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The Carle 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, through both impact and implementation analyses. 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.

Here we describe the Carle Foundation's Medicare Coordinated Care Demonstration Project (Carle MCCD). The Carle Foundation is part of a large, integrated delivery system located in Urbana, Illinois, which includes a 295-bed teaching hospital and primary care clinics in rural east-central Illinois. The prototype for the MCCD was Carle's Geriatric Team Care program, developed with funding from the Hartford Foundation and implemented in Carle's Medicare+Choice plan. Carle found Geriatric Team Care to reduce expenditures for the plan's high-risk patients by roughly 15 percent over two years.

Program Organization and Goals. The Carle MCCD is located in the Foundation's Urbana-based, not-for-profit Health Systems Research Center. The program leadership includes a program director and director of operations, both of whom have been with Carle for many years. The program's care coordinators (called nurse partners) are based in four main hub clinics, but they also see patients in smaller, outlying clinics. Case assistants, located in each clinic, assist the nurse partners by calling patients for routine monitoring, prioritizing patient requests and contacts, and helping with information gathering and paperwork for the program.

Early in the design phase of the demonstration, the MCCD program director established a physician advisory board that includes Carle opinion leaders relevant to the program. The board took an active role in formulating clinical practice guidelines, designing demonstration procedures, and promoting the program to local clinic physicians; the board continues to meet regularly to review program progress.

The program has adopted two main approaches to improving patient health and reducing health care costs: improving health care provider practice, and improving treatment adherence of patients and families. The program aims to improve and standardize the practice of physicians and nurses by helping them to consistently follow evidence-based practice guidelines and by disseminating updates to the guidelines as they change. It seeks to improve patient adherence to medication, exercise, and diet regimens by improving patients' ability to understand and manage their own care and to take an active role in medical decision making. Integral to both these approaches is improving communication and coordination between providers and patients.

Patient Identification. The Carle MCCD began enrolling patients in April 2002. Patients must have one of the following diagnoses: congestive heart failure, coronary artery disease, atrial fibrillation, diabetes, chronic obstructive pulmonary disease, or asthma; and they must have had at least one hospitalization or three medical office visits in the year before enrollment. The Carle

MCCD identifies patients primarily by reviewing the Carle Claims and Utilization database. The physicians then review patient lists to confirm that the patients are still alive and that they are not in nursing homes. The program sends each confirmed patient a brochure describing the program with an application form and a cover letter signed by his or her own physician. Patients who return the application and report that they meet the program's eligibility criteria are then invited to an information session with specially trained MCCD staff, during which they discuss and sign the informed-consent form and complete a brief health questionnaire.

Quality and program 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 Carle MCCD nurse partners must have a baccalaureate degree in nursing and five years' experience in medical-surgical or home health nursing (or an associate or diploma nursing degree and 10 years' experience). They receive three weeks of program training and attend education sessions. The nurse partner supervisor evaluates them formally each year, in addition to conducting monthly clinic visits and routine staff meetings, and communicating by e-mail and telephone in the interim.

The ability to generate reports for monitoring program activities and progress toward its goals depends on a comprehensive and flexible data system. The program has developed links between the MCCD's Care Management Information System (CMIS) and Carle's main electronic medical records system, EpicWeb, that enable the program to download laboratory results from EpicWeb into CMIS, and to upload care management progress notes from the MCCD into EpicWeb. The Carle MCCD program director uses an extensive set of reports generated from the CMIS (and a time/ activity database) to ensure the intervention is being delivered as intended and to improve care when needed. Reports are viewed as a starting point for conversations about program activities and tools for problem solving. Patient characteristics and outcomes are tracked monthly and fed back to the nurse partners, who share them with physicians as necessary. The program director notes that, without all these monitoring reports, "you're just praying that you're providing the intervention."

IS THE PROGRAM ATTRACTIVE TO ITS TARGET POPULATION?

The program has essentially met its target of enrolling 2,200 beneficiaries in the evaluation's treatment and control groups within a year and has done so with little change to their planned approach to identifying patients. After one year of operation, the Carle MCCD had enrolled 1,032 patients in the demonstration treatment group and 1,024 in the control group, roughly 20 percent of the 10,000 Carle patients the program estimated would be eligible. Staff attribute their success in meeting enrollment targets to an efficient system of identifying eligible patients and to physician support for the program, particularly in signing the letters inviting patients to participate and then actively encouraging patients to participate.

To gain another perspective on the proportion of eligible beneficiaries enrolling in the program and to describe their characteristics, we simulated the MCCD eligibility criteria using Medicare enrollment and claims data. Our simulation showed that 1,122 out of 29,775 eligible beneficiaries (or about 4 percent) enrolled in the MCCD during the program's first six months of operation (April through October 2002). The estimate of the size of the simulated eligible

beneficiary pool is greater than the program's estimate primarily because the latter is restricted to Carle patients.

Program participants were less likely than eligible nonparticipants to be nonelderly or very elderly, to be poor, or to have been recently hospitalized (Table 1). Almost all MCCD participants were age 65 or older, and 13 percent were over 85. Four percent were dually eligible for Medicare and Medicaid. By comparison, eligible nonparticipants were more likely to be either under 65 or over 85 (8 and 17 percent, respectively, were in these age categories) and more likely to be eligible for Medicaid (14 percent). Eligible nonparticipants were more likely than participants to have three of the program's target diagnoses: congestive heart failure, diabetes, and chronic obstructive pulmonary disease. Twenty-seven percent of participants had a hospitalization in the year prior to enrolling, as compared with 36 percent of eligible nonparticipants. (We used July 15, 2002, the midpoint of the six-month enrollment period used in this analysis, as a pseudo-enrollment date for nonparticipants.) Participants also were less likely to have had a hospitalization in the month before enrolling (3 percent), than were nonparticipants (5 percent). As a result of their poorer health, nonparticipants had greater average monthly Medicare expenditures over the two years before enrollment than participants: $625, as compared with $478.

Table 1

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

	Participants[a]	Eligible Nonparticipants
Age at Intake		
Younger than 65	0.8	7.9
65 to 84	86.6	75.5
85 or older	12.6	16.6
Female	52.2	55.3
Nonwhite	2.5	3.8
Medicaid Buy-In for Medicare A or B	3.5	13.6
Medical conditions treated in last two years		
Coronary artery disease	55.6	55.9
Congestive heart failure	28.1	35.2
Diabetes	38.9	43.9
Chronic obstructive pulmonary disease	35.6	38.5
Hospital discharge in last year	26.9	36.2
Hospital discharge in last month	2.5	5.1
Total Medicare reimbursement per month (dollars)	$478	$625
Number of beneficiaries	1,381	23,284

SOURCE: Medicare Enrollment Database and National Claims History.

NOTE: Beneficiaries from one county in the program's service area (Vermilion) were inadvertently excluded from this table.

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

To develop the cost estimate for its waiver application, the MCCD assumed that half of its participants would have had a hospital stay in the year prior to enrolling, resulting in MPR's estimate that Medicare costs would average $742 per month for eligible beneficiaries who did not participate in the program. It thus appears that patients who enrolled in the program are healthier than expected, with only 27 percent having a hospital stay and average monthly costs of $478 prior to enrollment. This is consistent with program reports that some beneficiaries invited to participate in the MCCD declined because they felt they first needed to recover from surgery.

Although staff believe that elderly patients in their service area typically are already highly satisfied with their physicians and other providers, they also believe that patients are highly satisfied with MCCD services. Voluntary disenrollment during the first six months was very low. Only 5 patients out of 663 disenrolled, primarily because they changed their minds about wanting to work with the nurse partners.

TO WHAT EXTENT DOES THE PROGRAM ENGAGE PHYSICIANS?

The Carle MCCD model is based on a highly collaborative relationship between nurse partners and physicians. The program also intends to improve physician practice in terms of more consistent use of evidence-based practice guidelines. The Carle MCCD model is based on the expectation that physicians will actively promote the program to patients and will collaborate with nurse partners in the care of their patients. The program devoted substantial resources to engaging physicians, starting with the development of the physician advisory group that includes influential physician leaders from all relevant Carle departments and the program's largest clinics. Physicians also quickly became familiar with the nurse partners because the program has each nurse partner practice out of one or two local clinics. Finally, the program pays physicians for participating in formal meetings with nurse partners. To promote more consistent use of guidelines, the program provides education to clinic physicians by asking them to review Web-based guidelines and associated case studies, as well as holding small-group presentations by specialists at the clinics. The program also has plans to provide physicians with patient reports aggregated to the clinic level that will include process information, such as whether particular tests have been conducted, as well as patient outcomes.

Program efforts to win the support of Carle physicians appear to have succeeded. All but two or three Carle physicians allow the program to approach patients it has identified as potentially eligible and have signed letters of invitation to them. All participating physicians have provided nurse partners with standing orders, largely at the encouragement of clinic medical directors. Moreover, physicians have started calling nurse partners about patients, suggesting both a high level of trust in their abilities and a sense that they are working together on the patient's behalf. Program staff report that clinic physicians view the program quite favorably: physicians think it is a valuable service for their patients and many believe that it has reduced burden for themselves.

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

Improving patient adherence. Improving patient (and family) adherence to treatment regimens is a major approach the Carle MCCD has taken to improving patient health. MCCD patient education, the means to improving adherence, seeks both to improve patients' self-management skills and to improve their ability to communicate with physicians. Self-management education includes disease etiology; routine tests associated with the disease; usual medications prescribed, how they work, and possible side effects; signs and symptoms that indicate the need for intervention; self-treatment of common symptoms; exacerbation triggers to avoid; needed lifestyle changes and how to make them; and the emotional effects of the disease. To improve communication between patients and physicians, nurse partners teach patients to ask physicians the right questions and to generally take a more active role in medical decision making. To aid in this process, the nurse partners give patients cards containing questions to ask the physician and checklists of needed tests to take to physician visits. They also help patients articulate what they are thinking about their health and teach them how to be better organized for relatively short physician appointments.

Nurse partners provide education to patients using established curricula tailored to each patient's educational needs and provide patients with packets of printed materials for their diagnoses. The nurse partner supervisor organized the curricula and information packets with the assistance of an HSRC education specialist. The nurse partners themselves receive patient education training when they begin to work for the program. This training includes reviewing the program's patient education and other materials, talking about the education process, and listening to other nurse partners provide education. Nurse partners also help each other with specific educational issues at regular staff meetings, capitalizing on their different nursing and educational backgrounds. During the first six months of operation, more than 80 percent of the 663 program patients had at least one encounter with nurse partners that included the provision of disease-specific education, and more than half had encounters that included explanation of tests, procedures, or medications.

Improving communication and coordination. Effective communication between physicians and nurse partners is an underpinning of the Carle MCCD intervention. Improved communication is supported by the development of the program's physician advisory group and the use of regular and as-needed formal conferences with physicians, as well as by providing the opportunity for nurse partners and physicians to see each other informally on a regular basis.

The program aims to make care less fragmented and more timely (that is, better coordinated) in several ways. First, physicians provide nurse partners with standing orders that allow them to schedule required tests for patients. Second, patients have easy access to their nurse partners, who have easy access to physicians. The nurse partner can go directly into the physician-scheduling program to make an appointment for the patient when necessary. Third, nurse partners are responsible for monitoring that patients receive medical care consistent with guidelines. Finally, if the patient is receiving conflicting advice from his or her primary and specialty physicians, the nurse partner will encourage (and if necessary, coach) the patient to ask the primary physician to speak with the specialty physician to resolve the conflict. If necessary, however, the nurse partner will act as the patient's advocate, working directly with the

physicians to resolve conflicting advice or polypharmacy. More than 60 percent of patients enrolled during the first six program months had contact with nurse partners during which the nurse partners identified the need for Medicare-covered services and more than three-fourths had contacts in which they identified the need for non-Medicare services such as financial assistance programs to purchase medications.

WHAT EFFECT HAS THE PROGRAM HAD ON MEDICARE SERVICE USE AND COSTS?

We provide preliminary estimates of the effect of the Carle MCCD on Medicare service use and costs, but caution that these estimates are not necessarily indicative of the true effects of the MCCD over a longer period. As might be expected during the first two months after random assignment, treatment and control group patients had roughly similar levels of Medicare service use and spending for most types of services. The exceptions were home health, and physician and other (noninstitutional) part B services. Treatment group patients were more likely to use these services, perhaps because, as nurse partners assessed them, they realized that some patients required recommended tests or had unmet needs for home-based skilled care. Nonetheless, these differences in use did not lead to higher overall costs. Total Medicare Part A and B reimbursement for the treatment group, exclusive of demonstration per-member-per-month payments, were nearly identical to those of the control group over the two-month period: $997, on average, for treatment patients as compared with $967 for the control patients. When the demonstration payment (which averages about $159 per month) is included in treatment group costs, the treatment-control difference is $316 over the first two months. It remains to be seen whether the program will generate sufficient savings to offset program payments.

CONCLUSION

Program strengths and unique features. The Carle MCCD appears to have many of the features research has shown to be associated with effective care coordination.

- The program targets patients with diagnoses that typically are associated with high health care costs and has a searchable database to identify potential patients. Once eligible patients are identified, physicians actively encourage them to enroll.
- Assessment and care planning result in written plans stored on the CMIS, which are then used to guide patient monitoring and provide prompts to nurse partners to order tests.
- The CMIS and EpicWeb provide data to generate a wide range of reports for nurse partners, program leadership, and the program advisory board to gauge patient and program progress.
- The education intervention is based on a structured curriculum developed by experienced patient educators and is tailored to patients' individual needs. The nurse partners regularly assess patient knowledge and try a variety of approaches to behavior change when the patient is not progressing as expected.

- Nurse partners coordinate patient care by holding regular formal and informal meetings with physicians and by following up with patients after all major medical contacts. Standing orders from physicians allow nurse partners to respond quickly and effectively to a number of patient needs.

- Nurse partners are highly educated and experienced. The program provides them with specific formal training, as well as informal training during frequent meetings with their supervisors.

- The program has the support of physicians. MCCD's physician advisory board actively promotes their collaboration with nurse partners and physicians become familiar with them because they see them regularly in the clinics.

- The program reimburses physicians for their participation in program conferences. Even though these payments are not large, staff believe that physicians appreciate that the program acknowledges the value of their time.

Potential barriers to program success. The Carle MCCD program design contains no obvious barriers to the ultimate success of this program. However, preliminary Medicare data analysis raises the concern that the program is not enrolling its intended mix of patients despite targeting beneficiaries with high-cost diagnoses. Among those patients enrolled during the program's first six months, fewer than anticipated have had a hospitalization in the year prior to enrolling, and enrolled patients have lower monthly Medicare costs than expected. If the program continues to enroll similar patients, it may be difficult to save enough in Medicare services to cover program fees, even though its fees are relatively low compared to those of other MCCD programs.

Another potential concern is that, given the apparent high quality of care that already exists within the Carle system, it may be difficult for the program to produce large reductions in patients' need for hospitalizations and other expensive Medicare services relative to the control group. Also, if the program succeeds in improving physician practice in general, there will be spillover effects on control group members.

It remains to be seen whether the program provides a big enough intervention beyond usual care delivered by Carle to yield detectable changes in patient health outcomes and Medicare costs. Separately examining impacts for program patients who are not part of the Carle system may shed some light on this issue, but there may not be enough such patients to obtain reliable estimates for this subgroup. Evaluation of whether the usual care provided by Carle is better than usual care elsewhere is beyond the scope of this evaluation.

INTRODUCTION

The Medicare Coordinated Care Demonstration, mandated by the Balanced Budget Act of 1997, is testing a range of models aimed at improving the care of chronically ill beneficiaries with Medicare fee-for-service coverage. Fifteen programs are participating in the demonstration sponsored by the Centers for Medicare & Medicaid Services (CMS). The programs are hosted by organizations as diverse as hospital systems, disease management vendors, and retirement communities and are serving patients in 17 states and the District of Columbia. Mathematica Policy Research, Inc. (MPR) is evaluating the national demonstration through both impact and implementation analyses.[1]

This report is one of a series that will describe each program during its first year of implementation and provide preliminary estimates of its impact on Medicare service use and costs. First, we briefly describe the data and methodology used in these reports and present an overview of the program that is the focus of this report. We then address the following questions: Who enrolls in the program, among the beneficiaries it targets? 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 effect did the program have on hospitalizations and other Medicare costs during its first six 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.

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

This report describes the Carle Foundation's Medicare Coordinated Care Demonstration Project, which we abbreviate as the Carle MCCD.[2] The Carle Foundation is part of a large, integrated delivery system in Urbana, Illinois that includes a 295-bed teaching hospital and primary care clinics in rural east-central Illinois. The Carle MCCD enrolls Medicare beneficiaries with heart conditions, diabetes, or chronic lung disease. It began enrollment in April 2002.

