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The Charlestown Retirement Community Medicare Coordinated Care Demonstration Program After One Year

Final Report

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EXECUTIVE SUMMARY

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

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

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

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

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

Program Organization and Approaches. Charlestown is a continuing care retirement community located just outside Baltimore in Catonsville, Maryland. Charlestown is part of Erickson Retirement Communities, which offers middle-income seniors independent-living, assisted-living, and nursing home care as well as access to a broad range of on-campus providers including primary care physicians, social workers, and home care. Two other Erickson communities are participating in the demonstration: Oak Crest Village in Parkville, Maryland and Riderwood Village in Silver Spring, Maryland. The MCCD program is based on a prototype developed and operated by Charlestown in 1999 and 2000. That program provided care coordination and utilization management services to 700 Charlestown and Oak Crest Village residents covered under a CareFirst Blue Cross/Blue Shield managed care plan. Staff report that as a result of the CareFirst program, care costs were 54 percent less than the average payment rate for Medicare managed care enrollees in the area.

The MCCD program operates from the Charlestown campus. Key staff include a program director, care coordination supervisor, and care coordinators. The program director is employed by Erickson and acts as a corporate liaison for the program but does not have day-to-day operational responsibilities. Charlestown employs the care coordination supervisor and the care coordinators. The care coordination supervisor has the responsibility for program operations as well as supervising the care coordinators. The on-campus primary care physicians practice exclusively within each community and are employed by Senior Campus Physicians, which is a separate corporate entity within Erickson.

The program's goals are to stabilize patients' health, improve their quality of life, and reduce health care costs by: (1) improving communication and coordination between patients and physicians, and (2) improving patients' adherence to care regimens. Specifically, the program seeks to use information systems to improve communication between patients and providers as well as among providers. The program also helps patients make and keep medical appointments, communicate better with their physicians, and better understand what their physicians are telling them. The program aims to improve patient adherence by providing education and making recommendations about how to incorporate treatment regimens into daily living.

Patient Identification. In April 2002 Charlestown's MCCD program began enrolling patients with congestive heart failure (CHF), coronary artery disease (CAD), or diabetes who reside in the independent-living settings of the Charlestown or Oak Crest communities. (The program added chronic obstructive pulmonary disease (COPD) as a target condition in December 2002 and the Riderwood Village community in April 2003 in an attempt to meet enrollment targets.) Individuals with CAD or diabetes must have had an inpatient admission within the two-year period preceding enrollment, although the diagnoses for the hospitalization need not have included CAD or diabetes. 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's primary method of identifying potential participants is to use the information systems of the three communities' medical centers to generate lists of residents with the target diagnoses. The communities' primary care physicians review the lists, determine which of their patients are appropriate for care coordination, and consent for such patients to participate in the program. The program sends the patients letters signed by their primary care physician inviting

them to a meeting at which the care coordination supervisor explains the program and asks interested patients to sign the demonstration's enrollment and consent forms. (At the start of the demonstration, the invitation letters were signed by the communities' medical directors, but the program changed this to the primary care physician in the first year of the demonstration because it thought that patients would be more likely to enroll.)

Assessment, Care Planning, and Monitoring. The care coordinators conduct comprehensive in-home assessments for all patients to determine their needs. The assessment tools include the SF-12, Pra Plus, and Modified Barthel Index as well as other tools developed by the program. The care coordinators also administer the program's diabetes or CHF assessment tools if the patient has one of these diagnoses. The assessment provides information about the patient's medical history and current status, medications, health habits, functional status, home safety, financial status, and health care utilization history. The care coordinators gather additional information from the patient's medical record, family, specialty physicians, and other health care providers in the continuing care community. Care coordinators reassess patients informally during follow-up contacts. In addition, the program formally reassesses patients by re-administering the SF-12, PraPlus, and Modified Barthel instruments every 12 months.

Based on the initial assessment, care coordinators develop care plans for each patient. Care plans include a list of individualized problems along with short- and long-term goals regarding adhering to medical regimens and making lifestyle changes, as well as the resources needed to achieve these goals. The program sends the patient's physician a letter summarizing the initial assessment, care plan, and a list of the patient's medications. If the physician recommends changes to the care plan, these are incorporated into a revised plan. The program shares assessments and care plans with physicians as a mechanism to improve information sharing, but the care coordination supervisor remarked that the physicians do not often provide feedback on these reports. The care coordinators review the care plans with patients and revise them to incorporate patients' stated goals and priorities. The care coordinators periodically update the care plans as a result of their monitoring contacts with patients, but they are not required to update plans with any set frequency or after adverse events such as hospitalizations.

The care coordinators use their clinical judgment to determine the frequency with which they monitor individual patients. All patients receive at least one follow up contact per month either in-person in their apartments or by telephone. During monitoring contacts, the care coordinator assesses the patient's symptoms and adherence to the prescribed treatment regimen and provides education to address the patient's individual needs. The care coordinator notifies the patient's physician and other members of the health care team if new problems are identified.

Staffing and Program Quality Management. Maintaining and improving care quality and ensuring that programs attain their goals both require that staff have adequate qualifications, training, and supervision and that management has the tools and support to monitor program progress toward its goals. The Charlestown MCCD requires its care coordinators to be registered nurses (preferably baccalaureate-prepared) with five years' medical or surgical experience or three years' experience in case management or utilization review. In addition, they must have attained case manager certification or be working toward certification. The care coordinator supervisor trains care coordinators. Training includes an overview of the program, instruction on the program's computer software, meetings with medical staff and other providers,

and mentoring by experienced care coordination staff. The care coordination supervisor also meets with the care coordinators monthly to discuss the program process, policies, and software issues and to review selected cases. Every three months, the care coordination supervisor conducts a formal review of five cases managed by each care coordinator. The care coordinators receive feedback on the results of these reviews.

The program uses Canopy™ web-based case management software to capture many types of data. The program generates reports from Canopy that it uses it monitor its operations. The software stores enrollment data as well as all patient data from assessments, care plans, and monitoring contacts. The care coordinators use this patient-level data to manage patient contacts and other tasks. They also use Canopy to capture data on patients' adverse events and monitor this data over time. The program planned to use Canopy to generate reports of patient outcomes based on yearly reassessment data from the SF-12, PraPlus, and Modified Barthel Index, but it has not yet begun to do so.

WHO ENROLLS IN THE PROGRAM?

The Charlestown MCCD program fell short of its year-one enrollment target. After a year of operations, the program had enrolled 195 patients in the evaluation treatment group and 189 patients in the control group (56 percent of the 686 patients expected in the first year). Program staff attributed this shortfall to reductions in the pool of eligible patients that resulted from the imposition by CMS of the prior hospitalization requirement for patients with CAD or diabetes. (This requirement was added to increase the likelihood that the program would attain cost neutrality.) The program also has had a higher patient refusal rate than it had hoped. Of the 541 patients who met the eligibility criteria and whose physicians deemed appropriate to participate, 44 percent either never responded to the program's invitation or directly refused to participate. The majority of patients invited did not attend the program's meetings describing the demonstration. The care coordination supervisor believes that the two most common reasons that patients decline to participate are that they do not believe they need the program because they believe they are managing well-enough on their own, and they do not want the administrators of their community to know if they are in poor health, which could lead to their transfer to the community's assisted living setting. To increase enrollment, the program added another Erickson community (Riderwood) to the demonstration and another diagnosis (COPD) to the list of target conditions.

To gain another perspective on 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. The simulation showed that there were 55,456 beneficiaries in the Baltimore area who met the eligibility criteria, of whom fewer than 1 percent enrolled in the Charlestown MCCD during the program's first six months of operation. (The time lag associated with processing Medicare claims data precluded the use of a longer reference period for this report.) The simulation clearly overestimates the number of beneficiaries eligible for the program, however, because it was not possible to limit beneficiaries included in this analysis to those living in the three Erickson communities participating in the demonstration. (In the second site-specific report, the participation analysis will restrict the sample of eligible

beneficiaries to those residing in the zip codes of the three Erickson communities participating in the demonstration.)

Program participants differed from eligible nonparticipants along a number of dimensions (Table 1). Participants were older: 50 percent were 85 or older versus 19 percent of eligible nonparticipants. (Although the program does not exclude individuals under age 65 from participation, Erickson communities have extremely few residents this age and none enrolled in the program in its first six months. To more closely approximate the demographic profile of potential participants, we limited the pool of eligibles to those age 65 or over.) No participants were eligible for Medicaid (whereas 14 percent of nonparticipants were). Participants were also less likely to be nonwhite (1 percent versus 29 percent). These differences may be a reflection of the characteristics of individuals who live in the Erickson communities. During the two years prior to enrolling, participants were more likely than eligible nonparticipants to have chronic conditions targeted by the MCCD including CAD (70 percent versus 59 percent) and CHF (61 percent versus 44 percent).

However, despite having more chronic conditions and being older, relative to nonparticipants, participants had slightly lower hospitalization rates and roughly similar levels of Medicare spending. Participants were less likely to have had a hospitalization in the month before enrollment (3 versus 7 percent), and just as likely as nonparticipants to have been hospitalized in the year before (just over half of each group). Both participants and nonparticipants had average monthly Medicare reimbursement rates of about $1,200 over the year prior to enrollment.

As part of the program's waiver application, MPR estimated that Medicare costs would average $1,488 per month for eligible beneficiaries who did not participate in the program. It appears that the program has enrolled patients who have slightly lower costs, averaging $1,208 prior to enrollment, than the estimate. It is possible that their lower costs may be due to the fact that the waiver cost estimate includes costs for beneficiaries who died during the time period over which costs were measured. However, the lower-than-expected costs may also be due in part to the enrollment of 23 beneficiaries into the demonstration who did not meet the program's prior hospitalization requirement.

The staff report that patients seem very satisfied with the program. No patients voluntarily disenrolled during its first six months. In spring 2004, the program surveyed all patients who had been in the program for at least six months to ask them about their interactions with the care coordinators and perceptions of whether the program had helped them. Seventy-three percent of patients returned the survey. The results of the survey were quite positive. On a five-point scale ranging from "strongly agree" to "strongly disagree," 98 percent of respondents either agreed or strongly agreed that the information that their care coordinators gave them was helpful. Ninety-four percent agreed or strongly agreed that the program had helped them to understand how daily habits affected their health. Finally, 96 percent agreed or strongly agreed that they would recommend the program to other residents.

TO WHAT EXTENT DOES THE PROGRAM ENGAGE PHYSICIANS?

Charlestown's care coordination model is designed so that care coordinators can work independently of physicians most of the time, but when the situation requires it, they also can work collaboratively with them. This approach avoids placing additional burden on physicians' time by giving them a small, but important role in the program. The program expects that physicians will (1) provide consent for their patients to participate in the program, (2) review and approve care plans, and (3) respond to care coordinators' requests for information and assistance with specific patients.

Table 1

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

	Participants[a]	Eligible Nonparticipants
Age at Intake		
Younger than 65	0.0	0.0
65 to 74	5.4	36.3
75 to 84	45.1	45.0
85 or older	49.6	18.7
Male	39.3	38.0
Nonwhite	0.9	28.7
Medicaid Buy-In for Medicare A or B	0.0	14.3
Medical Conditions Treated in Past Two Years		
Coronary artery disease	70.1	58.9
Congestive heart failure	61.2	44.3
Diabetes	33.9	36.0
Chronic obstructive pulmonary disease	38.8	35.2
Hospital Admission in Past Year	51.8	51.3
Hospital Admission in Past Month	3.1	7.4
Total Medicare Reimbursement per Month (Dollars)	$1,208	$1,112
Number of Beneficiaries	**224**	**55,262**

Source: Medicare Enrollment Database and National Claims History.

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

[a]Participants who do not meet CMS's Medicare requirements for the demonstration or 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 members are included above, but are not part of the research sample.

The program relies on the organizational ties between physicians and care coordinators to nurture good working relationships between them. Physicians and care coordinators share an employer, which means they are likely to have a shared vision of patient care. They also work in close proximity to one another. The physicians practice in on-campus medical centers and the care coordinators have offices in the same building or very nearby. As a result, physicians and care coordinators interact with each other many times each day. The program places great value on these informal meetings and conversations as a mean of building collaborative relationships. Informal communications seem to be effective because of the small number of physicians and care coordinators involved. (One year into the demonstration, there were six physicians and two care coordinators at both Charlestown and Oak Crest and three physicians and one care coordinator at Riderwood.) The program also has sought to promote good working relationships by hiring care coordinators who will work well with physicians. In addition, the program has arranged for physicians to be reimbursed for their participation in care coordination activities.

Charlestown would like physicians to recognize the value of care coordination. The program would like for physicians to see the care coordinators as their "eyes and ears" in the resident community. The care coordinators try to make physicians aware of issues in patients' lives that may have an impact on their medical treatment. The care coordinators also work with patients to resolve problems and prioritize their questions and concerns so that physician office visits are as efficient as possible and physician burden is reduced. At the start of the program, the care coordination supervisor met with all of the physicians in the Charlestown and Oak Crest communities to explain the program. At the end of the first year of operation, the program staff report that the physicians have met their expectations. Moreover, they have not just been willing to answer care coordinators' questions, but actively seek out their help and input in managing patient care.

Improving physicians' clinical practice is not one of the program's goals, because it believes that its physicians already follow current practice guidelines. When disagreement about clinical management issues do arise, the program addresses them on a case-by-case basis. However, the care coordinators are told to do so judiciously. The care coordination supervisor commented that because they all work for the same organization, it is essential for the care coordinators and physicians to get along without conflict. The program's medical director commented that he has received emails from physicians about the positive impacts of the program and instances where the physicians believe that the program has really helped individual patients. As further evidence of the physicians' appreciation of care coordination, in the second year of the demonstration they asked if the program would allow physicians from a University of Maryland residency program to attend home visits to demonstration patients with the care coordinators.

HOW WELL IS THE PROGRAM IMPLEMENTING KEY INTERVENTION APPROACHES?

Improving Communication and Coordination. Improving communication and coordination of care is one of two major approaches that the Charlestown MCCD program has taken to improve patient health. The program prefers its care coordinators to work directly with physicians rather than asking patients to convey information to their physicians or to prompt

their physicians to provide needed care (as some other programs do). The program takes this approach because it does not want to undermine patients' confidence in their physicians.

