

The Effect of Case Management on the Costs of Health Care for Enrollees in Medicare Plus Choice Plans: a Randomized Trial

Chad Boulton, M.D., M.P.H.¹

Joshua Rassen, M.D.²

Amy Rassen, L.C.S.W.³

Richard J. Moore, M.D.⁴

Stephanie Bouquillon, M.A.⁵

1. Department of Family Practice and Community Health, University of Minnesota Medical School, Minneapolis, Minnesota
2. California Pacific Medical Center, San Francisco, California
3. Jewish Family and Children's Services, San Francisco, California
4. Brown and Toland Medical Group, San Francisco, California
5. LifeMasters, San Francisco, California

Corresponding author:

Chad Boulton, M.D., M.P.H.

825 Washington Avenue SE, Suite 201, Minneapolis, MN 55102

612-627-4686 voice, 612-627-4314 FAX, boulton001@tc.umn.edu

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Abbreviated title: Effects of Case Management

Abstract

Objective: to measure the effects of case management on an older population's costs of health care.

Design: one-year randomized controlled trial

Setting: multiple sites of care in San Francisco, California.

Participants: patients age 65 or older of primary care physicians in a large provider organization that bore financial risk for their care (n=6,409).

Intervention: screening for high risk and provision of social-work based case management.

Outcome measures: volume and cost of hospital, physician, case management and other health-related services.

Results: the experimental group used more case management services than the control group (0.09 vs. 0.02 months per person, $p < 0.001$). The experimental groups' average total payments for health care were slightly lower (\$3,148 vs \$3,277, $p = 0.40$).

Conclusion: this study provides no statistically significant evidence that social-work oriented case management reduces the use or the cost of health care for high-risk older people.

Other potentially favorable effects of this type of case management need to be evaluated, as do the effects of other types of case management.

Keywords: case management, screening, health services research, randomized trial, aged

Introduction

In attempting to ameliorate the fragmentation, disorganization, inefficiency and frequent ineffectiveness of the health care of sick and disabled older people, many organizations have sought to link medical, social and family resources through case management.¹ Typically, case managers are social workers or nurses who coordinate and monitor the health-related services of their clients.^{2,3} The specific duties and methods of these “case managers” vary widely from program to program, but they often involve assessing the client’s needs, creating a plan of care, coordinating services, monitoring progress and adjusting the plan as needed. A few case management programs hire only social workers and restrict their focus to accessing and coordinating supportive services. Others rely solely on nurses and focus on their clients’ medical and health educational needs. Most programs, however, attempt to improve both supportive and medical care; many employ both social workers *and* nurses — and a few train technicians from other backgrounds to be case managers.⁴

The most common goals for case management are to limit expenditures for care in hospitals and nursing homes and to improve clients’ quality of life and satisfaction with health care. Accordingly, case management is typically offered to those older people thought to be at greatest risk of poor outcomes or high costs of care, i.e., those with chronic diseases, those taking several prescription medications, those with functional disability, those who use health care services heavily, and those lacking needed assistance from family or friends. Health care organizations identify such potentially appropriate recipients of case management through referrals, client surveys and analysis of administrative data.⁵

Despite the ubiquitous presence of case management programs in the Medicare managed

care industry,⁴ unbiased evidence of their cost-effectiveness is sparse. The National Long-term Care (“Channeling”) Demonstration showed that case management and access to supplemental community services satisfied clients but cost more than they saved in expenditures for nursing home care.⁶ Recently, analysts have claimed that more carefully targeted case management programs saved money by reducing high-risk seniors’ use of hospitals,^{7,8} but weaknesses in study designs make these findings vulnerable to powerful biases. A more rigorously evaluated case management program for older people who had been hospitalized for congestive heart failure (CHF) also reported success.⁹ Using standard protocols for educating and supporting participants in the hospital and at home, case management by an interdisciplinary team (a nurse, a dietician and a social worker) reduced hospital re-admissions by 56%. More recently, a randomized trial showed that a targeted program that combined disability prevention, self-management and case management by a geriatric nurse practitioner preserved functional ability and reduced hospital days significantly.¹⁰ Disappointingly, another randomized clinical trial of nursing-oriented case management of frail older people failed to improve function, quality of life, satisfaction with care, or hospital days.¹¹ A Medline search from 1986 to 1999 identified additional case studies but no reports of other well-controlled studies of the effects of case management for older people.