DATA SOURCES AND METHODOLOGY

Implementation Analysis. The evaluation's implementation analysis uses information gathered during telephone interviews with program staff conducted approximately three months after the program began enrolling patients and in-person interviews conducted approximately six months later. For each program, one of three MPR implementation team members conducted the telephone and in-person interviews using semistructured protocols. The interviews covered the following topics: organization and staffing, targeting and patient identification, program goals, care coordination activities (such as assessment, patient education, and service arranging), physician attitudes toward the program and program interventions with physicians, quality management, record keeping and reporting, and financial monitoring. Use of the protocols ensured that each interviewer collected as consistent a set of information for each program as possible, while allowing the interviewer to explore issues of specific importance to each program. The structure of the protocols will also make synthesizing findings across programs more efficient. MPR staff also reviewed written materials each program provided, including the program's proposal to CMS, its operational protocol, materials it provided to patients and

[2]For a more detailed description of the Carle MCCD implementation plans and early experiences, see Chen (2003).

physicians, and forms used in its operation. (Appendix Table A.2 contains a full list of documents reviewed for this report.) This analysis also includes an examination of data each program collected specifically for the evaluation describing care coordinator contacts with patients, patient disenrollment, and goods or services the program purchased for patients during its first six months of operation.

Participation Analysis. We use Medicare claims and eligibility data to estimate the number of beneficiaries in the Carle MCCD 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). We use July 15, 2002, the midpoint of the six-month enrollment period examined in this analysis, as a pseudo-enrollment date for nonparticipants and use the actual enrollment date for participants. We then compare participants and eligible nonparticipants 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. We also present early estimates of key outcomes from the study. The evaluation's impact analysis is based on the random assignment of consenting, eligible Medicare beneficiaries to either receive the program intervention in addition to their regular Medicare benefits, or to receive only their regular Medicare benefits as usual. Comparison of outcomes for the two groups will yield unbiased estimates of program impacts. We do not exclude disenrollees from the analysis sample because doing so would induce unmeasured, preexisting

differences between the treatment and control groups, and avoiding such potential sources of bias was the very reason for requiring random assignment.

The impact analysis presented here is preliminary and probably not a good indicator of the true long-term impacts of the program. Our next report will use data for the 12 months after enrollment for all beneficiaries enrolled in the demonstration to estimate program impacts on and service use and costs. For this report, however, we have data for the earliest enrollees only, and for a very short follow-up period. We provide two types of estimates of treatment and control group means for Medicare-covered service use and costs. The first covers outcomes 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 before that month, so we can observe any trends in treatment-control differences that may be emerging. Both sets of estimates are for a period too soon after beneficiary enrollment to expect to see any sizable impacts of the program, and sample sizes may be small. Furthermore, programs usually change as they mature and may enroll different types of patients over time, so a program's impacts on patients may well change as it gains more experience.

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

Despite the shortcomings of these early estimates, created by the timetable for the first report to Congress, we present them to provide some limited feedback to the programs on how

treatment and control group members compare. Later analyses will examine Medicare service use and cost impacts over a longer time and will include all first-year enrollees, as well as examining 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, and satisfaction with care, as well as disease-specific behaviors and health care.

OVERVIEW OF THE CARLE MCCD

Program Organization and Relationship to Physicians. The not-for-profit Carle Foundation includes a large hospital in Urbana, a nursing home, a home health agency, and a medical equipment company, and is the parent organization for the Carle Health Systems Research Center (HSRC). Carle Clinic Association, a 300-physician multispecialty group practice, is affiliated with the Carle Foundation. Carle Clinic Association owns primary care clinics in Urbana and nine smaller towns in rural east-central Illinois and neighboring counties in Indiana. Carle has a long history of developing and demonstrating innovative approaches to geriatric care, including participation in three previous HCFA/CMS Medicare demonstrations. With funding from the Hartford Foundation, Carle designed a program called Geriatric Team Care which was implemented in Carle's Medicare + Choice plan. The Geriatric Team Care program, which Carle found to reduce expenditures for the plan's high-risk patients by approximately 15 percent over two years, was the prototype for the Carle MCCD intervention.

The Carle MCCD is located in the foundation's Urbana-based HSRC. The program's director, manager/director of operations, and care coordination supervisor are located in the HSRC. The program's care coordinators, called nurse partners, are based in four main hub clinics (in Bloomington, Champaign-Urbana, Danville, and Mahomet). They also see patients in smaller, outlying clinics (where each has a space to meet with patients). Case assistants in each

of the four main clinics serve as the first point of contact for patients enrolled in the program, help the nurse partners by calling patients for routine monitoring, screen patient alerts automatically generated by the Carle data system (described in more detail below), and help with information gathering and paperwork for the program.[3] When the program reaches full enrollment (about 1,100 treatment group patients) each of nine nurse partners will have between 120 and 150 patients. The program expects that nurse partners will be able to handle this relatively large caseload because of the help case assistants provide.

Early in the design phase of the demonstration, the MCCD program director established a physician advisory board for the program. The advisory board includes the heads of family medicine and adult medicine for the Carle system; medical directors from the hub clinics; physician representatives from Carle's cardiology, pulmonology, and endocrinology departments; and a nurse doctorate from the cardiology department. The advisory board took an active role in formulating clinical practice guidelines, designing demonstration procedures, and promoting the program to local clinic physicians. The board continues to meet periodically to review program progress and to discuss ways to get local physicians to encourage more of their patients to enroll.

Primary Approaches. The program has adopted two main approaches to improving patient health and reducing health care costs: (1) improving health care provider practice, and (2) improving treatment adherence of patients and families. The program aims to improve and standardize the practice of physicians and nurses by helping them to follow evidence-based practice guidelines consistently and by disseminating updates to the guidelines as they change. It

[3]After the first year of operation, the program had enrolled enough patients in the southern part of its service area to designate another hub clinic in Mattoon. It moved a nurse partner formerly based in Mahomet to that clinic and hired a part-time case assistant to help her.

seeks to improve patient adherence to medication, exercise, and diet regimens by improving patients' ability to understand and manage their own care and to take an active role in medical decision making. Integral to both these approaches is improving communication and coordination between providers and patients.

Target Criteria and Patient Identification. To be eligible for the Carle MCCD, beneficiaries must meet CMS's insurance payer and coverage requirements for the demonstration—be enrolled in Medicare Parts A and B, not be in a Medicare managed care plan of any kind, and have Medicare as their primary payer—as well as Carle's specific targeting criteria. The Carle MCCD requires that patients have one of the following diagnoses: congestive heart failure, coronary artery disease, atrial fibrillation, diabetes, chronic obstructive pulmonary disease, or asthma. They must have had at least one hospitalization or three medical office visits (for any diagnosis) in the year before enrollment. They also must live in Carle's defined service area, which includes 11 counties in Illinois and 2 counties in Indiana.[4] The program does not enroll beneficiaries who have end-stage renal disease, who reside permanently in nursing homes, or who are currently in hospice.

The Carle MCCD initially identifies patients primarily by reviewing the Carle Claims and Utilization database, a billing database for the Carle system. It produces lists of patients who have Carle physicians as their primary doctors and who meet the program's diagnosis and geographic eligibility criteria, grouped according to the patient's Carle physician. The physicians review the lists to confirm that the patients are still alive and are not in nursing homes. (Physicians initially screened their listed patients for program appropriateness, but

[4]The Illinois counties are Champaign, Coles, Dewitt, Douglas, Edgar, Ford, Iroquois, McLean, Moultrie, Piatt, and Vermilion; the Indiana counties are Fountain and Vermillion.

nearly all Carle physicians have now given the program permission to invite all their eligible patients to enroll in the program.)

Next, staff send each patient a brochure describing the program, an application with a postage-paid return envelope, and, most important, a cover letter signed by the patient's own physician. The application asks patients about specific eligibility criteria including those for diagnosis and previous hospitalization or medical visits. Patients who agree to participate and meet the criteria according to their responses on the application have their Medicare status verified using the Common Working File. They are then invited to an information session with a specially trained MCCD staff member during which they discuss and sign the program's informed consent form and complete a brief health questionnaire.[5] This session can be conducted in the patient's home if necessary. Intake workers telephone patients who do not respond to the invitation to participate within five days, with a scripted message that encourages the patient to enroll in the study. (Appendix C contains copies of the brochure, application, physician letter, informed consent form, and a fact sheet.)

Nearly all (more than 90 percent) of the patients who enrolled during the first year had Carle physicians. By the end of the first demonstration year, however, the program had established relationships with three physician practices and three hospitals outside the Carle system and had begun to enroll their patients as well.[6]

[5]The program originally had the nurse partners conduct the information sessions and handle the marketing aspects of the program. However, the program found they were not well suited to these tasks and quickly became too busy with care coordination responsibilities.

[6]In this report, we focus on those program features designed to serve patients of Carle system physicians. Our next report will describe the care of non-Carle patients in more detail if sufficient numbers enroll.

Assessment, Care Planning, and Monitoring. The Carle MCCD uses the Problem Classification Scheme from the Omaha system for assessment. The Omaha system is a standardized tool for community nursing practice developed more than 30 years ago with funding from the National Institutes of Health (www.omahasystem.org/index.htm). The Problem Classification Scheme is made up of 44 sets of problem signs and symptoms grouped into four domains (environmental, psychosocial, physiological, and health maintenance). Carle developed an online version of the system and customized it to its own needs (for example, by adding questions about routine diabetic care such as referral to podiatrists or eye exams). The nurse partner reviews the 44 problems with the patient (and, sometimes, the patient's family) and selects those that pertain to the patient. The program reassesses patients annually with the full Omaha tool but conducts more ad hoc reassessments in the interim. The program views assessment as an ongoing dynamic process.

Between April and October 2002, the first six months of program operation, 663 patients enrolled and were randomly assigned to the Carle MCCD treatment group (Table 1). Ninety-three percent of patients (615 of 663) had at least one contact for assessment; among those contacted for assessment, 52 percent had their first contact within two weeks of enrollment. Staff had hoped to complete all patient assessments within two weeks. However, this has taken longer due to the high volume of patients enrolling in the program early on and the need of some patients for immediate help with urgent problems. Thus, the program now allows a one-month window to complete the assessment.[7]

[7]The program has the objective of conducting its first patient contact within two weeks of enrollment and its first face-to-face contact within a month.

Nurse partners base care plans on the assessment, the patient's medical history and clinical indicators (as found on EpicWeb, Carle's electronic medical records system, or, for non-Carle patients, in paper records), and conversations with the patient's physicians and community providers (for example, pharmacists or home health staff). To develop a care plan, the nurse partner and the patient identify potential interventions from the Nursing Intervention Classification (NIC). For example, if pain is a patient problem, they will review all NIC interventions to help manage pain and pick the one(s) that should best suit the patient (for example, using written materials to teach the patient about pain control). The MCCD developed comprehensive, disease-specific research guidelines to which nurse partners can also refer. The care plan is a dynamic tool that serves as a guide for nurse partners for each patient contact and provides patients with their own "to-do" lists. Plans include problem lists, short-term goals (for example, for behavior change), and reminders about reassessment, monitoring, testing, and self-management, as well as plans for patient education and arranging services. Nurse partners update care plans with each contact as the patient's condition changes; however, they find the paperwork associated with updating to be time-consuming. To ensure that the patient, physician, and nurse partner all have the same understanding of the care plan, the nurse partner finalizes the plan with the physician and then reviews it formally with the physician at least annually in a team conference. The program mails patients copies of their care plans.

The program monitors patients directly and indirectly. Nurse partners contact patients primarily by telephone at least monthly and in person at least every three months—more frequently if the nurse partner feels closer monitoring would be beneficial. The program views trust as the cornerstone of the nurse partner/patient relationship. To nurture this relationship, the nurse partner makes a point of seeing the patient between "official" contacts when the patient comes to the clinic for a physician visit and sends the patient birthday and holiday greeting cards.

Of the 663 patients enrolled during the first six months of operation, more than 96 percent had at least one contact with a nurse partner or case assistant, and the average patient had six contacts. Most contacts (87 percent) were initiated by nurse partners or case assistants and many contacts (76 percent) were by telephone. Two-thirds of the patients (67 percent) had a contact for routine monitoring, and a third (33 percent) had a contact during which the nurse partner or case assistant provided emotional support (Table 1).[8]

Nurse partners hold one or two formal team conferences with primary physicians each year. They also see physicians frequently in the clinic, which gives them an opportunity to informally monitor patient progress from the physician's perspective. The Carle system scheduling program (Cadence) and the Carle hospital database (Invision) also automatically alert nurse partners about any contact the patient has in the Carle system (for example, hospital admissions and discharges, emergency room and clinical visits). E-mail alerts are generated every 30 minutes and alerts for nurse partners' patients are sent to the clinics where the nurse partners practice. Nurse partners also review local non-Carle hospital admissions lists daily to keep current on their patients' conditions.

Quality and Program Management. Maintaining and improving care quality and ensuring programs attain their goals both require that staff have adequate qualifications, training, and supervision and that management has the tools and support to monitor program progress toward its goals. The Carle MCCD nurse partners must be licensed registered nurses in Illinois, have a baccalaureate degree in nursing, and have 5 years of experience in medical-surgical or home

[8]The Carle MCCD has a few patients who leave Illinois for the winter. Nurse partners monitor those patients by telephone and may coordinate with out-of-state doctors (for example, to help refill prescriptions or order laboratory tests). Even when patients are out of state, their Illinois physician remains in charge of their care.

TABLE 1

NURSE PARTNER CONTACTS WITH PATIENTS
DURING FIRST SIX MONTHS

Number of Patients Enrolled[a]	663
Number of Patients with at Least One Nurse Partner Contact[b]	634
Total Number of Contacts for All Patients	3,674
Number of Nurse Partners Contacting Patients	16
Among Those Patients with at Least One Contact:	
Percentage of contacts nurse partner initiated	87.3
Percentage of contacts in person at patient's residence	7.0
Percentage of contacts in person elsewhere	17.0
Percentage of contacts by telephone	75.9
Of all Patients Enrolled, Percentage with Assessment Contact	92.8
Among Those Patients with an Assessment, Percentage of Patients Whose First Assessment Contact Is:	
Within a week of random assignment	21.5
Between one and two weeks of random assignment	30.4
More than two weeks after random assignment	48.1
Of All Patients Enrolled, Percentage of Patients with Contacts for:	
Routine patient monitoring	67.3
Providing emotional support	32.6
Providing disease-specific or self-care education	82.4
Explaining tests or procedures	55.7
Explaining medications	55.7
Monitoring abnormal results	17.8
Identifying need for non-Medicare service[c]	77.1
Identifying need for Medicare service	61.5
Monitoring services	14.8
Average Number of Patients Contacted per Nurse Partner	41
Average Number of Patient Contacts per Nurse Partner	230

SOURCE: Carle program data received November 2002 and updated July 2003. Covers six-month period beginning April 19, 2002 and ending October 18, 2002.

[a]Number of patients enrolled in the treatment group as of October 18, 2002.

[b]Contacts described in this table include those made by nurse partners and case assistants

[c]Includes help applying for medication assistance; referral to exercise classes, interpreter services, housing, home repair, smoking cessation classes, dental/ hearing/ or eye care.

health nursing (or an associate or diploma nursing degree and 10 years of experience). They receive three weeks of program training, which includes the supervisor observing them directly during patient visits. Nurse partners and case assistants also attend education sessions. The sessions cover such topics as basic disease physiology, patient education methods, information systems, and the guidelines developed for the program upon which their practice is based. Nurse partners are evaluated annually. The nurse partner supervisor (and often the program director) also meet with the nurse partners monthly in Urbana for routine staff meetings, and the supervisor visits the nurse partners and case assistants at their clinics about once a month. Visits and meetings may include review of individual patient cases. In the interim, they hold conference calls and use e-mail extensively to monitor program activities.

The Carle MCCD program director meets with the program's advisory board bimonthly, but holds emergency sessions when necessary. The meetings, which are well attended, were used during most of the first year to refine physician guidelines and discuss how to promote physician and patient participation. More recently, the meetings have focused on program progress, patient outcomes, conflicting advice physicians may be giving patients, and how to maintain support for the program among clinic physicians. The program director prepares brief reports on the program during the year and an annual summary for the Carle Foundation Hospital CEO, who himself used to be a Carle Clinic medical director.

A comprehensive, flexible data system is used to generate reports for monitoring program activities and progress toward its goals. The program's patient-level data are stored in an electronic database called the Care Management Information System (CMIS). The CMIS is located at HSRC and contains data just on patients in the MCCD treatment group, including the MCCD's initial assessment, care plan, and monitoring contacts. The program has developed links between the CMIS and Carle's main electronic medical records system, called EpicWeb,

that enable the MCCD to download laboratory results from EpicWeb into CMIS and to upload care management progress notes from the MCCD into EpicWeb. All MCCD nurse partners, case assistants, and clinical supervisors have full access to EpicWeb, which can also produce time-trend graphs of clinical indicators such as blood pressure or cholesterol levels.