To improve communication and coordination, the program focuses on improving the flow of information among care providers within the Erickson communities. However, because the Charlestown MCCD program operates within these communities, both treatment and control group patients have access to on-campus medical care and support services that are already providing some level of communication and coordination. For example, the on-campus physicians (many of whom are geriatricians) emphasize preventive care and continuity of care. Erickson provides clinical practice guidelines for physicians and the medical centers use an electronic medical records system to organize and share information among providers. Each medical center has a system to remind patients about appointments with their primary care physician. In addition, each community knows about its residents' hospitalizations, emergency room visits, and other incidents requiring the use of its ambulance or security services. Erickson's acute care coordinators visit hospitalized residents and coordinate discharge planning. Finally, on-campus pharmacists monitor residents' medications for polypharmacy-related problems. The MCCD program seeks to enhance these coordination efforts by proactively identifying patient problems and needs and following up on communication to ensure that all parties have taken the appropriate action.

The Charlestown MCCD relies on informal communications to convey information to physicians about their patients. Care coordinators have frequent contacts with physicians either in-person (as already noted) or through emails. Physicians also initiate communication with care coordinators by dropping into the program office to ask them a question, but more frequently they email the care coordinators with a request (such as to check on which medications a patients has in her apartment). The care coordinators also use the electronic medical records system's "flag" feature to leave notes for physicians. For example they can remind physicians when a particular test is needed.

The care coordinators use information systems to gather information that they communicate to patients' physicians or that they use to organize and streamline patient care. For example, care coordinators have a key role in identifying and resolving polypharmacy issues. They enter medication information from the initial patient assessment into the program's case management software that is linked to a website detecting drug interactions. This is especially important for the 20 to 30 percent of program patients who do not use the on-campus pharmacies and whose medications cannot be monitored by the community pharmacists. The case management software also allows the care coordinators to set reminders for when patients should have various tests or procedures. The care coordinators use community incident reports to identify patients' adverse events. They then try to identify the causes of these incidents and work with the patient to modify any circumstances that could lead to a reoccurrence.

Through their interactions with patients, the care coordinators help them to improve communication with their physicians and coordinate their own care. The care coordinators repeat information from physicians back to patients to reinforce what they have been told. The care coordinators help patients to clarify their choices of treatments by helping them to ask appropriate questions of their physicians. The care coordinators help patients to resolve apparently conflicting advice from physicians by first determining if there is conflicting advice

and then speaking with the physicians to help align the treatment plans. Finally, the care coordinators monitor patients' medical appointments and teach them the importance of making and keeping these appointments.

Improving Patient Adherence. The program's second major approach to improving patient health is to improve patient adherence to medical regimens through education. The care coordinators identify patient education needs during the initial assessment and incorporate them into the patient's care plan goals. All patients receive education about the disease for which they were enrolled and any other condition that may lead to hospitalization or functional decline. The program seeks to improve patients' understanding of disease etiology and processes, self-care skills, need for adherence to treatment recommendations, and signs and symptoms, as well as which events signal a need to call their physician. The program also teaches patients strategies for living with their illness so that they feel more in control.

Care coordinators provide education to patients using separate teaching checklists for each of the program's target conditions that the program developed based on the structure and tone of a national patient teaching guideline for congestive heart failure. The checklists are structured according to topic areas such as disease etiology, diet, and medications. The information content for each checklist topic comes from MD Consult, a web-based database of patient education materials, to which the program subscribes. MD Consult materials are available in English and Spanish, as well as comprehensive and simplified versions depending on the amount and type of information needed. Some MD Consult materials also are available in a special version geared specifically to the unique clinical needs of geriatric patients. The program supplements the MD Consult materials with specific dietary instructions, exercise instructions, a weight chart, and other materials as needed.

The care coordinators adapt their teaching to meet patients' needs. For example, the care coordinators can cut and paste information from MD Consult into a word processing program, increasing the font, to make the information more accessible to patients with visual impairments. While the care coordination supervisor believes that low literacy skills are not a problem for program patients, she did comment that the care coordinators simplify and repeat information for patients who seem to have difficulty grasping educational messages. The care coordinators adapt their approach to teaching for patients with cognitive deficits by breaking down information into simpler and smaller pieces.

Care coordinators determine if their teaching has been effective by asking patients to repeat back information or demonstrate a skill they have been taught, looking for changes in patients' health status such as their blood pressure and weight, and reviewing adverse event reports on emergency room visits and hospitalizations. The program uses the teaching checklists to track patients' progress in attaining teaching goals. When a care coordinator believes that one of her patients is having difficulty understanding the material she is presenting or patient adherence is not improving, she will seek the input of the care coordination supervisor or other care coordinators.

The care coordinators conduct the majority of patient teaching in the Charlestown MCCD program. Because the program primarily hires nurses with home health experience, it does not provide additional training on how to conduct patient education. The care coordinators also

direct patients to other on-campus educational resources such as a certified diabetes educator or dietician if they believe that that resource would be more appropriate for the patient's needs. The care coordinator monitors the education provided from all sources and ensures that patients' educational goals are being met.

Increasing Access to Services. Increasing access to services is not a major focus of the Charlestown MCCD program. The monthly fee paid by all Erickson residents covers a number of services. Many other services are available on-campus on a fee-for-service basis. These services are available to residents enrolled in both the Charlestown MCCD's treatment and control groups. However, the program will help patients by referring them to or arranging for other services. It also will give scales and medication cassettes with review by a pharmacist to patients who need them. Although the program tries to teach patients to refill their own medication cassettes, it will pay for this service for those who are unable to manage this task independently. The care coordinators report that the most frequently arranged Medicare services are home health nursing and dietary education for patients with diabetes. The most frequently arranged non-Medicare service is assistance purchasing prescription medications. The care coordination supervisor also noted that although Erickson communities attract mostly middle-income seniors, these seniors are often quite reluctant to pay for any on-campus services beyond those that are covered by the monthly fees they pay to Erickon as residents of the communities.

WHAT WERE ENROLLEES' MEDICARE SERVICE USE AND COSTS?

This report provides preliminary estimates of the effect of the Charlestown MCCD program on Medicare service use and costs. These estimates may not reflect the true effects of the program over a longer period however, because the sample size was relatively small (85 treatment group members and 81 control group members) and the follow up period is too short (the first two full calendar months after random assignment). There were no statistically significant differences in total Medicare Part A and B reimbursements between the treatment and control groups during that follow up period. Although the treatment group was slightly more likely than the control group to use some types of services (inpatient hospital, emergency room, home health, and outpatient hospital services), none of the differences was statistically significant. While these differences may simply have been an artifact of the small sample size, it is possible that care coordinators uncovered unmet patient needs during assessment, and encouraged patients to seek services that they would not have sought in the absence of the program.

CONCLUSION

Program Strengths and Unique Features. Charlestown's MCCD program has many of the features associated with effective care coordination programs while also having some unique features.

- The program identifies potential patients with high-cost diagnoses using the communities' medical centers' databases. It has enrolled patients with expenditures roughly comparable to those estimated in its demonstration waiver.

- The comprehensive initial assessment includes input from community providers and review of electronic patient medical records. Each patient has an individualized care plan with long- and short-term goals that is sent to their physician for review and updated periodically to reflect changes in their status and progress in meeting goals. Patients are monitored at frequencies determined by the stability of their disease processes.

- Quarterly case reviews collect data on process of care measures and provide the care coordinators' with feedback on their performance. The program also collects clinical outcomes data in yearly patient reassessments, but it has not yet provided feedback to the care coordinators or physicians regarding patients' outcomes.

- The program provides patient education guided by standardized teaching checklists for each target condition. Care coordinators adapt their teaching to patients' individual needs and use a variety of methods to assess whether patients understand what they have been taught and are incorporating this knowledge into their daily activities.

- Charlestown is improving the flow of information about patients by having care coordinators work side-by-side with physicians on a daily basis. The program also uses its information systems to identify drug interactions; generate reminders to patients, physicians, and care coordinators; and identify adverse events.

- Care coordinators are registered nurses with at least five years' clinical experience or three years' experience in case management or utilization review. Most also have home health experience. The care coordinators must also have attained case manager certification or be working toward certification.

- The physicians and care coordinators have developed a trusting relationship that has been facilitated by their shared employer and corporate culture and frequent informal contacts. The physicians appear to have begun to appreciate the value of care coordination as evidenced by their asking care coordinators to intervene with their patients and seeking their input.

- The program's contract with CMS allows it to bill Medicare an additional $26 per patient per month to reimburse physicians for the time they spend on care coordination activities.

Potential Barriers to Program Success. The Charlestown MCCD program design contains no obvious barriers to success. However, one aspect of the program's evaluation design bears continued attention. Control group patients, by virtue of their residence in the program communities, have access to some support services that most other Medicare beneficiaries do not. These services, which include recreational facilities, transportation to nearby areas, on-campus availability of physicians and pharmacists, review of medications for potential adverse

interactions, and free access to a social worker, could enable control group patients to adopt a healthier lifestyle, reach their physician's office for appointments more easily, and obtain help in arranging for other necessary services (such as home-delivered meals) relative to typical Medicare beneficiaries. To the extent that these benefits reduce barriers to accessing necessary care or supplies, they could affect a patient's need for hospitalization and for other Medicare-covered services. In addition, all Erickson physicians have access to medical management and electronic medical records systems, which enables them to track some medical appointments and view laboratory, pharmacy, and other clinical data. Moreover, medical care in the communities is geared to the needs of very elderly patients and already provides considerable coordination of care. These features may affect control group patients' use of Medicare services, resulting in lower rates of hospitalization and emergency room visits than are experienced by other comparable Medicare beneficiaries. However, assessing the effects of the desirable features of Erickson Retirement Communities is not the purpose of this evaluation. Thus, the estimated program impacts will reflect only the incremental effects of having a care coordinator in an environment already rich in support services.

Finally, the results for the first six months suggest that for the program to be cost-neutral, future reductions in hospitalizations and other expensive Medicare services will have to be large enough not only to cover direct program fees, but also the costs of higher service use among the early treatment group members. It is too early to expect to see reductions in Part A costs, and the higher use of services for the treatment group may be due to care coordinators referring patients for Medicare-covered services consistent with program guidelines. Higher use of services may contribute to better short-term or long-term outcomes for enrollees. However, if the differences in service use and costs continue, it may be difficult to achieve cost neutrality in the one-year followup period.

INTRODUCTION

The Medicare Coordinated Care Demonstration, mandated by the Balanced Budget Act of 1997, is testing a range of models aimed at improving the care of chronically ill beneficiaries with Medicare fee-for-service coverage. Fifteen programs are participating in the demonstration sponsored by the Centers for Medicare and Medicaid Services (CMS). The programs are hosted by organizations as diverse as hospital systems, disease management vendors, and retirement communities and 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. First, it briefly describes the data and methodology used in this series of reports and presents an overview of the program that is the focus of this report. It then addresses the following questions: Who enrolls in the program? To what extent does the program engage physicians? How well is the program implementing its approaches to improving patient health and reducing health care costs? What were enrollees' Medicare service use and costs during its first months of operation? The report concludes with a discussion of the program's strengths and unique features, as well as potential barriers to program success.

This report describes Charlestown Retirement Community's Medicare Coordinated Care Demonstration (Charlestown's MCCD) program.[2] Charlestown is a continuing care retirement

[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 diagnosis.

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

community located in Catonsville, Maryland. Charlestown's MCCD program began enrolling Medicare beneficiaries with congestive heart failure (CHF), coronary artery disease (CAD), diabetes in April 2002, and, later, chronic obstructive pulmonary disease (COPD).

DATA SOURCES AND METHODOLOGY

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

Participation Analysis. The evaluation uses Medicare claims and eligibility data to estimate the number of beneficiaries in the Charlestown MCCD program's service area who

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

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

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

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

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

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

Despite these shortcomings, the treatment-control differences are presented in order 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 CHARLESTOWN MCCD PROGRAM

Program Organization and Relationship to Physicians. Charlestown Retirement Community is the host for the demonstration. It is part of Erickson Retirement Communities, which was founded in 1983. Erickson currently operates eight continuing care retirement communities in five states. The communities offer middle-income seniors independent-living, assisted-living, and nursing home care, as well as a broad range of on-campus service providers including physicians, social workers, and home care nurses. Three Erickson communities in Maryland are participating in the demonstration: Charlestown, in Catonsville; Oak Crest Village, in Parkville; and Riderwood Village in Silver Spring.[3]

Charlestown based its demonstration program on a care coordination/utilization management program it developed under a Medicare managed care risk contract with CareFirst Blue Cross/Blue Shield. Between 1999 and 2000, that program provided care coordination and utilization management services for 700 residents of the independent- and assisted-living units and long-term care facilities at the Charlestown and Oak Crest Village communities. All residents covered by CareFirst were eligible to participate if they were referred by their physician or had a sentinel event such as a hospitalization, emergency room visit, or fall. At the conclusion of the program, staff compared enrollees' cost of care with the average payment rate for Medicare managed care enrollees in the area and found that enrollees' costs were 54 percent lower than the average.

[3]Riderwood Village joined the demonstration in April 2003, one year after the program's start.

The key staff for the current MCCD program are a program director, care coordination supervisor, and care coordinators. The program director is employed by Erickson and acts as administrative liaison for the program on a corporate level; she does not have day-to-day program responsibilities. The care coordination supervisor and the care coordinators are employed by Charlestown. The care coordination supervisor directs day-to-day operations and supervises the care coordinators' activities. (Erickson's corporate offices are on Charlestown's campus in Catonsville.) The program's medical director, whose medical specialty is internal medicine, was involved in the preparation of the program's proposal, but does not currently have a role in day-to-day program activities. Each retirement community has its own medical director to whom the care coordinators bring their concerns if they have a difference of opinion with one of their patients' physicians.

The care coordinators are all registered nurses. One year after its start, the program had enrolled 195 treatment group patients and had the equivalent of four full-time care coordinators for a care coordinator-to-patient ratio of 1 to 49. The program plans to have six care coordinators when it reaches full enrollment (343 treatment group patients), for a ratio of 1 to 60.

All the participants in Charlestown's MCCD program live in the Charlestown, Oak Crest, or Riderwood Village communities and see primary care physicians who are employed by Erickson and who practice exclusively in the communities' on-campus medical centers. In the Charlestown and Riderwood communities, the care coordinators' offices are located in the same buildings as the medical centers. In the Oak Crest community, their offices are near the medical center. This allows the care coordinators to have frequent and informal contacts with physicians—either in-person conversations or emailed reports from the program's care coordination information system. The care coordination supervisor estimated that the care coordinators meet with physicians two or three times per week but email them more frequently.

The care coordinators' proximity to, and frequent interactions with, the program physicians offers them the opportunity to communicate effectively about their patients.

