Case Management for High-Cost Medicare Beneficiaries

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We estimated the effects of three Health Care Financing Administration (HCFA)-funded case management demonstrations for high-cost Medicare beneficiaries in the fee-for-service (FFS) sector. Participating beneficiaries were randomly assigned to receive case management plus regular Medicare benefits or regular benefits only. None of the demonstrations improved self-care or health or reduced Medicare spending. Despite the lack of effects of these interventions, case management might be cost-effective if it includes greater involvement of physicians, is more well-defined and goal-oriented, and incorporates financial incentives to generate savings in Medicare costs. Models incorporating these changes should be investigated before abandoning Medicare case management interventions.

INTRODUCTION

Each year for the past two decades, a small proportion of Medicare beneficiaries has accounted for a large proportion of Medicare spending. In 1993, roughly 10 percent of beneficiaries accounted for 70 percent of the $129.4 billion that made up total Medicare spending (Health Care Financing Administration, 1995). Case management of high-risk cases has emerged as a perceived cost-cutting tool in managed care, raising questions about whether it might be valuable in the FFS sector as well.

The highest-cost beneficiaries tend to be hospitalized at least once during the year. However, a growing body of literature suggests that some hospital admissions are avoidable. These admissions result from a lack of early diagnosis of treatable problems, non-adherence to recommended treatments (such as medication, diet, and exercise regimens), or inadequate post-hospital care. High-cost case management consists of identifying individuals likely to incur high health care costs, teaching them to take better care of themselves, and improving adherence to treatment regimens and access to post-hospital care and other support services.

The literature on the efficacy of case management, however, is limited and its conclusions mixed due to widely varying types of interventions, target populations, and settings in which studies are conducted. Conclusions are mixed even among studies with the strongest research designs—those that randomly assign patients to receive case management or to a control group to receive routine care. For example, Rich et al. (1995) assessed a case management intervention that appears to have successfully reduced costs. The intervention, specifically for elderly individuals hospitalized with congestive heart failure (CHF), included intensive CHF education, dietary assessment, medication review, a social service consultation for post-hospital services, and patient followup by the hospital's home care department. Over the 90 days following hospital discharge, patients who received the intervention had 32 percent fewer readmissions, 37 percent fewer days

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in the hospital, and higher life quality than did control group members. Naylor et al. (1994) and Wasson et al. (1992) studied other types of case-managed interventions that also reduced overall spending (for example, comprehensive discharge planning or increased physician telephone contact). However, Fitzgerald et al. (1994) and Weinberger et al. (1996) found case management in the form of more comprehensive discharge planning to have increased overall spending.

The Omnibus Budget Reconciliation Act of 1990 mandated that HCFA sponsor demonstrations to "provide case management services to Medicare beneficiaries with selected catastrophic illnesses, particularly those with high costs of health care services." The demonstration projects were to identify groups of FFS beneficiaries at risk of high-cost care and design the specific features of a case management intervention to reduce these costs.

Our evaluation of the demonstration projects (Schore et al., 1997) examined the projects' success in attracting clients, the characteristics of these clients, the features and costs of the case management interventions used by each of the projects, and the projects' impacts on client self-care and symptoms, health and functioning, satisfaction, use of home and community-based services, and Medicare-covered service use and costs. This article presents the key findings from that evaluation, focusing primarily on the effects on Medicare-covered service use and costs, and draws inferences about the potential of case management interventions to control costs in the Medicare FFS environment.

METHODS

Demonstrations and Their Clients

Three Medicare Case Management (MCM) demonstrations (Table 1) were conducted by: (1) a government business holding company of a large insurer (Project I), (2) a peer review organization (PRO) (Project P), and (3) a tertiary-care teaching hospital (Project H). All three host organizations were located in the Midwest. Projects began operating in October 1993 and continued through November 1995.

The host organizations' prior case management and related experiences shaped their visions of case management for the demonstration projects. Project I had provided case management for individuals in State uninsured risk pools who had catastrophic and chronic illnesses. At the time of the demonstration, Project I also provided cost containment services for preferred provider organizations (PPOs) and health maintenance organizations (HMOs). In addition, Project I provided claims review-based cost containment and quality assurance services for Medicare carriers in five States. Project P, in addition to its PRO activities, provided case management for a large manufacturer's employees who had catastrophic illnesses or who were undergoing unusual treatment. Case management was conducted by telephone and included the authority to purchase services not routinely covered by the employer-furnished insurance plan. Project H had a longstanding mission to provide care for poor and elderly persons. The hospital provided in-house case management to