Brown and Toland Medical Group (BTMG), formerly California Pacific Medical Group, is a physician-owned, multi-specialty independent practice association (IPA) in San Francisco, California. At the time of this study, BTMG was composed mostly of small practices including about 500 specialists and 200 primary care physicians who saw adults (85% internists and 15% family physicians; 4% board-certified in geriatrics). Under capitated contracts with six health maintenance organizations (HMOs), BTMG provided care for more than 10,000 older Medicare

beneficiaries. Financial risk for care was shared by BTMG and its affiliated hospital, the California Pacific Medical Center (CPMC). In 1994, an internal study revealed that 10% of BTMG's capitated Medicare beneficiaries incurred 75% of the annual health care costs; 20% incurred 87% of the group's costs.

In response, BTMG sought to determine whether case management of its high-risk older patients could help contain the costs of their care. Believing that unmet needs for social services contributed to poor health and avoidable health care expenditures, it designed a case management program that attempted to identify high-risk patients proactively and to provide them with home-based, social-work oriented case management through a community social service agency, Seniors-At-Home (SAH), a division of Jewish Family and Children's Services of San Francisco. BTMG hypothesized that an older population with access to a targeted case management program would use fewer health-related resources than would such a population receiving usual care. This paper reports the effects of this "Identification and Early Intervention" (IEI) program during the first twelve months of its operation.

Methods

Study design. The investigators conducted a randomized controlled trial to measure the effects of the IEI program on its older patients' health care costs. All BTMG primary care practices were invited to participate in the study. Practices that responded affirmatively (including all physicians and all of their patients age 65 or older) were randomly assigned to either the experimental group, in which the IEI program was implemented, or the control group, in which usual care (which could include case management) was continued.

The experimental intervention. The IEI program relied on three methods for identifying older persons who were at risk for suboptimal use of needed social services and, thereby, for high medical costs. During the first half of 1995, SAH trained at least one member of the office staff (e.g., an office assistant, receptionist or nurse) of each experimental practice to function as a geriatric resource person (GRP). The GRP's role was to identify older patients visiting the office who might benefit from case management by SAH. GRP training included six ninety-minute introductory classes followed by ongoing bi-monthly educational sessions designed to **familiarize the trainees with the potential benefits of case management and to help them recognize patients with increasing frailty or deteriorating health status who might benefit from it. The GRPs were encouraged to use a low threshold for referring to case management all patients with new or worsening forgetfulness, deteriorating personal hygiene, or a pattern of missed appointments or increasingly frequent contacts with the office, as well as those who were simply "not doing as well as expected."** Trainees received a \$25 payment for each meeting attended.

A geriatric clinical nurse specialist (CNS) provided a second avenue for referral of high-risk persons to SAH. **Relying on clinical judgment rather than specific protocols, she assessed all hospitalized BTMG patients to identify those whose probability of re-hospitalization could potentially be reduced by additional social services and assistance at home. Typical examples included older patients with cognitive impairments and those returning home alone after hip fractures.**

The third identification method was a mailed survey designed to monitor the status of all older people under the care of the BTMG primary care physicians, including those who rarely visited the physicians' offices. At the beginning of the study, BTMG mailed a cover letter and a

six-page, 32-item questionnaire to each participant; it sent postcard reminders to non-respondents. The questionnaire (available on request) included items from the SF-36,¹² the Pra (probability of repeated admission) instrument¹³⁻¹⁶ and the screening tool used by the Social Health Maintenance Organizations to address seven domains of information. BTMG sent experimental participants' responses to their GRPs **and primary physicians** in the form of computer-generated one-page summaries that highlighted the person's Pra score and any individual responses suggestive of potential problems. BTMG sent similar summaries to the primary care physicians of participants in the control group. When a GRP detected a patient who appeared to be at risk, through either an office visit or a survey summary, she encouraged the primary physician to make a referral to SAH for a more detailed in-home evaluation.