Program Approaches. The program focuses on stabilizing patients' health, improving their quality of life, and reducing the use of costly health care services. It uses two main approaches to accomplish these goals—improving communication and coordination between patients and physicians, and improving patients' adherence to care regimens. Specifically, the program seeks to use existing information systems within its communities to improve communication between providers. The program also helps patients make and keep medical appointments, communicate better with their physicians, and understand what their physicians are telling them. The program aims to improve patient adherence by providing education and making recommendations about how to incorporate treatment regimens into daily living. The program does not aim to change physician practice, though it does hope to make them more accepting of care coordination. To this end, and to prevent overburdening them, the program expects physicians to participate in only a limited way.

Target Criteria and Patient Identification. Charlestown's MCCD program targets patients with CHF, CAD, diabetes, or COPD who reside in the independent-living settings of the Charlestown, Oak Crest, or Riderwood Village continuing care retirement communities.[4] As with the other MCCD programs, participants must have both Medicare Parts A and B, must have Medicare as their primary payer, and must not be in a Medicare managed care plan of any type. Those with CAD or diabetes must have had an inpatient admission within the two-year period preceding enrollment, although the principal diagnosis for the admission need not have been

[4]The program added COPD as a target diagnosis in December 2002, in an attempt to increase the number of patients eligible for the demonstration. This addition is discussed in greater detail later in this report.

CAD or diabetes.[5] (Individuals with CHF or COPD are not required to have been hospitalized.) In addition, participants must receive their primary care through one of the communities' on-campus physicians. The program excludes those who have end-stage renal disease, have fewer than six months to live, are receiving hospice care, or have permanently moved to the community's skilled nursing facility or off campus.[6]

The Charlestown MCCD program's primary method of identifying potential participants is to use the information systems of the three communities' medical centers to generate lists of patients with any of the four target diagnoses. The communities' primary care physicians review the lists and determine which patients are appropriate for care coordination. The program sends patients deemed appropriate a letter inviting them to an information meeting signed by their primary care physicians.[7] (See Appendix C for project process flow sheet a copy of the invitation letter.)

At the information meeting, the care coordination supervisor explains the program and asks residents who are interested in participating to sign the demonstration's enrollment and consent forms. (See Appendix C for a copy of the consent form.) If a patient consents, the care coordinators review the patient's medical record to determine whether he or she meets the program's eligibility criteria. MPR randomly assigns eligible residents who consent to participate to the treatment group, in which they receive care coordination services in addition to

[5]At the request of CMS, the program added the inpatient-admission requirement. The intent of this change is to increase the likelihood that the program would be budget-neutral, as based on waiver cost calculations performed by MPR.

[6]While the program does not enroll patients in the assisted-living setting, it will not disenroll patients who transition from independent to assisted living during the demonstration.

[7]At the start of the program, the medical director of the patient's community signed the invitation letter. In the first year of the demonstration, the program began to have the letters signed by the primary care physicians in the hope that patients would be more likely to enroll if the invitation came directly from their physician.

the usual Medicare-covered and Erickson-provided services, or to the control group, in which they continue receiving the usual Medicare-covered and Erickson-provided services.

There are two additional ways in which the program identifies potential patients. Physicians may refer patients directly to the program. Charlestown has developed a special referral form for this purpose and hopes that physicians will directly refer more patients as they become more familiar with the program. Patients may refer themselves to the program, but they must also obtain their physicians' consent to participate. The program has marketed itself to patients by having the care coordination supervisor and medical director appear on the communities' closed-circuit television channel.

Assessment, Care Planning, and Monitoring. Care management begins with a comprehensive assessment of each new patient to determine his or her needs. The assessment covers the patient's medical and health service use history, current health, medications, health habits, functional status, and finances. The care coordinators access patients' medical records in the communities' medical centers to verify their target diagnoses and identify problems, medications, treatment plans, and other medical or psychosocial information relevant to the development of a care plan. The care coordinator then schedules an in-person, in-home assessment that includes the SF-12, Pra Plus, and Modified Barthel Index, as well as other tools developed for the program that describe health, health behaviors/self-management, medications, and home safety. (See Appendix C for copies of the assessment forms.) The care coordinators also administer the program's brief diabetes or CHF assessment tools if the patient has either of these diagnoses. The assessment usually takes one to one and a half hours to complete. Additional information may be gathered from the patient's family, specialty physicians, and other on-campus health care providers caring for the patient.

The program staff believe the assessment process is valuable in uncovering patient problems and needs. One care coordinator related her experiences in assessing a patient with cardiac disease and cognitive impairments. She requested a pharmacy review of the patient's medications and found that the patient's symptoms resulted from his taking four times the prescribed dosage of his heart medication. She believes that if it were not for the assessment, no one would have recognized that neither the patient nor his wife was capable of managing their medications.

Assessment results are documented on paper, then entered into discrete data fields in Canopy™, a web-based case management software system developed by Canopy Systems, Inc. Care coordinators reassess patients informally during follow-up contacts and document the results in free-text Canopy notes. They also formally reassess patients every 12 months by re-administering the SF-12, PraPlus, and Modified Barthel instruments. As of summer 2004, the program had not yet analyzed these data, which they plan to use to report on patient outcomes.

Between April 23 and October 19, 2002, 110 patients enrolled and had been randomly assigned to the Charlestown MCCD's treatment group (Table 1). Eighty-nine percent of patients (101 of 110) had at least one contact for assessment; among these, approximately 49 percent had their first contact within two weeks of enrollment. Staff had hoped to complete all patient assessments within two weeks. However, completing the assessments took longer than expected because the care coordinators were responsible for conducting both patient recruitment and initial patient assessments.

TABLE 1

CARE COORDINATOR CONTACTS WITH PATIENTS
DURING FIRST SIX MONTHS

Number of Patients Enrolled[a]	110
Number of Patients with at Least One Care Coordinator Contact (Percent)	101 (92)
Total Number of Contacts for All Patients	805
Average Number of Contacts per Patient, Among Those Contacted	8
Number of Care Coordinators Contacting Patients	4
Among Those Patients with at Least One Contact:	
Percentage of contacts care coordinator initiated	86.8
Percentage of contacts by telephone	67.5
Percentage of contacts in person at patient's residence	26.0
Percentage of contacts in person elsewhere	6.6
Of all Patients Enrolled, Percentage with Assessment Contact	89.1
Among Those Patients with an Assessment, Percentage of Patients Whose First Assessment Contact Is:	
Within a week of random assignment	29.6
Between one and two weeks of random assignment	19.4
More than two weeks after random assignment	51.0
Of All Patients Enrolled, Percentage of Patients with Contacts for:	
Routine patient monitoring	84.5
Providing emotional support	71.8
Providing disease-specific or self-care education	80.0
Explaining tests or procedures	30.0
Explaining medications	64.5
Monitoring abnormal results	15.5
Identifying need for non-Medicare service	22.7
Identifying need for Medicare service	59.1
Monitoring services	35.5
Average Number of Patients Contacted per Care Coordinator	25.3
Average Number of Patient Contacts per Care Coordinator	201.3

Source: Charlestown MCCD program data received July 2002 and updated July 2003. Covers six-month period beginning April 23, 2002 and ending October 19, 2002.

[a]Number of patients enrolled in the treatment group as of October 19, 2002.

Care coordinators develop care plans for each patient which specify individual goals and resource needs based on the results of the initial assessment. Because the care plan coordinates the care that all community departments provide (for example, residential social services, home health, rehabilitation team, or the diabetes support group), care coordinators consult with any department providing services to a patient when developing their plan. Care plans include a list of individualized problems or issues along with short- and long-term goals regarding adhering to medical regimens, making lifestyle changes, and improving functional ability, quality of life, and self-management skills.

The program sends the patient's physician a letter summarizing the initial assessment, the care plan, and a list of the patient's medications. (See Appendix C for a sample care plan and letter to the physician.) If the physician makes comments on the care plan, the care coordinator revises it to incorporate recommended changes. The care coordinators then review the care plans with patients and revise them to incorporate patients' stated goals and priorities. However, the program does not share written copies of care plans with patients because it believes that Canopy's care plan format is not well designed for patients' use. The care coordinator also reviews the care plan with the patient's family if requested by the patient.

The care plan is documented in Canopy and serves as a guide for all the care managers' patient contacts. The care coordinators periodically update the care plans as a result of their monitoring contacts with patients. However, the program does not require them to update care plans with any set frequency or after adverse events such as hospitalizations.

The care coordinators use their clinical judgment to determine the frequency with which they monitor individual patients.[8] However, the program does have some basic monitoring

[8]The program had planned to assign patients to risk levels based on the patients' scores on the SF-12, PraPlus, and Barthel Index, and to use these risk levels to set the minimum frequency of follow up monitoring. However,

guidelines. For example, patients whose disease processes are unstable and who receive home health or rehabilitation on a daily or weekly basis are considered to have the highest care coordination needs and are monitored daily or weekly. Patients whose disease processes are unstable, but who receive supportive services only intermittently, are monitored weekly or biweekly. Patients whose disease processes are stable and who are not currently receiving supportive services are monitored biweekly to monthly. All patients receive at least one follow up contact per month either in person in their apartments or by telephone. Patients who have met all the goals outlined in their care plans receive monthly monitoring.

During monitoring contacts, the care coordinator assesses the patient's symptoms and adherence to the prescribed treatment regimen and provides education that addresses the patient's individual needs. The care coordinator notifies the patient's physician and other members of the health care team if new problems are identified. Although the care coordinators initiate most patient contacts, the program does encourage patients to contact their care coordinators with their questions and concerns. The care coordinators are available during normal office hours, but at night and on weekends the answering machine in the demonstration office instructs patients to contact the community medical center or activate the emergency response system in their apartment for emergencies.

Of the 110 patients enrolled in the first six months of operation, more than 90 percent had at least one contact with a care coordinator, and the average patient had eight contacts. Most patient contacts (87 percent) were initiated by care coordinators and most (68 percent) were by

(continued)
this plan was not implemented because program staff felt that risk scores did not capture patients' physical and psychological status with sufficient accuracy to determine the frequency with which they should be monitored.

telephone. Among all patients enrolled, 85 percent had received a contact from a care coordinator for routine monitoring.

Staffing and Program Quality Management. Maintaining and improving care quality and ensuring programs attain their goals both require that staff have adequate qualifications, training, and supervision and that managers have the tools and support needed to monitor the program's progress toward its goals. The Charlestown MCCD requires its care coordinators to be registered nurses (preferably baccalaureate-prepared) with five years' clinical experience (medical/surgical nursing, community health nursing, or home health care) or three years' experience in case management or utilization review. In addition, care coordinators must have attained case manager certification or be working toward certification.[9] The demonstration does not employ social workers, but instead refers patients to the resident services coordinator employed by their community.

The care coordination supervisor trains the care coordinators by providing an overview of the demonstration and the program's policies and procedures. Care coordinators receive three days of training on how to use the program's computer software, including the Canopy system and Microsoft Outlook. They also spend one day meeting their community's medical staff and other providers. Care coordinators then shadow more experienced staff to observe their interactions with patients. (See Appendix C for the care coordinator's training schedule.) The care coordination supervisor believes that since most of the program's care coordinators have a strong home health background, they already know a lot about care coordination, but that they still need to spend more time learning about the program's computer systems and specific policies and procedures. The program does not test the care coordinators to determine the

[9]As of summer 2004, two care coordinators were certified through the Commission for Case Manager Certification, and a third care coordinator was preparing to take her examination.

effectiveness of their training, but reviews their work on an ongoing basis to ensure that it meets the program's quality standards.

The care coordination supervisor meets with the care coordinators monthly to discuss the program process, policies, and software issues. This meeting also is used to review selected clinical cases. Every three months, the care coordination supervisor selects five patient cases managed by each care coordinator. She uses a formal assessment tool (see the care management inter-rater tool in Appendix C) to review specific process of care measures. For example, she assesses whether all data collection tools have been completed, the care plan reflects the problems and issues identified, and the frequency of monitoring is appropriate. The care coordinators receive feedback on the results of the review.

The care coordination supervisor reports to the program director regarding current program issues including enrollment, staffing, and the program's financial status. They do not have formal meetings, but exchange telephone calls and emails. For all other matters, the care coordinator supervisor reports to Erickson's director of health services for the Charlestown and Oak Crest communities. Each month, the program director reports to the program's medical director regarding enrollment, care coordinator-physician relationships, successful interventions, or any other issue that requires the medical director's attention.

The Charlestown MCCD program uses its Canopy case management software to monitor its operations. In addition to enrollment data, the software stores patient-level data from assessments, care plans, and monitoring contacts. It has task-management features to help the care coordinators to manage their time and workflow. (See Appendix C for an example of a care coordinator's task list.) Working with the software's developer, the program had been able to generate patient-level data from Canopy for use by the evaluator including the date of program enrollment, date of program disenrollment, records of care coordinator contacts, and goods paid

for by the program such as scales and medication cassettes. The software can also generate reports of adverse patient events. (See Appendix C for examples of these reports.)

The program had planned to use patient reassessment data from the SF-12, Pra Plus, and Modified Barthel Index to develop report of patient outcomes. Although the program has been collecting these reassessment data, as of summer 2004, analysis had not begun.

WHO ENROLLS IN THE PROGRAM?

The program did not meet its enrollment target for the first year of operation. Staff attributed this shortfall to reductions in the pool of eligible patients that resulted from imposing the prior-hospitalization requirement for patients with CAD or diabetes. To increase enrollment, the program added another Erickson community to the demonstration and another diagnosis to the list of target conditions. However, the program appears to have enrolled patients with the expected level of health care costs. Patients also appear satisfied with the program and none voluntarily disenrolled in the first six months of operation.

Enrollment after One Year. After one year of operation, the Charlestown MCCD program had enrolled 195 patients in the demonstration treatment group and 189 patients in the control group (MPR Weekly Enrollment Report, week ending April 27, 2003). This is 56 percent of the program's target of 686 patients in the first year.

Staff report that the program's primary barrier to enrollment is the limited pool of community residents from which it can identify eligible patients. Before the start of the demonstration, CMS required the program to add the inpatient admission requirement for patients with CAD or diabetes in order to increase the likelihood that the program would be cost-neutral (as required by the legislation establishing the demonstration). However, as a result of this requirement, the program staff estimated that their pool of potentially eligible patients

decreased from 2,100 to 685.[10] In the program's first six months of operation, it attempted to enroll all 685 patients and succeeded in enrolling 239.[11]

The program staff did not make any estimates regarding the participation rate but believed they would have no difficulty reaching their enrollment target. However, the patient refusal rate has been higher than the program had hoped it would be. Of the 541 patients who met the eligibility criteria and whose physicians deemed them appropriate for the program, 44 percent either never responded to the program's invitation or directly refused to participate. The majority of patients invited did not attend the program's meetings describing the demonstration. The care coordination supervisor believes that the two most common reasons that patients decline to participate are that they do not believe they need the program and that they do not want the administrators of their community to know too much about their health status. Erickson permits its residents to remain in independent-living apartments only as long as they are medically and functionally able. The care coordination supervisor believes that some residents fear that Erickson will move them to the assisted-living or skilled nursing facility setting if the care coordinators find that they are in poor health or have too many functional deficits.