Nurse partners routinely review patient data stored in EpicWeb and enter abbreviated patient summaries (including clinical notes, vital signs, and medication changes) into EpicWeb, since physicians see them any time they open a patient record to enter their own notes. Nurse partners make their notes as short as possible to make it more likely that physicians will read them. Physicians in at least one clinic (Urbana) have reported finding these notes valuable in tracking their patients.

The Carle MCCD program director uses an extensive set of reports generated from the CMIS (and a time/ activity database) to ensure the intervention is being delivered as intended and to improve care when needed. Reports are viewed as a starting point for conversations about program activities and tools for problem solving. Most current reports are at the program and patient level, although there soon will be more reports at the nurse partner caseload and clinic levels. Reports include program application status, enrollment by month and clinic (used to monitor enrollment relative to program targets and keep nurse partner caseloads balanced), length of time until different types of patient contacts, program staff contacts with hospitalized patients, nurse partner time and activities (used to monitor productivity and as input to the data required for the evaluation), and patient characteristics and behaviors (for example, treatment understanding, self-monitoring behavior, medication use, oxygen use, shortness of breath, obesity, and receipt of preventive procedures). The program is developing reports on outcomes, such as hospitalizations and laboratory test values. (Appendix C contains a list of outcomes the program is tracking.) Patient characteristics are tracked monthly and fed back to the nurse

partners, who share them with physicians as necessary. The program director noted that, without all these monitoring reports "you're just praying that you're providing the intervention."

IS THE PROGRAM ATTRACTIVE TO ITS TARGET POPULATION?

Program staff have worked hard to meet their enrollment target within a year and have done so with only modest operational change to the original approach to identifying patients. However, the program appears to have enrolled patients who are somewhat less likely than anticipated to have been hospitalized during the previous year and who have lower than expected Medicare costs. Staff reports that patients are highly satisfied with the program, and it has experienced only minimal voluntary disenrollment.

Enrollment After One Year. After one year of operation, the Carle MCCD had enrolled 1,032 patients in the demonstration treatment group and 1,024 in the control group (MPR weekly enrollment report, week ending April 20, 2003), about 20 percent of the 10,000 beneficiaries the program estimated would be eligible for the program based on Carle patient records for a single year. This roughly meets the program's target of enrolling 2,200 beneficiaries within a year.

Among those patients to whom the program sent invitation letters and followed up by telephone during the first nine months of operation, just over a quarter declined to participate.[9] The most common reason beneficiaries gave for declining was a lack of energy; others deferred deciding for a few months, particularly if they had just had surgery. The program also sends letters to patients, again signed by their physicians, who previously declined to participate, about three months after the program's call following up on the initial invitation letter. More recently,

[9]As of early 2003, the program had mailed 10,022 invitation letters and followed up on 4,887. Among those beneficiaries followed up, 1,355 (28 percent) were found to be ineligible or deceased, 1,332 (27 percent) refused to participate, and 1,901 (39 percent) enrolled. The program was still processing the other 299 applications (MCCD program application report for January 17, 2003).

the program also started sending letters signed by the Carle Foundation Hospital CEO to eligible patients following hospital discharge.

Staff attribute their success in meeting enrollment targets to an efficient system of identifying eligible patients and to physician support for the program, particularly in signing the letters inviting patients to participate, then actively encouraging patients to participate. Staff said, "elders like their doctors and have a high level of trust in them; this is the best [program] marketing."

Percent of Eligible Beneficiaries Participating. To gain another perspective on the appeal of the program to beneficiaries, we simulated the program's eligibility criteria using Medicare enrollment and claims data to estimate the percent of eligible beneficiaries who chose to participate in the Carle MCCD. (Appendix B contains a detailed description of the simulation.) Our simulation identified 29,775 beneficiaries eligible for the Carle MCCD between April and October 2002, the program's first six months of operation. That is, they lived in the program's service area, were not in Medicare managed care, and met the program's diagnostic and service use criteria.[10] During the same six months, 1,122 eligible beneficiaries enrolled in the

[10]Between April and October 2002, 90,821 Medicare beneficiaries were living in the program's 13-county service area. (Due to a programming error, eligible nonparticipants were dropped for one county. We estimated that number for our discussion of eligible participants and nonparticipants.) Of those, 15,062 (17 percent) would have been ineligible for the program because they were in managed care, did not have both Medicare A and B, or Medicare was not their primary payer. Of the remaining 75,759 beneficiaries who met these insurance criteria, 29,775 (39 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.)

demonstration (about four percent of the 29,775 eligible beneficiaries).[11] (See Tables B.2 and B.3.)

The MCCD estimated the size of its pool of eligible beneficiaries at 10,000—about a third of our simulated estimate. This is primarily because the program estimate is based only on the number of Carle patients with the target diagnoses and in fee-for-service Medicare during a year prior to the start of the demonstration, while our simulation includes beneficiaries outside the Carle system.

Comparison of Participants and Nonparticipants. Medicare enrollment and claims data analysis shows that program participants were less likely than eligible nonparticipants to be nonelderly or very elderly, to be poor, or to have been recently hospitalized. Almost all of the 1,381 MCCD participants were over age 65, and 13 percent were over 85 at enrollment (Table 2). Four percent were dually eligible for Medicare and Medicaid. By comparison, eligible nonparticipants were more likely to be either under 65 or over 85 (8 and 17 percent, respectively, were in these age categories) and more likely also to be enrolled in Medicaid (14 percent).[12]

[11]In fact, 1,439 participants actually enrolled in the program during its first six months. When estimating the participation rate, we exclude enrollees with invalid HIC numbers on MPR's enrollment file, as well as those who did not meet the Medicare coverage and payer requirements, or did not meet Carle's geographic, diagnostic, or service-use criteria that we measured using Medicare data. We excluded these enrollees because we need to use a consistent definition of eligible for the numerator and denominator of the ratio. (Those with invalid 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 for them have since been corrected.) This leaves 1,122 *eligible* participants. Most of the reduction was due to failure to meet diagnostic or service-use criteria. When we compare participants to eligible nonparticipants in Table 2, however, we only exclude participants with invalid HIC numbers, and those who did not meet Medicare payer and coverage requirements, leaving 1,381 participants. This is because we wish the comparison to more closely reflect differences between all actual participants and those who might have participated.

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

TABLE 2

CHARACTERISTICS OF 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)	76.1	75.3	***
Younger than 65	0.8	7.9	***
65 to 74	44.2	38.2	***
75 to 84	42.4	37.3	***
85 or older	12.6	16.6	***
Male	47.8	44.7	**
Nonwhite	2.5	3.8	**
Original Reason for Medicare: Disabled or ESRD	6.5	15.1	***
State Buy-In for Medicare Part A or B	3.5	13.6	***
Newly Eligible for Medicare (Eligible Less than Six Months)	0.1	0.0	***
Enrolled in Fee-for-Service Medicare 6 or More Months During Two Years Before Intake	99.7	99.7	
Medical Conditions Treated During Two Years Before Month of Intake[b]			
Coronary artery disease	55.6	55.9	
Congestive heart failure	28.1	35.2	***
Stroke	22.2	24.4	*
Diabetes	38.9	43.9	***
Cancer	21.8	20.2	
Chronic obstructive pulmonary disease	35.6	38.5	**
Dementia (including Alzheimer's disease)	2.5	5.0	***
Peripheral vascular disease	10.9	10.8	
Renal disease	4.6	6.3	**
Total Number of Diagnoses (number)	2.2	2.4	***
Days Between Last Hospital Discharge and Intake Date[b]			
0 to 30	2.5	5.1	***
31 to 60	3.0	4.3	**
61 to 180	10.2	13.5	***
181 to 365	11.2	13.3	**
366 to 730	15.6	15.0	
No hospitalization in past two years	57.5	48.8	***

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	57.2	49.4	***
0.1 to 1.0	32.7	36.0	**
1.1 to 2.0	7.4	9.9	***
2.1 to 3.0	1.8	3.1	***
3.1 or more	0.9	1.6	*
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]			
Part A	$257	$368	***
Part B	$221	$257	***
Total	$478	$625	***
Distribution of Total Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]			
$0	0.2	0.6	*
$1 to 500	75.5	67.2	***
$501 to 1,000	10.7	12.8	**
$1,001 to 2,000	8.0	11.2	***
More than $2,000	5.6	8.3	***
Number of Beneficiaries	**1,381**	**23,284**	

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

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

[c]Calculated as 12 x (number of hospitalizations during two years before month of intake) / (number of months eligible). 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 prenrollment period occurred on September 5, 2003, would not be counted as hospitalized during the 24 months before the month of intake. Conversely, someone hospitalized on September 25, 2001 would be captured in the measure defined by month of enrollment, but not in the measure based on the day of enrollment.

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

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

***Difference between participants and eligible nonparticipants significantly different from zero at the .01 level, two-taile11d test.

Nonparticipants were more likely than participants to have certain diagnoses. Fifty-six percent of participants had been treated for coronary artery disease during the two years prior to enrolling, 28 percent for congestive heart failure, 39 percent for diabetes, 36 percent for chronic obstructive pulmonary disease—all target diagnoses for the MCCD. Nonparticipants were somewhat more likely to have had treatment for congestive heart failure, diabetes, or chronic lung disease, but they had similar rates of treatment for coronary artery disease. Substantial fractions of both groups also had been treated for stroke or cancer.

Twenty-seven of participants had a hospitalization in the year prior to enrolling and had average monthly Medicare expenditures of $478 over the two years prior. By contrast, 36 percent of nonparticipants had a hospitalization and had monthly Medicare spending that averaged $625. Participants were also less likely to have had a hospitalization in the month before intake (3 percent) than were eligible nonparticipants (5 percent). This is consistent with program reports that some beneficiaries invited to participate in the MCCD declined because they felt they first needed to recover from surgery.

To develop the cost estimate for its waiver application, the MCCD assumed that half of its participants would have had a hospital stay in the year prior to enrolling, resulting in MPR's estimate for the application that Medicare costs would average $742 per month for eligible beneficiaries who did not participate in the program. It thus appears that patients who enrolled in the program are healthier than expected, with only 27 percent having had a hospital stay and average monthly costs of $478 prior to enrollment.[13]

[13]The pre-enrollment costs are lower than the projected post-enrollment costs included in the waiver application in part because the sample members were all alive throughout the pre-enrollment period, whereas the projected costs included beneficiaries who died during the period over which costs were measured. However, the difference in costs is too large to be attributable solely to this difference in sample composition; it is primarily attributable to the difference in hospitalization rates.

Satisfaction and Voluntary Disenrollment. Although staff believe that elderly patients in their service area typically are already highly satisfied with their physicians and other providers, they also believe that patients are highly satisfied with MCCD services.[14] When nurse partners called a few patients to get quotations to add to their invitation letter, one said, "It's excellent. The nurse and her office are really helpful. If I have a problem I'm not sure about, I call and they have information to help me decide what to do." Another said, "I love it. I feel it is a wonderful resource. When I feel overwhelmed, I call the nurse. There's so much wrong with both of us and the nurse is such a help and so kind."

Patients may stay in the Carle MCCD for the duration of the demonstration (that is, until April 2006). Among the 663 (treatment group) patients who enrolled over the first six months of operation, just over a third had been enrolled five or more months, while just under a third had been enrolled 10 weeks or less during those six months. Voluntary disenrollment during the first six months was very low. Only 5 patients out of 663 disenrolled, primarily because they changed their minds about wanting to work with the nurse partners (that is, they felt they were doing fine working directly with their physicians and did not want to take the time to meet with the nurse partners). Another six died, and five lost their program eligibility during that period, primarily because they joined managed care organizations or because they returned to a job that included health insurance, so Medicare was no longer their primary insurer (Table 3).[15]

[14]The MCCD administers an annual health questionnaire that includes some questions about satisfaction with program services.

[15]Although the program will not enroll permanent nursing home residents, hospice participants, or beneficiaries with end-stage renal disease, it does not disenroll those treatment group members who move to nursing homes or hospice or who develop end-stage renal disease. Staff believe the program can reduce hospital/ nursing home cycling for nursing home residents with complicated needs by advocating on their behalf or by helping family to do so and that the program will complement home-based hospice care.

TABLE 3

DISENROLLMENT FOR PATIENTS ENROLLED DURING FIRST SIX MONTHS

Number of Patients Enrolled[a]	663
Length of Enrollment as of October 18, 2002 (Percentage of Patients)	
10 weeks or less	30.5
11 to 20 weeks	34.4
21 or more weeks	35.1
Mean Length of Enrollment (Weeks)	15.6
Number of Patients Who Disenrolled	16
Number Who Disenrolled Because:	
Patient died	6
Patient lost program eligibility[b]	5
Patient initiated disenrollment	5
Number Disenrolling:	
Within a week of random assignment	2
Between 1 and 4 weeks	2
Between 5 and 12 weeks	6
More than 12 weeks	6

Source: Carle program data received November 2002 and updated July 2003. Covers six-month period beginning April 19, 2002 and ending October 18, 2002.

[a]Number of patients ever enrolled in the treatment group through October 18, 2002.

[b]Patients can lose program eligibility for the following reasons: joined a managed care plan, returned to employment that included health insurance so Medicare no longer primary payer, or moved out of the program's service area.

TO WHAT EXTENT DOES THE PROGRAM ENGAGE PHYSICIANS?

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

The Carle MCCD model is based on a highly collaborative relationship between nurse partners and physicians. The program's structures and procedures support these relationships. The program also intends to improve physician practice in terms of more consistent use of practice guidelines.

Collaboration. The Carle MCCD model is based on the expectation that physicians will actively promote the program to patients and will collaborate with nurse partners in the care of their patients. The program asks all physicians in the Carle system to do the following: (1) agree to let the program invite all their eligible patients to enroll and actively encourage those patients to do so; (2) agree to collaborate with nurse partners in the care of each enrolled patient and give nurse partners standing orders to schedule needed tests, order medications in specific

instances, and provide advice on behavior modification;[16] and (3) attend "team conferences" with nurse partners once or twice a year, as well as participate in "collaborative visits" that include patients, in addition to communicating with nurse partners informally as necessary in the interim.[17] Collaboration between physicians and nurse partners was part of the Geriatric Team Care model that was the prototype for the MCCD and thus is a familiar concept for both Carle physicians and nurse partners.

The program devoted substantial resources to engaging physicians—starting, as noted, in the program's design phase—by developing a physician advisory group that includes influential physician leaders from relevant Carle departments and the program's largest clinics. Carle clinic medical directors have substantial influence over clinic physicians, and Carle also has a long history of physician participation in demonstrations. Moreover, most physicians were familiar with the MCCD leadership, all of whom have a long tenure with Carle.

Primary care physicians quickly became familiar with the nurse partners because the program has each of them practice out of one or two local clinics. Thus, a physician has the same nurse partner caring for all his or her patients, and sees the nurse partner regularly. (Nurse partners and specialty physicians contact each other primarily by telephone.) Finally, the program pays physicians for participating in team conferences and collaborative visits.

Program efforts to win the support of Carle physicians appear to have succeeded. All but two or three Carle physicians (whom staff describe as "never participating in anything") allow the program to approach patients it has identified through the Carle patient billing database as

[16]Standing orders must be renewed every year.

[17]Collaborative visits, which include the nurse partner, the patient, and the patient's physician are most often conducted just after the patient has suffered some type of acute episode, such as a hospitalization. The focus of these visits is on adjusting the patient's care plan to meet his or her current care needs.

potentially eligible and have signed letters of invitation to them. Program staff would like physicians to refer new patients directly, and some have started doing that. Staff recognize, however, that the physicians have limited time with patients and are not likely to remember to make this referral (a common problem among demonstration programs during the first year). All participating physicians have provided nurse partners with standing orders, largely at the encouragement of clinic medical directors. Advisory board physicians are getting positive feedback from their colleagues about the team conferences during which the nurse partner and the physician typically review patient charts and program guidelines and then map out the next steps for the patient. Physicians have started calling nurse partners about patients, suggesting both a high level of trust in their ability and a sense that they are working together on the patient's behalf.

Improving Practice. A primary goal of the Carle MCCD is to improve physician practice. The program provides education to clinic physicians by asking them to review Web-based guidelines and in small group presentations by specialists at the clinics. The Web-based guidelines include short case studies to review, followed by a quiz for the physician to complete. The program's advisory group developed seven sets of disease-specific guidelines based on national evidence-based standards, but tailored them for the program to resolve conflicts in recommendations and acceptable clinical ranges that tend to occur for patients with several comorbid conditions. (Each guideline includes components for physicians, nurse partners, and patients.) Early presentations focused on the medical management of the program's target diagnoses, while more recent ones focused on changes to practice guidelines. (These meetings are also used as a forum to promote collaboration with nurse partners, provide program status reports, and discuss physicians' concerns about the program.) The program provides physicians with relevant written materials to review in advance of each meeting. The program tracks

completion of the Web-based guideline quizzes, and physicians receive continuing medical education (CME) credit for passing the quizzes, as well as a modest financial incentive for attending group education meetings (for example, credits to purchase medical text books).