Table 1

Host Organizations and Target Populations of Medicare Case Management Projects

Demonstration Host Organization	Previous Case Management Experience	Project Goals	Target Population and Screening Procedures
Project I Part of the Government Business Holding Company of a Large Insurance Company	Case management for uninsured risk pools for beneficiaries with catastrophic or chronic illnesses Private case management for health maintenance organizations and preferred provider organizations	Determine feasibility of using claims to identify beneficiaries with CHF who would benefit from case management Investigate effects of case management on costs and outcomes Improve outcomes and reduce costs through education and support	Elderly beneficiaries with CHF as identified by review of Medicare hospital claims diagnosis-related groups. Must reside and receive care in project State. Beneficiaries with certain comorbid conditions excluded. Beneficiaries solicited through mass mailing to those potentially eligible. Consenting beneficiaries then verified eligible by telephone. No physician consent required. Planned treatment group size: 550
Project P Peer Review Organization	Case management for private insurance enrollees with catastrophic illnesses	Develop alternative, cost-effective approach to treating CHF and COPD within current Medicare fee-for-service payment system without jeopardizing quality Reduce hospital admissions	Elderly or disabled beneficiaries with CHF or COPD admitted to 1 of 10 participating hospitals in 2-State area Beneficiaries primarily contacted while hospitalized if chart review verified eligibility and physicians gave consent; others identified by Medicare hospital claims review Planned treatment group size: 400
Project H Tertiary-Care Teaching Hospital	In-hospital case management for high-risk patients	Test screening guidelines to identify beneficiaries at risk of frequent hospitalization Improve health and reduce hospitalizations and medical crises	Elderly beneficiaries with CHF, COPD, ischemic heart disease, pneumonia/sepsis, nutritional/metabolic problems, stroke, cancer, major joint replacement. Must be hospital patient of physician on staff and have prognosis of at least 6 months. Beneficiaries primarily contacted while hospitalized if chart review verified eligibility and physicians gave consent; others referred directly by physicians Planned treatment group size: 750 (reduced in second-year to 400)

NOTES: CHF is congestive heart failure. COPD is chronic obstructive pulmonary disease.

SOURCE: (Schore et al., 1997.)

certain groups of patients who had complicated medical problems that require care coordination across disciplines and hospital departments.

The three projects shared the goal of using case management to improve client health, and thereby reduce total medical expenses, especially for costly inpatient care. In addition, Project I had the goal of testing the feasibility of using Medicare claims data to identify beneficiaries with CHF who would be likely to benefit from case management. Similarly, Project H sought to test the efficacy of their screening guidelines in identifying elderly individuals at risk of repeat hospitalizations.

Each project chose different target populations and developed different procedures for identifying those populations. Project I chose one diagnosis, CHF, and identified 8,002 potentially eligible beneficiaries by reviewing Medicare claims for CHF hospitalizations during the year before the project started, mailing beneficiaries materials describing the project. In all, 1,134 beneficiaries (14 percent) were eligible for the project and consented to participate. Project P chose two target diagnoses, CHF and chronic obstructive pulmonary disease (COPD), and identified potential clients primarily through the review of ongoing admissions at 10 hospitals in 2 States. The project identified 3,628 potential clients in this way; among those, 2,537 were eligible for the project and 806 (22 percent, 32 percent of eligible persons) ultimately agreed to participate. Project H targeted eight diagnostic groups: (1) CHF, (2) COPD, (3) ischemic heart disease, (4) stroke, (5) pneumonia and sepsis, (6) major joint replacement, (7) nutritional and metabolic problems (including diabetes, dehydration, and decubitus ulcers), and (8) cancer. The project identified potential clients by reviewing ongoing admissions to the host hospital. It identified 4,135 patients, of whom 1,674 were eligible for the project and 442 (11 percent, 26 percent of eligible persons) agreed to participate.[1]

Reasons for refusal among consenting eligible beneficiaries varied by project. Most of the 8,000 beneficiaries identified as potentially eligible for Project I never responded to the project mailings. Projects P and H required consent from the beneficiary's primary physician and physician refusal eliminated over two-thirds of beneficiaries eligible for Project P and roughly one-quarter of those eligible for Project H. The high refusal rate among physicians at Project P was attributed to the "punitive" reputation Project P had among physicians, stemming from its role as the State Medicare PRO. Reasons for beneficiary refusal included a perceived lack of need and the erroneous belief that the project was related to health care reform efforts ongoing at that time and thus, would result in the loss of services.

Random Assignment and Demonstration Interventions

One-half of all consenting eligible beneficiaries in each project were randomly assigned to receive case management in addition to regular Medicare benefits or to a control group that received regular Medicare benefits only. Case management caseloads at the projects over the two demonstration years were: Project I—556, Project P—376, and Project H—209.