Having exhausted the pool of eligible patients in the first six months, the program had to find ways to expand its target population. The program initiated five strategies to increase enrollment, but none had an immediate or significant effect on the number of patients enrolling in the program. First, the program added another Erickson community—Riderwood Village.

[10]This estimate was made before the addition of the Riderwood Village to the demonstration and the addition of COPD as a target diagnosis.

[11]Of 446 patients who did not enroll, 118 were ineligible because they had died, moved to long-term care, moved off-campus, or were enrolled in the program's pilot project. Another 26 patients were deemed inappropriate for the program by their primary care physicians. Among those patients who passed the program's initial screening criteria and received their physicians' endorsement but did not enroll, 165 did not respond to the invitation to attend the information session, 72 attended the session but did not enroll, 26 consented to participate but were then found to be ineligible (because they had moved to a hospice or began receiving ESRD benefits), and 39 were undecided.

While the program had planned to do this as early as late 2002 or early 2003, the first patients from Riderwood did not enroll until April 2003, due to a change in management staff at this community and the need to increase enrollment in the other two communities so that the program could afford to hire another care coordinator. In addition, Riderwood is a relatively new community that is not fully occupied. In March 2003, the program estimated that 130 Riderwood residents would be eligible for the demonstration. By spring 2004, 132 Riderwood residents had enrolled.

Second, the program expanded the number of conditions targeted. In December 2002 the program received permission from CMS to add patients with COPD. (Patients with COPD are not required to have a prior hospitalization.) The program identified a total of 242 residents in the three communities with COPD. Of these, 157 patients had enrolled by spring 2004.

The program tried other small changes to increase enrollment in its first year of operation. It revised the letter sent to patients inviting them to attend the information sessions so that it came from patients' own primary care physicians rather than the medical director of their community. Although few physicians refuse to let patients enroll, the program spent more time marketing the program to physicians to help them understand how the program could benefit their less severely ill patients. Finally, the program increased marketing efforts directed at patients by writing articles for the resident newsletters, appearing on the communities' closed circuit television channels, and having a more visible presence at community events such as flu immunization clinics.

Ultimately, the changes were successful. The Charlestown MCCD reached its target enrollment of 686 patients in December 2003, 21 months after the program started.

Percent of Eligible Beneficiaries Participating. To gain another perspective on 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. (Appendix B contains a detailed description of the simulation.) The simulation showed that approximately 55,456 beneficiaries were eligible for the MCCD between April and October 2002, the program's first six months of operation. That is, they met CMS's three demonstration-wide requirements, lived in Baltimore City or County, and met the program's specific eligibility criteria.[12] This clearly is an overestimate of the number of eligible beneficiaries, since the sample is not restricted to Erickson continuing care community residents.[13] During the same six months, 199 of these "eligible" beneficiaries enrolled in the demonstration (0.36 percent of the 55,456 eligible beneficiaries in the Baltimore area).[14]

Comparison of Participants and Eligible Nonparticipants. An analysis of Medicare enrollment and claims data shows several significant demographic differences between program participants and eligible nonparticipants. Participants were considerably more likely to be very old. Among the participants, half were 85 or older, compared with 19 percent of eligible

[12]Between April and October 2002, 183,286 beneficiaries were living in the program's service area (Baltimore city or county). Of those, 20,407 (11 percent) would have been ineligible because they did not meet one of CMS's demonstration-wide criteria. Of the remaining 162,879 beneficiaries who met those criteria, 55,456 (34 percent) also met the program's diagnostic and service use criteria at some point during the six-month intake window, and had none of its exclusion criteria (to the extent they could be simulated with the Medicare data). (See Table B.2.)

[13] In the second site-specific report, the participation analysis will restrict the sample of eligible beneficiaries to those residing in the zip codes of the three Erickson communities participating in the demonstration.

[14]In fact, 229 beneficiaries actually enrolled in the program during its first six months. When estimating the participation rate, the evaluation excludes enrollees with incorrect Health Insurance Claim (HIC) numbers on MPR's enrollment file (there were three), and those who did not meet the demonstration-wide criteria or the program's geographic, diagnostic, utilization, or exclusion criteria (as measured using Medicare data). These enrollees were excluded from the participation analyses in order to use a consistent definition of eligibility for the numerator and denominator of the ratio. (The three beneficiaries with invalid HIC numbers may well be eligible, but the beneficiaries' Medicare data could not be obtained to assess that, so they were excluded. The HIC numbers have since been corrected.) This leaves 199 known *eligible* participants. Twenty-three enrollees (10 percent of the 229) did not meet the program's eligibility criteria. They had CAD or diabetes but did not have a hospitalization in the previous two years for any condition (23 of the 28 did not have any hospitalizations in the previous two years). The comparison of participants to eligible nonparticipants in Table 2, however, excludes only participants with invalid HIC numbers and those who did not meet Medicare demonstration-wide requirements, leaving 224 participants. Thus, the comparison more closely reflects the differences between all actual participants and those who were eligible to participate but did not.

nonparticipants (Table 2).[15] Participants were also less likely to be poor: none were enrolled in Medicaid, compared with 14 percent of nonparticipants. Almost all the participants were white (99 percent), compared with 71 percent of nonparticipants. These differences likely reflect the differences between individuals who live in the Erickson communities and other local Medicare beneficiaries.[16]

Participants were more likely than eligible nonparticipants to have a series of chronic conditions. During the two years prior to enrolling, 70 percent of participants had been treated for CAD and 61 percent for CHF, both target diagnoses for the demonstration. In addition, 64 percent of participants had been treated for peripheral vascular disease, 46 percent for stroke, and 35 percent for cancer. Nonparticipants had significantly lower rates of these chronic conditions. About a third of each of the two groups, however, had diabetes or COPD.

Despite having more chronic conditions and being older, participants had slightly lower hospitalization rates and roughly comparable Medicare spending compared to eligible nonparticipants. Participants were less likely to have had a hospitalization in the month before intake (3 versus 7 percent of eligible nonparticipants), as well as in the previous two years (69 versus 75 percent). Both groups had average monthly Medicare reimbursement rates of about $1,200 over the year prior to enrollment.

When developing the cost estimate for the Charlestown waiver application, MPR estimated that Medicare reimbursements would average $1,488 per month for eligible beneficiaries who

[15]Although the program does not exclude individuals under age 65 from participation, Erickson communities have extremely few residents this age and none enrolled in the program in its first six months. To more closely approximate the demographic profile of potential participants, we limited the pool of eligibles to those 65 or older.

[16]Residents in Erickson's Maryland communities pay a deposit upon entrance ranging between $60,000 and $440,000 depending on the apartment they select. In addition, residents pay a monthly fee of between $950 and $1,850.

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)	84.0	77.7	***
Younger than 65	0.0	0.0	
65 to 74	5.4	36.3	***
75 to 84	45.1	45.0	
85 or older	49.6	18.7	***
Male	39.3	38.0	
Nonwhite	0.9	28.7	***
Original Reason for Medicare: Disabled or ESRD	2.2	8.8	***
State Buy-In for Medicare Part A or B	0.0	14.3	***
Newly Eligible for Medicare (Eligible Less than Six Months)	0.0	0.0	
Enrolled in Fee-for-Service Medicare 6 or More Months During Two Years Before Intake	100.0	99.7	
Medical Conditions Treated During Two Years Before Month of Intake[b]			
Coronary artery disease	70.1	58.9	***
Congestive heart failure	61.2	44.3	***
Stroke	46.4	32.1	***
Diabetes	33.9	36.0	
Cancer	34.8	25.2	***
Chronic obstructive pulmonary disease	38.8	35.2	
Dementia (including Alzheimer's disease)	2.2	6.3	**
Peripheral vascular disease	63.8	21.6	***
Renal disease	16.5	8.8	***
Total Number of Diagnoses (number)	3.7	2.7	***
Days Between Last Hospital Admission and Intake Date[b]			
No hospitalization in past two years	30.8	24.8	**
0 to 30	3.1	7.4	**
31 to 60	4.9	5.8	
61 to 180	22.8	19.0	
181 to 365	21.0	19.1	
366 to 730	17.4	23.9	**

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	30.4	25.6	
0.1 to 1.0	43.3	52.0	***
1.1 to 2.0	18.3	15.5	
2.1 to 3.0	6.3	4.1	
3.1 or more	1.8	2.9	
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]			
Part A	$733	$725	
Part B	$475	$387	***
Total	$1,208	$1,112	
Distribution of Total Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]			
$0	0.0	1.2	*
$1 to 500	46.4	50.8	
$501 to 1,000	19.2	16.4	
$1,001 to 2,000	14.7	14.5	
More than $2,000	19.6	17.1	
Number of Beneficiaries	**224**	**55,262**	

Source: Medicare Enrollment Database and National Claims History File.

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

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

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

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

TABLE 2 *(continued)*

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

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

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

did not participate in the program. This estimate is slightly higher than the enrollees' average actual monthly costs of $1,208 for the period prior to enrollment.[17]

Satisfaction and Voluntary Disenrollment. Patients may stay in the Charlestown MCCD program for the duration of the demonstration (that is, until April 2005). Of the 110 (treatment group) patients who enrolled over the first six months of operation, 28 percent had been enrolled for 10 weeks or less by the end of this period, 54 percent had been enrolled between 11 and 20 weeks, and 18 percent had been enrolled for 21 weeks or more (Table 3). No patient voluntarily disenrolled during the first six months of operation. The program disenrolled four patients either because they lost their eligibility (one joined an Medicare+Choice plan) or because the program realized that they did not have one of the target diagnoses or they did not have Medicare Parts A or B.

Participants appear to be satisfied with the MCCD program. One year into the demonstration, the program had received only one complaint from a patient who wanted to disenroll, but that person later decided to remain in the program. In spring 2004, the Charlestown MCCD program conducted a survey of all patients who had been in the program for at least six months. The survey questions focused on patients' interactions with their care coordinator and patients' perceptions of whether the program had helped them (see Appendix C for a copy of the survey). Seventy-three percent of patients returned the survey, the results of which were quite positive. On a five-point scale ranging from "strongly agree" to "strongly disagree," 98 percent of respondents either agreed or strongly agreed that the information that their care coordinators

[17]The preenrollment costs are lower than the projected post-enrollment costs in part because the sample members were all alive throughout the preenrollment period, whereas the projected costs included beneficiaries who died during the period over which costs were measured. However, the difference in costs can also be partially attributed to the 23 enrollees who do not meet the program's criterion that patients with diabetes or CAD had to have been hospitalized in the two years before enrollment.

TABLE 3

DISENROLLMENT FOR PATIENTS ENROLLED DURING FIRST SIX MONTHS

Number of Patients Enrolled[a]	110
Length of Enrollment as of October 15, 2002 (Percentage of Patients Enrolled)	
10 weeks or less	28
11 to 20 weeks	54
21 or more weeks	18
Mean Length of Enrollment (Weeks)	14
Number of Patients Who Disenrolled	4
Number Who Disenrolled Because:	
Patient died	0
Patient lost program eligibility[b]	4
Patient initiated disenrollment	0
Program assessed patient as uncooperative	0
Patient completed program	0
Number Disenrolling:	
Within a week of random assignment	1
Between 1 and 4 weeks	1
Between 5 and 12 weeks	1
More than 12 weeks	1

SOURCE: Charlestown MCCD program data received July 2002 and updated July 2003. Covers six-month period beginning April 23, 2002 and ending October 19, 2002.

[a]Number of patients enrolled in the treatment group as of October 19, 2002.

[b]Patients can lose program eligibility for the following reasons: joined a managed care plan, Medicare no longer primary payer, developed renal disease treated with dialysis, moved to the skilled nursing facility or assisted-living setting, or moved out of the community or into hospice.

gave them was helpful. Ninety-four percent agreed or strongly agreed that the program had helped them to understand how daily habits affected their health. Finally, 96 percent agreed or strongly agreed that they would recommend the program to other residents.

TO WHAT EXTENT DOES THE PROGRAM ENGAGE PHYSICIANS?

While the importance to program success of engaging eligible patients is self-evident, the importance of engaging physicians is also critical. Care coordinators must develop trusting, collaborative relationships with primary care physicians for physicians to feel comfortable communicating important information to them about their patients (for example, medication changes, new problems identified during office visits, or areas for additional patient education) and to feel that information they get from the care coordinators is credible and warrants their attention (for example, regarding problems in the home environment that affect patients' health, functional deficits that patients do not tell physicians about, or reminders about providing preventive care). A trusting, respectful relationship also will facilitate care coordinators' access to physicians when urgent problems arise and will facilitate communication and coordination across medical care providers (Chen et al. 2000). Moreover, to increase acceptance of care coordination among physicians in general, care coordinators would naturally need to engage physicians.

Charlestown's care coordination model requires only occasional physician input—most often, in response to care coordinators' requests concerning specific patients. The model is designed so that care coordinators can work independently most of the time, but they can also work collaboratively with physicians when the situation requires it. This approach avoids placing an additional burden on physicians' time. The goal of the Charlestown MCCD program is to make physicians more accepting of care coordination; it does not try to change their clinical

practice. At the corporate level, Erickson has promoted quality of care by adapting national clinical practice guidelines to focus on patients over age 80 and implementing an electronic medical record system in its communities.

Collaboration. Physicians have a small but important role in the Charlestown MCCD program. The program intentionally limited their role to prevent overburdening them and to increase the likelihood that they would accept care coordination. The program expects that physicians will (1) provide consent for their patients to participate in the program, (2) review and approve care plans, and (3) respond to care coordinators' requests for information and assistance about specific patients.

The program relies on the organizational ties between physicians and care coordinators to nurture good working relationships between them. Physicians and care coordinators share an employer, which means they are likely also to have a shared vision of patient care. They also work in close proximity to one another. The primary care physicians practicing in each community are employed by Senior Campus Physicians, a separate corporate entity within Erickson. One year into the demonstration, there are six full-time equivalent physicians each at Charlestown and Oak Crest and three full-time equivalent physicians at Riderwood.[18] As noted, the physicians practice on campus in the communities and the program care coordinators work in the same building or nearby. As a result, in the course of their routine activities, the care coordinators interact with the physicians many times each day. The program places great value on these informal, ad hoc conversations and other informal meetings as a means of facilitating casual and collaborative relationships between the care coordinators and physicians.

[18]At the same time, there were two care coordinators each at Charlestown and Oak Crest and one a care coordinator at Riderwood.