A SAH social worker visited the home of each BTMG patient referred from the CNS or a primary care office. There she evaluated the person's functional, cognitive, social and medical status and determined, according to a standard protocol,* the need for specific levels of case management (i.e., none, low-, medium- or high-level). The social worker then communicated her findings and her suggested plan to the primary physician and the utilization management department of BTMG. After receiving BTMG's approval, she implemented the case management plan.

The goal of the SAH intervention was to connect older people with the family, community and financial resources that could meet their needs. Through home visits and telephone contacts,

* Available on request.

the SAH case managers arranged and coordinated resources such as home care, transportation,

meals, rehabilitative therapy, bill paying and volunteer services until each client's situation stabilized.

Financial arrangements. More than 90% of the study patients were enrolled in Medicare HMOs with which BTMG had full-risk contracts. BTMG employed the hospital-based geriatric CNS, trained the GRPs, and conducted and reported the results of the survey to the primary care practices.

BTMG subcapitated the individual practices to cover primary care services; it reimbursed other providers of health care on a fee-for-service basis, including SAH for the case management it provided to study participants. CPMC reimbursed BTMG for the costs of the geriatric CNS, the training of the GRPs, the survey and the SAH services. The individual practices were responsible for the salaries of their employees who functioned as GRPs.

The study participants who were referred to SAH were not billed for the SAH case management services they received, but they were responsible for the costs of community services such as home care (unless they qualified for public subsidies).

Measures. The period of observation began on July 1, 1995 and ended on June 30, 1996. The survey provided baseline information about the sociodemographic, residential, health-related, functional, life-style and affective characteristics of the patients of all participating practices. BTMG's payment records provided an **accounting of most** of each person's health care costs during the pre-intervention year (July 1, 1994 through June 30, 1995) and during the period of observation (July 1, 1995 through June 30, 1996). Included were payments for the participants' use of services provided by hospitals, specialist physicians, outpatient facilities, skilled nursing facilities, emergency rooms, ambulances, home health agencies, hospice programs, medical supply companies, laboratories and the SAH case management program.

Analysis. We analyzed person-level data according to the intention-to-treat principle, using t and χ^2 statistics for continuous and categorical variables, as appropriate. We used multiple linear regression with logarithmic transformations and the Wilcoxon rank-sum test to evaluate the relationship between group assignment (case management or usual care) and payments for health services. We regarded $p < 0.05$ as statistically significant.

Results

Fifty primary care practices were offered the opportunity to participate in the study; 35 accepted. Of these, 16 practices (with a total of 3,480 older patients) were randomly assigned to the experimental group, 19 practices (with 2,929 older patients) to the control group.

The experimental and control groups' response rates to the mailed baseline questionnaire were 63.4% and 58.3%, respectively, but the age, sex and previous payments for health care for the respondents and non-respondents did not differ significantly. As shown in Table 1, the groups reported similar baseline characteristics, except that a higher percentage of the experimental group had advance directives, a history of colon cancer, and difficulty doing light housework and using a telephone. More control participants reported urinary incontinence. During the year before the observation period (July 1, 1994 to June 30, 1995), BTMG average total health care payment for the experimental group was higher than that for the control group, i.e., \$2040 vs. \$1648 per person.

[please insert Table 1 about here]

During the observation period (July 1, 1995 to June 30, 1996), SAH provided case management services to 3.2% of the experimental group (mean duration 3.0 months, mean

payments \$312) and to 0.7% of the control group (mean duration 2.1 months, mean payments \$204). The two groups' use and costs of other health-related resources are shown in Tables 2 and 3. BTMG's mean total health care payments, including those for SAH case management, were slightly lower for the experimental group (\$3,148 vs \$3,277 per person).

