By Randall S. Brown, Deborah Peikes, Greg Peterson, Jennifer Schore, and Carol M. Razafindrakoto

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# Six Features Of Medicare Coordinated Care Demonstration Programs That Cut Hospital Admissions Of High-Risk Patients

**Randall S. Brown** (RBrown@mathematica-mpr.com) is vice president and director of health research at Mathematica Policy Research, in Princeton, New Jersey.

**Deborah Peikes** is a senior researcher at Mathematica Policy Research.

**Greg Peterson** is a health researcher at Mathematica Policy Research.

**Jennifer Schore**, now retired, was a senior health researcher at Mathematica Policy Research.

**Carol M. Razafindrakoto** is a senior systems analyst at Mathematica Policy Research.

**ABSTRACT** **As policy makers seek to slow the growth in Medicare spending, they have appropriately focused attention on beneficiaries with multiple chronic conditions. Many care coordination and disease management programs designed to improve beneficiaries' care and reduce their need for hospitalizations have been tested, but few have been successful. This study, however, found that four of eleven programs that were part of the Medicare Coordinated Care Demonstration reduced hospitalizations by 8–33 percent among enrollees who had a high risk of near-term hospitalization. The six approaches practiced by care coordinators in at least three of the four programs were as follows: supplementing telephone calls to patients with frequent in-person meetings; occasionally meeting in person with providers; acting as a communications hub for providers; delivering evidence-based education to patients; providing strong medication management; and providing timely and comprehensive transitional care after hospitalizations. When care management fees were included, the programs were essentially cost-neutral, but none of these programs generated net savings to Medicare. Our results suggest that incorporating these approaches into medical homes, accountable care organizations, and other policy initiatives could reduce hospitalizations and improve patients' lives. However, the approaches would save money only if care coordination fees were modest and organizations found cost-effective ways to deliver the interventions.**

Medicare's rapidly increasing costs have led policy makers to focus on improving the coordination of care for people with high-cost chronic conditions, for several reasons. First, beneficiaries with such conditions account for a disproportionately large share of total Medicare spending.[1] Second, ample opportunities exist to improve the care they receive.[2–4] Studies of care coordination have noted the high proportion of preventable hospitalizations arising from inadequate or inappropriate care, poor patient adherence to recommended medication and self-care regimens, and poor communication among the many providers whom a patient with chronic conditions typically sees.[2–9]

Despite the apparent opportunity to control spending by reducing the need for hospitalizations among such beneficiaries, several demonstrations by the Centers for Medicare and Medicaid Services (CMS) to test disease management and care coordination programs in fee-for-service Medicare have been largely unsuccessful.[8,9] Most of these unsuccessful programs are telephone-only interventions that develop and update care plans to meet patients' needs, educate patients about self-care and medication

adherence, and monitor patients. However, other well-designed office-based interventions have also failed to show major reductions in hospitalizations and spending.[10]

A few care coordination programs have shown favorable effects, but each program was tested within a single health care system with small samples, which raises questions about the generalizability of the findings to other settings.[11–13] Furthermore, impacts of these programs were identified only for high-risk subsets of enrolled patients. Transitional care programs have generated major reductions in readmissions for people recently discharged from a hospital.[14–17] However, the narrow targeting of these programs on readmissions does not address the broader opportunity to prevent any hospitalizations that are not short-term readmissions.

This article makes use of data from a fifteen-program randomized controlled trial—CMS's Medicare Coordinated Care Demonstration—to address the critical questions of what works and for whom in care coordination interventions. The demonstration tested whether paying the fifteen programs to provide care management to fee-for-service Medicare beneficiaries, in addition to whatever services they received from their usual health care providers, reduced total Medicare expenditures or increased both the quality of care and the satisfaction of patients and providers without increasing total expenditures.

CMS allowed the programs to design and deliver their interventions to fee-for-service Medicare beneficiaries who had chronic illnesses. Each program defined the particular conditions and eligibility criteria that it would target. CMS selected Mathematica Policy Research to design the evaluation, randomize eligible patients, and conduct the implementation and impact analyses. An earlier study found that only two of the fifteen programs reduced hospitalizations overall during the first four years of operation.[18]

The current study used the increased sample sizes available from two additional years of operations, for the eleven programs that CMS extended, to assess whether the overall results masked important effects on high-risk subgroups of patients, as others have found for other programs.[11–13] Also, to assess which program features appeared to be most important for success, the study took advantage of the fact that the eleven programs implemented their interventions in different ways.