The program also believes that establishing physician trust in care coordinators is key to building collaborative relationships. The program has worked to build trust by hiring care coordinators who it thinks can work with physicians and providing them with daily opportunities for informal communication. The care coordination supervisor believes that her own work with community physicians during the prototype program set the tone for collaborations with physicians in the demonstration.

The program also has fostered collaboration with physicians by arranging for them to be paid for the time they spend in care-coordination activities. The program's contract with CMS allows it to bill Medicare an additional $26 per patient per month, which it then pays to the physicians. This fee reimburses physicians for the time they spend on care coordination activities, including speaking with the care coordinators and reviewing care plans. While this payment does not fully reimburse physicians for their time, it does recognize the value of the their input into the care coordination process.

One year into the demonstration, it appeared that the care coordinators were developing good collaborative relationships with physicians. The care coordination supervisor reported that physicians were generally meeting the program's expectations for them. They were reviewing lists of potential participants to determine whether they were suitable for the program. They also reviewed patients' care plans but made few comments on them. (The care coordination supervisor believes that physicians do not provide much input into the care plans because they describe patient problems using nursing diagnoses and include interventions that are outside the scope of physicians' practice.) The physicians also responded to care coordinators' requests for information and assistance.

The program staff reported that the care coordinators had established good communications with the physicians. It appears that co-location of care coordinators has helped this process. The

care coordination supervisor reported that care coordinators whose offices are in the communities' medical centers have a more intensive and better relationship with the physicians than the care coordinators whose offices are in another building.

As another indication of developing communications, the staff report that physicians also initiate communication with the care coordinators. They sometimes drop into the program's offices to ask the care coordinators a question, but more frequently they will email the care coordinators with a request. For example, a physician reported to one of the care coordinators that a patient's laboratory tests showed that her condition was unstable. He suspected that the patient was not taking her medication correctly. The physician asked the care coordinator to go by the patient's apartment to ensure that the patient had filled the physician's prescription for a new medication and had thrown away her old medication, which she should no longer be taking.

The program's medical director commented that he has received emails from physicians about the positive impacts of the program and about instances where the physicians believe the program has really helped individual patients. As further evidence of the physicians' appreciation of care coordination, in the second year of the demonstration they asked whether the program would allow physicians from a University of Maryland residency program to attend home visits to demonstration patients with the care coordinators.

The program plans to conduct a survey of physicians regarding their satisfaction with the program. However, given the small number of physicians involved, it is having difficulty designing a survey that will permit the physicians to share their opinions in a candid and confidential way.

Improving Practice. Charlestown would like physicians to recognize the value of care coordination. The program would like for physicians to see the care coordinators as their "eyes and ears" in the resident community. The care coordinators try to make physicians aware of

issues in patients' lives that may have an impact on their medical treatment. The care coordinators also work with patients to resolve problems and prioritize their questions and concerns so that physician office visits are as efficient as possible and physician burden is reduced.

To help the physicians better understand the program prior to the start of the demonstration, the care coordination supervisor had one-on-one meetings with them in which she gave them the program's marketing brochure for residents and the ICD-9 codes for the conditions that the program targets. She reports that helping the physicians understand what care coordination is (and is not) is an ongoing task.

HOW WELL IS THE PROGRAM IMPLEMENTING KEY INTERVENTION APPROACHES?

Improving Communication and Coordination. Most of the program's emphasis on improving communication and coordination is focused on improving the flow of information among care providers within the Erickson communities. The care coordinator's first task when a patient enrolls in the program is to understand the physician's goals for that patient. By doing this, the care coordinator can communicate these goals to the patient and, in turn, share the patient's questions, concerns, and understanding of these goals with the physician. Because of their close relationships, the Charlestown MCCD program prefers that its care coordinators work directly with its physicians rather than use patients as a conduit for communication. The program takes this approach because it does not want to undermine patients' confidence in their physicians.

Because the Charlestown MCCD operates within a continuing care retirement community, both treatment and control group patients have access to on-campus medical care and support services that were already providing some level of communication and care coordination before

the start of the demonstration. For example, the primary care physicians in each community (many of whom are geriatricians) emphasize preventive care and continuity of care. As a result, the staff report that Erickson residents have a lower rate of hospitalization and emergency room use than seniors living in the general population. In addition, Erickson has provided clinical practice guidelines to all its physicians, and the on-campus medical centers use an electronic medical records system to organize and share information among providers.[19] Each medical center has a system that reminds all community residents of their primary care appointments (but not specialist appointments because these are not scheduled in their information system). Moreover, because each community is gated and operates its own ambulance service, community administrators and medical staff have timely knowledge of hospitalizations and trips to the emergency room. They also know about nearly all other nonsentinal events that require intervention by the communities' security or emergency medical services (such as falls). All events are recorded in daily incident reports. Each community employs an acute care coordinator whose office is located on campus. The acute care coordinators make rounds with the community physicians who have been assigned to local hospitals that week. If a patient is seen in the emergency room or admitted to the hospital, the acute care coordinator assumes responsibility for monitoring and discharge planning. Finally, each community has an on-campus pharmacy that is used by many residents. When the pharmacists identify polypharmacy issues, they contact the resident's physician.

In the MCCD program, Charlestown seeks to provide an even higher level of communication and coordination than that which already exists in each Erickson community.

[19]Although these tools help physicians provide better care for their patients, there may be additional barriers to the improvement of their patients' health of that physicians are not aware of. For example, patients may not adhere to care regimens or they may be unwilling to pay out-of-pocket for additional services recommended by their physicians, such as personal care or private-duty nursing.

For example, to promote communication the care coordinators have frequent informal contacts with physicians, rather than scheduled meetings. The care coordinators and physicians spend much of their time in the same buildings and often talk with each informally. More often, however, the care coordinators send emails to the physicians. For example, if a care coordinator is going to conduct an in-home visit, she may email the physician to say that she is going to see the patient and ask whether the physician would like to see him as well. Often the physician responds that the care coordinator should just detail her observations in a return email.

The care coordinators ensure that patients understand what physicians have told them by re-explaining information if they think additional clarification is needed. The program has found that patients often cannot remember all that a physician has told them during a visit or that patients are confused about what their physician has said. For example, the care coordinators help patients understand their medical alternatives. A care coordinator may find that a patient's physician has described two possible courses of treatment during an office visit, but the patient does not seem to fully understand the risks and benefits of the two alternatives. In such a case, the care coordinator would consult the physician regarding their impressions before talking to the patient about his or her choice. The care coordinators present the facts only, asking patients to talk with both their physicians and families before making treatment decisions.

The program also uses Erickson's electronic medical record system to improve both communication and coordination of care. The care coordinators and physicians leave notes for each other in the medical record by using a "flag" feature. For example, the care coordinators can remind physicians when certain tests are needed. In addition, by viewing patients' records, the care coordinators can quickly obtain the information they need for initial assessments, review a list of current medications, and see when patients have follow-up visits scheduled. The program recently used the electronic medical record to determine how many of its patients had

current flu shots so that it could target its flu shot campaign to only those patients who had not yet received their vaccination.

The program also teaches patients to make and keep medical appointments. When a patient enrolls in the program, the care coordinator accesses his or her medical record to determine whether the patient appears to have had difficulty organizing his or her care. She looks for long gaps between office visits or notes from the physician that the patient skipped an appointment. For example, if the care coordinator sees that a patient with CHF had no visit scheduled within the next six months, she would make a note in the care plan to follow up on the patient's medical appointments. The care coordination supervisor commented that some patients forget their appointments (despite receiving a reminder from the medical center) or purposely skip appointments. The care coordinators try to get patients to set up a calendar and use it to track their appointments. They also educate patients about why they should keep their appointments. The care coordinators understand, however, that not all patients are capable of organizing their own care and will therefore take a more active role in reminding patients about appointments if needed.

The program also helps improve the coordination of care by ensuring that patients receive the appropriate examinations, tests, and followup for their conditions in the appropriate order. The care coordinators use Canopy to help them with this task by setting reminders in the system for when patients should have various tests or services. When the care coordinator receives the reminder, she asks the patient whether the test or service has been scheduled. If she finds that it has not, she will contact the physician to have them order it. The care coordinator then follows up with the patient to see whether the test or service was received. The care coordination supervisor recalled one patient who was taking an anticoagulant medication for her heart condition and needed to have surgery to remove a melanoma on her arm. The anticoagulant

medication had to be stopped prior to surgery to prevent possible complications due to uncontrollable bleeding and then restarted. Her care coordinator contacted her primary care and specialty physicians, as well as home health providers, to ensure that her medications were stopped and restarted at the appropriate times and that she was properly monitored for complications. The care coordination supervisor believes that, without the program's intervention, the changes in the patient's medication regimen would not have been handled correctly and the patient may have suffered a stroke or some other adverse event.

The program helps resolve conflicting treatment plans or advice given to patients by different physicians. The care coordination supervisor commented that Erickson sees its primary care physicians as coordinators of care who are responsible for knowing all that is happening with their patients' care. To support the physicians in this role, the program tries to identify all of a patient's treatment plans and make sure that the primary care physicians are aware of what other physicians are recommending for the patient. If the conflicting advice appears to be coming from the primary care physician and a specialist, the care coordinator will contact the primary care physician to clarify what the patient has been told.

Similarly, care coordinators help identify and resolve polypharmacy issues. The care coordinators reported that the majority of demonstration patients use the pharmacy services within each Erickson community and that community pharmacists are very good about picking up on polypharmacy issues. However, some patients' health care plans require them to use outside pharmacies. The care coordinators estimated that between 20 and 30 percent of residents use outside pharmacies or mail-order services to fill their prescriptions. The care coordination supervisor stated that for these patients, the program helps alert the patients' primary care physicians to possible polypharmacy issues. The care coordinators enter medication information from the initial assessment into the Canopy care management software. The software is linked to

a website that tells the care coordinators whether the patient is at low, moderate, or high-risk for a drug interaction. The care coordinators then discuss possible interactions with the primary care physicians. The care coordination supervisor reported the most common types of problems are food-medication interactions that the care coordinators address by patient teaching. They rarely discover life-threatening medication problems.

The care coordinators also sometimes make recommendations to physicians about changes to patients' medications. If a care manager believes that a patient should be on a different medication or a different dose of a medication, she will approach the physician with her recommendation for this change. The program's approach is not to tell the physicians that they are treating the patient inappropriately, but for the care coordinator to say that she has an idea that may help the patient and to ask the physician for his or her input. However, the care coordinators are told to do so judiciously. For example, a patient with diabetes was in good glycemic control but wanted to know if it was possible to be in even tighter control. The care coordinator suggested another medication to the patient's physician, but the physician thought the medication was too expensive and not necessary. The care coordination supervisor asked the care coordinator to drop the matter. However, the care coordinators often offer patient management suggestions to which the physicians agree without much discussion: the care coordination supervisor described these "wins" as more subtle. The care coordination supervisor commented that because they all work for the same organization, it is essential for the care coordinators and physicians to get along without conflict.

As discussed previously, community administrators and medial staff have timely knowledge of residents' adverse events, such as hospitalizations and trips to the emergency room. In response to sentinel events, the care coordinators try to identify the cause of the event, and work with the patient to modify any circumstances that could lead to a reoccurrence. The care

coordinators track and follow trends in sentinel events to determine their root cause. For example, one resident frequently called campus security in the evenings. After analyzing the reasons for the calls (which included requests to open a window or to provide a glass of water), the care coordinator was able to convince the patient that she needed to hire a personal care assistant to stay with her in the evenings.

The Charlestown MCCD program appears to have implemented a number of effective interventions to improve communication and care coordination. The care coordinators communicate frequently and informally with community physicians to update them on their patients' status. They work with patients to ensure that they understand what their physicians have told them and that they need to make and keep their appointments. The program also has some formal communication tools. Its Canopy case management software generates reminders to care coordinators regarding patient contacts, physician visits, tests, and procedures. The care coordinators use other software that checks for medication interactions—for example, reports from other community information systems to gather information which they communicate to patients' health care providers; or they help organize and streamline patient care and identify adverse events. At the same time, the medical and social supports available within Erickson communities already provide some level of care coordination. Thus, the marginal benefits of demonstration services for treatment group patients may be small.

Improving Patient Adherence. The Charlestown MCCD program's other key approach is to improve patient adherence to medical regimens through education. Because a high proportion of program patients are very elderly, the Charlestown MCCD focuses somewhat less than others on lifestyle improvements (such as smoking cessation or weight loss) because the program staff feel that these improvements are difficult to make and may have little impact on patient outcomes for this population. The degree to which the program emphasizes lifestyle changes

depends on the impact on the patient's quality of life. For example, a care coordinator may not suggest that a patient lose weight to prevent high blood pressure, but she may recommend weight loss in order to lower the amount of blood pressure medicine the patient is taking.

The care coordinators identify patient education needs during the initial assessment and incorporate them into the patient's care plan goals. All patients receive education about the disease for which they were enrolled and about any other condition that may lead to hospitalization or functional decline. The program seeks to improve patients' understanding of disease etiology and processes, self-care skills, the need for adherence to treatment recommendations, signs and symptoms, and when to call their physician. The care coordinators tell their patients that if they are uncertain whether to call their physician, then they should call the program. The program also teaches patients strategies for living with their illness so that they feel more in control. For example, patients with COPD receive a pamphlet from the American Lung Association that explains how to conserve energy doing everyday tasks and other approaches to living with COPD.

Care coordinators provide education to patients using separate teaching checklists for each of the program's target conditions. (See Appendix C for copies of the checklists.) The care coordination supervisor developed these checklists for the prototype care coordination program, basing them on the structure and tone of the Agency for Health Care Policy and Research's (AHCPR's) patient guidelines for congestive heart failure (AHCPR 1994). The checklists are structured according to topic areas such as disease etiology, signs and symptoms, diet, medications, self-care, and so on. The information content for each checklist topic comes from MD Consult, a web-based database of patient education materials to which the program subscribes. MD Consult materials are available in English and Spanish, as well as comprehensive and simplified versions depending on the amount and type of information

needed. Some MD Consult materials also are available in a special version geared to the unique clinical needs of geriatric patients. The care coordinators download and print the materials they need for each patient. (See Appendix C for an example of MD Consult's geriatric version of materials for CHF.) The program supplements the MD Consult materials with specific dietary instructions, exercise instructions, a weight chart, and other materials as needed.

The program also produces a quarterly newsletter for patients that includes such information as reminders to get flu shots, tips on how to get the most from physician visits, and descriptions of the types of services the program offers (one issue contained a list of the services care coordinators had arranged for patients). The care coordinators also can insert personal messages into the newsletters of individual patients, such as reminders about immunizations or upcoming appointments, encouragement to continue a particular therapy, or requests to notify the care coordinator when the patient has an upcoming specialist visit. (See Appendix C for one of the newsletters.)