[please insert Tables 2 and 3 about here]

In order to adjust for non-normal distribution and possible confounding, we constructed a linear regression model of the relationship between group assignment and log-transformed total payments during the observation period, adjusting for the unequal payments during the pre-intervention year and other differences between the two groups at baseline. In this model, membership in the experimental group was associated with a small, statistically insignificant reduction in total health care payments ($p = 0.40$). The Wilcoxon rank-sum test also showed the IEI-related savings to be statistically insignificant ($p = 0.18$).

Certain other costs of providing the experimental intervention were not formally tracked as outcomes of the study. We estimate that the aggregate cost of the postal screening program, the training of the GRPs, and the salaries and benefits related to their new ongoing senior-specific activities was \$25-30 per experimental participant.

Conclusions

Debates about the value of case management for high-risk older people are often passionate. Most people who have experienced the fragmentation and inefficiencies of complex care for the chronically ill assert that coordination of care would help improve clinical outcomes and reduce health care costs. Most case managers assert that it does. In opposition,

econometricians stress that many of the published studies of case management are biased and that, for several reasons,¹⁷ the costs of case management programs have generally *not* been offset by savings in other types of care.

The present study is the first randomized comparison of targeted, social-work oriented case management and usual care. The results suggest that the IEI program was cost-neutral, but we should interpret these results carefully. **Only 111 (3.2%) of the 3,480 patients in the experimental group received case management, but the study design permitted analysis of only the aggregate health care costs of the whole group. Thus, among high-risk older people, SAH case management may have achieved statistically significant cost savings that we were unable to detect.** Furthermore, the study's data collection system did not track death or disenrollment, so the analysis could not include the censoring of payment records. In addition, other important effects of case management -- on clients' and families' health, function, affect, quality of life or satisfaction with health care, on physicians' satisfaction with practice, and on the community's perception of BTMG -- were not measured in this study.

The small size of the aggregate savings observed in this study may also be related to the characteristics of the SAH model of case management, i.e., intuitively targeted and social work oriented. Alternative case management models may produce more beneficial effects on older people's health-related expenditures and well-being in the future by:

- **using more objective criteria and methods for identifying appropriate recipients of case management,**
- selecting and training nurses as case managers and pursuing more medically-oriented approaches to case management,
- providing evidence-based, algorithm-driven, time-limited care for defined sets of

conditions, and

- maintaining closer communication and more effective collaboration between case managers and primary care physicians.

To make more informed choices about the allocation of health care resources in the future, we need to continue to study the effects of case management carefully. A next logical step would be to classify models of case management according to pre-determined criteria such as programmatic goals and objectives, target population, emphasis (e.g., medical vs. social), background and training of case managers, role of case managers, case load, degree of standardization of interventions, financial incentives, and extent of integration with primary medical care. Such a taxonomy would facilitate future rigorous studies of numerous distinct interventions with different potentials for improving health care, all of which are now labeled “case management.”

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Table 1. Baseline Characteristics of Experimental and Control Respondents