In brief, we found that four programs significantly reduced the number of hospitalizations among a high-risk subset of their enrollees over the six-year study period. The four programs were operated by the following different types of organizations: a safety-net academic medical center in an economically depressed urban area (Washington University in St. Louis); a hospital in an integrated delivery system in rural Iowa (Mercy Medical Center); a hospice and home health agency in the Southwest (Hospice of the Valley, in the Phoenix area); and a nonprofit quality improvement services provider that acts as an adjunct to primary care in suburban and rural areas of southeastern Pennsylvania (Health Quality Partners). This diversity demonstrates that a program need not be operated by a particular type of organization to be effective.

Our examination of intervention features in ten care coordination domains revealed that six approaches were present in at least three of the four programs that reduced hospitalizations for their high-risk enrollees but were present in few or none of the unsuccessful programs. These findings suggest that a properly targeted and well-designed intervention can produce important improvements in critical outcomes for patients and Medicare spending for traditional services. The findings also suggest that to generate net Medicare savings for this population, programs must keep intervention costs to about $125–$150 per member per month and continually seek ways to increase interventions' effectiveness.

## Study Data And Methods

**STUDY POPULATIONS AND RANDOMIZATION** Each of the fifteen original demonstration programs recruited Medicare beneficiaries to participate. Mathematica randomly assigned eligible beneficiaries to the treatment or the control group in each program. Eligible beneficiaries included anyone who resided in the program's catchment area, was covered by fee-for-service Medicare with primary Part A and B coverage, and had one or more of the program's targeted chronic conditions.

Most of the programs focused on coronary artery disease, congestive heart failure, diabetes, chronic pulmonary disease, or some combination of those conditions. Some also focused on other chronic conditions such as hypertension, liver disease, renal failure, cancer, serious mental illness, Alzheimer's disease, and other cognitive impairments. Seven programs also required enrollees to have been hospitalized within the year before enrollment.

Each program excluded some beneficiaries based on having certain conditions, such as terminal illness or severe cognitive impairments. Four programs excluded beneficiaries younger than age sixty-five (see Appendix Exhibit 1).[19]

The programs began enrollment between April and September 2002 and were initially authorized to operate for four years. Of the original fifteen programs, four ended on or before schedule in 2006; CMS extended the others for two years or longer.

Our research sample included nearly 22,000 patients who voluntarily enrolled in these eleven extended programs at any point during the five years after their program's start date in 2002. Complete Medicare claims data were available for services rendered in 2002–08, ensuring that information from at least one year of potential exposure to the intervention and follow-up was available for all sample members. In practice, we observed outcomes for an average of thirty-nine months after enrollment.

**SETTINGS AND INTERVENTIONS** The eleven programs were hosted by three commercial disease management providers, one provider of health care quality improvement services, three community hospitals, one academic medical center, one integrated delivery system, one hospice, and one long-term care facility. The programs were distributed throughout the country (see Appendix Exhibit 1).[19]

Our descriptions of the programs' operational features are based on the following sources: Mathematica's review of their written designs and protocols; two rounds of telephone interviews, at three and thirty-six months after each program began, with program leaders and clinical directors; an in-depth, in-person visit to each program about nine months after it began; written updates of the features that listed changes from the previous year during the fourth and fifth years of operation; and responses from nine programs to a February 2009 e-mail request, with telephone follow-up, for more detailed information on specific approaches that we hypothesized were playing an important role in programs' successes.

We conducted in-person and telephone interviews using semistructured discussion guides (available from the authors on request) developed by a physician and a certified case manager nurse who was a past president of the Case Management Society of America. The on-site interviews included discussions with multiple care coordinators, their supervisors, and the program's medical director or manager. Care coordinators' interactions with a few patients were observed during each site visit. The authors and a physician colleague participating in that phase of the study questioned multiple respondents to obtain unbiased descriptions of how the programs were actually delivering care coordination. Broad findings from the site visits have been reported elsewhere.[18,20]

The interview guides were based on a prior literature review[21] and a conceptual model constructed by the authors and their physician colleague showing the planned activities of the care coordinators, the mechanisms by which these activities were expected to influence patients' and physicians' behavior, and how these behavior changes were expected to influence patients' use of expensive health care services. The guides covered ten domains of care coordination programs drawn from definitions of case management, disease management, patient self-management, care coordination, and transitional care.

The ten domains were as follows: program staffing and training; initial patient assessment; problem identification and care planning; patient education; improving communication and coordination; improving provider practice; arrangement of services and resources; information technology and electronic health records; ongoing monitoring; and quality management and outcome measurement. Multiple questions asked in each domain assessed the strength and comprehensiveness of the programs' interventions in that area.[20]

The authors established a data collection system to track the contacts that care coordinators had with patients over the first year of the program. For each contact, care coordinators recorded the date, reason for the contact, whether the contact was by phone or in person, and who initiated the contact.