The program plans to provide physicians with patient reports aggregated to the clinic level but does not plan to produce reports restricted to the physician's individual patients, since each physician would have too few patients in the program's treatment group to be meaningful. The reports will include process information, such as whether particular tests have been conducted, as well as patient outcomes.

Management staff believe that clinic physicians view the program quite favorably: physicians reportedly think it is a valuable service for their patients and many believe that it has reduced burden for themselves. Even some physicians who initially were resistant to the program now see its benefit. Program meetings are well attended. Thus, the Carle MCCD appears to enjoy a high level of physician support and has the structure and procedures necessary for effective collaboration between physicians and program staff and for improving physician practice.

It is important to note, however, that traditional care in the Carle system already includes advanced practice nurse-physician collaboration and the use of evidence-based practice guidelines. Carle developed practice guidelines under its Medicare+Choice program that are available to all its physicians on its intranet. They put particular effort into improving diabetes care in their Medicare+Choice program, including providing physicians with population-based reports of clinical indicators and with incentive payments for good patient outcomes. The MCCD medical directors noted, however, that congestive heart failure practice at Carle is not as sophisticated. The directors also believe that if physicians begin to use the guidelines developed for the program for their treatment group patients, they likely will also use them for control

patients. On the other hand, the medical directors noted that even with the widespread dissemination of guidelines prior to the MCCD, there was still considerable variation in physician practice. The directors hope that physicians working closely with the program's nurse partners, "who will hold doctors to task," will reduce this variation and that the nurse partners will improve patient access to physicians and will help physicians to more quickly titrate new medications for patients.

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

Improving Patient Adherence. Improving patient (and family) adherence to treatment regimens is another major approach the Carle MCCD has adopted to meet its goal of improving patient health; a structured patient education intervention is the means to achieving improved adherence. Patient education seeks to improve both patients' self-management knowledge, skills, and their ability to communicate with their physicians.

To promote better self-management, the nurse partners teach patients the following for each of the patient's target diagnoses and common comorbid conditions: disease etiology; routine tests associated with the disease; usual medications prescribed, how they work, and possible side effects; signs and symptoms that indicate the need for intervention; self-treatment for common symptoms (for example, use of an inhaler, postural drainage, and energy conservation); exacerbation triggers to avoid; needed lifestyle changes and how to make them (for example, reducing dietary salt, increasing exercise level, and ceasing to smoke); and the emotional effects of the disease. Teaching takes place at every patient contact. If possible, the nurse partner teaches both the patient and his or her primary caregiver. If the patient has a cognitive impairment, teaching is primarily with the caregiver, although the patient is always included. Among the 663 patients enrolled in the Carle MCCD during its first six months, the majority (82

percent) had received at least one contact for self-care or disease-specific education, and more than half had at least one contact during which the nurse partner explained tests, procedures, or medications (Table 1).

To reinforce education, nurse partners give each patient a diary with the patient's name on it to track health measures and behaviors, and cards on which to record blood pressure or diabetes self-care. The nurse partners review the diaries and records during each patient contact, tying in relevant educational messages and modifying care plans and self-management strategies based on diary information. To improve self-management, the program also provides peak flow meters, blood pressure cuffs, and glucose monitors if patients need them.

One key to improving communication between patients and physicians is educating patients to ask physicians the right questions (for example, about new medications) and to generally take a more active role in medical decision making. To aid in this process, the nurse partners give patients cards with questions to ask the physician or checklists of needed tests to take to physician visits. They also help patients articulate what they are thinking about their health and related factors, and teach them how to be better organized for their relatively short physician appointments. Program staff note that physicians are receptive to the nurse partners preparing patients in these ways because they make their visits more efficient. As noted, the nurse partner, physician, and patient meet formally for collaborative visits as needed, which afford the nurse partner the opportunity to assess the patient's communication skills.

Nurse partners provide education to patients using established curricula tailored to each patient's educational needs and provide patients with packets of printed educational materials for their diagnoses. The nurse partner supervisor organized the curricula and information packets with the assistance of an HSRC education specialist. Some materials were externally developed;

others were developed by Carle or the Carle MCCD program.[18] Patients receive most materials following the first home or office visit (about a month after enrollment), but they also get materials throughout their participation in the program as guided by changes in their care plans. The program recently started sending informational letters to patients each month on different topics (for example, asthma and cancer warning signs). Nurse partners sometimes refer patients to existing community group education sessions separate from the MCCD (for example, for smoking cessation), but attending classes is not practical for most patients living in rural areas.

The nurse partners themselves receive patient education training when they begin to work for the program. This training includes reviewing the program's patient education and other materials, talking about the education process, and listening to other nurse partners provide education. Nurse partners also help each other with specific educational issues at regular staff meetings, capitalizing on their differing nursing and educational backgrounds (which include psychiatric nursing, dementia care, family practice, and diabetes education). Supervisors assess the effectiveness of training by asking the nurse partners specific questions, as well as by reviewing patient charts and reports to see how frequently they are providing education and distributing educational materials.

Nurse partners negotiate with the patient which problems to work on first, while continually educating the patient about a range condition-specific issues and the importance of adopting recommended self-management behaviors. When several different approaches to behavior change do not work, nurse partners fall back to a more incremental approach to change, guided

[18]The materials are in English and are written at an eighth-grade level. Staff report that there are very few people in their service area who do not speak English and that most of their patients have at least a high school education. The Carle system, however, can provide materials in other languages if needed, using the American Diabetes Association and American Heart Association Web sites.

by the patients' expressed needs. In addition, if the patient is not progressing as planned (that is, his or her clinical indicators are persistently out of control according to the reports the program generates, or the patient reports directly that he or she is not adhering to treatment recommendations or is having difficulty understanding or being understood by the physician), the nurse partner may schedule a "brain-storming session" in the form of a team conference with the physician. Many physicians have known their patients for much longer than the nurse partners and often have relevant insights into patient problems. In addition, some patients may not progress because they have a low level of literacy. The program adopted some educational materials that consist primarily of pictures (for example, 17 cartoon people to illustrate symptoms of hypo- and hyperglycemia and pictures of food groups on plates, instead of text about diet).

The Carle MCCD appears to have implemented a variety of patient education approaches that should result in improved patient adherence to treatment recommendations and in more effective communication between patients and physicians. The nurse partners providing education are all registered nurses (whose nursing education will have emphasized patient education) and receive additional patient-education training specific to the MCCD and its patients. There is close supervision, both directly and through staff meetings, to help the nurse partners master the art of patient education. The curriculum the nurse partners use to teach patients is structured and is supported by reminders from the CMIS, so that good nurse partners do not have to also be exceptionally gifted teachers to be effective. If patients do not appear to be learning, nurse partners brainstorm with physicians and takes a more incremental approach to changing patient behavior based on the patient's readiness to make small changes. Better evidence as to whether patients are taking educational messages to heart, however, will come

from the program-generated reports on patient tests and clinical indicators, and the evaluation's analyses of patient and physician surveys and of Medicare claims data.

Improving Communication and Coordination. Improving communication and coordination among providers can help improve both provider practice and patient adherence. Effective communication between physicians and nurse partners is an underpinning of the Carle MCCD intervention and is supported by numerous program structures and procedures. It starts with the program's advisory group, which, as noted, played a major role in designing the program and continues to meet regularly and to encourage the active support of clinic physicians for the program. Communication is further facilitated by formal team conferences conducted for all patients with the patient's physician at least annually and collaborative visits conducted as needed with the patient, the patient's physician and potentially other providers. The program pays physicians for their participation in these conferences. In addition, frequent informal contact results from locating the nurse partners in the clinics where the physicians practice every day, and from the use of telephone and e-mail contact as needed.

The program aims to make care less fragmented and more timely (that is, better coordinated), in several ways. First, physicians provide nurse partners with standing orders that allow them to schedule required tests for patients. The CMIS allows nurse partners to program reminders to themselves to order tests. Second, patients have easy access to their nurse partners. If a patient needs immediate medical attention, the nurse partner can go directly into the physician scheduling program to make an appointment for the patient, rather than the patient having to leave a message for the physician with the clinic receptionist and wait for a response. This is particularly important, since Carle has had difficulty hiring physicians and is beginning to reduce its clinic nursing staff. Having fewer physicians and nurses is likely to reduce access to medical care.

A third way in which the MCCD facilitates care coordination is that nurse partners are responsible for monitoring that patients are receiving medical care consistent with program guidelines. If a physician is not following guidelines, the nurse partner checks with the physician to see whether there is a specific reason for the deviation or whether it was an oversight. If the nurse partner disagrees with a physician decision following this type of discussion (which, staff report, happens rarely), she can refer the issue to the MCCD medical director for review, who would, in turn, consult with the local clinic medical director or a specialty physician. The primary physician has the final decision, however. (The goal in resolving such disagreements is to reach a diplomatic, nonconfrontational solution.)

Finally, if the patient is receiving conflicting advice from his or her primary and specialty physicians, the nurse partner will encourage (and, if necessary, coach) the patient to ask the primary care physician to speak with the specialty physician to resolve the conflict. If necessary, however, the nurse partner will act as the patient's advocate, working directly with the physicians to resolve conflicting advice or polypharmacy. For example, a nurse partner helped a patient who was discharged from a nursing home with 21 prescription medications to reduce the list to just 5 by working with the patient's primary and specialty physicians. Staff noted that having the medical specialties represented on the program's advisory board has been especially useful when it comes to coordinating care and resolving conflicts with specialty physicians.

Nurse partners have additional tools and strategies for improving care coordination. EpicWeb routinely sends an e-mail alert to the nurse partner for every Carle system contact her patients have. The case assistant reviews the alerts the nurse partner receives each day and informs the nurse partner of those that require a response, such as an emergency room visit, a hospitalization, or several physician visits in the same week. The MCCD program has a protocol for nurse partner followup on important alerts. Nurse partners try to visit patients when they are

hospitalized and assist typically overburdened discharge planners. (Stays are now so short, however, that the nurse partner may not be able to get to the hospital before the patient is discharged.) More important, the nurse partner visits a patient within a day or two after hospital discharge to make sure the patient will be safe at home and understands any instructions hospital staff provided, particularly those pertaining to medication dosage and follow-up physician appointments. Following an emergency room visit, the nurse partner will contact the patient to discuss whether there was anything the patient should do differently to reduce the chance of another visit and to make sure the patient understands emergency staff recommendations. If the patient sees a physician other than the primary physician, the nurse partner will first check EpicWeb for visit notes, then, if necessary, follow up with both the patient and physician(s) to see what the problem was and determine whether some change in care is needed.

The Carle MCCD has adopted procedures and structures to improve the coordination of patient care. The program's physician advisory group has fostered an environment in which nurse partners and physicians work in collaboration, not merely in parallel, with the common goal of improving patient care and health. Nurse partners have regular formal, face-to-face meetings with primary care physicians. Because they are located in the same place, they see each other almost every day and thus can discuss patient problems informally as well. The advisory group has also been instrumental in including specialty physicians in program processes. The program provides the nurse partners with protocols to respond to different types of adverse events in a timely way in order to determine what the patient's problem is, how to resolve the problem as quickly as possible, and how to minimize the likelihood of it happening again. Finally, as noted earlier, the program produces numerous reports describing patient tests, medications, and provider contacts that also alert nurse partners of coordination successes and gaps.

Increasing Access to Services. Although the Carle MCCD refers patients to a wide variety of services (or, if necessary, arranges services on their behalf), increasing access to services is not a major focus of the program. Nevertheless, before the demonstration began, program staff strengthened relationships with community agencies to maximize patient access to transportation, meals, skilled and personal home care, adult day care, and housing. Nurse partners also help patients apply for programs and obtain Medicare-covered goods and services.

The program planned to pay for adult day care, transportation, and personal care/ homemaker/ companion/ respite services, if necessary, setting aside $300 per patient per year for such services. However, because the need to pay for such services has been less than expected, the program is considering expanding the list of services it would pay for. In addition, the program did not initially plan to pay for supplies and equipment. It subsequently realized that some patients needed peak flow meters, blood pressure cuffs, glucometers, and other equipment to improve self-management and began supplying such equipment to patients who could needed, but could not, afford it.

The cost of prescription medications has been an adherence barrier for some program patients, although many have Medigap policies covering prescriptions. Illinois has a good pharmacy assistance program (called Circuit Breakers) that has withstood recent state budget crises. Nurse partners help patients apply to Circuit Breakers, as well as to pharmaceutical company assistance programs, since the paperwork involved is typically complex.

During its first six months of operation, the program did not purchase any goods or support services for patients as its focus was on assessment and care planning during that period. However, it did pay physicians for participating in team conferences and collaborative visits for 74 percent of the 663 patients who were enrolled in the program (Table 4). In addition, more than three-quarters of the 663 patients enrolled received help from nurse partners referring them

TABLE 4

GOODS AND SERVICES PURCHASED FOR PATIENTS
ENROLLED DURING FIRST SIX MONTHS

Number of Patients Enrolled[a]	663
Percentage of Patients for Whom Program Purchased:	
Day care	0
Durable medical equipment[b]	0
Personal care/ homemaker services	0
Physician services[c]	74.0
Respite care	0
Transportation	0

Source: Carle program data received November 2002 and updated December 2003. Covers six-month period beginning April 19, 2002 and ending October 18, 2002.

NOTE: The Carle MCCD has limited funds which it uses to pay for the goods and service listed above when patients need, but cannot afford, them.

[a]Number of patients enrolled in the treatment group as of October 18, 2002.

[b]Equipment includes items that aid in patient safety and self-management for which Medicare does not pay such as peak flow meters, blood pressure cuffs, and glucometers. Program began providing equipment subsequent to the period covered by data in this table.

[c]Payments to physicians for meeting with nurse partners and with nurse partners and patients.

to, or arranging for, non-Medicare-covered services, primarily assistance applying for programs that pay for prescription medications and referral to exercise programs. Over 60 percent received help arranging for Medicare-covered services (Table 1).

DOES THE PROGRAM AFFECT MEDICARE SERVICE USE AND COSTS?

We provide preliminary estimates of the effect of the Carle MCCD on Medicare service use and costs, but caution that these estimates are not necessarily indicative of the true effects of the MCCD over a longer period. Due to lags in data availability, we are only able to analyze an early cohort of enrollees (those enrolling during the first four months of program operation), and to observe their experiences during their first two months in the program. Estimates are also preliminary because they include patients' experiences during the program's first six months of operation, when staff may have been fine-tuning the intervention, as well as because the program may enroll patients with different characteristics over time.

As might be expected during the first two months after random assignment, treatment and control group patients had roughly similar levels of Medicare service use and spending for most types of services (Table 5).[19] The exceptions were home health, and physician and other (noninstitutional) part B services. Treatment group patients were more likely to use these services, perhaps because, as nurse partners assessed them, they realized that some patients required tests specified in disease-specific practice guidelines or had unmet needs for home-based skilled nursing or therapy services. Nonetheless, these differences in use did not lead to higher overall costs. Total Medicare Part A and B reimbursement for the treatment group,

[19]As would be expected with random assignment, the treatment and control groups were statistically similar before random assignment (Table B.6). Thus, any post-enrollment differences in Medicare service use and costs would not be due to pre-existing differences in the two groups.

TABLE 5

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

	Treatment Group	Control Group	Difference[a]	
Inpatient Hospital Services				
Any admission (percent)	7.1	6.3	0.8	
Number of admissions	0.08	0.07	0.01	
Number of hospital days	0.36	0.30	0.06	
Emergency Room Services				
Any emergency room encounters (percent)				
Resulting in admission	4.4	4.1	0.3	
Not resulting in admission	6.0	6.1	0.0	
Total	9.3	9.9	–0.6	
Number of emergency room encounters				
Resulting in admission	0.05	0.04	0.01	
Not resulting in admission	0.07	0.06	0.01	
Total	0.12	0.11	0.01	
Skilled Nursing Facility Services				
Any admission (percent)	0.8	0.9	0.0	
Number of admissions	0.01	0.01	0.00	
Number of days	0.19	0.23	–0.04	
Hospice Services				
Any admission (percent)	0.0	0.7	–0.7	*
Number of days	0.00	0.20	–0.20	
Home Health Services				
Any use (percent)	4.2	1.1	3.1	***
Number of visits	0.35	0.10	0.26	**
Outpatient Hospital Services[b]				
Any use (percent)	36.9	34.8	2.2	
Physician and Other Part B Services[c]				
Any use (percent)	90.0	84.0	6.0	***
Number of visits or claims	5.4	4.8	0.6	*
Mortality Rate (percent)	0.4	0.4	0.0	
Total Medicare Reimbursement[d]				
Part A[e]	$503	$491	$12	
Part B	$494	$476	$18	
Total	$997	$967	$30	
Reimbursement for Care Coordination[f]	$316	$0	$316	***
Number of Beneficiaries	**483**	**465**		

Source: Medicare National Claims History File.