The three projects had basic case management activities in common (assessment, service coordination, condition-spe-

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[1] In addition to target diagnoses, the projects had additional eligibility criteria. Project I excluded beneficiaries who resided out-of-state or who had comorbid conditions that would make its education-focused intervention impractical (for example, Alzheimer's disease). Project P reviewed the charts of referred patients with specially developed clinical criteria to verify admitting diagnoses. Hospital-based Project H reviewed charts to verify admitting diagnoses and required patients to live within 25 miles of the hospital, have a primary physician on staff, and have a prognosis of at least 6 months to live.

cific self-care education, and emotional support to clients and informal caregivers). The projects differed noticeably, however, in (1) their levels of in-person client contact, (2) the degree to which case management activities were structured, (3) their use of nurses and social workers, and (4) their emphasis on education and service coordination. As shown in Table 2, project I case managers, who communicated with clients entirely by telephone, had no opportunity for in-person client contact, and Project P case managers had only limited in-person contact. Project H case managers had the most in-person client contact, reassessing clients in person quarterly and making home visits as needed.

The projects differed in the extent to which case management activities were structured and standardized, rather than left to the discretion of individual case managers. Project I presented the most highly structured intervention of the three. Its operational protocol specified how frequently case managers were to contact clients with different levels of need, and its educational message was clearly delineated in the CHF booklet it sent to clients at enrollment and on which subsequent teaching was based. Standardized case management plans and a set of specific follow-up questions provided case managers with concrete guidelines for all client contacts. The other two projects developed and used forms, lists, and letters to standardize client assessment and communication with clients and providers. However, the content of Project P and Project H client contacts was left largely to the discretion of case managers.

Also, the projects differed in their relative emphasis on nursing and social work backgrounds for case managers. Project I case managers were all nurses from a variety of health care settings. Project I had one social worker on staff to whom the nurse case managers could make referrals for support services. Project H had one social worker case manager (out of three); the case manager supervisor was also a social worker. Project P staff was made up entirely of nurses from a variety of health care settings. By their own description, it appears that Project P nurse case managers learned to be social workers on the job.

Finally, projects differed in their emphasis on client education and, therefore, the degree to which educational efforts were focused and systematic. Project I placed the greatest emphasis on education and took the most systematic and consistent approach. Educational efforts at the other two projects were less systematic. The projects' relative emphasis on service arranging and client advocacy appeared to be inversely related to their emphasis on education. Project H placed the most emphasis on services and advocacy. Its relatively small service area, high level of in-person client contact, and social worker case manager facilitated such activities.

Data Collection

Research data came from several sources. The primary source of data for the findings presented in this article was Medicare claims files, from which we constructed measures of clients' service use and Medicare payments for these services during the year following enrollment. These files also provided data on sample members use and cost of services during the year preceding demonstration enrollment. We also constructed demographic variables from Medicare enrollment files, for use as control variables in our regression models. Control variables on the number of physicians per 10,000 residents, number of nursing home beds per 100

Table 2
Key Case Management Features for the Medicare Case Management Projects

Feature	Project I	Project P	Project H
Intervention Focus and Mode	Telephone intervention to provide CHF education and monitoring of treatment regimens and symptoms; referrals for support services; caregiver support	Intervention primarily through telephone contact to provide CHF/COPD education and monitoring of treatment regimens and symptoms; assistance arranging for support services; caregiver support	Telephone and in-person contact to provide assistance arranging for support services; client advocacy; condition-specific education; caregiver support
Assessment and Reassessment	Project-specific assessment form included CHF etiology, frequency of common CHF symptoms, lifestyle habits related to CHF control, medications, comorbid condition, ADL limitations, informal support; reassessment at each contact with set of follow-up questions	Initial assessment instrument included measures of mental status and ability to perform ADLs; secondary assessment instrument (administered to clients who "failed" initial assessment) included health status, medications, lifestyle habits, emotional status, informal support; reassessment with tools at 3, 9 and 12 months; reassessment informally at each contact	Assessment forms included measures of mental status, ability to perform ADLs and IADLs, depression, morale, medications, health status, informal support; reassessment quarterly in person
Case Management Planning	Plans included client goals regarding CHF education; social work referral documented need for support services	Plans included support services, cardiac rehabilitation, and therapy, as well as Medicare-covered services arranged by discharge planners and physicians	Plans included support services, medical services, and education, including services arranged by physicians and discharge planners
Client/Caregiver Education	Highly focused CHF education at each contact, building on educational pamphlet mailed to client just after random assignment; quarterly newsletters	Education at each contact	Education as noted in case management plan
Service Arranging and Monitoring	Case managers referred clients to social worker for support services; social worker contacted local AAA, with referral and followed up until services in place; also assisted with paperwork for indigent drug programs	Case managers arranged for services not ordered by physicians or discharge planners; telephone followup with providers and clients	Case managers arranged and coordinated services and followed up with providers and clients; included coordination for hospitalized clients
Staff Composition	7 FTE nurse case managers, 1 case manager supervisor, 1 social worker	4 FTE nurse case managers; project director was also case manager supervisor	3 FTE case managers (2 nurses, 1 social worker), 1 case manager supervisor

NOTES: Support services refers to homemaker/housekeeping, transportation to medical appointments, home-delivered meals, assistance purchasing medications. CHF is congestive heart failure. COPD is chronic obstructive pulmonary disease. ADL is activity of daily living. IADLs is instrumental activities of daily living. AAA is Area Agency on Aging. FTE is full-time-equivalent.