The programs had several common features. For example, each program hired experienced registered nurses as care coordinators. The nurses assessed patients and developed care plans to address identified gaps or problems, educated patients about adherence to treatment recommendations and self-care activities, monitored patients over the life of the study, and attempted to improve the flow of information among providers and between patients and providers. The nurses also contacted patients 1.2–2.5 times per month, on average.

Only four programs tried to increase physicians' general adherence to evidence-based care. In the other programs, care coordinators instead spoke with physicians about particular patients who they found were not receiving recommended medication or preventive care, or who experienced problems.[18,20]

CMS paid each program a negotiated fixed care management fee per beneficiary per month. The fees were $70–$125 for four programs, $125–$225 for five programs, and above $225 for two programs.[18,20] The average monthly amounts paid to the programs over the follow-up period were slightly lower than the negotiated rates be-

cause eligible patients who disenrolled remained in the study until death, although the program received no fees for them after disenrollment and provided no further care coordination services.

Overall, 11 percent of the patients who enrolled during the first year of a program disenrolled within twelve months. Half of those patients voluntarily disenrolled; the other half died or became ineligible for the program because of joining a health maintenance organization or losing Medicare Part A and B as primary coverage.[20] The average monthly fee received over the follow-up period was $153, ranging across programs from $70 to $269.

**DATA** We obtained data from Medicare claims on hospital admissions, Part A and B Medicare expenditures, care management fees, and service use and chronic conditions before enrollment. We took patient characteristics and Medicare eligibility status from the Medicare Enrollment Database. Characteristics and prevalence of subgroups nationally were calculated using the 2005 data from the Medicare 5 percent sample.

**OUTCOME MEASURES** The study examined the number of hospitalizations and Part A and B Medicare spending per month, with and without care management fees, after enrollment. It did not collect information on expenditures not covered by Medicare or on Medicare expenditures for prescription drugs.[22] We calculated hospitalization and expenditures per month observed for each sample member, taking into account the period from enrollment through mid-2008 or until the sample member died or became ineligible. We then multiplied hospitalizations per month by twelve to annualize them.

**STATISTICAL ANALYSIS** We calculated impacts using an intent-to-treat analysis that included all randomized sample members for all eligible months, regardless of whether they received care management services. We calculated results for each program separately because the programs' interventions, target populations, and practice environments differed widely.

The research sample excluded the 0.3 percent of randomized beneficiaries who did not have Medicare fee-for-service as their primary coverage at enrollment. Observations were weighted to reflect the number of eligible months.

Treatment-control comparisons were regression-adjusted to increase the precision of the estimates and to control for any chance baseline treatment-control differences. The regressions controlled for demographic factors, utilization before enrollment, and prior diagnoses for twelve chronic conditions.

We conducted exploratory tests for four alternative (and overlapping) subgroups of beneficiaries at high risk of subsequent hospitalization. Beneficiaries were assigned to the first two subgroups based solely on the chronic conditions for which they had been treated in the year before enrollment. The other two subgroups were based on a combination of diagnoses and severity (for which one or more hospitalizations before enrollment served as a proxy). Our goal was to identify the largest subgroup we could find of high-risk beneficiaries for which we found consistent evidence of reductions in hospitalizations across multiple programs.

The first three subgroups consisted of enrollees who had congestive heart failure; those who had congestive heart failure, chronic obstructive pulmonary disease, or coronary artery disease; and those who had one or more of those three conditions along with one or more hospitalizations in the year before enrollment. The fourth subgroup consisted of enrollees who belonged to the third subgroup, plus those who had two or more hospitalizations in the two years before enrollment, and at least one of the following nine conditions: diabetes, any type of cancer other than skin cancer, stroke, depression, dementia, atrial fibrillation, osteoporosis, rheumatoid arthritis or osteoarthritis, and chronic kidney disease.

Beneficiaries meeting the various subgroup definitions had annualized hospitalization rates during the follow-up period that were two to three times greater than those of sample members who did not meet these high-risk criteria.

The power of the statistical tests varied substantially across programs and subgroups. Although each program had well above 80 percent statistical power to detect a 20 percent effect on hospitalizations for the full sample, only four of the eleven programs had sufficient power to detect a savings in Medicare expenditures without program fees of $150, the average fee received across the eleven programs.

**LIMITATIONS** The main limitation of this study was its low statistical power (18–59 percent) to detect reductions in standard Medicare expenditures large enough to offset program fees of $150 for the high-risk group. Nevertheless, the sample sizes were larger than most published studies of care coordination.

A second limitation was that we did not specify which subgroups would be tested before the demonstration began in 2002. We attempted to mitigate concerns that the findings were simply the result of "fishing" for significant estimates by exploring a limited number of subgroups, each defined by common diagnoses with high hospitalization rates and prior hospitalizations. Nor are the subgroups examined the only ones for which impacts are possible—high-risk patients

defined by other measures (such as Medicare's Hierarchical Condition Categories measure or measures predicting risk of a hospitalization) might also have significant results for some of the programs.