	Experimental (n=2206)	Control (n=1708)	t / X ²	
Age (mean years)	76.0	75.9	-0.14	
Sex (% female)	61.1	60.6	0.14	
Lives alone (%)	34.2	34.6	0.08	
Exercise (days / week)	3.6	3.4	-1.64	
Cigarettes (mean # / day)	1.2	1.0	-1.09	
Alcohol (mean drinks / day)	0.6	0.6	-0.29	
Prescription medications (mean # / day)	2.0	1.8	-1.95	
Non-Prescription medications (mean # / day)	0.6	0.6	-0.25	
General health is fair or poor (%)	24.8	23.9	0.39	
Pra Score (mean)	0.33	0.33	0.34	
Ever had (% yes):				
Asthma	7.9	6.5	2.74	
Emphysema	3.2	2.7	0.91	Stroke
6.3	7.2	1.40	Breast cancer	4.9
4.2	1.34	Colon cancer	3.7	2.5
4.09*				
Cervical cancer	2.0	2.0	0.01	
Depression	14.1	15.8	2.24	
Coronary heart disease	8.6	10.0	2.23	
In the previous 12 months, had (% yes):				
Arthritis	36.6	35.2	0.84	High
blood pressure	37.9	38.1	0.03	Back
problems	23.0	21.7	0.92	Diabetes
9.1	8.2	0.89	Fatigue	17.1
15.9	0.96	Difficulty chewing or swallowing		
4.5	3.6	2.24	Ankle or leg swelling	
19.8	17.6	3.09	Urinary problems	
17.9	19.8	2.28	Dizziness	14.3
14.3	0.01	Blackouts	2.2	2.6
0.53	Diabetes	7.3	7.5	0.06

Heart problems	12.1	13.0	0.70	
Breathing problems	12.6	11.5	1.11	
Because of a health problem, has difficulty (% yes):				
Using the telephone	6.7	4.8	5.73*	
Doing light housework	8.5	6.6	4.68*	Taking
your medicine	4.1	3.2	2.29	Using
transportation	11.6	11.0	0.43	Running
errands or getting to appointments	11.2	10.5	0.44	
Preparing meals	8.2	7.7	0.25	
Shopping for groceries	11.8	11.1	0.48	Paying
bills or doing paperwork	8.4	8.4	0.01	Walking
across room	5.2	4.6	0.61	Getting
in and out of bed or chairs	9.2	9.4	0.08	Dressing
6.2	5.3	1.42	Bathing or showering	
7.3	6.9	0.17	Using bathroom	4.3
3.3	2.43	Feeding yourself	2.5	1.8
1.82				
Without aid, has difficulty with (% yes):				
Walking 1/4 mile	19.1	20.8	1.67	
Climbing ten steps without resting	16.8	16.1	1.20	
Stooping, crouching or kneeling	27.0	28.1	0.58	Using
fingers to grasp or handle	12.2	10.6	2.20	Lifting
and carrying 10+ lbs.	23.6	24.1	0.10	
Poor ability to control urine (%)	7.2	9.1	4.74*	
Lost 10+ lbs. without trying in last 6 months (% yes)	7.7	7.6	0.00	
Felt sad frequently during past month (%)	16.2	17.7	1.36	
Has an advance directive (% yes)	48.7	41.7	18.38**	

* p < .05

** p < .0001

Table 2: Mean Payments for Health Services: 7/1/95 - 6/30/96

	Experimental (n=3480)	Control (n=2929)
Hospital	\$1096.84	\$1178.61
Specialist physician	783.53	827.29
Skilled nursing facility	376.43	471.45
Primary care physician	191.60	184.82
Ambulatory surgery	141.29	132.10
Lab tests, X-rays	234.19	194.08
Ambulance	58.33	66.82
Home health	85.03	66.44
Emergency department	49.66	53.40
Medical equipment	42.14	38.35
Medications	45.51	31.08
Dialysis	19.77	22.24
PT/OT/speech therapy	11.86	8.09
Case management	9.94	1.46
Other	1.61	0.98
Total payments	\$3,147.73	\$3,277.21

Table 3: Use of Services: 7/1/95 - 6/30/96

	Units	Experimental (n = 3480)	Control (n = 2929)
Hospital	Days	1.06	1.14
Specialist physician	Visits	9.00	9.01
Skilled nursing facility	Days	0.92	1.20
Primary care physician	Visits	3.99	4.10
Ambulatory surgery	Visits	0.13	0.10
Ambulance	Trips	0.38	0.46
Home health	Visits	1.14	0.95
Emergency department	Visits	0.49	0.49
Dialysis	Visits	0.19	0.20
PT/OT/Speech therapy	Visits	0.38	0.26
Case management	Months	0.09	0.02