SOURCE: (Schore et al., 1997.)

elderly residents, and average Medicare reimbursement for sample members' county of residence were obtained from the Area Resource File. We also conducted telephone surveys of clients and control group members 6 months after demonstration enrollment to collect data on condition-specific self-care behaviors and symptoms, physical functioning, and satisfaction with care. Because the questions of interest were often specific to the conditions on which the projects were targeted and client's reaction to the interventions, original questions were developed and extensively pretested. Results from analysis of the survey data are touched on only briefly in this article. HCFA and the demonstration projects provided information about the costs of case management.

Analytic Methods

Due to the differences across projects in the target populations and case management interventions implemented, impact analyses were conducted separately for each of the three projects. Although the evaluation relied on a randomized design, we used regression models to estimate impacts because they provided more precise estimates than simple comparisons of means and controlled for chance differences in measured baseline characteristics between client and control groups. This control was especially important given the relatively small sample sizes in two of the projects. Logit models assessed the project impacts on the probability of occurrence for binary outcomes. Ordinary least squares regression assessed impacts on Medicare reimbursements. Ordered logit models assessed impacts on numbers of hospital and emergency room visits.

The characteristics of sample members enrolled differed across projects, but in each project, clients and controls were very similar on the limited set of control variables available. (Table 3). Average age was 77 years in each project, with over one-half of the sample in each project being female. On other characteristics, the projects differed from one another substantially, reflecting their different target populations, catchment areas, and methods of identifying eligible beneficiaries. Very few members of minority racial or ethnic groups enrolled in Projects I and P (over 90 percent of enrollees were white and non-Hispanic), but one-fourth of Project H enrollees were minorities. The projects also varied substantially in the proportion of clients for whom Medicaid paid their Part B premium, ranging from about 3 or 4 percent in Project H to 13 percent in Project P. Project P also had a somewhat higher percentage of enrollees whose original reason for entitlement was disability.

The projects also differed substantially in their clients' pre-enrollment service use, largely because of differences in their target populations, and methods of identifying and enrolling participants. These differences are most clearly apparent in the length of time since prior hospital admission. The proportion who were enrolled within 1 month of hospital discharge varied from 8 percent for Project I to over 80 percent for the other two projects, reflecting Project I's use of claims data (for which there is a time lag) to identify sample members. Project P clients had the most comorbidities, as measured by the average number of secondary diagnoses listed on their last hospital claim prior to enrollment. Average Medicare costs per sample member in the year prior to enrollment in

Table 3

Mean Characteristics of Treatment and Control Group Members at Enrollment

	Project I		Project P		Project H	
Characteristic	Clients	Control Group	Clients	Control Group	Clients	Control Group
Number of Observations	556	556	376	363	209	211
Age (Years)	77.2	77.0	77.0	76.1	77.2	77.5
Female (Percent)	57.9	55.9	54.0	55.1	61.2	61.1
White (Percent)	91.6	92.5	95.2	97.5	74.2	75.4
Medicaid Buy-in for Medicare (Percent)	10.1	8.8	13.3	12.7	3.8	2.8
Original Reason for Medicare Entitlement Was Disability (Percent)	12.1	13.3	16.6	16.6	13.5	12.9
Timing of Most Recent Hospital Discharge at Enrollment (Percent)						
Under 1 Month	8.3	8.3	84.7	82.4	84.1	85.3
2-6 Months	47.9	49.2	4.3	3.0	8.7	9.0
6 Months or Over	43.8	42.5	11.0	14.6	7.2	5.7
Number of Secondary Diagnoses at Last Hospitalization Before Enrollment	3.8	3.9	4.9	5.1	3.1	3.2
Total Medicare Reimbursement During Year Before Enrollment	$11,207	$12,236	$15,040	$15,352	$16,826	$15,531

NOTES: Statistical comparisons are of client and control group means within project using Student's *t*-test (two-tailed). None of the client/control differences in this table were statistically significant at the 0.10 level.

SOURCES: Medicare Health Insurance Skeleton Write-Off files (May 1996) and National Claims History files (1992-1995).

the demonstration were about 20 percent lower in Project I than in the other projects (about $12,000 compared with more than $15,000). On all measures, however, for each project the treatment and control groups were very similar.[2]

The modest sample sizes limited our ability to examine impacts on client subgroups. For example, although impacts on beneficiaries who were also enrolled in Medicaid might have differed from those on other beneficiaries, there were too few such cases to warrant this analysis.