The third limitation was that the evaluation was not designed to test the effects of specific intervention approaches systematically. Therefore, other studies will have to ascertain whether the features correlated with success in this study are actually the determining factors.

The study's strengths were the use of a randomized design in each of eleven independent programs; access to complete records of Medicare hospitalizations and expenditures, as well as a host of information on program features; a large sample size; and a considerably longer follow-up period than any prior studies of care coordination that we have identified.

## Study Results

The programs enrolled beneficiaries who were sicker, on average, than the national Medicare population. Compared to all Medicare beneficiaries, enrollees also had higher educational levels and were less likely to be Hispanic, be under age sixty-five, or have a state buy-in for Medicaid (an indicator of poverty) (see Appendix Exhibit 2).[19] These differences reflected where the programs operated, their eligibility criteria, and beneficiaries' decisions to enroll.

Overall, 68 percent of the study sample at enrollment had coronary artery disease; 54 percent had congestive heart failure; 40 percent had diabetes; and 27 percent had chronic obstructive pulmonary disease. Sixteen percent had been treated for depression and 9 percent for dementia.

The average monthly Medicare expenditure of $1,797 per beneficiary in the sample during the year before enrollment was more than three times that of beneficiaries nationwide.[23] The treatment and control groups were comparable before the intervention, as expected (see Appendix Exhibit 3).[19]

**PROGRAMS WITH SIGNIFICANT EFFECTS FOR THE FULL SAMPLE** The results for the full sample of enrollees for the six-year follow-up were roughly comparable to those presented in the earlier evaluation of the Medicare Coordinated Care Demonstration covering the first four years.[18] Mercy Medical Center's program continued to show reduced hospitalizations of about 12 percent ($p < 0.05$) when the two additional years of data were included (Appendix Exhibit 4),[19] although this reduction was smaller than the 17 percent reported earlier.[18] The estimated impact of Hospice of the Valley's program for the full sample grew in magnitude from the 7 percent previously reported[18] for the first four years to 11 percent over the full six-year period and became significant.

None of the other nine programs showed a significant overall treatment-control difference in hospitalizations. Over the six years, none of the eleven programs reduced traditional Part A and B expenditures. Thus, there were no savings for the full sample of enrollees in any program to offset the care management fees.

**SIGNIFICANT EFFECTS FOR HIGH-RISK SUBGROUPS** In the exploratory subgroup analyses, four programs—those at Health Quality Partners, Mercy Medical Center, Washington University in St. Louis, and Hospice of the Valley—had favorable effects on hospitalizations among one or more of the high-risk subgroups. The other seven programs had no effects (Exhibit 1; for details, see Appendix Exhibit 5).[19] Only the last of the four subgroups met our robustness criteria of having favorable effects across all four programs (Exhibit 1). Thus, simply having a high-risk condition was not sufficient; effects were generally larger when the dimension of severity (a recent hospitalization) was added.

In the four programs combined, average hospitalizations for control-group members in the fourth high-risk subgroup were nearly three times higher than for control-group members not in the subgroup (1.38 annual hospitalizations versus 0.48; data not shown). This subgroup accounted for more than 70 percent of the research sample for Hospice of the Valley, Mercy, and Washington University but only 17 percent for Health Quality Partners, which had intentionally enrolled beneficiaries with a range of risk levels to test variations in program effectiveness.

Three of the four programs reduced hospitalizations for this subgroup by 13–16 per 100 beneficiaries per year (8–15 percent of the control-group mean; $p < 0.10$); the program with the widest confidence interval, Health Quality Partners, reduced hospitalizations by 30 per 100 beneficiaries (33 percent; $p = 0.02$) (Exhibit 2). Because we could not reject the hypothesis that impacts were equal in the four programs ($p = 0.95$), we calculated impacts for the four programs combined. For this combined sample, the intervention reduced hospitalizations per 100 beneficiaries for the subgroup by 15 per year (10.7 percent; $p = 0.001$) (Exhibit 2).

Only Health Quality Partners' program generated significant savings on Medicare expenditures before considering the care management fees (Exhibit 3). The average monthly estimated effects for the other three effective programs were favorable but not significant.

