	43.5	**	34.8
Original Reason for Medicare: Disabled or ESRD	27.8	29.7		28.6	25.0	34.8		29.2
State Buy-In for Medicare Part A or B	22.2	21.6		22.0	20.7	20.3		20.5
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	96.3	97.3		96.7	97.8	98.6		98.1
Medical Conditions Treated During Two Years Before Month of Intake[a]								
Coronary artery disease	94.2	97.2		95.5	91.1	91.2		91.1
Congestive heart failure	100.0	100.0		100.0	97.8	98.5		98.1
Stroke	38.5	41.7		39.8	38.9	41.2		39.9
Diabetes	44.2	58.3		50.0	51.1	58.8		54.4
Cancer	15.4	11.1		13.6	20.0	13.2		17.1
Chronic obstructive pulmonary disease	67.3	61.1		64.8	66.7	66.2		66.5
Dementia (including Alzheimer's disease)	3.9	2.8		3.4	3.3	5.9		4.4
Peripheral vascular disease	15.4	19.4		17.0	17.8	16.2		17.1
Renal disease	23.1	33.3		27.3	26.7	25.0		25.9
Total Number of Diagnoses (Number)	4.0	4.3		4.1	4.1	4.2		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
No hospitalization in past two years	15.4	2.8	*	10.2	14.4	5.9	*	10.8
0 to 30	7.7	13.9		10.2	12.2	14.7		13.3
31 to 60	21.2	19.4		20.5	16.7	13.2		15.2
61 to 180	32.7	41.7		36.4	38.9	39.7		39.2
181 to 365	17.3	22.2		19.3	13.3	25.0	*	18.4
366 to 730	5.8	0.0		3.4	4.4	1.5		3.2
Annualized Number of Hospitalizations During Two Years Before Month of Intake[a,b]								
0	15.4	2.8	*	10.2	14.4	5.9	*	10.8
0.1 to 1.0	42.3	25.0	*	35.2	35.6	30.9		33.5
1.1 to 2.0	25.0	30.6		27.3	22.2	29.4		25.3
2.1 to 3.0	7.7	19.4		12.5	13.3	14.7		13.9
3.1 or more	9.6	22.2		14.8	14.4	19.1		16.5
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[a]								
Part A	$1,313	$2,704	***	$1,882	$1,485	$2,271	**	$1,823
Part B	$657	$1,067	**	$825	$750	$990	*	$853
Total	$1,970	$3,770	***	$2,707	$2,235	$3,261	**	$2,676
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	21.2	5.6	**	14.8	17.8	8.8		13.9
$501 to 1,000	25.0	8.3	**	18.2	22.2	13.2		18.4
$1,001 to 2,000	21.2	33.3		26.1	18.9	30.9	*	24.1
More than $2,000	32.7	52.8	*	40.9	41.1	47.1		43.7
Location During Program Intake Period								
Texas								
Chambers	0.0	0.0		0.0	0.0	0.0		0.0
Fort Bend	3.7	2.7		3.3	4.4	1.5		3.1
Harris	83.3	78.4		81.3	77.2	79.7		78.3
Liberty	0.0	0.0		0.0	0.0	0.0		0.0
Montgomery	3.7	8.1		5.5	6.5	4.4		5.6
Waller	3.7	0.0		2.2	5.4	0.0	*	3.1
Outside catchment area	5.6	10.8		7.7	6.5	14.5	*	9.9
Number of Beneficiaries	**54**	**37**		**91**	**92**	**69**		**161**

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

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

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

ESRD = end-stage renal disease.

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

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

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

intake, (2) were nonwhite, (3) did not have a hospitalization in the two years before intake, (4) had zero or 0.1 to 1.0 hospitalizations per year in the two years before the month of intake, and (5) lived in the Houston catchment area. In addition, the two groups had different Medicare Part A, Part B, and total Medicare reimbursement per month enrolled during two years before month of intake. 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 a person who was randomized in the month of July, we tabulated that person'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). We caution that the sample sizes are not large enough to draw statistically valid comparisons between the treatment and control groups. Other than the mortality rate, in which the estimated impact had a significant result in the sensitivity analysis, and whether or not beneficiaries used physician or other Part B services, which had an insignificant result in the sensitivity analysis, the results were similar to those for outcomes measured over the two-month period (text Table 5). In both cases, the differences were only significant at the eight percent level. Thus, it is likely that the results are not sensitive to how the month of randomization is treated.

TABLE B.7

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

	Treatment Group	Control Group	Difference[a]
Inpatient Hospital Services			
Any admission (percent)	22.2	21.6	0.6
Mean number of admissions	0.35	0.43	–0.08
Mean number of hospital days	2.56	3.00	–0.44
Emergency Room Services			
Any emergency room encounters (percent)			
Resulting in admission	16.7	18.9	–2.3
Not resulting in admission	18.5	10.8	7.7
Total	29.6	21.6	8.0
Mean number of emergency room encounters			
Resulting in admission	0.22	0.30	–0.08
Not resulting in admission	0.22	0.16	0.06
Total	0.44	0.46	–0.02
Skilled Nursing Facility Services			
Any admission (percent)	1.9	0.0	1.9
Mean number of admissions	0.02	0.00	0.02
Mean number of days	0.13	0.00	0.13
Hospice Services			
Any admission (percent)	0.0	0.0	0.0
Mean number of days	0.00	0.00	0.00
Home Health Services			
Any use (percent)	11.1	21.6	–10.5
Mean number of visits	2.22	5.00	–2.78
Outpatient Hospital Services[b]			
Any services (percent)	57.4	59.5	–2.1
Physician and Other Part B Services[c]			
Any use (percent)	98.2	97.3	0.9
Mean number of visits or claims	13.9	17.1	–3.2
Mortality Rate (Percent)	0.0	5.4	–5.4*
Total Medicare Reimbursement[d]			
Part A[e]	$2,740	$3,764	–$1,024
Part B	$2,278	$2,528	–$251
Total	$5,017	$6,292	–$1,274
Reimbursements for Care Coordination[f]	$1,171	$0	$1,171***
Number of Beneficiaries	**54**	**37**	

Source: Medicare National Claims History File.

Note: Sample includes those enrolled during the first four months of program operation. 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 a Medicare managed care plan, or not having Part A and Part B coverage) during the month of randomization. Patient-months were excluded if the participant did not meet the above Medicare coverage and payer requirements that month or had died in a previous month.

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

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

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

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

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

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

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

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

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

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

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