RESULTS

Identification of High-Risk Beneficiaries

The demonstration projects sought to develop targeting criteria and procedures that would identify beneficiaries who were likely to have catastrophic health care costs during the demonstration period. The projects appeared to have been successful in this regard, as reflected by a comparison of Medicare service use and reimbursement for eligible beneficiaries invited to participate in the demonstration projects with all beneficiaries in the projects' States in 1994. (Table 4).

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[2] Control variables included in the models but not shown in the table were a set of binary variables indicating the client's target condition (for Projects H and P, which included multiple diagnoses) and county-level variables for number of physicians per 10,000 population, number of nursing home beds per 100 elderly residents, and average Medicare payments per beneficiary.

Table 4

Medicare Service Use and Reimbursement for Project Eligible Persons and Other Medicare Beneficiaries During the First Demonstration Year

	Project I		Project P[1]			Project H		
Medicare Service	Eligible Persons	State	Eligible Persons	State 1	State 2	Eligible Persons	State	United States
Number of Observations	5,783	804,600	2,308	469,940	246,820	1,589	1,330,700	36,189,600
Percentage Receiving Care								
Inpatient Hospital	55.0	20.9	56.3	19.9	17.9	54.8	20.1	19.3
Skilled Nursing Facility	14.3	3.7	17.5	3.7	3.6	16.2	2.4	3.1
Home Health	30.9	8.0	37.5	7.0	6.6	56.6	8.8	9.4
Total Mean Part A and B Reimbursement per Enrollee	$10,063	$3,945	$11,882	$3,080	$2,926	$15,970	$4,307	$4,375

[1] Project P was implemented in parts of two contiguous States.

NOTES: Project-eligible beneficiaries in this table include clients (consenting eligible beneficiaries randomly assigned to the treatment group), who make up between 5 and 10 percent of all eligible beneficiaries and whose service use may have been affected by the demonstration.

SOURCES: State (and United States) data for 1994 from Medicare and Medicaid Statistical Supplement, 1996 (Health Care Financing Administration, 1996) and personal communication with Health Care Financing Administration Office of Research and Demonstrations staff. Data describing the demonstration eligibles during the year following the participation decision are from the 1993-1995 National Claims History files.

Using Medicare's National Claims History File, we calculated eligible individuals' average Medicare cost during the year after their participation decision and the proportion of eligible persons using hospital, skilled nursing facilities (SNFs), and home health services during this year. These estimates were then compared with analogous estimates for 1994 for all Medicare beneficiaries in the State in which the project operated (Project P drew enrollees from hospitals located in two States).[3]

Eligible beneficiaries in each project were nearly three times as likely as the general population of beneficiaries in the same State (about 55 percent versus 20 percent) to have a hospital admission during the year after their opportunity to enroll in the demonstration. Among those who were hospitalized, mean Medicare reimbursement was also substantially higher for project-eligible beneficiaries than for other Medicare beneficiaries in their States (not shown), suggesting project-eligible beneficiaries also had more hospital admissions or were hospitalized for more costly conditions than others. Rates of SNF and home health use (and mean reimbursements for users) were also much (three to six times) higher for project-eligible beneficiaries than beneficiaries more generally. As a result, total Medicare reimbursement was two-and-a-half to four times greater for project-eligible beneficiaries than for others in their States.

Mortality and Voluntary Disenrollment

The Project P and H interventions, each meant to last up to 1 year, had mortality rates that differed from one another but had comparably low voluntary disenrollment rates. Among Project P clients, the 1-year mortality rate was 26 percent, compared with 14 percent for Project H. Project H excluded beneficiaries who did

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3 These State estimates were obtained from HCFA's Medicare and Medicaid Statistical Supplement published in 1996. This comparison may understate the difference between those who are eligible and all beneficiaries because the eligible group includes project clients. If the projects are successful in reducing the use and cost of Medicare-covered services, this will lower the means for clients, which in turn will reduce the mean somewhat for all eligible persons. Only about 5 to 10 percent of eligible beneficiaries for each project are treatment group clients, however, so any underestimation of the difference is likely to be small.

not have a prognosis of at least 6 months to live, which partly explains its lower mortality rate. The disenrollment rate during the demonstration was just 2 percent for Project P and 8 percent for Project H.

The Project I intervention was meant to last 2 years. Project I's mortality rate during the intervention was 27 percent (19 percent during the first year) and its voluntary disenrollment rate 17 percent.

Self-Care and Symptom Control

The projects generally failed to improve client self-care or symptom control relative to that of control group members, measured 6 months after enrollment (not shown; [Schore et al. 1997]). The only significant effect on self-care was that Project I's clients increased their adherence to daily weight monitoring. We found no effects on the proportion of clients who: (1) missed doses of prescribed medicine, (2) heeded their doctor's advice to quit smoking, (3) monitored their blood pressure regularly, or (4) practiced other behaviors recommended for their condition, such as (for clients with chronic lung disease) practicing breathing exercises or getting influenza shots. Consequently, we observed no significant effects on symptoms such as abnormal weight gain, breathing problems, swelling of extremities, or the need for antibiotics (other than a slightly lower rate of shortness of breath among Project I clients than among control group members).