**EXHIBIT 1**

**Four Programs' Regression-Adjusted Effects On Hospitalizations In High-Risk Subgroups Of Patients, First Six Years**

| | Treatment-control differences in annualized number of hospitalizations | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Health Quality Partners | | Hospice of the Valley | | Mercy Medical Center | | Washington University in St. Louis | |
| Subgroup[a] | Difference | %[b] | Difference | %[b] | Difference | %[b] | Difference | %[b] |
| CHF | −0.119 | 12.3 | −0.206* | 51.8 | −0.159** | 64.2 | −0.074 | 46.2 |
| CHF, CAD, or COPD | −0.169*** | 43.1 | −0.165** | 80.0 | −0.117* | 92.5 | −0.067 | 76.2 |
| ≥1 of those 3 conditions and ≥1 hospitalization in prior year | −0.343*** | 14.2 | −0.145 | 63.9 | −0.182*** | 72.6 | −0.108 | 59.8 |
| Previous subgroup plus those with ≥1 of 9 other conditions[c] and ≥2 hospitalizations in prior 2 years | −0.297** | 16.9 | −0.160* | 71.3 | −0.153** | 79.0 | −0.132* | 71.0 |

**SOURCE** Authors' calculations. **NOTES** These four programs are promising because the treatment group had fewer hospitalizations than the control group ($p < 0.10$) for at least one of the subgroups analyzed. The treatment- and control-group rates were not statistically different ($p < 0.10$) in the other seven programs for any of these subgroups. Treatment-control differences for all programs are reported in Appendix Exhibit 5 (see Note 19 in text). CHF is congestive heart failure. CAD is coronary artery disease. COPD is chronic obstructive pulmonary disease. [a]Subgroup definitions were based on patient diagnoses and service utilization in the year or two prior to enrollment. With the exception of cancer, diagnoses were based on claims in the year or two prior to enrollment, as defined by the Chronic Condition Data Warehouse. User Manual, version 1.5. Warrenton (VA): Buccaneer Computer Systems and Services; 2009. A diagnosis of cancer was defined as having one or more inpatient or two or more hospital outpatient or carrier claims in the prior year for *International Classification of Diseases*, Ninth Revision, codes 140–208 (all cancers except skin cancer). [b]Percent of all enrollees in the subgroup. [c]Diabetes, cancer (not skin), stroke, depression, dementia, atrial fibrillation, osteoporosis, rheumatoid arthritis/osteoarthritis, and chronic kidney disease. *$p < 0.10$ **$p < 0.05$, ***$p < 0.01$

Pooling the four effective programs to estimate program effects on Medicare expenditures shows that the programs reduced average monthly Medicare expenditures (without fees) by $123, or 5.7 percent (Exhibit 3).

Turning to expenditures including care management fees, none of the four programs generated net savings to Medicare (Exhibit 3). However, for the four programs combined, the estimated effect on Medicare expenditures, including fees, was not significant, which indicates that the programs as a group were cost-neutral.

## Discussion

### IMPORTANCE OF THE HIGH-RISK POPULATION

Overall, the findings indicated that care coordination can reduce the need for hospitalizations if programs are targeted to the right people. Four programs significantly reduced hospitalizations by 8–33 percent among high-risk enrollees and were cost-neutral (Exhibit 2).

This high-risk target population is attractive because it includes 18 percent of the Medicare population and it accounted for a disproportionately high 37 percent of Medicare fee-for-service expenditures in the first year after these benefi-

**EXHIBIT 2**

**Four Programs' Regression-Adjusted Effects On Hospitalizations For One Subgroup Of High-Risk Enrollees, First Six Years**

| | Health Quality Partners | Hospice of the Valley | Mercy Medical Center | Washington University in St. Louis | Four programs combined |
|---|---|---|---|---|---|
| Number of enrollees | 273 | 1,138 | 904 | 1,975 | 4,290 |
| Percent of all program enrollees | 16.9 | 71.3 | 79.0 | 71.0 | 60.1 |
| Statistical power to detect a 20% effect on hospitalizations | 0.40 | 0.92 | 0.92 | 0.99 | > 0.99 |
| **ANNUALIZED NUMBER OF HOSPITALIZATIONS** | | | | | |
| Control-group mean | 0.897 | 1.335 | 1.028 | 1.634 | 1.376 |
| Treatment-control difference | −0.297 | −0.160 | −0.153 | −0.132 | −0.147 |
| 90% confidence interval | −0.507, −0.086 | −0.302, −0.017 | −0.265, −0.042 | −0.262, −0.001 | −0.222, −0.072 |
| Percent difference | −33.1 | −12.0 | −14.9 | −8.1 | −10.7 |
| *p* value | 0.02 | 0.07 | 0.02 | 0.096 | 0.001 |

**SOURCE** Authors' calculations based on data from the Medicare Enrollment Database, National Claims History File, and Standard Analytic File. **NOTE** *High-risk* was defined as patients who, at the time of enrollment, met the criteria for the fourth subgroup in Exhibit 1.