TABLE 5 *(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.

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

[b]Includes both emergency and nonemergency visits to outpatient hospital facilities, as well as use of laboratory and radiology services.

[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. The difference between the recorded amount and what 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.

exclusive of demonstration per-member-per-month payments, were nearly identical to those of the control group over the two-month period: $997, on average, for treatment patients as compared with $967 for the control patients. When the demonstration payment (which averages about $159 per month) is included in treatment group costs, the treatment-control difference is $316 over the first two months.[20]

We also examined monthly trends in treatment-control differences from April through September 2002, the first six months of program operation (Table 6). Consistent with those differences measured over each beneficiary's first two months in the demonstration, treatment and control group patients have similar rates of hospitalization and levels of Medicare reimbursement (exclusive of program payments) each month. When program payments are taken into account, however, treatment group patients have greater Medicare costs.

Our comparison of treatment and control patients during the early months of program operations showed no increase or reduction in overall Medicare reimbursement for regular (non-program) services. Because we are looking at early program months and the earliest program participants, it is too soon to expect that the program will have had a major impact on the use of regular Medicare services, with the possible exceptions noted as nurse partners facilitate the receipt of recommended tests and examinations, and identify the need for home health services. It is too soon to tell whether the increased use of these services will be sustained and will ultimately result in improved patient health and reduced rates of hospital and emergency room use. It thus, remains to be seen whether the program will generate sufficient savings to offset program payments.

[20]The per-member-per-month payment is $159, or $318 over a two-month period. The slightly lower means in Tables 5 and 6 may have resulted from billing errors, payment delays, or payment adjustments for patients who disenrolled.

TABLE 6

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
Number of Beneficiaries Who Were Enrolled In or Before the Month	Treatment	149	275	366	451	522	610
	Control	144	269	352	440	507	597
Number of Beneficiaries Enrolled Who Meet Medicare Coverage and Payer Requirements and are Alive that Month	Treatment	148	274	364	445	515	599
	Control	142	265	344	430	494	582
Average Medicare Reimbursement During the Month[a]	Treatment	$617	$409	$531	$524	$421	$449
	Control	$511	$427	$418	$506	$474	$389
Average Reimbursment for Care Coordination During the Month[a,b]	Treatment	$159	$159	$158	$159	$158	$158
Whether Admitted to Hospital This Month[a] (Percentage)	Treatment	4.1	2.9	4.1	2.5	2.7	3.7
	Control	2.1	4.2	1.7	3.7	2.8	2.2
Treatment - Control Difference[c]							
Average Medicare Reimbursement[a]		$105	–$18	$113	$17	–$52	$60
Average Reimbursement for Medicare plus Care Coordination[a]		$264	$141	$271 **	$176	$106	$219 **
Percentage Hospitalized[a]		1.9	–1.2	2.4 *	–1.2	–0.1	1.4

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 Medicare managed care plan, had Medicare as a secondary payer, or did not have both Part A and Part B coverage. Participants were also excluded entirely from this table if they had an invalid HIC number on MPR's enrollment file.

TABLE 6 *(continued)*

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

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

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

CONCLUSION

Research over the last decade suggests, but is by no means conclusive, that a number of features are associated with successful care coordination. 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, effective programs tend to target high-risk individuals in order to generate net savings over a relatively short period. 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 individual patient needs. Key features include: a multifaceted assessment whose end product is a written care plan that can be used to monitor patient progress toward specific long-term and short-term goals and that is updated and revised as the patient's condition changes (Chen et al. 2000); and a process for providing aggregate and patient-level feedback to care coordinators, program leaders, and physicians about patient outcomes (Chen et al. 2000). Another critical aspect is patient education that combines the provision of factual information with techniques to help patients change self-care behavior and better manage their care, as well as addressing affective issues related to chronic illness (Williams 1999; Lorig et al. 1999; Vernarec 1999; Roter et al. 1998; and Aubry 2000). Finally, successful programs tend to have structures and procedures for integrating fragmented care and facilitating communication among providers, to address the complexities posed by patients with several comorbid conditions, and, when necessary, to arrange for community services (Chen et al. 2000; Bodenheimer 1999; and Hagland 2000).

The third and fourth characteristics that have been associated with successful programs are having highly trained staff and actively involved providers. Strong programs typically have care coordinators who are baccalaureate-trained nurses (or social workers) or who have 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, 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. 1997). Periodic feedback during the demonstration period can motivate providers and care coordinators and enable the program to modify or intensify the intervention if it appears that it is not having the expected effect on intermediate or ultimate outcome indicators.

Program Strengths and Unique Features. The Carle MCCD appears to have almost all the features associated with effective care coordination.

- The program targets patients with diagnoses that typically are associated with high health care costs and has a searchable database for identifying potential patients. Once eligible patients have been identified, physicians actively encourage them to enroll: physicians sign invitation letters and discuss the program with patients. The program has met its year-one enrollment target and has experienced minimal voluntary disenrollment.
- Program assessment and care planning are based on the Omaha system and NIC scheme, which have been adapted for the demonstration, and result in written plans stored and referenced on the CMIS. Care plans guide the primarily telephonic monitoring process, and the CMIS provides prompts to nurse partners for monitoring and ordering tests, as well as protocols for responding to e-mail alerts about patient encounters in the Carle and other systems.
- CMIS and EpicWeb provide data to generate a wide range of reports for nurse partners, program leaders, and the program advisory board to gauge patient and program progress. The program includes formal, in-person meetings between nurse partners and physicians that often use these reports as starting points for discussion.
- The program delivers an educational intervention aimed at improving patient adherence to treatment recommendations, as well as improving patient ability to communicate with providers. The intervention is based on a structured curriculum that can be adapted to individual patient needs. It was developed by experienced

patient educators and includes existing and newly developed written materials. Patients keep diaries to help them monitor their health; the diaries also serve as teaching devices. The nurse partners regularly assess patient knowledge and try a variety of approaches to behavior change when the patient is not progressing as expected.

- Nurse partners reduce care fragmentation and facilitate communication among providers in a number of ways. The nurse partners have regular formal meetings with physicians and patients, as well as seeing them informally in the clinics where both the nurses partners and physicians practice. They have standing orders from physicians and can directly schedule appointments for patients with physicians. They receive e-mail alerts about all patient contacts in the Carle system (and review local hospital admissions rosters), then follow up when necessary to ensure that patients understand instructions they have received during those contacts and that avoidable contacts are not repeated. They also teach patients to communicate more effectively with their physicians and to manage their care more proactively.

- The program has the capacity to arrange for support services for patients (and can pay for some), but did not do so during its first six months. Nurse partners have helped many patients apply for pharmacy assistance and referred a number to exercise programs.

- Current nurse partners are either bachelor's trained registered nurses with at least five years of community or medical/surgical nursing experience, or nurses with other training but at least 20 years of nursing experience. The program provides specific training, both formally and through frequent meetings between nurse partners and their supervisors.

- The program has the support of patient physicians. Carle has a history of physician/ nurse collaboration that has been nurtured and enhanced by the active participation of the MCCD's advisory board, which includes leading physicians from the program's hub clinics and Carle medical departments. Carle physicians are familiar with the MCCD's leadership and become familiar with the nurse partners because they are based in the clinics where the physicians practice. After a year of operation, staff report that physicians can see for themselves that the nurse partners are helping some of their most complex patients. The MCCD also seeks to make physician practice more consistent with national guidelines both through Web-based case reviews and through one-on-one prompting by the nurse partners, both of which have been proceeding well.

- Finally, while the program does not provide financial incentives to staff to achieve particular patient outcomes or program goals, it does reimburse physicians for their participation in the program, by paying them to attend formal meetings and offering credits for completing Web-based lessons. Even though these payments are not large, staff believe that physicians appreciate that the program acknowledges the value of their time.

Potential barriers to program success. The Carle MCCD program design contains no obvious barriers to success. However, preliminary Medicare data analysis raises potential concerns that the program is not enrolling its intended population despite targeting beneficiaries with high-cost diagnoses. Among those patients enrolled during the program's first six months, far fewer than anticipated have had a hospitalization in the year prior to enrolling: 27 percent, as compared with the 50 percent assumed in the Carle MCCD waiver application. Enrolled patients also have lower monthly Medicare costs than expected: $478 in the pre-enrollment period, compared with $742 estimated for the target population in the waiver application. If patients with similar costs continue to enroll, it may be difficult for the program to save enough through reductions in services normally covered by Medicare to cover program fees of $159 per month even though this fee is relatively low compared to that of other programs.

Another potential concern is that, given the apparently high quality of care that already exists within the Carle system, it may be difficult for the program to improve outcomes for treatment group members relative to those experienced by controls. Carle physicians have had access to clinical practice guidelines for many years, Carle has electronic patient medical records, and the Carle culture encourages physicians to collaborate with nurses. Furthermore, even if the program does succeed in improving physician practice, there may be spillover effects to physician care of control group members, which would lead to underestimates of program effects.

Despite the concerns, the Carle MCCD program has considerable potential to improve enrollees' health outcomes to lower Medicare costs. The MCCD program capitalizes and expands on the Carle system in several ways, in addition to providing a structured educational intervention to improve patient adherence and self-management. Staff noted that although physicians are familiar with the practice guidelines, they rarely refer to them and do not always

remember to apply them. It is the responsibility of the program's nurse partners to make the application of the guidelines more consistent, and they are supported in this by program protocols and CMIS prompts. In addition, nurse partners can triage patient problems and directly schedule patients for physician visits, which is particularly important in light of current staff shortages at the clinics. Although all professional staff in the Carle system have access to the electronic medical records, the program has specific reports that it generates from the medical records so that patient progress can be gauged. Additionally, e-mail alerts are generated for nurse partners specifically for MCCD patients and protocols guide nurse partner responses to the alerts. Finally, while it is true that collaborative practice is already a part of Carle culture, the MCCD and its advisory board have set up structures and processes that facilitate collaboration and provide ongoing encouragement to physicians to work with the nurse partners.

It remains to be seen whether the program provides a big enough intervention beyond usual care delivered by Carle to yield detectable changes in patient health outcomes and Medicare costs. Separately examining impacts for program patients who are not part of the Carle system may shed some light on this issue, but there may not be enough such patients to obtain reliable estimates for this subgroup. Evaluation of whether the usual care provided by Carle is better than usual care elsewhere is beyond the scope of this evaluation.

Plans for the second site-specific report. We will prepare a second report on MCCD activities during the second and third years of operation that will focus more heavily on program impacts based on survey and claims data. This 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. This 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	3 retirement communities in the Baltimore, Maryland, metropolitan area	Heart conditions Diabetes COPD
CorSolutions	Provider of disease management services	Harris County (Houston), Texas	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	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, 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, New Mexico	CHF Diabetes
Medical Care Development	Consortium of 17 Maine hospitals hosted by a health services research organization	Rural areas of Maine	Heart conditions
Mercy Medical Center/North Iowa	Hospital	Rural areas of Iowa	CHF Chronic lung disease Liver disease Stroke Vascular disease Renal failure
QMed	Provider of disease management services	2 counties in northern California	CAD
Quality Oncology, Inc.	Provider of disease management services	Broward county, Florida	Cancer
University of Maryland Medical School	Academic institution	Baltimore, Maryland, metropolitan area	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[a]

TABLE A.1 *(continued)*

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

TABLE A.2

LIST OF DOCUMENTS REVIEWED FOR THIS REPORT

Carle Medicare Care Coordination Demonstration (proposal submitted to the Health Care Financing Administration, October 2000)

MCCD informed consent form and process documentation form*

Carle MCCD invitation letter, program application and brochure*

Carle MCCD Annual Health Questionnaire**

Carle's MCCD Fact Sheet*

Carle MCCD Protocol (revised February 2002)

Flow for Enrollment (procedures for identifying, verifying diagnoses for, and enrolling patients revised June 2002)

Carle Patient education materials: asthma, anticoagulant therapy, type 2 diabetes, congestive heart failure, chronic obstructive pulmonary disease, hypertension

Carle MCCD Clinical Guidelines: asthma, atrial fibrillation, angina, coronary artery disease, chronic obstructive pulmonary disease, diabetes, heart failure**

Carle MCCD Study Outcomes for Treatment and Control Groups (documents outcome measures hypothesized to be affected by MCCD)*

Reports generated at the nurse partner level

- MCCD Institution Report and Patient Contacts (documents patients' institutional stays and followup contacts by nurse partners)
- MCCD First Contact Variance Report (documents when time to first nurse partner contact with patient is more than two weeks after enrollment)
- MCCD First Face-to-Face Contact Variance Report (documents when time to first nurse partner contact with patient is more than one month after enrollment)
- MCCD Team Conference Variance Report (documents when time to first team conference with patient physician is more than two months after enrollment)

Reports generated at the patient level

- MCCD Health Questionnaire: coronary artery disease knowledge, symptoms, medications used
- MCCD Health Questionnaire: congestive heart failure symptoms, self-management
- MCCD Health Questionnaire: chronic lung disease symptoms, oxygen use, self-management
- MCCD Health Questionnaire: diabetes knowledge, self-management

MCCD Health Questionnaire: health service use, health status, pain level
MCCD Health Questionnaire: diet and exercise knowledge and practice
MCCD Health Questionnaire: whether patient smokes, has had influenza short or pneumonia vaccine, has had mammogram

Reports generated at the clinic level
MCCD Verified Patient Report (documents number of patients for whom physicians have provided standing orders, informed consent completion status, health questionnaire completion status)
Count of MCCD Treatment Patients by Location and Specialty

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* Included in Appendix C of this report
** Included in Appendices to "Early Experience of the Carle Medicare Coordinated Care Demonstration Program" (Chen 2003)

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

The participation rate and patterns were calculated to measure the proportion and types of beneficiaries who were attracted to the program. 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 19, 2002, through October 15, 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 Carle's specific criteria. CMS excluded beneficiaries from the demonstration who were not at risk for incurring full costs in the fee-for-service (FFS) setting because they (1) were enrolled in a Medicare managed care plan, (2) did not have both Part A and B coverage, or (3) did not have Medicare as the primary payer.

In addition to the Medicare coverage and payer requirements, Carle applied program-specific criteria to identify the target population. Table B.1 summarizes these criteria, which were approved by CMS and by the Office of Management and Budget (Brown et al. 2001). The program confirmed these criteria in spring 2003. To be included in the program's demonstration, beneficiaries must have reported having three or more medical visits or a hospitalization in the past 12 months and must have a diagnosis of asthma, atrial fibrillation, chronic obstructive

TABLE B.1

ELIGIBILITY CRITERIA

Inclusion Criteria	Patient reports (1) a diagnosis of asthma, atrial fibrillation, chronic lung disease (COPD or emphysema), congestive heart failure, coronary artery disease, or diabetes, (2) 3 or more medical visits or a hospitalization in the last 12 months, and (3) reside in the 13-county service area. ICD-9 Codes: 398.91, 402.01, 402.11, 402.91, 404.01, 404.11, 404.91, 404.03, 404.13, 404.93, 428.0, 428.1, 428.9, 411.0, 411.1, 411.8, 411.81, 411.89, 412, 414.0, 414.00, 414.01, 414.02, 414.03, 414.04, 414.05, 414.8, 414.9, 492, 492.8, 496, 714.1, 250.0, 250.1, 250.2, 250.3, 250.4, 250.5, 250.6, 250.7, 250.8, 250.9
Exclusion Criteria	Any of the following criteria: 1. ESRD at time of enrollment 2. Hospice or nursing home resident at time enrollment
Providers/Referral Sources	Carle affiliated physicians and Carle Foundation Hospitals. Self-referral by patients; Referrals by independent physicians or community service providers
Geographic location	Champaign, Coles, Douglas, Ford, Iroquois, Piatt, Vermilion, Edgar, DeWitt, Moultrie, McLean counties in Illinois; Vermillion or Fountain Counties in Indiana

pulmonary disease lung disease (COPD), congestive heart failure, coronary artery disease, or diabetes. In addition, beneficiaries could not (1) have end-stage renal disease (ESRD) at the time of enrollment, or (2) be a resident of a hospice or a nursing home at the time of enrollment.