To help patients better adhere to treatment recommendations, the program provides scales and medication cassettes to patients who need them. Care coordinators teach patients to refill their own medication cassettes, or the program pays for this service for patients who are unable to manage the task independently. The care coordinators also ask patients to weigh themselves or check their blood sugar or blood pressure at the intervals recommended by their physicians.

The program's educational approach is to first send written materials for the patient to review. Then the care coordinator schedules an in-home visit to discuss the material with the patient. Finally, the care coordinator reinforces the material during telephone followup. The care coordinators adapt their approach to teaching for patients with cognitive deficits by breaking down information into simpler and smaller pieces. The care coordinator also may recommend

supportive services. For example, if a patient is having difficulty remembering when or how to take his or her medications, the care coordinator would suggest using a medication cassette.

The care coordinators adapt their teaching to meet patients' needs. For example, the care coordinators can cut and paste information from MD Consult into a word processing program, increasing the size of the font, to make the information more accessible to the visually impaired. While the care coordination supervisor believes that low literacy skills are not a problem for program patients, she did comment that the care coordinators will simplify and repeat information for patients who seem to have difficulty grasping educational messages. The program would take a similar approach for patients with a cognitive impairment.

Care coordinators take several approaches to determining whether their teaching has been effective. First, they ask patients to repeat back information or demonstrate a skill they have been taught. The care coordinators commented that they can often tell that patients understand what they have been taught by the way they describe their activities and daily routines. The care coordinators also look for changes in patients' health status, such as their blood pressure and weight and review adverse event reports on emergency room visits and hospitalizations. The program uses the teaching checklists to track patients' progress in attaining teaching goals.

When a care coordinator believes that one of her patients is having difficulty understanding the material she is presenting, or patient adherence is not improving, she will seek the input of the care coordination supervisor or other care coordinators. Sometimes the problem is one of motivating the patient to improve adherence. The care coordination supervisor commented that living longer is not necessarily a motivating factor for patients in their upper 80s. Instead, they focus on what really matters to the patient. For example, a woman with diabetic neuropathy complained about pain. The care coordinator told her that a change in her diet may alleviate some of the pain. This approach worked for this patient who previously had been resistant to

change. In other instances, the barrier to understanding is not motivation, but visual or cognitive impairments. In these cases, the care coordinators work to identify the barrier and adapt their teaching to overcome it.

The care coordinators conduct the majority of patient teaching in the Charlestown MCCD program. Because the program primarily hires nurses with home health experience, it does not provide additional training on how to conduct patient education.[20] The care coordinators direct patients to other educational resources if they believe that that resource would be more appropriate. For example, the care coordinator may refer the patient to a home health nurse (for instance, if the patient needs intensive daily teaching related to a new diagnosis), certified diabetes educator, dietician, or group educational class. The care coordinator monitors the education provided in these setting and ensures that patients' educational goals are being met, as described above.

Staff report that care coordinators provide education during almost every patient contact. Among the 110 patients enrolled in the Charlestown MCCD program during its first six months, 80 percent had received at least one contact for self-care or disease-specific education, 65 percent had received a contact to explain a medication, and 30 percent had received at least one contact to explain a test or procedure (Table 1). Given the Charlestown MCCD program's emphasis on education, one might expect that all enrolled patients would have had at least one contact in which the care coordinator provided education. That not all patients had such a contact can likely be attributed to the fact that, in the early months of the program (the period described with the data presented in this report), many patients were newly enrolled and were

[20]Five of the six care coordinators currently employed by the program have a home health background. The sixth care coordinator is a certified case manager with five years' experience.

still receiving their initial assessments at the time the program reported care coordinator contact data.

In summary, the Charlestown MCCD program provides a moderately strong intervention to increase patient adherence to medical regimens. The program does not use a published, patient education curriculum or a curriculum based on published guidelines. It does, however, use a published guideline to shape the structure and tone of its teaching checklists. The information content for the checklist comes from MD Consult. Use of checklists and standardized teaching materials helps the program ensure that each care coordinator teaches the same concepts. The care coordinators adapt their teaching to patients' needs. All of the program's patients are English-speaking; and, because of the communities' demographics, literacy is not an issue. However, the care coordinators do adapt their teaching to patients' cognitive abilities, providing simpler explanations, smaller pieces of information, and repeating material. Care coordinators provide large-print material for the visually impaired. The program does not train the care coordinators how to provide patient education, but almost all have a home health background in which they would have developed considerable patient education experience. The care coordinators use a variety of approaches to determine if patients seem to understand what they have been taught. If a patient is having difficulty grasping the educational message, the care coordinator will try to identify and remove barriers to their understanding.

Increasing Access to Services. Increasing access to care-related goods and services is not a major focus of the Charlestown MCCD program. The monthly fee that all Erickson residents pay to live in the community covers the rental of their apartment; one meal per day; transportation on campus and within a five-mile radius of the campus; campus security (including a personal emergency response system, if necessary); resident services coordinators (social workers); and some recreational activities. In addition, many other services are readily

available on campus on a fee-for-service basis, including dental, and podiatric care; home health care; housekeeping/home support; mental health care; ambulance service; and pharmacy services. These services are available to all residents including individuals enrolled in the demonstration's treatment and control groups.

Given the availability of these services, the program staff did not feel the need to emphasize service arrangement as part of the demonstration's intervention. However, the program will help patients apply for pharmaceutical assistance programs and other public benefit programs. It also will give patients scales and medication cassettes with medication review by a pharmacist. The program teaches patients to refill their own medication cassettes and will pay for this service for patients who are unable to manage the task independently. If the use of the medication cassette does not improve compliance with the prescribed medication regimen, the care coordinator may recommend bringing in an aide to hand the medication to the patient or arranging for a home health nurse to give the patient the medication. However, these services are not included in the program and would be billed to the patient.[21] The program's goal is to exhaust all independent care alternatives before recommending the patient move to an assisted-living setting.

During its first six months of operation, the program did not purchase any goods or support services for patients such as transportation, home-delivered meals, or durable medical equipment. (The program does purchase scales and medication cassettes, but it did not report any such purchases to the evaluation in its first six months of operation.) However, approximately 23 percent of patients received help from a care coordinator who referred them to, or arranged for, non-Medicare covered services. A larger proportion of patients (59 percent) received help arranging for Medicare-covered services (Table 1). The care coordination

[21]The care coordination supervisor commented that community residents (including demonstration patients) are often reluctant to pay for services not covered by Medicare.

supervisor reported that the most frequently arranged-for Medicare services were home health nursing and dietary education for patients with diabetes. One of the most frequently arranged-for non-Medicare services was assistance in purchasing prescription medications.

WHAT WERE ENROLLEES' MEDICARE SERVICE USE AND COSTS?

This report provides preliminary estimates of the effect of the Charlestown MCCD on Medicare service use and expenditures. These early estimates must be viewed with caution, since they are not likely to be reliable indicators of the true effects of the MCCD 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, when staff may have been fine-tuning the intervention. Moreover, the program may enroll patients with different characteristics over time.

Total Medicare Part A and B reimbursements for the treatment group, exclusive of demonstration payments, were $3,138, on average, during the first two months after enrollment, compared with $1,953 for the control group (Table 4). This treatment-control difference of $1,185, or 60 percent, is sizeable but is not statistically significant ($p = 0.20$). While treatment group members were slightly more likely than control group members to use various types of services over the two months (for instance, hospitalizations, emergency room visits that do not result in a hospitalization, home health, and outpatient hospital services), none of the differences were statistically significant.[22] These differences may be due to the small sample size or

[22]As would be expected with random assignment, the treatment and control groups were statistically similar. Thus, these small but consistent post-enrollment differences in Medicare service use and costs do not appear to be due to preexisting differences in the two groups. (See Appendix Table B.6.)

TABLE 4

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

	Treatment Group	Control Group	Difference[a]	
Inpatient Hospital Services				
Any admission (percent)	15.3	12.4	3.0	
Mean number of admissions	0.20	0.14	0.06	
Mean number of hospital days	1.21	0.68	0.53	
Emergency Room Services				
Any emergency room encounters (percent)				
Resulting in admission	7.1	4.9	2.1	
Not resulting in admission	0.0	0.0	0.0	
Total	7.1	4.9	2.1	
Mean number of emergency room encounters				
Resulting in admission	0.09	0.05	0.04	
Not resulting in admission	0.00	0.00	0.00	
Total	0.09	0.05	0.04	
Skilled Nursing Facility Services				
Any admission (percent)	7.1	6.2	0.9	
Mean number of admissions	0.07	0.09	–0.02	
Mean number of days	1.16	0.75	0.41	
Hospice Services				
Any admission (percent)	1.2	2.5	–1.3	
Mean number of days	0.12	0.07	0.04	
Home Health Services				
Any use (percent)	15.3	11.1	4.2	
Mean number of visits	1.73	0.84	0.89	
Outpatient Hospital Services[b]				
Any use (percent)	54.1	49.4	4.7	
Physician and Other Part B Services[c]				
Any use (percent)	100.0	100.0	0.0	
Mean number of visits or claims	9.2	7.8	1.4	
Mortality Rate (percent)	1.2	2.5	–1.3	
Total Medicare Reimbursement[d]				
Part A[e]	$1,971	$1,104	$867	
Part B	$1,167	$850	$317	
Total	$3,138	$1,953	$1,185	
Reimbursement for Care Coordination[f]	$481	$0	$481	***
Number of Beneficiaries	**85**	**81**		

Source: Medicare National Claims History File.

TABLE 4 *(continued)*

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

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

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

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

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

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

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

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

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

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

characteristics of early enrollees or early program practices, and may disappear when the sample size increases. Alternatively, it is possible that when care coordinators assessed treatment group patients, they uncovered unmet needs, and encouraged patients to obtain more services (or as mentioned above with respect to home health care and diabetic teaching, arranged for such services on their behalf). In addition, the treatment-control difference in costs increases by $481 over the first two months, from $1,185 to $1,666, when one takes into account the CMS per member per month payment to the MCCD.[1]

We also examined monthly trends in treatment-control differences from April through September 2002, the first six months of program operation (Table 5). The sample enrolled in the first three months is too small to draw inferences. In the last month, September 2002, the treatment group incurred greater Medicare costs than the control group, and the difference, $1,768, is statistically significant. The treatment group patients were more likely to have been hospitalized during the last two months (a statistically significant 8 percentage points higher each month). This suggests that there may be short-term increases in utilization among the treatment group. Again, further analysis is needed to see if these differences persist with a larger sample and a longer follow-up period.

It is too soon to tell whether the intervention will ultimately result in improved patient health and reduced hospitalization and emergency room use. Care coordination programs may increase service use in the short term, as staff discover that patients have not received recommended care or require services to prevent deterioration in health. Or, program enrollees may simply continue

[1]The per patient per month fee charged by the program is $218, or $436 over the two-month period. In addition, the program also bills Medicare $26 per patient per month on behalf of the program physicians or $52 over the two-month period. Thus, over two months, the program bills Medicare a total of $488 per patient. The average amount billed per patient according to Medicare claims data, is $481, slightly lower than that billed by the program. This difference occurs because a few treatment group patients had claims for only one month of program fees.

TABLE 5

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

	Group	Apr 02	May 02	Jun 02	Jul 02	Aug 02	Sep 02
Cumulative Enrollment Through Month End	Treatment	8	29	47	74	94	103
	Control	9	26	45	70	90	99
Mean Number of Beneficiaries Enrolled Who Meet Medicare Coverage and Payer Requirements and Are Alive That Month	Treatment	8	29	47	74	94	102
	Control	9	26	45	70	87	94
Average Medicare Reimbursement During the Month[a]	Treatment	$240	$615	$540	$740	$1,608	$2,622
	Control	$289	$500	$426	$1,607	$1,004	$854
Average Reimbursement for Care Coordination During the Month[a,b]	Treatment	$244	$254	$245	$242	$244	$237
Whether Admitted to Hospital This Month[a] (Percentage)	Treatment	0.0	3.4	2.1	2.7	13.8	12.7
	Control	0.0	7.7	0.0	7.1	5.7	5.3
Treatment - Control Difference[c]							
Average Medicare Reimbursement[a]		–$49	$115	$114	–$867	$604	$1,768 **
Average Reimbursement for Medicare plus Care Coordination[a]		$196	$369	$359 *	–$625	$848	$2,005 ***
Percentage Hospitalized[a]		0.0	–4.2	2.1	–4.4	8.1 *	7.4 *

Source: Medicare National Claims History File.

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

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

TABLE 5 *(continued)*

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

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

to use more services than the control group, particularly if the program enrolls too few patients who are likely to be hospitalized in the absence of the program.

CONCLUSION

Research over the last decade suggests, but is by no means conclusive, that successful care coordination has a number of features. These include effective patient identification, a well-designed and structured intervention, highly qualified staff, physician buy-in, and financial incentives aligned with program goals.

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

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

when necessary, to arrange for community services (Chen et al. 2000; Bodenheimer 1999; and Hagland 2000).

The third and fourth characteristics that have been associated with successful programs are having highly trained staff and actively involved providers. Strong programs typically have care coordinators who are baccalaureate-trained nurses or who have case management or community nursing experience. They also tend to have the active support and involvement of patients' physicians (Chen et al. 2000; and Schore et al. 1997).

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

Program Strengths and Unique Features. Charlestown's MCCD program has many of the features associated with effective care coordination programs, while also having some unique features.

- The program targets patients with typically high-cost diagnoses and has enrolled patients with expenditures roughly comparable to those estimated in its demonstration waiver. It identifies potential patients efficiently using the medical centers' databases.
- Care coordinators conduct a comprehensive initial assessment that includes input from community providers and review of electronic patient medical records. They then develop care plans with each patient's long- and short-term goals, which they send to the physicians for review. The care plans are updated periodically to reflect changes in patient status and progress in meeting goals. Care coordinators monitor patients at frequencies determined by the stability of each patient's disease processes.
- The program's care coordination supervisor conducts quarterly case reviews to collect data on process of care measures and provide the care coordinators' with feedback on their performance. The program also collects clinical outcomes data in its yearly patient reassessments. However, it has not analyzed these data or provided feedback to the care coordinators or physicians regarding patients' outcomes.