**EXHIBIT 3**

**Four Programs' Regression-Adjusted Effects On Medicare Parts A And B Expenditures For One Subgroup Of High-Risk Enrollees, First Six Years**

| | Health Quality Partners | Hospice of the Valley | Mercy Medical Center | Washington University in St. Louis | Four programs combined |
|---|---|---|---|---|---|
| Number of enrollees | 273 | 1,138 | 904 | 1,975 | 4,290 |
| Percent of all program enrollees | 16.9 | 71.3 | 79.0 | 71.0 | 60.1 |
| Statistical power to detect $150 PBPM effect | 0.18 | 0.32 | 0.59 | 0.38 | 0.75 |
| **MONTHLY MEDICARE PART A AND B EXPENDITURES** | | | | | |
| Without care management fees | | | | | |
| Control-group mean ($) | 1,363 | 2,364 | 1,366 | 2,521 | 2,159 |
| Treatment-control difference ($) | −408 | −112 | −111 | −98 | −123 |
| 90% CI ($) | −741, −76 | −321, 97 | −243, 22 | −283, 86 | −229, −17 |
| Percent difference | -30.0 | −4.7 | −8.1 | −3.9 | −5.7 |
| *p* value | 0.045 | 0.38 | 0.17 | 0.38 | 0.057 |
| With care management fees | | | | | |
| Treatment-control difference ($) | −293 | 66 | 131 | 61 | 55 |
| 90% CI ($) | −626, 40 | −143, 274 | −1, 263 | −123, 246 | −51, 162 |
| Percent difference | −21.5 | 2.8 | 9.6 | 2.4 | 2.6 |
| *p* value | 0.15 | 0.61 | 0.10 | 0.59 | 0.39 |

**SOURCE** Authors' calculations based on data from Medicare Enrollment Database, National Claims History File, and Standard Analytic File. **NOTES** *High risk* was defined as patients who, at the time of enrollment, met the criteria for the fourth subgroup in Exhibit 1. PBPM is per beneficiary per month. CI is confidence interval.

ciaries met the subgroup criteria—as well as 32 percent during the three years after meeting the criteria. The subgroup criteria had clinical face validity—that is, physicians would readily agree that their Medicare patients who met the criteria were at high risk of having a hospitalization in the coming year—and eligible patients could be easily identified with claims, patient self-reports, or physician referrals.

Our finding that the programs' effects on service use and spending were limited to high-risk subgroups of patients is consistent with several other studies of care coordination interventions.[11–13] Care management programs tailored to patients with congestive heart failure have reduced hospitalization rates for high-risk patients[14,17] but not for lower-risk patients.[5] And a transitional care program, which by design was limited to patients at risk because they had recently been hospitalized, had stronger impact for beneficiaries who had recently had multiple hospitalizations.[24]

Although the four programs in this study that reduced hospitalizations for high-risk enrollees shared many features, they differed on others and were implemented by four disparate organizations in four distinct settings, as described above. The success of the programs in these varied settings suggests that care coordination, if directed to the appropriate populations and designed correctly, could be successfully implemented for fee-for-service Medicare patients in diverse settings throughout the country.

Notably, the seven other care coordination programs participating in the demonstration from 2002 through 2008 did not reduce hospitalizations or regular Medicare expenditures for the high-risk group; in fact, one increased expenditures. Thus, focusing on high-risk patients alone does not guarantee success.

**DISTINGUISHING FEATURES OF SUCCESSFUL PROGRAMS** Drawing on the information collected on a range of program features, we found six distinguishing features that were present in at least three of the four programs that reduced hospitalizations but were absent in all or most of the five unsuccessful programs for which we had complete data (Exhibit 4).

One common distinguishing feature was the amount of face-to-face contact between care coordinators and patients. Programs that succeeded in reducing hospitalizations had more frequent in-person contacts—about once a month, on average, during the first year—either in the patient's home or physician's office. These were in addition to telephonic contacts.

Opportunities for occasional face-to-face contact between care coordinators and their pa-

tients' physicians helped improve communications and trust. For example, care coordinators in successful programs tended to be located in buildings or campuses where the patients' physicians delivered care, and to talk with the physicians when accompanying patients on office visits, or when physicians visited their hospitalized patients. Assigning all of a physician's patients to the same care coordinator also was more often a feature of the successful programs than the unsuccessful ones and contributed to physicians' willingness to work with care coordinators.

In all four effective programs, the care coordinator served as a communications hub, making sure that all providers had key information about patients from other providers. In contrast, coordinators played this role in only two of the ineffective programs. The coordinators made few demands on physicians' time but kept them informed of patients' failure to adhere to medication regimens and any deterioration in patients' condition between office visits.