We could approximate most of Carle's criteria using Medicare data. We implemented Carle's requirement that a patient must have had a hospitalization or three or more medical visits during the past year by examining whether a beneficiary had such an encounter at any point during the six-month enrollment window. To do this, we examined the 18-month period from one year before enrollment began until the window closed. There were three criteria we could

not fully approximate using Medicare data. First, while Carle accepted a beneficiary's self-report of a condition and medical visits/hospitalizations, we needed to rely on the patient's claims history. We were unable to observe the complete diagnostic history for beneficiaries who had not been in FFS Medicare during the full two years before the six-month enrollment window.[1] We may also have missed beneficiaries whose self-reports did not match the diagnosis or service use reported on their claims.[2] Second, we did not limit eligible beneficiaries to people who had used specific doctors who refer patients to the program, thus making our estimates potentially overstate the true number of people Carle would have approached about participating. Third, to identify whether a beneficiary met the utilization requirements at any point during the six-month enrollment window, we examined an 18-month period, beginning on May 1, 2001, roughly one year before the program began and ending six months after the program began, on October 31, 2002, rather than the 12-month window Carle used for participants. This allowed us to identify whether someone met the criteria during any month during the six-month enrollment period. We used the same period to approximate whether beneficiaries met the program's medical exclusion criteria at the time of enrollment. Finally, while Carle did not require that the hospitalization, or three or more medical visits be for the target condition, our assessment of

[1]Among the 1,381 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, 2 percent were enrolled in Medicare FFS 12 or fewer of the 24 months before they enrolled in the demonstration; 0.3 percent of participants were in FFS fewer than 6 of the previous 24 months before enrolling.

[2]This could occur if beneficiaries incorrectly reported that they met the utilization criteria or if the claims data did not include all the diagnoses for which the patient was treated. For example, patients may have been treated for diabetes, or they may have had three physician visits where they received treatment for diabetes during the year, but diabetes may not have been recorded as a diagnosis for all three visits.

eligibility did so, because these assumptions were also used when MPR projected costs for the waiver application.

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

We used Medicare claims and eligibility data and data submitted by the program to identify participants and eligible nonparticipants. For all participants, we used the Medicare Enrollment Data Base (EDB) file to confirm the HIC number, 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 of 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 entitlement, health maintenance organization 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

[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.

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) reimbursement were counted in other Part B reimbursement. A small number of negative values for Part A and Part B reimbursements during the past two years occurred in some of the demonstration programs. Any negative Part A and Part B amounts were truncated to zero. The few patients with a different number of months in Part A and Part B were dropped from the analysis of reimbursement in the two years before intake.

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

4. Defining Eligible Nonparticipants and Eligible Participants

We used target criteria information to pare down 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 eligibles and eligible participants used to analyze participation patterns.

TABLE B.2

SAMPLE OF ALL ELIGIBLE BENEFICIARIES FOR PARTICIPATION ANALYSIS

Sample	Actual Sample Size Using 12 Counties	Projected Sample Size for 13 Counties
Full Sample of Eligible Beneficiaries Who Live in Catchment Area One or More Months During the First Six Months of Enrollment	74,444	90,821
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	–12,346	–15,062
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	–30,959	–37,770
Did not have a hospitalization or three or more medical visits for the target criteria during the 18 months from April 2001 through October 2002	–5,682	–6,932
Met at least one of the exclusion criteria during the 18 months from April 2001 through October 2002	–1,051	–1,282
Eligible Sample	**24,406**	**29,775**

Note: Due to a data-coding error, we excluded Vermilion County, Illinois from the 13-county catchment area used to define eligible nonparticipants (the error did not affect participants). We used the proportion of beneficiaries not meeting each criterion in the 12-county area to project the number of eligible beneficiaries in the 13-county area.

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	730	709	1,439
Minus those who:			
Had an invalid HIC number on MPR's enrollment file	–16	–25	–41
Not in geographic catchment area during the month of intake	–5	–8	–13
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	–8	–9	–17
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	–72	–76	–148
Did not have a hospitalization or three or more medical visits for the target criteria during the 18 months from April 2001 through October 2002	–32	–62	–94
Met at least one of the exclusion criteria during the 18 months from April 2001 through October 2002	–1	–3	–4
Eligible Sample	**596**	**526**	**1,122**

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).

To compare people who participated in Carle's program with those who were eligible but did not participate, we next created comparable samples of participants and nonparticipants. Some participants did not meet the eligibility criteria, at least from what we could observe using claims data. To be consistent in comparing eligible participants to eligible nonparticipants, we dropped participants from the sample who did not fulfill Carle's target criteria according to the data available from Medicare claims.

Due to a data-coding error, we excluded Vermilion County, Illinois, from the 13-county catchment area used to define eligible nonparticipants (the error did not affect participants). Because this error affects only the calculation of the participation rate, we used eligibility patterns in the 12 counties to simulate eligibility in the entire 13-county area.

We identified 74,444 beneficiaries who lived in 12 counties in Carle's catchment area at some point during the first six months of enrollment (Table B.2). We then excluded 12,346 people 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. About half (30,959) of the remaining people 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. Eighteen percent of the remaining beneficiaries (5,682 people) did not have a hospitalization or three or more medical visits for the target condition during the 18 months from May 2001 through October 2002 (which includes the year before the program began, as well as the six-month enrollment window). Finally, 1,051 people were identified as having at least one of Carle's exclusion criteria, leaving us with a sample of 24,406 beneficiaries in the 12 counties. Using estimates of the number of beneficiaries who lived in the 13th county (16,474), and the same rates of people not meeting

eligibility requirements, we estimated that a total of 29,775 beneficiaries would have been eligible to participate in Carle's program.

Carle randomized 1,439 beneficiaries who enrolled in the demonstration program during the first six months of operation (Table B.3). Of these, 41 people (about 3 percent) could not be matched to their Medicare claims data due to problems with the HIC numbers they reported to the program and were therefore excluded from the participation sample.[4] Carle randomized 13 people (less than 1 percent of enrollees) who had addresses on the EDB that were outside its 13-county catchment area. We excluded these cases from the participation analysis to maintain comparability to the eligible nonparticipant sample. We also excluded 17 participants who did not meet CMS's insurance requirements for participation in the program during the month of intake. We also dropped 148 beneficiaries for not having at least one claim for a target diagnosis during the two years before the program began or the first six months of the program, 94 for not having a hospitalization or three or more medical visits for the target diagnoses during the 18-month period from May 2001 through October 2002, and 4 for meeting one of the program's exclusion criteria during the same 18-month period.[5] Thus, among the 1,439 participants

[4]This number includes both beneficiaries with invalid HIC numbers reported and problematic HIC number errors due to the way the Medicare files are created (described in footnote 3). The program has subsequently provided corrected HIC numbers, so those beneficiaries will be included in the next report.

[5]While we identified 242 participants who did not meet the diagnostic or service use criteria using claims data, all of these participants had reported to the MCCD on its application that they had a target condition and a hospitalization or three medical visits in the last year. (Carle did not require that the utilization be for the target conditions.) The MCCD rechecked the eligibility of these 242 participants in September 2003, using the Carle claims system, which contains records for services that are not billed to Medicare, and found that roughly 85 percent had one of the program's target diagnoses and met the program's service use criterion according to Carle's claims system.

randomized by Carle into the program during its first six months of operations, after exclusions, 1,122 people are included in the participation analyses as eligible participants.

Carle's participation rate for the first six months of enrollment is therefore calculated as the number of participants who met the eligibility requirements (1,122), divided by the number of eligibles who live in the catchment area (29,775), or 3.8 percent.

Table B.4 describes the characteristics of the 1,122 participants who were enrolled by Carle during the first six months and who appear to meet Carle's eligibility requirements as measured in Medicare data and the 23,284 eligible nonparticipants. This table is identical to Table 2 in the text, except that the participant sample has been restricted to the beneficiaries who meet the eligibility criteria according to Medicare claims data. The results are very similar to those in Table 2, except that a slightly higher proportion of eligible demonstration participants had been treated for CAD, CHF, and diabetes in the two years before intake and, on average, had slightly higher Medicare reimbursement than all demonstration participants.[6]

(continued)
In addition, some of the remaining 15 percent of participants could also have had information in their medical records indicating that they met the requirements, since most of them reported using physicians or hospitals that are not part of the Carle system, and claims for such services would not be in Carle's claims system.

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

TABLE B.4

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

	Eligible Demonstration Participants (Treatments and Controls)[a]	Eligible Nonparticipants	
Age at Intake			
Average age (in years)	76.0	75.3	**
Younger than 65	0.8	7.9	***
65 to 74	45.3	38.2	***
75 to 84	41.3	37.3	***
85 or older	12.7	16.6	***
Male	50.1	44.7	***
Nonwhite	2.7	3.8	*
Original Reason for Medicare: Disabled or ESRD	6.8	15.1	***
State Buy-In for Medicare Part A or B	3.8	13.6	***
Newly Eligible for Medicare (Eligible Less than Six Months)	0.09	0.00	***
Enrolled in Fee-for-Service Medicare 6 or More Months During Two Years Before Intake	99.7	99.7	
Medical Conditions Treated During Two Years Before Month of Intake[b]			
Coronary artery disease	61.8	55.9	***
Congestive heart failure	32.5	35.2	*
Stroke	22.9	24.4	
Diabetes	45.8	43.9	
Cancer	22.1	20.2	
Chronic obstructive pulmonary disease	35.9	38.5	*
Dementia (including Alzheimer's disease)	2.8	5.0	***
Peripheral vascular disease	11.7	10.8	
Renal disease	4.7	6.3	**
Total Number of Diagnoses	2.4	2.4	
Days Between Last Hospital Discharge and Intake Date[b]			
0 to 30	3.0	5.1	***
31 to 60	3.5	4.3	
61 to 180	11.5	13.5	*
181 to 365	12.4	13.3	
366 to 730	15.6	15.0	
No hospitalization in past two years	54.1	48.8	***

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	53.8	49.4	***
0.1 to 1.0	34.1	36.0	
1.1 to 2.0	8.8	9.9	
2.1 to 3.0	2.2	3.1	
3.1 or more	1.2	1.6	
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[b]			
Part A	$300	$368	***
Part B	$233	$257	**
Total	$533	$625	***
Distribution of Total Medicare Reimbursement per Month Fee-for-Service During One Year Before Intake[b]			
$0	0.1	0.6	**
$1 to 500	72.6	67.2	***
$501 to 1,000	11.6	12.8	
$1,001 to 2,000	9.2	11.2	**
More than $2,000	6.5	8.3	**
Number of Beneficiaries	**1,122**	**23,284**	

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

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

[c]Calculated as 12 x (number of hospitalizations during two years before month of intake) / (number of months eligible). 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 prenrollment period occurred on September 5, 2003, would not be counted as hospitalized during the 24 months before the month of intake. Conversely, someone hospitalized on September 25, 2001 would be captured in the measure defined by month of enrollment but not in the measure based on the day of enrollment.

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

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

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

B. METHOD FOR CALCULATING TREATMENT-CONTROL DIFFERENCES

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

1. Treatment-Control Differences

We used two approaches to estimate treatment-control differences in Medicare-covered service use and cost outcomes. First, we estimated differences over a two-month follow-up period for people Carle randomized during the first four months of enrollment. The four-month enrollment window covers April 19, 2002 through August 16, 2002. The follow-up time covered the two calendar months after the month of randomization. For example, for a beneficiary randomized on April 25, we examined outcomes in May and June.

Second, we estimated treatment-control differences by calendar month over the first six months of Carle'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 the program staff's 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 Carle'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.[7] Someone randomized in May would not be part of the calculations for April but would be included in May through September, again provided that the person is eligible during those months.

The sample used to analyze treatment-control differences in outcomes deviates from that used to analyze participation. Like the participation analyses, we excluded from the analysis sample randomized individuals for whom we have an invalid HIC number, because we could not obtain their Medicare claims data. We also excluded those people who enrolled but were ineligible for the demonstration according to CMS's insurance criteria (as determined from data on the EDB). 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.[8] 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 1,087 people randomized in the first four months of Carle's demonstration, the sample for analyzing treatment-control differences contained 989 people. For the six-month sample, 1,252, or 87 percent of the 1,439 randomized people, were included in the final sample (Table B.5). Nearly all the excluded cases were beneficiaries who were members of the same household as a beneficiary who was in the research sample. Less

[7] Patients were excluded as ineligible during months when we could not observe their full costs in FFS (when they were enrolled in a Medicare managed care plan, did not have Medicare as the primary payer for the full month, or did not have both A and B coverage for the full month).

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

TABLE B.5

SAMPLES FOR TREATMENT-CONTROL COMPARISONS

	First Four Months	First Six Months
Number of beneficiaries who were randomized	1,087	1,439
Minus those who:		
Were members of the same household as research sample members	–102	–131
Had invalid HIC numbers on MPR's enrollment file	–28	–40
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	–9	–16
Number of usable sample members	**948**	**1,252**

than 4 percent were dropped due to our inability to verify their HIC number or their failure to meet CMS's insurance eligibility criteria. In addition to excluding beneficiaries, we excluded months during which we could not observe the beneficiaries' full costs in FFS (described in footnote 7).

2. Integrity of Random Assignment

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

As expected under random assignment, the treatment and control groups had similar characteristics in both the four- and six-month samples. Of the baseline characteristics, there were statistically significant differences in only three variables for the four-month sample: (1) the proportion of beneficiaries who were treated for stroke in the two previous years, (2) the share of people who had monthly reimbursements greater than $2,000 a month, and (3) the share coming from a particular county. For the six-month sample, there were two statistically significant differences, in the percentage of treatment group members and control group members who had been treated (1) for stroke, and (2) for peripheral vascular disease. All differences were significant at the 10 percent level. 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 fairly small, early sample create any cause for concern.

TABLE B.6

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

	Four-Month Sample			Six-Month Sample			
	Treatment Group	Control Group	Total Research Sample	Treatment Group	Control Group		Total Research Sample
Age at Intake							
Average age (in years)	76.5	76.8	76.7	76.2	76.0		76.1
Younger than 65	1.2	0.4	0.8	1.1	0.5		0.8
65 to 74	40.8	40.9	40.8	42.8	46.0		44.4
75 to 84	43.5	43.7	43.6	42.5	41.0		41.8
85 or older	14.5	15.1	14.8	13.5	12.5		13.0
Male	46.2	49.5	47.8	46.8	49.0		47.8
Nonwhite	2.1	2.8	2.4	2.4	3.1		2.7
Original Reason for Medicare: Disabled or ESRD	6.4	7.3	6.9	5.8	7.5		6.6
State Buy-In for Medicare Part A or B	4.1	3.2	3.7	4.3	3.2		3.8
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	99.6	99.8	99.7	99.7	99.8		99.8
Medical Conditions Treated During Two Years Before Month of Intake[a]							
Coronary artery disease	54.1	56.7	55.3	54.5	57.0		55.7
Congestive heart failure	30.2	26.9	28.6	29.4	26.5		27.9
Stroke	23.5	19.0	* 21.3	23.2	19.2	*	21.2
Diabetes	39.7	37.3	38.5	40.1	38.8		39.5
Cancer	23.9	20.9	22.4	22.9	20.9		21.9
Chronic obstructive pulmonary disease	35.8	33.0	34.4	36.3	34.3		35.3
Dementia (including Alzheimer's disease)	1.7	2.2	1.9	2.4	2.0		2.2
Peripheral vascular disease	9.4	11.6	10.5	9.2	12.5	*	10.8
Renal disease	5.8	4.5	5.2	5.1	4.2		4.6

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)	2.2	2.1	2.2	2.2	2.2	2.2
Days Between Last Hospital Discharge and Intake[a]						
0 to 30	2.5	3.0	2.8	2.2	2.8	2.5
31 to 60	2.5	4.1	3.3	2.5	3.6	3.0
61 to 180	10.2	11.2	10.7	9.8	11.5	10.6
181 to 365	12.3	10.1	11.2	12.0	10.6	11.3
366 to 730	17.1	13.8	15.4	17.1	13.8	15.5
No hospitalization in past two years	55.5	57.8	56.6	56.4	57.8	57.1
Annualized Number of Hospitalizations During Two Years Before Month of Intake[a,b]						
0	54.7	57.5	56.1	55.8	57.6	56.7
0.1 to 1.0	33.7	33.6	33.7	32.9	32.6	32.7
1.1 to 2.0	7.9	6.3	7.1	8.2	7.3	7.8
2.1 to 3.0	2.5	1.7	2.1	2.2	1.5	1.8
3.1 or more	1.3	0.9	1.1	1.0	1.0	1.0
Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[a]						
Part A	$305	$239	$273	$275	$261	$268
Part B	$231	$213	$222	$221	$223	$222
Total	$536	$452	$495	$496	$484	$490
Distribution of Total Medicare Reimbursement per Month in Fee-for-Service During One Year Before Intake[a]						
$0	0.2	0.4	0.3	0.2	0.3	0.2
$1 to 500	74.6	75.0	74.8	75.3	73.8	74.6
$501 to 1,000	10.8	11.0	10.9	10.4	11.9	11.1
$1,001 to 2,000	7.1	8.6	7.8	8.1	8.3	8.2
More than $2,000	7.3	5.0	6.2	6.0	5.7	5.9
Location During Program Intake Period						
Illinois						
Champaign	34.8	36.6	35.7	36.5	36.5	36.5
Coles	7.3	8.6	7.9	6.9	7.5	7.2
DeWitt	1.2	0.4	0.8	1.1	1.1	1.1
Douglas	2.3	2.2	2.2	2.7	2.1	2.4
Edgar	1.2	1.3	-0.1	1.3	1.3	1.3
Ford	1.2	0.7	0.9	0.9	0.8	0.9

TABLE B.6 *(continued)*

	Four-Month Sample			Six-Month Sample		
	Treatment Group	Control Group	Total Research Sample	Treatment Group	Control Group	Total Research Sample
Iroquois	2.1	1.7	1.9	2.1	2.1	2.1
McLean	18.2	16.3	17.3	16.2	16.2	16.2
Moultrie	0.0	0.2	0.1	0.3	0.5	0.4
Piatt	6.0	5.6	5.8	5.5	5.4	5.4
Vermilion	23.8	25.0	24.4	24.6	24.6	24.6
Indiana						
Fountain	0.6	0.0	* 0.3	0.6	0.3	0.5
Vermillion	0.6	0.7	0.6	0.6	0.7	0.6
Outside catchment area	0.6	0.9	0.7	0.6	1.0	0.8
Number of Beneficiaries	**483**	**465**	**948**	**635**	**617**	**1,252**

Source: Medicare Enrollment Database and National Claims History File.