Medicare Spending

We estimated program impacts on a wide range of Medicare service use and cost outcomes, measured over the 12-month period following enrollment in the demonstration. Outcomes included various measures of services used, including hospitals (e.g., whether admitted, number of admissions, days), SNFs, home health care, hospice, and outpatient services, since these are all expensive services for which the projects expected to reduce clients' needs. We also examined impacts on total Medicare costs over the 12 months. Table 5 displays the estimated differences between treatment and control groups on a representative subset of these measures, obtained from regression models controlling for the beneficiary characteristics identified in Table 3.[4]

Given the general absence of marked effects on self-care and symptom control, it is not surprising that none of the projects reduced hospital admission rates and costs. For Project I and Project P, the client-control differences in the probability, number, and cost of hospital admissions were small and statistically insignificant (no *p*-values were below .46). For Project H, the estimated effects on the probability and number of hospital admissions were statistically significant but positive, suggesting that the intervention increased the proportion of clients admitted to a hospital by 10 percentage points (from 46 to 56 percent) and increased the average number of admissions by 34 percent (from 0.9 admissions to 1.21 admissions). Whether these are true case management effects is difficult to determine. It is possible that case managers identified some clients in need of an admission. Alternatively, since the project was hosted by a hospital, it may have been especially receptive to admitting project clients for observation or treatment. In any case, it is clear that case management did not have the intended effect on hospital use.

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[4] The sample sizes in this table for Projects H and P are about 20 percent smaller than those listed in Table 1 due to the restriction to those who had been enrolled in the demonstration for at least 12 months at the time the file was created. Analogous estimates of program impacts over the first 6 months of this time period obtained on the full sample were very similar to those obtained on this restricted sample. Thus, the loss of observations did not distort estimated effects of the case management projects.

Table 5
Estimated Demonstration Impacts on Medicare Services

	Project I		Project P		Project H	
First Demonstration Year	Estimated Impact (*p*-value)	Control Group Mean	Estimated Impact (*p*-value)	Control Group Mean	Estimated Impact (*p*-value)	Control Group Mean
Number of Observations[1]	1,110	—	586	—	334	—
Inpatient Hospital						
Any Admission (Percent)	2.2 (.46)	52.5	-1.5 (.71)	61.4	*10.0 (.06)	46.1
Number of Admissions	.03 (.71)	1.12	.03 (.83)	1.32	*.31 (.06)	0.90
Reimbursement	-$154 (.75)	$5,799	$148 (.83)	$6,472	$2,086 (.14)	$8,211
Number of Emergency Room Visits	-.01 (.90)	1.37	-.02 (.88)	1.45	**.85 (.01)	.99
Total Medicare Reimbursement	-$585 (.48)	$10,481	$801 (.52)	$12,851	$2,280 (.34)	$16,212
Total Medicare Reimbursement per Month Alive	-$35 (.57)	$957	-$31 (.79)	$1,358	$175 (.35)	$1,460

* Statistically significant at the 0.10 level using a two-tailed test.

** Statistically significant at the 0.01 level using a two-tailed test.

[1] A full year of claims data were available for only that subset of beneficiaries who enrolled in the demonstration prior to 1995. We did have 6 months of data for all enrollees. A comparison of impact estimates measured over 6 months did not differ for beneficiaries with a full year of claims and those with only 6 months.

NOTES: Estimates were obtained using a logit model for any admission, a Tobit model for hospital reimbursement, and ordinary least squares regression for the other outcomes. Number of admissions and visits were also estimated with ordered logit models which yielded similar results to those presented in this table.

SOURCE: Medicare's National Claims History files 1993-1995.

The projects also did not reduce the use of other Medicare services. While use of some services (such as physician visits) might have been expected to increase as a result of the case managers' monitoring, the hypothesis was that better self-care and monitoring would reduce the need for most services. The use and cost of SNF, home health, hospital outpatient, emergency room, and physician services were not significantly lower for clients than for the control group members in any of the projects (only emergency room use is shown in Table 5; [Schore et al., 1997 for complete results]). For emergency room and hospital outpatient services, use and costs were again significantly higher for Project H clients than for the control group.

Case Management Costs

The projects varied widely in their overall costs and cost per client per month enrolled, as well as in the nature of those costs. HCFA reimbursed the projects monthly for invoiced costs, up to the limits of their annual budgets. We used these invoices to calculate total cost and case manager costs, overall and per client month, over the life of the projects.