Another distinguishing approach was the presence of strong, evidence-based patient education intervention. The education interventions in the programs at Health Quality Partners and Mercy Medical Center were among the top three when all fifteen programs were rated in the original evaluation.[18,20] Programs taught patients about their diseases, how to recognize symptoms, and other recommended self-care issues, including adherence to diet and exercise regimens and condition-specific self-monitoring, such as weighing oneself daily, measuring blood pressure, and measuring blood sugar (for patients with diabetes). Three of the effective programs trained care coordinators in behavior-change techniques and motivational interviewing and used the techniques consistently, whereas only one ineffective program did so.

The four effective programs had comprehensive medication management, built on reliable sources of information about patients' medications and ready access to pharmacists or the program's medical director to address problems. Only successful programs had significant effects on the proportion of surveyed beneficiaries reporting that someone had taught them how to take medications correctly.

A timely, comprehensive response to transitions between care settings—most notably, transitions from hospitals—was another distinguishing feature. This was less systematic and protocol-driven than some proven transitional care models.[14–16] However, three of the four programs that reduced hospitalizations had mechanisms to inform care coordinators quickly when a patient was hospitalized and a process for them to develop a comprehensive transition plan.

**EXHIBIT 4**

**Features Distinguishing Four Programs That Reduced Hospitalizations For High-Risk Enrollees**

| Feature | Number of programs with feature: Among 4 programs that reduced hospitalizations | Among 5 programs that did not |
|---|---|---|
| Face-to-face patient contact: more than 0.9 per month (based on data from first year of programs) | 3 | 1 |
| Physician engagement and cooperation | | |
| Care coordinators located near physicians, attended patient appointments, or saw physicians on hospital rounds | 4 | 1 |
| Physician works with just 1 care coordinator | 3 | 2 |
| Paid physician | 0 | 4 |
| Care coordinator had "communications hub" role with physicians | 4 | 2 |
| Patient education: used behavior change model in addition to providing factual information | 3 | 1 |
| Transition management—care coordinators: | | |
| Usually had timely notification of an admission to hospital/emergency department | 3 | 3 |
| Contacted patient during hospitalization | 4 | 1 |
| Requested copy of patient discharge instructions | 3 | 1 |
| Used transition protocol and monitored for consistent use | 2 | 0 |
| Medication management | | |
| Had information about medications from source other than patient | 4 | 1 |
| Consulted with pharmacist or program medical director when medication problems arose | 4 | 2 |

**SOURCE** Authors' analysis. **NOTE** These nine programs responded to a February 2009 e-mail request for more information on specific program features.

Care coordinators communicated with hospital staff during admission about the patient's current diagnoses, medications, and relevant psychosocial issues; visited and assessed patients in person while in the hospital; reviewed discharge instructions and medications; contacted patients after they returned home; and ensured that patients made and kept follow-up appointments with their physicians after discharge.

**IMPLICATIONS** Our study has important, evidence-based implications for how policy makers and program operators can design a care coordination program that should be more likely to succeed than earlier efforts.

The first major implication is that offering such programs to beneficiaries receiving fee-for-service care can reduce hospitalizations over multiple years if they are directed at individuals with a high risk of near-term hospitalization.

The high-risk subgroup that we found to yield the most consistent findings across programs and to capture a sizable proportion of Medicare beneficiaries and total Medicare expenditures included both beneficiaries who had both a common, high-risk chronic condition (congestive heart failure, coronary artery disease, or chronic obstructive pulmonary disease) and a hospitalization in the past year and beneficiaries with one or more of nine other chronic conditions and two or more hospitalizations in the previous two years. This subgroup is not the only one for which impacts are possible—the key is that the definition correctly identifies people who are expected to have a consistently high rate of hospitalizations (at least one per year) over the next few years.

The patients our definition labels as high-risk enrollees are easily identified and constituted 17 percent of the Medicare population in 2005, accounting for a disproportionate 37 percent of total Medicare spending in the calendar year after meeting the high-risk definition (2006) and 32 percent of Medicare spending in the three years after meeting the definition (2006–08). Thus, deploying these interventions to similar beneficiaries around the country could greatly reduce national Medicare spending for hospitalization.

The second major implication is that programs are more likely to reduce hospitalizations if they employ six specific approaches, described below. A program with these features can succeed in urban or rural settings and in a range of organizational settings. At the same time, the different settings in which programs operate and the many components (and combinations of components) of care coordination make it difficult to determine whether some are necessary and sufficient features for success.

Nonetheless, our comparison of the four demonstration programs that reduced hospitalizations for high-risk patients to the programs that did not suggests that care coordinators should have frequent face-to-face contact with patients during their first year to establish trust; have occasional face-to-face contact with patients' physicians to improve communications and collaboration; serve as a communications hub, making sure that all providers have key information about the patient from other providers; use behavior-change techniques and motivational interviewing to help patients follow recommendations concerning medication, behavior, and self-care; have reliable information about patients' medications and ready access to pharmacists or the program's medical director to address problems; and implement a comprehensive approach to transitions from hospital to home. This last approach should include receiving early notification when a patient is hospitalized, supporting the patient during transition between different care settings, and encouraging the patient to make and keep follow-up physician appointments.