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

Participants were excluded from this table if they did not meet Medicare coverage and payer requirements for the demonstration, had an invalid HIC number on MPR's enrollment file, or were identified as a member of the same household as a research sample member.

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

[b]Calculated as 12 x (number of hospitalizations during two years before month of intake) / (number of months eligible). 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 prenrollment period occurred on September 5, 2003, would not be counted as hospitalized during the 24 months before the month of intake. Conversely, someone hospitalized on September 25, 2001 would be captured in the measure defined by month of enrollment, but not in the measure based on the day of enrollment.

ESRD = end-stage renal disease.

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

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

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

3. 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). The results were largely similar to those for outcomes measured over the two-month period (text Table 5). In both analyses, there are no statistically significant differences in hospitalizations, the main determinate of total costs, or in costs for the treatment and control groups. The significant differences in the use of physician and other part B services disappear when the month of randomization is included. However, the difference in the number of visits or claims services is the same. Thus, the conclusion in the text, that the treatment group uses more physician visits and other part B services, may not hold up when a longer time interval is examined; but other conclusions are unaffected by inclusion of the month of randomization.

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)	9.3	8.6	0.7	
Number of admissions	0.12	0.11	0.00	
Number of hospital days	0.52	0.51	0.00	
Emergency Room Services				
Any emergency room encounters (percent)				
Resulting in admission	6.2	5.8	0.4	
Not resulting in admission	8.1	9.1	–1.0	
Total	12.6	14.4	–1.8	
Number of emergency room encounters				
Resulting in admission	0.07	0.07	0.01	
Not resulting in admission	0.10	0.10	0.00	
Total	0.17	0.17	0.00	
Skilled Nursing Facility Services				
Any admission (percent)	1.5	1.7	–0.3	
Number of admissions	0.02	0.02	0.01	
Number of days	0.27	0.31	–0.05	
Hospice Services				
Any admission (percent)	0.0	0.7	–0.7	*
Number of days	0.00	0.20	–0.20	
Home Health Services				
Any use (percent)	4.8	2.6	2.2	*
Number of visits	0.44	0.22	0.22	
Outpatient Hospital Services[b]				
Any services (percent)	44.7	43.8	1.0	
Physician and Other Part B Services[c]				
Any use (percent)	94.8	93.5	1.3	
Number of visits or claims	8.0	7.3	0.7	
Mortality Rate (percent)	0.6	0.4	0.2	
Total Medicare Reimbursement[d]				
Part A[e]	$747	$754	–$7	
Part B	$732	$715	$18	
Total	$1,479	$1,469	$9	
Reimbursements for Care Coordination[f]	$474	$0	$474	***
Number of Beneficiaries	**483**	**465**		

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.

[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.

[b]Includes both emergency and nonemergency visits to outpatient hospital facilities, as well as use of laboratory and radiology services.

[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. The difference between the recorded amount and what 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

Carle MCCD invitation letter, program application, and brochure

Carle's MCCD Fact Sheet

MCCD informed consent form and documentation form

Carle MCCD Study Outcomes for Treatment and Control Groups (documents outcome measures hypothesized to be affected by MCCD)

Dear «FName» «LName»;

I am excited to tell you about a new and valuable program for seniors called Carle Medicare Coordinated Care Demonstration, also known as the MCCD. Carle is working with Medicare to develop better ways of providing care for our Medicare patients who have certain health conditions such as diabetes, heart, or lung problems. I would like for you to apply for this program. **There is no cost to you to join and participation does not affect your health insurance coverage!**

Please read the enclosed brochure that describes the program. Please complete the *Application for Participation*. Return the completed application in the postage-paid envelope. After we receive your application and determine you are eligible for the program, you will be contacted to complete a *Health Questionnaire* and an *Informed Consent for Participation.*

I encourage you to call the MCCD office at (217) 586-5913 or toll-free at (888) 874-4477 with any questions. I am pleased to offer you the opportunity to participate in this nationwide Medicare study that is committed to finding better ways for seniors to manage their health.

Sincerely,

Thomas Halloran, MD
Danville Clinic

Eligibility Requirements

To be eligible for MCCD, you must:

- Maintain your Medicare Part A & B coverage;
- Have a participating physician;
- Have been hospitalized (includes one day surgery or overnight) **OR** had 3 or more medical office visits (visits with all types of doctors or nurses are counted) during the past 12 months;
- Have one of the following health conditions: atrial fibrillation, heart failure, coronary artery disease, diabetes, COPD (chronic obstructive pulmonary disease), emphysema, or chronic asthma;
- Live in one of the following counties in Illinois: Champaign, Coles, Dewitt, Douglas, Edgar, Ford, Piatt, Iroquois, McLean, Moultrie, Vermilion; or in Indiana: Vermillion or Fountain;
- **Not** be a member of a Medicare Risk Plan (such as Premier Choice);
- **Not** be a permanent resident in a nursing home;
- **Not** be diagnosed with end stage kidney disease;
- **Not** be receiving hospice services.

How to Enroll into MCCD

- Contact the MCCD central office at (217) 586-5913 or (888) 874-4477 to request an application packet.
- After we receive your application and confirm your Medicare eligibility, we will contact you to obtain an Informed Consent for Participation and a Health Questionnaire.
- After we receive your signed Informed Consent and Health Questionnaire, you will be randomly assigned to the Coordinated Care or the Usual Care group.
- You will be informed of your assignment by letter within two weeks.

Medicare Coordinated Care Demonstration

Carle MCCD, P.O. Box 718
Mahomet, IL 61853
(217) 586-5913

Call Toll-Free at (888) 874-4477

The MCCD is a 4-year study funded by Centers for Medicare & Medicaid Services (CMS) and administered by Carle Foundation Hospital.

CARLE MCCD

Medicare Coordinated Care Demonstration

Medicare Coordinated Care Demonstration (MCCD), a National Demonstration

MCCD Program

Carle has been selected as one of 16 national sites to offer a new program designed to improve health care to seniors. MCCD is intended to offer coordinated, cost-effective health care. These coordinated care services are provided at **no cost to you** and you **retain your complete Medicare benefits.**

The program will study the impact of a team approach to healthcare for patients with chronic health conditions. It will address the following issues important to the future of Medicare:

- Improvement in health outcomes.
- Improvement in the quality of care.
- Lowering of Medicare costs.

MCCD Participants

Eligible participants who enroll into MCCD are randomly assigned into one of two groups, a **coordinated care group** or a **usual care group.** Participants of both groups retain all of their current Medicare services.

The Usual Care Group

If you are selected to participate in the Usual Care group, you will continue to receive care as you currently do now.

The Coordinated Care Group

If you are selected to participate in the Coordinated Care group, you will be assigned a Nurse Partner and may receive the additional benefits described below as MCCD Supportive Community Services and Team Care Services.

MCCD Supportive Community Services

To assist you with access to medical care, the following services may be provided on a limited basis (up to $300 per year). These services are authorized under a plan of care developed with your Nurse Partner and your physician.

- Homemaker & personal care
- Transportation
- Adult Day Care
- Respite services

MCCD Team Care Services

You will become an active member of a team with your Physician(s) and Nurse Partner(s) who will provide:

- Health care visits with you and your nurse partner and your physician.
- In-person and phone consultations.
- Medical and nursing care.
- Disease monitoring.
- An individualized care plan.
- Education on specific self-management techniques associated with your health conditions.
- Assistance in making progress toward your health goals.
- Coordination of care with your family members, your physician, and other healthcare providers.
- Assistance with arrangement of needed health services.
- Medication review by a pharmacist if needed.

Medicare Coordinated Care Demonstration

Carle MCCD, P.O. Box 718
Mahomet, IL 61853
(217) 586-5913
(888) 874-4477

Individual Information (please print):

Last Name:_____ First Name:_____ Middle Initial:_____

Mailing Address:_____ County:_____

City:_____ State:_____ Zip Code:_____

Female ☐ Male ☐ Social Security:_____-_____-_____ Birthdate:___/___/____

Phone: (_____)_____ Medicare #: _____ Carle Clinic #: _____

What is your ethnicity?

☐ American Indian or Alaskan Native (1) ☐ Asian or Pacific Islander (2) ☐ African American (3)

☐ Caucasian/White (4) ☐ Other (5) ☐ Unknown (6) ☐ Hispanic or Latino (7)

Contact Person Information:

Name, address, and phone for a proxy decision-maker or someone who will know how to reach the participant

Name: _____Phone Number: (_____)_____

Address: _____

Relationship to Applicant: _____

Individual Demographics:

1. What was the last grade of schooling that you completed?

☐ 8th Grade or less (1) ☐ 8th Grade (2) ☐ High School/GED (3)

☐ Some college/2 year degree (4) ☐ 4 year college graduate (5) ☐ More than 4 year college degree (6)

2. What is your marital status?

☐ Married (1) ☐ Separated (2) ☐ Divorced (3) ☐ Widowed (4) ☐ Never Married (5)

3. What are your current living arrangements? Please mark all that apply:

☐ Alone ☐ With a spouse ☐ With a relative ☐ With a non-relative ☐ In some form of group housing

Is there another person in your household that is planning to join the MCCD demonstration, or would be interested in joining?

☐ Yes ☐ No Name:_____

(OVER)

Physician Information:

5. Personal Physician's Name: _____ Phone Number: (____) _____

   Personal Physician's City: _____

Please list any specialist physicians (i.e. cardiologist, endocrinologist) that you are currently seeing:

6. Physician's Name: _____ Phone Number: (____) _____

   Physician's City: _____

7. Physician's Name: _____ Phone Number: (____) _____

   Physician's City: _____

8. Physician's Name: _____ Phone Number: (____) _____

   Physician's City: _____

9. If I am hospitalized, I usually go to these hospitals: _____

_____

10. If I have lab work or x-rays, I usually go to these facilities: _____

_____

Please CHECK ALL That Apply To You:

☐ I have both Medicare Parts A & B

☐ I have had 3 or more medical office visits in the last 12 months (visits with all types of doctors and nurses are counted)

☐ I have been in the hospital in the last 12 months (this includes 1 day surgery or overnight care)

☐ I currently live in a nursing home

☐ I have end stage renal disease

☐ I am using hospice services

☐ I am enrolled in Premier Choice (or another Medicare Risk Program)

Has Your Doctor Ever Told You That You Have ANY of the Following Health Conditions? Please CHECK ALL That Apply To You:

☐ Asthma

☐ Atrial Fibrillation or Atrial Flutter (irregular heartbeat)

☐ Chronic Lung Disease (COPD or emphysema)

☐ Congestive Heart Failure

☐ Coronary Artery Disease (Chronic Angina, chest pain, Heart Attack, or Heart Surgery)

☐ Diabetes

☐ I Do Not Have Any of the Health Conditions

gnature _____ Date _____

Thank you for completing this application. If you have any questions or concerns, or need help completing the application, please feel free to contact our office Monday thru Friday, 9:00 – 5:00.

CARLE MEDICARE COORDINATED CARE DEMONSTRATION
INFORMED CONSENT FOR PARTICIPATION

STUDY TITLE: Medicare Coordinated Care Demonstration (MCCD)
SOURCE OF SUPPORT: Centers for Medicare & Medicaid Services
IRB STUDY NUMBER: 01-25
PRINCIPAL INVESTIGATOR: Cheryl Schraeder, PhD, RN, FAAN

You are being invited to take part in a research study. Please read this consent form carefully and ask as many questions as you like before deciding whether you want to participate.

1. PURPOSE OF THE STUDY

The purpose of this study is to test whether a new type of service called Coordinated Care will help Medicare beneficiaries with chronic illnesses to have better management of their health, fewer hospital stays, and a better quality of life. Coordinated Care services may include assessment, care planning, patient education, physician and nurse education, monitoring of symptoms, service arrangement, and attempts to improve communication among the multiple health care providers caring for the patient.

2. PROCEDURES

Coordinated Care services will be provided by Carle's MCCD and are described in the Carle Medicare Coordinated Care Demonstration brochure. This study will randomly assign you to one of two groups after study enrollment.

- One group will receive coordinated care services in addition to their usual Medicare benefits.
- The other group will receive their usual Medicare benefits without the additional coordinated care services.

Random assignment (like the flip of a coin) helps to ensure that selection of the two study groups is fair and that the study results are not biased by differences between the groups at the start of the study. Your assignment to the Coordinated Care or Usual Care group will take place after you sign this consent form, complete the health questionnaire, and your eligibility for participation is confirmed. As a participant in this study, you will not receive experimental medication, diagnostic tests, or treatments; however, if you are in the coordinated care group you may be requested to obtain additional lab tests and/or x-rays to help in the management of your care.

3. ABOUT THE RESEARCH

This study is funded by the Centers for Medicare & Medicaid Services (CMS), the Federal agency that runs the Medicare program. CMS has funded a private company, Mathematica Policy Research, Inc., to evaluate Carle's MCCD. Mathematica Policy Research is a national research organization that will collect health information from enrolled members, maintain confidentiality for all information obtained, analyze the impact of the coordinated care services, and report overall findings to the funder. CMS has also contracted with KPMG Consulting for technical assistance. They will assist in tracking total numbers of enrolled participants and types of services provided.

Six months from now someone from Mathematica will call you to conduct a confidential telephone interview. All the participants in both the Coordinated Care and the Usual Care groups will be interviewed. The interviewer will ask you about: (1) how you are feeling, (2) recent doctor visits you have had, (3) your understanding of your illness, and (4) your satisfaction with the health care and supportive services you receive. The interview will take about 20 minutes. If you are not able to speak on the telephone, a family member or friend may answer the questions for you.

In addition to the interview, Mathematica will get information from CMS about the Medicare services you use during the study. Mathematica will use this information to see if the coordinated care services provided by Carle's MCCD were able to improve the quality of care for study participants and lower Medicare costs. Mathematica maintains a confidentiality policy that assures your personal information is kept private and is only accessed by limited project staff for the time it is needed.

Carle's MCCD staff will ask you to complete health questionnaires at enrollment and annually. Staff will be available to assist you if you need help completing the forms. MCCD research staff will also obtain information on your health status through review of your lab, x-ray, hospital admission and discharge dates, and diagnoses while you are in the program. This will be obtained from Carle Clinic and Hospital as well as the area hospitals and/or healthcare facilities you use while a member of MCCD. This information will be used only for research purposes and is kept private. Information is accessed only by limited project staff for the time it is needed according to Carle's and each healthcare facility's confidentiality policy.

4. STUDY DURATION

This study, including any coordinated care services you may receive, is scheduled to continue at least through December 31, 2005.

5. RISKS

The only identifiable risk in this study is unintentional sharing of your private information. Confidentiality agreements have been signed between Carle, CMS, and Mathematica stating that all efforts will be made to assure your confidentiality. All of the Medicare benefits and other coverage for which you are eligible will be available to you during and after the study. In the unlikely event that injury or illness results from this study, emergency medical treatment is available and provided at the usual charge.

6. BENEFITS

This study addresses issues important to the future of the Medicare program: increasing the quality of patient care and holding down Medicare costs. Participants in the program will not be required to change their doctors or be restricted in their choice of providers for Medicare services in any way. If you are assigned to the Coordinated Care group, you will be assigned to a nurse partner who will help you with identification of health needs, making health care decisions and caring for yourself. You may benefit from the close attention to your health. Participants in the Usual Care group will help to determine if the Coordinated Care services are beneficial. If the study results show that Coordinated Care services are beneficial, they may be added as a routine benefit in Medicare's future program.

7. STUDY COSTS AND COMPENSATION

There are no costs to you for the additional Coordinated Care Services and the Supportive Community Services (see brochure). You will not be paid for your participation in this study. No funds have been set aside by the healthcare facilities that may serve you to compensate you in the unlikely event of injury or illness as a result of participating in biomedical or behavioral research. These healthcare facilities include, but are not limited to, Carle Foundation Hospital, BroMenn Healthcare, Decatur Memorial Hospital, OSF St. Joseph Medical Center, Provena Covenant Medical Center, Provena United Samaritan's Medical Center, St. Mary's Hospital or Sarah Bush Lincoln Healthcare. You may, however, have

additional lab tests and x-rays in the Coordinated Care group where you could incur minimal co-payment charges.