Total costs invoiced to HCFA during the demonstration ranged from roughly $670,000 for Project P to $1.2 million for Project I. (Table 6). Case manager salaries accounted for one-third of total costs for Project P and Project H but one-half of total costs for Project I. In addition to case

Table 6

Demonstration Case Management Costs

Item	Project I	Project P	Project H
Total Invoiced Cost	$1,217,069	$673,151	$808,424
Case Manager Cost	$623,364	$226,952	$264,543
Case Manager Cost as Percent of Total	51.2	33.7	32.7
Total Client Months	9,381	3,540	2,169
Total Cost per Client Month	$130	$190	$373
Case Manager Cost per Client Month	$66	$64	$122

SOURCES: Costs comes from demonstration project invoices to the Health Care Financing Administration. Enrollment information comes from the Project I, P, and H demonstration databases developed to monitor the flow of clients into projects.

manager salaries, total costs included salaries for project directors and staff from host organizations who supported the projects (such as computer programmers), other direct costs, fringe benefits, and overhead. In addition to case management per se, project activities included those for beneficiary recruitment, random assignment, case manager training, and preparation of educational materials.

Project H (the smallest project), with just over 2,100 months of client service provided during the 2-year demonstration, had the highest cost per client per month, at $373. Project I (the largest project), with nearly 9,400 months of client service, had the lowest cost per client per month, at $130.

Project H's high per-client costs are attributable to two factors. First, the fixed administrative costs of running the program and performing activities such as case finding, eligibility verification, and obtaining consent were spread over relatively few clients. Second, the Project H intervention had the most in-person contact and highest level of time-consuming service coordination, leading to case manager costs per client month nearly twice as large as the other projects. By contrast, Project I had the lowest cost per client per month as result of having very low pre-enrollment costs (due to identifying potential clients through claims review), the largest number of clients across which to spread fixed costs, and the least time spent with clients.

DISCUSSION

On the basis of discussions with project staff and existing literature on high-cost case management, we identified four primary reasons for the lack of project impacts on Medicare spending or health behaviors:

(1) Clients' physicians were not involved in the interventions.

(2) The projects did not have sufficiently focused interventions and goals.

(3) Projects lacked staff with sufficient case management experience and specific clinical knowledge to generate the desired reductions in hospital use.

(4) Projects had no financial incentive to reduce Medicare spending.

Perhaps the primary reason for the lack of impacts was that case managers received little or no cooperation from clients' physicians. Most refusals at Project P came from physicians on behalf of their patients, and a substantial proportion of refusals at Project H were due to physicians. (Project I did not require the approval of a client's physician but tried unsuccessfully to engage physicians in ongoing case management.) Among physicians who did agree to have their patients enrolled, most wanted little interaction with the case manager. Although some physicians came to view the case manager as a useful ally, most essentially ignored the case manager. Even in Project H, where the hospital employed the case managers and physicians, the case managers stated that the physicians did not think about case management much after consenting on behalf of a patient. The case managers at all three projects felt that they would have been more effective if they and the physicians had coordinated their advice to clients and if physicians had generally supported their efforts. With a team approach, the physicians might have been able to draw on input from the case managers about whether to see clients first instead of admitting them directly to a hospital or sending them to the emergency room. In addition, clients might have been more likely to adhere to case managers' advice if their physicians had told them that a case manager would be calling with further instructions. Other studies of high-cost case management have stressed the central importance of physician involvement and support (Rich et al., 1995; Wasson et al., 1992; Fitzgerald et al., 1994; Aliotta, 1996).

The lack of focus of the projects was reflected in several project-specific dimensions. Project H, for example, took clients with a variety of illnesses. This made it difficult for the project to develop materials for and train case managers on the comprehensive disease-specific self-care education that might have helped reduce the need for hospital admissions. Project P and Project H also had very little structure to their case management efforts. These projects provided little guidance on the types of activities on which the case managers should concentrate, how frequently clients at different levels of severity should be contacted, or the content of the education provided. Only Project I had well-developed educational protocols. The projects also made little formal use of client outcomes. For example, clients were not consistently and systematically monitored to determine whether hospital admissions were attributable to poor self-care or were otherwise avoidable.

Most of the case managers lacked in-depth condition-specific expertise and extensive case management or community nursing experience, although nearly all were nurses. The case managers received several days of initial training to review project procedures and clinical topics, and some completed in-service training or attended seminars. This limited training may have been an inadequate substitute for a more comprehensive background in the clients' disease and in community-based care or case management. Our review of selected cases (by a nurse consultant who specialized in case management) revealed several oversights by project case managers, suggesting that nurses with no experience in community nursing may underestimate the importance of social and environmental factors in improving the health of a client. Rich et al. (1995) cite the case managers' condition-specific training as central to the success of their case management intervention for CHF patients.

A final reason for observing no impacts on service use, costs, or health outcomes may have been that the projects had no financial incentive to produce such outcomes. Case managers focused on providing education or arranging services but had no target outcomes (such as holding hospital admission rates below, say, 30 percent). If payment to the case management project for services delivered had been based in part on measurable outcomes, the projects might have monitored the outcomes more closely and focused their efforts more consistently on activities that would increase the likelihood of achieving these goals.