The third implication is that generating net savings for Medicare will require modest fees and increased effectiveness. The observed reductions in hospitalizations generated sufficient savings to cover monthly fees for care coordination only if fees had been roughly $125–$150 per member (during the 2002–08 period). Thus, programs must find cost-effective ways to deliver their interventions. Whether provided as a fee-based independent intervention like the demonstration programs or built into capitated programs such as managed care plans or accountable care organizations, such effects should be achievable. Regardless of the setting, the costs for care coordination for this high-risk group will have to be kept to this range in order to yield net savings.

Finally, programs need to build on the lessons in this article and their own experiences to find ways to enhance their effectiveness. The demonstration program with the largest effects, at Health Quality Partners, was very data-driven, tracking care coordinators' performance and continually assessing the effectiveness of newly introduced intervention components and refinements to existing ones. Another program, at Washington University, discussed in a separate article in this month's issue of *Health Affairs,* fundamentally changed its nature after four years, resulting in much larger impacts on Medicare spending while actually decreasing its costs for delivering the intervention.[25]

We believe these implications for Medicare coordinated care programs and policy makers are applicable whether medical homes, accountable care organizations, communities, or payers implement the programs. Achieving net savings will not be easy, but these findings suggest that it is possible with the proper targeting, program design, and fee structure. ■

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## NOTES


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# ABOUT THE AUTHORS: RANDALL S. BROWN, DEBORAH PEIKES, GREG PETERSON, JENNIFER SCHORE & CAROL M. RAZAFINDRAKOTO

**Randall S. Brown** is vice president and director of health research at Mathematica Policy Research.

In this month's *Health Affairs*, Randall Brown and colleagues report on their examination of Medicare Coordinated Care Demonstration projects to isolate what factors were most successful in reducing hospitalizations among Medicare beneficiaries at high risk. Among the most important features were having care coordinators supplement their telephone calls to patients with frequent in-person visits and provide comprehensive medication management, patient education, and transitional care. Although they did not generate savings, they reduced hospitalizations without increasing total costs. These features should be incorporated into medical homes, accountable care organizations, and other policy initiatives, and more cost-effective ways should be found to deliver the services, the authors write.

Brown is vice president and director of health research at Mathematica Policy Research, specializing in studies of care coordination and long-term care. He is principal investigator of the Money Follows the Person long-term care support program evaluation and directs the federally funded Center of Excellence for Disability Research.

For the disability program, Brown oversees ten independent studies of interventions designed to improve the lives of "dual eligibles" and others with disabilities. He serves on the AcademyHealth Methods Council, and he holds a doctorate in economics from the University of Wisconsin.

**Deborah Peikes** is a senior researcher at Mathematica Policy Research.

A senior researcher at Mathematica, Deborah Peikes is an expert on evaluating care coordination interventions for people with chronic illnesses as well as the patient-centered medical home model of primary care. She led the impact analysis of CMS's Medicare Coordinated Care Demonstration—the subject of this article in *Health Affairs*—and leads CMS's current evaluation of one of the demonstrations in that program. In 2010 Peikes and Brown received "best paper" awards from the National Institute for Health Care Management and AcademyHealth for an article about the care coordination demonstration. Peikes holds a master's degree in public affairs, with a concentration in economic policy, and a doctorate in public policy, both from Princeton University.

**Greg Peterson** is a health researcher at Mathematica Policy Research.

Greg Peterson is a health researcher at Mathematica Policy Research, specializing in payment reform, chronic care management, long-term care, and the quality of care for Medicare and Medicaid recipients. He is a co–principal investigator for the ongoing evaluation of the Medicare Coordinated Care Demonstration, and he is heading a study for the Center of Excellence for Research on Disability on the impacts of waiting periods for Medicaid home and community-based services.

Peterson earned a master's degree in public affairs from Princeton University and is a doctoral candidate at the George Washington University.

Now retired, Jennifer Schore was a senior health researcher specializing in long-term care and qualitative studies of care coordination issues. She earned a master's degree in social work at Rutgers University.

**Carol M. Razafindrakoto** is a senior systems analyst at Mathematica Policy Research.

Carol Razafindrakoto is a senior systems analyst at Mathematica Policy Research who works on health, education, employment, and welfare studies. Recently, he processed and analyzed data pertaining to Medicare and Medicaid populations, particularly people with chronic illnesses. He earned a master's degree in epidemiology from the University of Wisconsin.