- Although the program does not use a published patient education curriculum, it has developed standardized teaching checklists for each target condition. Care coordinators adapt their teaching to patients' individual needs and use a variety of methods to asses whether patients understand what they have been taught and are incorporating this knowledge into their daily activities.
- Charlestown's care coordinators have close relationships with physicians and work side by side with them on a daily basis. The program emphasizes improving the flow of information by using its information systems to identify drug interactions; generate reminders to patients, physicians, and care coordinators; and identify adverse events.
- Care coordinators are registered nurses with at lease five years' clinical experience or three years' experience in case management or utilization review. Most also have home health experience. The care coordinators must also have attained case manager certification or be working toward certification.
- The communities' physicians are actively involved in the program. The physicians and care coordinators have developed a trusting relationship that has been facilitated by their shared and employer and corporate culture and frequent informal contacts. The physicians appear to have begun to appreciate the value of care coordination as evidenced by their asking care coordinators to intervene with their patients and seeking out their input.
- The program's contract with CMS allows it to bill Medicare an additional $26 per patient per month to reimburse physicians for the time they spend on care coordination activities including speaking with the care coordinators and reviewing care plans.

Potential Barriers to Program Success. The Charlestown MCCD program design contains no obvious barriers to success. However, one aspect of the program's evaluation design bears continued attention: Control group patients, by virtue of their residence in the program communities, have access to some support services that most other Medicare beneficiaries do not. These services include recreational facilities, transportation to nearby areas, on-campus availability of physicians and pharmacists, and free access to a social worker—service that could enable control group patients to adopt a healthier lifestyle, reach their physician's office for appointments more easily and obtain help in arranging for other necessary services (such as home-delivered meals), relative to typical Medicare beneficiaries. To the extent that these benefits reduce barriers to accessing necessary care or supplies, they could affect a patient's need

for hospitalization and for other Medicare-covered services. In addition, all Erickson physicians have access to medical management and electronic medical records systems, which enables them to track some medical appointments and view laboratory, pharmacy, and other clinical data. Moreover, medical care in the communities is geared to the needs of very elderly patients and already provides considerable coordination of care. These features may affect control group patients' use of Medicare services, resulting in lower rates of hospitalization and emergency room visits than are experienced by other comparable Medicare beneficiaries. However, measuring the effects of Erickson Retirement Communities as a whole is not the purpose of this evaluation. Thus, the estimated program impacts will reflect only the incremental effects of having a care coordinator in an environment already rich in support services.

Finally, the results for the first six months suggest that for the program to be cost-neutral, future reductions in hospitalizations and other expensive Medicare services will have to be large enough not only to cover direct program fees, but also the costs of higher service use among the early treatment group members. It is too early to expect to see reductions in Part A costs, and the higher use of services for the treatment group may be due to care coordinators referring patients for Medicare-covered services consistent with program guidelines. Higher use of services may contribute to better short-term or long-term outcomes for enrollees. However, if the differences in service use and costs continue, it may be difficult to achieve cost neutrality in the one-year followup period.

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

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APPENDIX A

ADDITIONAL TABLES

TABLE A.1

DEMONSTRATION PROGRAMS PARTICIPATING IN THE EVALUATION

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

TABLE A.1 *(continued)*

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

TABLE A.1 *(continued)*

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

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

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

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

TABLE A.2

DOCUMENTS REVIEWED FOR THIS REPORT

Erickson Care Coordination Demonstration Project (proposal submitted to the Health Care Financing Administration, October 2000)

Policies and procedures manual (June 18, 2002)

Program organizational chart

Position descriptions:
- MCCD program manager (care coordination supervisor)
- Community care coordinator (care coordinator)
- Care coordination analyst (enrollment coordinator)

Project process flowsheet*

Beneficiary marketing materials

Invitation letter to eligible patients*

Informed consent for participation*

Initial assessment instruments
- SF-12/PraPlus/Modified Barthel Index
- CHF brief assessment*
- Diabetes brief assessment*
- Care coordination collection tool*
- Environmental assessment*
- Health related patterns*
- Psychosocial*
- Advance directives*

Sample care plan*

Sample care plan letter to physicians*

Clinical staff training*

Care management inter-rater tool*

Care coordinator task list*

Satisfaction survey (patients)*

MD Consult materials – congestive heart failure

Medicare Care Coordination Project Newsletter*

Care coordination teaching checklist
- Diabetes mellitus*
- Coronary artery disease
- Congestive heart failure
- Chronic obstructive pulmonary disease

* Included in Appendix C of this report

APPENDIX B

METHODS USED TO ANALYZE PARTICIPATION AND PROGRAM IMPACTS

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

A. METHOD FOR CALCULATING PARTICIPATION RATE AND PATTERNS

We measured the proportion and types of beneficiaries attracted to the program by calculating the participation rate and patterns. The participation rate was calculated as the number of beneficiaries who met the program's eligibility criteria and actually participated during the first six months of the program's operations, divided by the number who met the eligibility criteria. The six-month window spanned 179 days, from April 23, 2002, through October 19, 2002. We explored patterns of participation by comparing eligible participants and eligible nonparticipants, noting how they differed on demographics, reason for Medicare eligibility, and costs and use of key Medicare services during the previous two years.

1. Approximating Program Eligibility Criteria

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

In addition to the Medicare coverage and payer requirements, Charlestown 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 reside in independent-living setting of the Charlestown, Oak

TABLE B.1

ELIGIBILITY CRITERIA

Inclusion Criteria	Patients living in an independent-living apartment at the time of enrollment who use Charlestown, Oak Crest, or Riderwood primary care physicians and who satisfy any of these three conditions: 1. Have a history of CHF, or 2. Diagnosis of CAD or diabetes and have been hospitalized in the preceding 2 years for that condition. 3. Have a history of COPD (added December 2002). ICD-9 Codes: 428, 428.0, 428.1, 428.9,401, 401.0, 401.1, 401.9, 402, 402.0, 402.00, 402.01, 402.1, 402.10, 402.11, 402.9, 402.90, 402.91, 411, 411.1, 411.8, 411.81, 413, 413.0, 413.1, 413.9, 414, 414.0, 414.00, 414.01, 414.02, 414.03, 414.04, 414.05, 250, 250.0, 250.1, 250.2,250.3, 250.4, 250.5, 250.6, 250.7, 250.8, 250.9
Exclusion Criteria	Meet any of these three criteria: 1. Reside in the Skilled Nursing Facility or the Assisted Living Facility at the retirement communities 2. Receive Medicare ESRD program benefits 3. Receive hospice care
Providers/Referral Sources	Charlestown and Oak Crest Retirement Communities. Riderwood Village retirement community was added on 4/23/03
Geographic location	Baltimore, MD (Charlestown and Oak Crest) Washington, DC metropolitan area added 4/23/03 (Riderwood is in Silver Spring, MD)

Crest, or Riderwood Village retirement communities and be cared for by a primary care physician practicing in one of those communities. In addition, they must satisfy one of the following diagnostic criteria: have a history of congestive heart failure (CHF) in the previous two years or have a diagnosis of coronary artery disease (CAD) or diabetes *and* have a hospitalization in the preceding two years for any condition. Charlestown added beneficiaries with a history of COPD in December 2002 (not used for this report). Along with the diagnosis criteria, at the time of enrollment beneficiaries could not (1) be a resident in the skilled nursing facility or assisted living facility at the retirement communities, (2) have end-stage renal disease (ESRD), and (3) be receiving Medicare's hospice benefit.

We could approximate most of Charlestown's criteria using Medicare data with some exceptions. We implemented Charleston's inclusion criteria by examining whether a beneficiary had any claim for CHF or a hospital admission for CAD or diabetes at any point during the 30-month period beginning May 2, 2000, two years before enrollment began, and ending six months after enrollment started (October 31, 2002).[1] We used the same time period to approximate whether beneficiaries met the program's medical exclusion criteria at the time of enrollment. We were unable to observe the complete diagnostic history for beneficiaries who had not been in FFS Medicare during the full two years before the enrollment window.[2] In addition, we did not limit eligible beneficiaries to people who lived in Charlestown's retirement communities, making

[1]We understood that a hospitalization for CAD or diabetes is required for patients with CAD or diabetes to be eligible. Charlestown's demonstration staff, however, indicate that patients with CAD or diabetes are eligible if they have been hospitalized for <u>any condition</u>. For this analysis, we used our understanding of the target criteria for comparisons of eligible participants and nonparticipants, and a mixture of the two for calculations of the participation rate. We will correct the misunderstanding of the target criteria for the next report.

[2]Among the 226 participants who enrolled in the first six months, who had valid Health Insurance Claim (HIC) numbers reported and who met CMS's insurance requirements at intake, there were no beneficiaries that were enrolled in Medicare FFS 12 or less of the previous 24 months before they enrolled in the demonstration.

our estimates significantly overstate the true number of people Charlestown would have approached about participating, and hence understate the participation rate. We also limited the eligible sample to people age 65 or older to more closely approximate the beneficiaries likely to be eligible for the program and living in the retirement communities. Finally, we could not fully approximate one of Charlestown's exclusion criteria using Medicare data: excluding those beneficiaries that are currently a resident in the retirement communities' skilled nursing facility.

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

Medicare claims and eligibility data and data submitted by the program were used to identify participants and eligible nonparticipants. For all participants, we used the Medicare enrollment database (EDB) file to confirm the HIC numbers, name, and date of birth submitted by the program when beneficiaries were randomized. We identified potentially eligible nonparticipants by identifying the HIC numbers of all Medicare beneficiaries who were alive and living in the catchment counties during the six-month enrollment window. Initially, three years of Denominator records (1999-2001) and one year of HISKEW records (2002) were used to identify people living in the catchment counties at any time in the 1999-2002 period. HIC numbers of potentially eligible nonparticipants and all participants together formed a "finder file." The finder file was used to gather data on the beneficiary's state and county residence during the six-month enrollment period, as well as to obtain eligibility information from the EDB. Using this information, we limited the sample to people living in the catchment counties at any point during the six-month enrollment window. This finder file was also used to make a "cross-reference" file to ensure that we obtained all possible HIC numbers the beneficiary may have been assigned. This was done using Leg 1 of CMS's Decision Support Access Facility. At

the end of this step, we had a list of HIC numbers for all participants, as well as all beneficiaries living in the catchment area during the six-month enrollment period.

3. Creating Variables from Enrollment and Claims Data

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

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

The EDB file provided us the information with which to construct measures of beneficiaries' demographic characteristics (age, sex, race), dates of death, original reason for Medicare

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

entitlement, Medicare managed care enrollment, Part A and B coverage, whether Medicare was the primary payer, and the state buy-in proxy measure for enrollment in Medicaid.

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

When we examined a beneficiary's history from the month during which they were randomized, we used the actual date of randomization for participants and a simulated date of randomization for nonparticipants, picked to be July 15, 2003, or roughly the midpoint of the six-month enrollment window.

4. Defining Eligible Nonparticipants and Eligible Participants

We used target criteria information to reduce the group of beneficiaries who lived in the catchment area 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 estimate the participation rate.

We identified 183,286 beneficiaries who lived in the two counties in Charlestown's catchment area at some point during the first six months of enrollment (Table B.2). We then excluded 20,407 people (11.1 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 32,446 of the remaining people (17.7 percent of all area beneficiaries) were dropped from the sample, since they were not treated for one or more of the target diagnoses the program identified as necessary for inclusion during the two years before the program began or during the first six months of enrollment. Fifty-five percent of the remaining beneficiaries (71,668 people) did not meet the utilization requirements we measured (a hospitalization for CAD or diabetes, if the beneficiary did not have CAD) during the 30 months from May 2000 through October 2002 (which includes the two years before the program began, as well as the six-month enrollment window). Finally, 3,309 people were identified as having at least one of Charlestown's exclusion criteria, leaving us with a sample of 55,456 beneficiaries in the two counties who would have been eligible to participate in Charlestown's program. This number dramatically overstates the number of beneficiaries Charlestown can invite to participate because it is not limited to people living in their retirement communities.Charlestown randomized 229 beneficiaries who enrolled in the demonstration program during the first six months of operation (Table B.3). Of these, three people (about 1 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. Charlestown randomized two beneficiaries who had an address on the EDB that was outside its county catchment area (despite living in their retirement communities).

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	183,286
Minus those who:	
During 6-month enrollment period, either (1) were always in a Medicare managed care plan, or (2) never had Medicare Part A coverage, or (3) never had Medicare Part B coverage, or (4) Medicare was not primary payer during one or more months	–20,407
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	–32,446
If had CAD or diabetes without CHF, did not have any hospitalizations for that condition during the 30 months from May 2000 through October 2002	–71,668
Met at least one of the exclusion criteria during the 30 months from May 2000 through October 2002	–3,309
Eligible Sample	**55,456**

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	118	111	229
Minus those who:			
Had an invalid HIC number on MPR's enrollment file	–1	–2	–3
Not in geographic catchment area during the month of intake	–2	–0	–2
In a Medicare managed care plan, or did not have Medicare Part A and B coverage, or Medicare is not primary payer during the month of intake	–1	–1	–2
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	–0	–0	–0
If had CAD or Diabetes without CHF, did not have any hospitalizations during the 30 months from May 2000 through October 2002	–14	–9	–23
If had CAD or Diabetes without CHF, did not have hospitalizations <u>for that condition</u> during the 30 months from May 2000 through October 2002	–2	–3	–5
Met at least one of the exclusion criteria during the 30 months from May 2000 through October 2002	–0	–0	–0
Eligible Sample	**98**	**96**	**194**

TABLE B.3 *(continued)*

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

We excluded these cases from the participation analysis to maintain comparability to the eligible nonparticipant sample. We also excluded two participants who did not meet CMS's requirements for participation in the program during the month of intake. The largest share (10 percent of enrollees), or 23 beneficiaries, were dropped from the participation analysis because they did not meet the utilization requirement during the 30-month period from May 2000 through October 2002. They had CAD or diabetes but did not have a hospitalization in the past two years for any condition.[4] Charlestown relies on patients' self-reports of hospitalization when assessing eligibility.[5] None of the participants had any of Charlestown's exclusion criteria. Thus, among the 229 participants randomized by Charlestown into the program during its first six months of operations, after exclusions, 199 people are included in the participation analyses as eligible participants.

Charlestown's participation rate for the first six months of enrollment is therefore calculated as the number of participants who met the eligibility requirements (199), divided by the number of eligibles who live in the catchment area (55,456), or 0.36 percent.

[4]As mentioned above, we understood that a hospitalization for CAD or diabetes is required for patients with CAD or diabetes to be eligible. Charlestown's demonstration staff, however, indicate that patients with CAD or diabetes are eligible if they have been hospitalized for *any condition.* For this report, we were able to correct the eligibility criteria applied to participants, but not to eligible nonparticipants. When we calculated the participation rate, we used Charlestown's criteria for the participants but required the eligible nonparticipants to have a hospitalization for CAD or diabetes. This approach classifies 23 participants as ineligible, instead of 28, resulting in 199 eligible participants. When the error is corrected, the number of eligible nonparticipants will increase, reducing the estimated participation rate. Table B.4 uses the incorrect criteria (requiring a hospitalization for CAD or diabetes for non-CHF enrollees) for both eligible participants and nonparticipants, and thus contains five fewer eligible participants (194).