8. CONFIDENTIALITY

The information about you collected for this study is confidential and protected by law. Your name, enrollment in the program, and personal information collected by Carle's MCCD will be used for your medical care and for research. It will be shared only with your written consent as described below.

By signing this form, you give permission for the following shared information:

- Carle MCCD may share your name and enrollment in the program with CMS to alert them to your participation in the program.
- Carle MCCD may share your name, enrollment in the program, and descriptive information with Mathematica for research purposes.
- Carle MCCD may share information with KPMG Consulting on the total program enrollment and the services offered to MCCD patients.
- Carle MCCD may share your name and enrollment in the program with Carle Clinic/Hospital and the healthcare facilities in the service area, (listed on the bottom of page 5) in order to obtain information from those facilities on any hospitalization dates and diagnoses, as well as lab and x-ray results. This information will be used for research purposes.
- Carle Clinic/Hospital and the area healthcare facilities (indicated on page 5) may provide notice to Carle MCCD staff of dates and diagnoses during a hospitalization, as well as lab and x-ray results, for research purposes.
- If you are in the Coordinated Care group, your name, enrollment in the program, and health information will be shared with your nurse partner and your physician(s) for coordination of your medical care.
- The information collected by Mathematica will be used for research purposes only and will not be shared with any party, including Carle's MCCD or CMS, in a way that can identify you.
- After the study is completed, the Carle MCCD will get information from CMS and/or Mathematica about the Medicare services you used during the study. Carle MCCD will use this information to see if the services provided by the program were able to

improve the quality of care for Coordinated Care participants and lower Medicare costs.

- The Food and Drug Administration has the right to inspect records if requested.

You will not be identified in any reports about the study written by Carle MCCD, by Mathematica, or by CMS.

9. VOLUNTARY PARTICIPATION

You do not have to take part in this study. Your decision to be in the study is completely voluntary. If you change your mind about participating, you can withdraw from the study at any time. Your decision to not participate or to withdraw will not affect your Medicare benefits in any way. Signing this consent form does not waive any of your legal rights.

I have read and understand this entire consent form. I have been given the chance to ask questions about the study and all my questions have been answered to my satisfaction. I understand that if I have other questions about this study I can call the Carle MCCD program staff at (217) 586-5913 or toll-free (888) 874-4477.

If I have questions about my rights as a participant in this study I can call the Carle Institutional Review Board (which is a group of people who review the research to protect your rights) at (217) 383-4366. If I am a patient in one of the area healthcare facilities I may also call the secretary or chairperson of their Institutional Review Board with questions about my rights. These contacts include BroMenn Healthcare at 309-268-5896, Decatur Memorial Hospital at 217-876-6629, OSF St. Joseph Medical Center at 309-662-3311, x-1281, Provena Covenant Medical Center at 217-337-2852, Provena United Samaritan's Medical Center at 217-443-5202, St. Mary's Hospital at 217-464-2966 or Sarah Bush Lincoln Healthcare at 217-258-2525.

I may also call the following healthcare facility contacts if I am a patient in that facility and have questions about my rights as a participant in the study: Christie Clinic, at 217-366-1327, Gibson City Hospital at 217-784-2603, Hoopeston Hospital at 217-283-5531, x-229, John and Mary Kirby Hospital at 217-762-6148, Dr. John Warner Hospital at 217-258-9571, Illinois Heart and Lung at 309-663-2496, and Paris Community Hospital at 217-465-4141.

I agree to participate in this study. I will respond to the confidential survey by Mathematica in approximately six months and I will complete the health questionnaires for the program.

I give consent to the release of my information to my personal doctor(s), the area healthcare facilities, the Carle MCCD, Mathematica Policy Research, and CMS as described in this document.

Participant Signature	**Date**	**Participant Printed Name**	
Person Authorized to Sign for Participant	**Date**	**Relationship of Authorized Signature**	
Witness to Signature	**Date**	*Principal Investigator Signature (office use only)*	

Carle IRB Approved Consent Form Do not use this version after: 08/21/2003

MCCD

PATIENT INFORMED CONSENT DOCUMENTATION FORM

Last Name: _____ First Name: _____

Clinic # _____

1. Face-to-face Visit- Date: _____ 2. Phone Visit: _____

Explanation of Items	Check box if item was discussed	Notes (complete with client specific questions/ issues or if there is a need for follow-up)
Discussed Key Elements of Informed Consent 3. Purpose		
4. Randomization – 2 groups		
5. Research elements- the roles of CMS and Mathematica		
6. Confidentiality – how and with whom information will be shared		
7. Voluntary participation and voluntary disenrollment		
8. Patient expressed understanding of project and satisfaction with answers given		
9. Patient signed consent	1- Yes 2- No 3-Undecided (don't know)	
Health Questionnaire(s) 10. Patient completed HQ (s)	1- Yes 2- No 3-Took HQ home (don't know)	

Completed by: _____ Completion Date: _____

Carle's Medicare Coordinated Care Demonstration (MCCD)

Fact Sheet

Purpose

- The purpose of this demonstration is to test whether care coordination interventions with new research based guidelines can be applied to Medicare fee-for-service beneficiaries with specific chronic conditions, and whether the interventions can affect health outcomes and total cost of care. A prospective randomized (Treatment/Control) study will be implemented with 2000 Medicare patients who have complex chronic conditions.

Funder

- Center for Medicare and Medicaid Services (CMS), formerly the Health Care Financing Administration (HCFA)

Funding Legislation

- The Coordinated Care Demonstration was authorized by Section 4016 of the Balanced Budget Act of 1997 (BBA). The BBA required that the projects target chronically ill Medicare fee-for-service beneficiaries who are eligible for both Medicare Parts A and B.

Key Objectives

- improve quality of services for MCCD patients with targeted chronic conditions
- implement research based medical, nursing, and patient self management clinical care guidelines
- improve patients' clinical health status and preventive health practices by adherence to research-based medical and nursing care guidelines and patient centered decision-making
- reduce hospitalization rates and length of stay

Services

- MCCD healthcare team comprised of a patient's physician, nurse partner, and clinical nurse partner specialist partnering with MCCD patients and their family members to provide services which include:
  - Assessing healthcare needs, developing care plans, planning pre and post hospital care, implementing care guidelines, providing health education, and coordinating community services.
  - Team visits and care conferences to assess and plan for a member's care needs.
- Supportive community services including adult day care, transportation, counseling and respite care guided by the plan of care.

Research Design

- Four year research demonstration
- **Randomized treatment/control design**
  - 1000 treatment (coordinated care group) & 1000 control (usual care group) patients

Eligibility Criteria

- Maintain enrollment in Medicare Part A & B;
- Three or more medical office visits (all types of doctor or nurse visits apply) or have been hospitalized (includes one day surgery or overnight) during the 12 months prior to enrollment;
- Diagnosed with one of the following health conditions: diabetes, heart disease (CHF, Atrial Fib, or CAD), or chronic lung disease (COPD, chronic asthma, or emphysema);
- Live in one of the following counties: Champaign, Coles, Dewitt, Douglas, Edgar, Ford, Piatt, Iroquois, McLean, Moultrie, Vermilion, or Vermillion or Fountain in Indiana;
- Not be a member of a Medicare HMO (such as Premier Choice);
- Not be a permanent resident in a nursing home; and,
- Not be diagnosed with end stage kidney disease and not be receiving hospice services.

Referral Information and Questions

- Contact Carle Medicare Coordinated Care Demonstration office- 217-586-5913 or 888-874-4477
- Information on Carle's C-Web under Physician Resources (Medicare Coordinated Care Demonstration)
- Call Cindy Fraser at 217-586-5419 or e-mail to Cindy.Fraser@carle.com

MEDICARE COORDINATED CARE DEMONSTRATION (MCCD) AT CARLE

A National Demonstration
Funded by Medicare, the Centers for Medicare & Medicaid Services (CMS)

FAQ: Why should I participate in a care demonstration with my patients at Carle?

ANSWER: MCCD is a study designed to collect and measure data on the effectiveness of care to seniors with select chronic conditions enrolled in the treatment (coordinated care) group of the demonstration when compared to patients enrolled in the control (usual care) group.

- This demonstration will utilize clinical nurse partner specialists and nurses partners teamed with primary care physicians in a relationship that will increase the availability of the nurse to monitor the patient's health status in the home, office, and pre and post hospital stays.

- Physicians will be reimbursed and receive production credit for collaborative and team conference visits through demonstration funds.

- This "team care" approach is intended to decrease the workload of physicians with treatment (coordinated care) group patients by providing an additional resource for patients and their families.

- Coordinated care is guided by 7 research guidelines developed specifically for seniors with any of the 7 chronic conditions (Diabetes, CHF, Stable CAD, Sec. Prevention CAD, Atrial Fib, Asthma, & COPD) studied in this demonstration.

- Each research guideline was developed through the work of physician specialists and has been reviewed/approved by the MCCD medical director team.

- Each research guideline:
  - identifies diagnostic procedures to confirm diagnosis; and,
  - offers medication and treatment algorithms consistent with the most recent research and 2001-2002 national guideline information.

- Included in the research guidelines are standing orders and order sets that facilitate more effective nurse management of problems and offer individualized treatment plans authorized by the primary care provider.

- MCCD Medical directors are available for consultation and referral when managing complex conditions and patients with multicare needs. Please feel free to contact any of the following MCCD Medical Directors:
  - Dr. Robert Healy, Dr. Jeffrey Roberts, Dr. James DeBoer, Dr. Christian Wagner, Dr. Stephen Belgrave, Dr. Louis Schwing, Dr. Robert Kirby, Dr. Abraham Kocheril, Dr. Curtis Krock, Dr. Shalini Manchanda, Dr. John Stoll

The MCCD Research Guidelines are available on the Cweb under Physician Resources (Medicare Coordinated Care Demonstration)

Carle's Medicare Coordinated Care Demonstration (MCCD)
Study Outcomes for Treatment and Control Groups

Outcome Variable	Type of Measure	Data Type	Measure	Measurement Interval	Collection Method	Evidence-based	Baseline Measurement Window
All MCCD Patients							
Health Status:							
General Health	General (SF-12)	Mean	Physical & Mental Component Scores (0-100)	Annually	HQ (SR)	Yes	NA
Body Mass Index	General	Frequency	% optimal BMI (based on age & gender	Annually	HQ (SR)	Yes	NA
Functional Status:							
Disability	General (Modified Katz ADL Scale)	Frequency	% w/ 1 or more limitations	Annually	HQ (SR)	Yes	NA
Magnitude	General (Magnitude Estimation Scale)	Mean	MES Score (0-4,371)	Annually	HQ (SR)	Yes	NA
Preventive Health Practices:							
Fluogen	General	Frequency	% having shot	Annually	HQ (SR)	Yes	NA
Pneumovax	General	Frequency	% having shot after age 65	Annually	HQ (SR)	Yes	NA
Living Will/Advance Directives	General	Frequency	% having completed	Annually	HQ (SR)	Yes	NA
Mammography	General	Frequency	% having annually (<age 70; % every 2 years (age ≥70)	Annually	HQ (SR)	Yes	NA
Prostate Exam	General	Frequency	% having annually	Annually	HQ (SR)	Yes	NA
Patient Satisfaction:							
MD	General (CAHPS)	Mean	Total Score (0-10)	Annually	HQ (SR)	Yes	NA
Overall Health Care	General (CAHPS)	Mean	Total Score (0-10)	Annually	HQ (SR)	Yes	NA
Nurse	General (CAHPS)	Mean	Total Score (0-10)	Annually	HQ (SR)	Yes	NA
Adherence to Medical & Nursing Guideline Recommendations:							
Nutrition	Process/Clinical	Frequency	% follow healthful eating plan (most/all the time)	Annually	HQ (SR)	Yes	NA
Exercise	Process/Clinical	Frequency	% exercise regularly	Annually	HQ (SR)	Yes	NA
Medications	Process/Clinical	Frequency	% take meds (all of the time)	Annually	HQ (SR)	Yes	NA
Specific Health Conditions							
Atrial Fibrillation:							
Warfarin (Coumadin)	Process/Clinical	Frequency	% on med; % having ≥6 INR values; % in range (2.0 to 3.0)	Annually	Lab test	Yes	12 m pre enrollment date
Resting Heart Rate	Process/Clinical	Frequency	% having ≥4 values; % in range (60-100)	Annually	EKG test	Yes	12 m pre enrollment date

Outcome Variable	Type of Measure	Data Type	Measure	Measurement Interval	Collection Method	Evidence-based	Baseline Measurement Window
Congestive Heart Failure:							
Brain Natriuretic Peptide (BNP)	Process/Clinical	Frequency	% having ≥4 values; % in range (<150)	Annually	Lab test	Yes	NA (test didn't start at Carle until 1/02
Blood Urea Nitrogen (BUN)	Process/Clinical	Frequency	% having ≥1 value; % in range (6-20)	Annually	Lab test	Yes	12 m pre enrollment date
Serum Creatinine	Process/Clinical	Frequency	% having ≥1 value; % in range (.06-1.19)	Annually	Lab test	Yes	12 m pre enrollment date
Weight Compliance	Process/Clinical	Frequency	% who weigh daily	Annually	HQ (SR)	Yes	NA
Symptoms (swelling in feet, ankles, legs)	Process/Clinical	Frequency	% who rarely/never have	Annually	HQ (SR)	Yes	NA
Coronary Artery Disease:							
Lipid Profile	Process/Clinical	Frequency	% having ≥1 value; % in range (LDL <130; Triglycerides <200)	Annually	Lab test	Yes	12 m pre enrollment date
Smoking Cessation	Process/Clinical	Frequency	% quit during study for ≥ 6 m	Annually	HQ (SR)	Yes	NA
Symptoms (chest pain)	Process/Clinical	Frequency	% who have never/once or twice a month	Annually	HQ (SR)	Yes	NA
Blood Pressure	Process/Clinical	Frequency	% who are in normal range (130/90)	Annually	Chart Review	Yes	12 m pre enrollment date
Diabetes:							
HbA1c	Process/Clinical	Frequency	% having ≥1 value; % in control (<7.4)	Annually	Lab test	Yes	12 m pre enrollment date
Lipid Profile	Process/Clinical	Frequency	% having ≥1 value; % in range (LDL <130; Triglycerides <200)	Annually	Lab test	Yes	12 m pre enrollment date
Microalbuminuria	Process/Clinical	Frequency	% having ≥1 value; % in control (<30)	Annually	Lab test	Yes	12 m pre enrollment date
Dilated Eye Exam	Process/Clinical	Frequency	% having exam	Annually	HQ (SR)	Yes	NA
Foot Exam	Process/Clinical	Frequency	% having exam	Annually	HQ (SR)	Yes	NA
Testing Blood Sugar	Process/Clinical	Frequency	% testing blood sugar daily	Annually	HQ (SR)	Yes	NA
COPD and Asthma:							
Oxygen use	Process/Clinical	Frequency	% O^2 Use 19-24 hrs/day	Annually	HQ (SR)	Yes	NA
Smoking Cessation	Process/Clinical	Frequency	% quit during study for ≥ 6 m	Annually	HQ (SR)	Yes	NA
Peak Flow Monitoring	Process/Clinical	Frequency	% using on a daily basis	Annually	HQ (SR)	Yes	NA
Symptoms (shortness of breath, wheezing)	Process/Clinical	Frequency	% who have never/once or twice a month	Annually	HQ (SR)	Yes	NA

Outcome Variable	Type of Measure	Data Type	Measure	Measurement Interval	Collection Method	Evidence-based	Baseline Measurement Window
All MCCD Patients							
Quality of Life:							
Heart Failure	General (Minnesota LWHF)	Mean	Total Score (0-105; higher scores = lower QoL)	Annually	HQ (SR)	Yes	NA
Diabetes	General (Problem Areas in Diabetes)	Mean	Total Score (0-100; higher scores = lower QoL)	Annually	HQ (SR)	Yes	NA
Mortality	General	Frequency	% death during enrollment	Annually	Medicare files	NA	NA
Hospital Use	General	Frequency & Mean	% hospitalized and N of hospitalizations	Annually	Medicare claims & TSI (CFH)	NA	NA
Hospital Bed Days	General	Mean	N of total bed days	Annually	Medicare claims & TSI (CFH)	NA	NA
Cost of Care	General	Mean	Total Medicare Expenditures PMPM	Annually	Medicare claims	NA	NA

Notes: HQ = health questionnaire; SR = self-report; N = number; NA = not applicable; PMPM = per member per month
Process Outcome = did patient get the test/procedure/shot according to the research-based care protocols?
Clinical Outcome = the specific result of a test/procedure.
General Outcome = study outcomes applicable to all patients regardless of health condition(s).