As noted earlier, the best hard evidence that case management can reduce medical costs comes from the study by Rich et al. (1995) who attribute the effectiveness of their intervention to "the focused nature of the intervention and the fact that it had multiple components." In that study, an experienced cardiovascular research nurse conducted most of the education and client interaction and was clearly an integral part of the care team. The study focused on a single condition, using a teaching booklet that the study team developed specifically for elderly patients with CHF. A dietitian performed client-specific assessments and prepared instructions, which the research nurse reinforced while the patient was still hospitalized. A geriatric cardiologist reviewed and simplified the clients' medication regimens, and the research nurse taught the clients about each medication and the dosing regimen. At discharge, the research nurse completed a summary form describing prescribed medication, dietary guidelines, and activity restrictions. The form was passed on to a nurse from the hospital's home health care division, who visited each client three times during the first week after discharge. This home health nurse reinforced the client's education, reviewed medications, diet, and activity guidelines, and performed a general physical assessment and cardiovascular examination. The research nurse contacted clients by telephone to assess their progress, answer questions, and encourage them to call study personnel at any time concerning questions, problems, or symptoms (Rich et al., 1995). None of the three demonstration projects matched this level of intensity or staff skill level.

However, even if case management can lower Medicare costs for medical services, the reductions may not be enough to offset the cost of case management. The study by Rich et al. (1995) found that its intervention saved enough money on hospital admissions to more than cover the cost of case management. The case management costs reported ($72 per month), however, are much lower than those our demonstration projects recorded, despite the fact that the Rich study intervention was more resource intensive. The discrepancy in cost estimates between that study and ours suggests that more research may be needed to accurately estimate case management costs.

In any case, unless more effective case management can be provided for no more than the costs in two of the demonstration projects evaluated here, it is not likely to be cost-effective. The lowest estimate of total billed costs for the three projects, $130 per client month for Project I, was approximately 14 percent of the $957 average Medicare costs per month alive incurred by these clients during the year after enrollment. Project P had a similar ratio of case management costs to Medicare costs. This may be the maximum proportion of costs that can be incurred for case management if there are to be sufficient net savings to provide adequate financial incentive to case management providers and savings to HCFA. The Rich et al. study intervention cut medical costs by about 23 percent during the 3-month intervention. If that figure is an accurate estimate of the expected percentage savings from effective case management, the net savings from a program with case management costs like Project I or P would be about 9 percent of medical costs (23 percent minus 14 percent).

Despite the experience of these three demonstration projects, the widespread use of case management by managed care organizations and the experience reported in a few studies suggest that carefully designed case management interventions for conditions associated with high future costs might save money. The challenge will be to design such interventions that do not cost more than the medical cost savings and can be implemented in a FFS setting. If this can be accomplished, costs may be reduced in the most desirable way—by enhancing the ability of some of the highest-cost beneficiaries to practice effective self-care, thereby reducing their need for resource-intensive services.

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REFERENCES

Aliotta, S.: Components of a Successful Case Management Program. *Managed Care Quarterly* 4(2):38-45, 1996.

Fitzgerald, J., Smith, D., Martin, D., et al.: A Case Manager Intervention to Reduce Readmissions? *Archives of Internal Medicine* 154:1721-1729, 1994.

Health Care Financing Administration: Medicare and Medicaid Statistical Supplement, 1995. *Health Care Financing Review* 1995 Annual Supplement. Pp. 28,36, September 1995.

Health Care Financing Administration: Medicare and Medicaid Statistical Supplement, 1996. *Health Care Financing Review* 1996 Annual Supplement. Pp. 198-301, October 1996.

Naylor, M., Brooten, D., Jones, R., et al.: Comprehensive Discharge Planning for the Hospitalized Elderly. *Annals of Internal Medicine* 120(12):999-1006, 1994.

Rich, M., Beckham, V., Wittenberg, C., et al.: Multidisciplinary Intervention to Prevent the Readmission of Elderly Patients with Congestive Heart Failure. *New England Journal of Medicine* 333(18):1190-1195, 1995.

Schore, J., Brown, R., Cheh, V., and Schneider, B.: Costs and Consequences of Case Management for Medicare Beneficiaries. Report prepared for the Health Care Financing Administration. Princeton, NJ. Mathematica Policy Research, Inc., April 30, 1997.

Wasson, J., Gaudette C., Whaley, F., et al.: Telephone Care as a Substitute for Routine Clinic Followup. *Journal of the American Medical Association* 267(13):1788-1793, 1992.

Weinberger, M., Oddone, E., and Henderson, W.: Does Increased Access to Primary Care Reduce Hospital Readmissions? *New England Journal Of Medicine* 334(22):1441-1447, 1996.

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