[5]Charlestown relies on patients' self-reports of hospitalization when assessing eligibility. The 28 patients without CHF who did not have a hospitalization for CAD or diabetes had much lower costs than patients who meet the eligibility requirements. The average monthly cost during the two years prior to intake for these 28 patients was $382.

Table B.4 describes the characteristics of the 194 participants who were enrolled by Charlestown during the first six months and who appear to meet Charlestown's eligibility requirements, as measured in Medicare data, and the 55,262 eligible nonparticipants.[6] This table is identical to Table 2 in the text, except that the participant sample has been restricted to the beneficiaries who meet the eligibility criteria according to Medicare claims data. Because almost 90 percent of the participants are included in this table, the results are similar to those in Table 2.[7]

METHOD FOR CALCULATING TREATMENT-CONTROL DIFFERENCES

Sample sizes are too small, and the follow-up period too short, to estimate program impacts. Comparing the treatment and control groups on mean outcomes, however, provides an early indication of potential effects. The analysis draws on the data and the variables constructed for the participation analysis but is restricted to the program's participants (treatments and controls).

The cost of the intervention was estimated as the amount CMS paid to Charlestown for the treatment group patients, using G-coded claims in the physician claims file.

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[6]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 3). Those with incorrect HIC numbers may well be eligible, but we could not obtain the Medicare data for them to assess that; so they were excluded. HIC numbers have since been corrected and those beneficiaries will be included in the final report.

[7]Nonparticipants were identified as eligible if they met the target criteria anytime during the six-month enrollment window, as well as the two years before that time. 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)	84.3	77.7	***
Younger than 65	0.0	0.0	
65 to 74	4.5	36.3	***
75 to 84	44.7	45.0	
85 or older	50.8	18.7	***
Male	41.2	38.0	
Nonwhite	1.0	28.7	***
Original Reason for Medicare: Disabled or ESRD	2.0	8.8	***
State Buy-In for Medicare Part A or B	0.0	14.3	***
Newly Eligible for Medicare (Eligible Less than Six Months)	0.00	0.00	
Enrolled in Fee-for-Service Medicare 6 or More Months During Two Years Before Intake	100.0	99.7	*
Medical Conditions Treated During Two Years Before Month of Intake[b]			
Coronary artery disease	73.4	58.9	***
Congestive heart failure	68.3	44.3	***
Stroke	48.7	32.1	***
Diabetes	35.2	36.0	
Cancer	35.2	25.2	***
Chronic obstructive pulmonary disease	40.2	35.2	
Dementia (including Alzheimer's disease)	2.5	6.3	**
Peripheral vascular disease	66.3	21.6	***
Renal disease	17.6	8.8	***
Total Number of Diagnoses	3.9	2.7	***
Days Between Last Hospital Admission and Intake Date[b]			
No hospitalization in past two years	23.1	24.8	
0 to 30	3.0	7.4	**
31 to 60	5.5	5.8	
61 to 180	25.1	19.0	**
181 to 365	23.6	19.1	
366 to 730	19.6	23.9	

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	23.1	25.6	
0.1 to 1.0	47.7	52.0	
1.1 to 2.0	20.6	15.5	**
2.1 to 3.0	7.0	4.1	**
3.1 or more	1.5	2.9	
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]			
Part A	$758	$725	
Part B	$501	$387	***
Total	$1,260	$1,112	
Distribution of Total Medicare Reimbursement per Month Fee-for-Service During One Year Before Intake[b]			
$0	0.0	1.2	
$1 to 500	41.7	50.8	**
$501 to 1,000	20.1	16.4	
$1,001 to 2,000	16.6	14.5	
More than $2,000	21.6	17.1	*
Number of Beneficiaries	**199**	**55,262**	

Source: Medicare Enrollment Database and National Claims History File.

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

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

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

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

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

TABLE B.4 *(continued)*

**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.

1. Treatment—Control Differences

We used two approaches to estimate treatment-control differences in Medicare-covered service use and cost outcomes. First, we estimated differences over a two-month follow-up period for all people Charlestown randomized during the first four months of enrollment. The four-month enrollment window covers April 23, 2002 through August 20, 2002. The follow-up time covered the two calendar months after the month of randomization. For example, for a beneficiary randomized on May 25, we examined outcomes in June and July.

Second, we estimated treatment—control differences by calendar month over the first six months of Charlestown's enrollment to look at how cost-effectiveness might vary over the life of a program. One might expect programs to have little effect at first, since it takes time for patients to be assessed, the program to become fully functional, the patients to adopt case managers' recommendations, and these behavior changes to affect the need for health care. Analyzing costs by program month will allow us to examine such patterns. For each month from April 2002 through September 2002, we identified the patients who were enrolled in Charlestown's coordinated care program and analyzed their Medicare-covered service use. For example, a person randomized in April would be present in April through September, provided that person is eligible and alive in each month.[8] Someone randomized in May would not be part of the calculations for April but would be included in May through September, again provided that the person is eligible during those months.

The sample used to analyze treatment—control differences in outcomes differs from that used to analyze participation. Like the participation analyses, we excluded from the analysis

[8]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).

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.[9] Also, in contrast to the participation analyses, participants who did not meet the program's target criteria according to the claims and EDB data were not excluded from the outcomes analyses. Given this, of the 180 people randomized in the first four months of Charlestown's demonstration, the sample for analyzing treatment-control differences contained 166 people. For the six-month sample, 211, or 92 percent of the 229 randomized people, were included in the final sample (Table B.5). In addition to excluding beneficiaries, we excluded months during which we could not observe the beneficiaries' full costs in fee-for-service (described in footnote 8).

2. Integrity of Random Assignment

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

[9]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	180	229
Minus those who:		
Were members of the same household as research sample members	–12	–14
Had invalid HIC numbers on MPR's enrollment file	–2	–2
In a Medicare managed care plan, or did not have Medicare Part A and B coverage, or Medicare is not primary payer during the month of intake	–0	–2
Number of usable sample members	**166**	**211**

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)	84.6	84.2		84.4	84.1	83.8		83.9
Younger than 65	0.0	0.0		0.0	0.0	0.0		0.0
65 to 74	3.5	4.9		4.2	5.6	5.8		5.7
75 to 84	41.2	48.2		44.6	41.7	49.5		45.5
85 or older	55.3	46.9		51.2	52.8	44.7		48.8
Male	55.3	61.7		58.4	59.3	65.1		62.1
Nonwhite	100.0	98.8		99.4	100.0	98.1		99.1
Original Reason for Medicare: Disabled or ESRD	0.0	4.9	**	2.4	0.9	3.9		2.4
State Buy-In for Medicare Part A or B	0.0	0.0		0.0	0.0	0.0		0.0
Newly Eligible for Medicare (Eligible Less than Six Months)	0.0	0.0		0.0	0.0	0.0		0.0
Enrolled in Fee-for-Service Medicare Six or More Months During Two Years Before Intake	100.0	100.0		100.0	100.0	100.0		100.0
Medical Conditions Treated During Two Years Before Month of Intake[a]								
Coronary artery disease	67.1	60.5		63.9	63.9	58.3		61.1
Congestive heart failure	42.4	46.9		44.6	47.2	45.6		46.4
Stroke	27.1	33.3		30.1	29.6	37.9		33.6
Diabetes	35.3	38.3		36.7	34.3	34.0		34.1
Cancer	37.7	38.3		38.0	38.0	41.8		39.8
Chronic obstructive pulmonary disease	1.2	2.5		1.8	1.9	1.9		1.9
Dementia (including Alzheimer's disease)	61.2	66.7		63.9	64.8	65.1		64.9
Peripheral vascular disease	24.7	11.1	**	18.1	23.2	11.7	**	17.5
Renal disease	3.7	3.7		3.7	3.7	3.7		3.7

TABLE B.6 *(continued)*

	Four-Month Sample				Six-Month Sample			
	Treatment Group	Control Group		Total Research Sample	Treatment Group	Control Group		Total Research Sample
Total Number of Diagnoses (number)	67.1	60.5		63.9	63.9	58.3		61.1
Days Between Last Hospital Admission and Intake Date[a]								
No hospitalization in past two years	35.3	25.9		30.7	34.3	24.3		29.4
0 to 30	1.2	3.7		2.4	2.8	3.9		3.3
31 to 60	2.4	7.4		4.8	2.8	6.8		4.7
61 to 180	21.2	24.7		22.9	20.4	27.2		23.7
181 to 365	16.5	24.7		20.5	16.7	26.2	*	21.3
366 to 730	23.5	13.6		18.7	23.2	11.7	**	17.5
Annualized Number of Hospitalizations During Two Years Before Month of Intake[a,b]								
0	35.3	24.7		30.1	34.3	23.3	*	28.9
0.1 to 1.0	40.0	42.0		41.0	41.7	46.6		44.1
1.1 to 2.0	20.0	24.7		22.3	18.5	20.4		19.4
2.1 to 3.0	2.4	8.6	*	5.4	2.8	8.7	*	5.7
3.1 or more	2.4	0.0		1.2	2.8	1.0		1.9
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[a]								
Part A	$483	$852	*	$663	$638	$863		$748
Part B	$432	$505		$468	$452	$502		$476
Total	$915	$1,357	*	$1,131	$1,090	$1,364		$1,224
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	54.1	44.4		49.4	50.9	40.8		46.0
$501 to 1,000	21.2	12.4		16.9	22.2	16.5		19.4
$1,001 to 2,000	7.1	19.8	**	13.3	9.3	20.4	**	14.7
More than $2,000	17.7	23.5		20.5	17.6	22.3		19.9
Location During Program Intake Period								
Baltimore, MD								
County Code 21020	97.7	97.5		97.6	95.4	97.1		96.2
County Code 21030	2.4	2.5		2.4	2.8	2.9		2.8
Outside catchment area	0.0	0.0		0.0	1.9	0.0		0.9
Number of Beneficiaries	**85**	**81**		**166**	**108**	**103**		**211**

Source: Medicare Enrollment Database and National Claims History File.

TABLE B.6 *(continued)*

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

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

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

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

ESRD = end-stage renal disease.

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

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

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

As expected under random assignment, the treatment and control groups had similar characteristics in both the four- and six-month samples. There were statistically significant differences in five baseline characteristics for the four-month sample: (1) the proportion of beneficiaries whose original reason for Medicare was disabled or ESRD, (2) the proportion of beneficiaries who have peripheral vascular disease, (3) the proportion of beneficiaries who had 2.1 to 3.0 hospitalizations per year in the two years before the month of intake, (4) Part A and total Medicare reimbursement per month enrolled during two years before month of intake, and (5) the distribution of total Medicare reimbursement per month enrolled during the two years before the month of intake. For the six-month sample, there were four statistically significant differences: (1) the proportion of beneficiaries who have peripheral vascular disease, (2) the proportion of beneficiaries whose days between last hospital discharge and intake was 181 to 365 days and 366 to 730 days, (3) the proportion of beneficiaries whose annual number of hospitalizations during the two years before month of intake was zero or 2.1 to 3.0, and (4) the distribution of total Medicare reimbursement per month enrolled during the two years before the month of intake. We would expect this number of false-positive differences to occur by chance, given the number of characteristics examined. Thus, none of the differences in this small, early sample create any cause for concern.

3. Sensitivity Tests

To assess outcomes, we calculated Medicare-covered service use and cost in the two months after the month of randomization. For example, for an individual who was randomized in the month of May, we tabulated the individual's outcomes in June and July. To examine whether our results were affected by not including costs and services that occurred closer to the randomization date, we conducted a sensitivity analysis examining outcomes for three months—

during the month the individual was randomized, as well as the two months after randomization (Table B.7). Other than outpatient hospital services, which saw a change in direction in the estimated impact that was not statistically significant in either table, the results were similar to those for outcomes measured over the two-month period (text Table 5). Thus, the results are not sensitive to how the month of randomization is treated.

TABLE B.7

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

	Treatment Group	Control Group	Difference[a]	
Inpatient Hospital Services				
Any admission (percent)	17.7	14.8	2.8	
Mean number of admissions	0.26	0.17	0.09	
Mean number of hospital days	1.41	0.90	0.51	
Emergency Room Services				
Any emergency room encounters (percent)				
Resulting in admission	8.2	6.2	2.1	
Not resulting in admission	0.0	0.0	0.0	
Total	8.2	6.2	2.1	
Mean number of emergency room encounters				
Resulting in admission	0.12	0.06	0.06	
Not resulting in admission	0.00	0.00	0.00	
Total	0.12	0.06	0.06	
Skilled Nursing Facility Services				
Any admission (percent)	9.4	6.2	3.2	
Mean number of admissions	0.09	0.10	0.00	
Mean number of days	1.40	0.99	0.41	
Hospice Services				
Any admission (percent)	1.2	2.5	–1.3	
Mean number of days	0.12	0.07	0.04	
Home Health Services				
Any use (percent)	18.8	16.1	2.8	
Mean number of visits	2.35	1.59	0.76	
Outpatient Hospital Services[b]				
Any services (percent)	58.8	60.5	–1.7	
Physician and Other Part B Services[c]				
Any use (percent)	100.0	100.0	0.0	
Mean number of visits or claims	12.4	11.5	1.0	
Mortality Rate (percent)	1.2	2.5	–1.3	
Total Medicare Reimbursement[d]				
Part A[e]	$2,300	$1,783	$517	
Part B	$1,552	$1,254	$298	
Total	$3,852	$3,037	$815	
Reimbursements for Care Coordination[f]	$732	$0	$732	***
Number of Beneficiaries	**85**	**81**		

Source: Medicare National Claims History File.

TABLE B.7 *(continued)*

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

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

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

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

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

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

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

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

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

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

APPENDIX C

SELECTED PROGRAM DOCUMENTS

SELECTED PROGRAM DOCUMENTS

Project process flowsheet

Invitation letter to eligible patients

Informed consent for participation

Initial assessment instruments
- CHF brief assessment
- Diabetes brief assessment
- Care coordination collection tool
- Environmental assessment
- Health related patterns
- Psychosocial
- Advance directives

Sample care plan

Sample care plan letter to physicians

Clinical staff training

Care management inter-rater tool

Care coordinator task list

Satisfaction survey (patients)

MD consult materials – congestive heart failure

Medicare Care Coordination Project Newsletter

Care coordination teaching checklist - diabetes mellitus