

Care Management Improves Total Cost of Care for Patients With Dementia

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As the number of individuals 65 years and older in the US balloons, dementia-related health care costs are expected to exceed \$345 billion.¹ Several former US surgeons general published an opinion article in 2019 declaring, “Dementia is our top public health crisis.”² From 2000 to 2019, global dementia expenditures increased 4.5% annually, and economic models project it will eventually represent 11% of all health care spending.³ The Milken Institute report for 2022 showed that total health care costs for individuals with dementia were almost quadruple the costs of those without dementia.⁴ Additionally, this public health crisis is not evenly distributed among the general population. It is estimated that by 2060, Hispanic and non-Hispanic Black patients will experience the most dramatic increases compared with non-Hispanic White patients.⁵

Tools to combat this growing crisis have thus far been sparse. Whereas other expensive chronic conditions have a range of treatment solutions, patients with dementia are still without treatments that significantly improve or modify disease course. Recent developments with anti-amyloid therapeutics, such as aducanumab⁶ and lecanemab,⁷ are, unfortunately, not without controversy^{8,9} as to clinical efficacy.

To meet the growing needs of patients with dementia and their caregivers along with the dramatic rise in costs of care—much of which is due to avoidable inpatient care^{10,11}—various collaborative care management programs for dementia have been developed.¹² The University of California, Los Angeles, created the Alzheimer’s and Dementia Care Program based on a fee-for-service and comanagement model, in which a nurse practitioner partners with physicians and community resources to coordinate dementia care.^{13,14} The Healthy Aging Brain Center in Indianapolis, Indiana, offers multiphased care by completing a full diagnostic workup in the initial visit, followed by as-needed check-ins provided by a dementia social worker and a registered nurse.^{15,16} The Care Ecosystem, initially launched by the University of California, San Francisco, and now implemented at more than 20 sites nationwide, provides telephone-based dementia care by unlicensed, specially trained care navigators working within a multidisciplinary clinical team.¹⁷

ABSTRACT

OBJECTIVES: To examine a 12-month dementia care management program’s effect on health care cost, utilization, and overall return on investment in a Medicare managed care population.

STUDY DESIGN: Pre-post analysis of participants (n = 121) enrolled in Ochsner’s Care Ecosystem program from 2019 through 2021 compared with propensity-matched controls (n = 121). The primary outcome comparison was total cost of care. Secondary outcomes included components of total cost of care (eg, inpatient, outpatient, emergency department [ED] costs), health care utilization (eg, number of ED visits), and differences in Hierarchical Condition Category (HCC) risk scores.

METHODS: Difference-in-differences analyses were conducted from baseline through 12 months comparing various financial metrics and utilization between groups.

RESULTS: Care Ecosystem participants had significantly lower total cost of care at 12 months, mean savings of \$475.80 per member per month compared with controls. Care Ecosystem participants had fewer ED, outpatient, and professional visits. HCC risk scores were also better relative to matched controls.

CONCLUSIONS: A collaborative dementia care program demonstrated significant financial benefit in a managed Medicare population.

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Although dementia care programs meet critical clinical needs,¹⁸⁻²⁰ the financial value must be reliably demonstrated to scale in resource-strapped health systems. Historically, financial and utilization reduction metric results have been primarily within a fee-for-service (FFS) payment environment and shown mixed results. Some programs have demonstrated financial value,¹⁶ whereas most others reported modest results around cost and subsequent utilization.²¹⁻²⁴ As the health care landscape evolves, there has been an increase in capitated, rather than FFS, payment plans. Such plans provide health care systems with a fixed amount of money per patient per year based on each patient's likely cost of care.²⁵ Payments for each patient are calculated via a risk score generated based on various patient information, particularly Hierarchical Condition Category (HCC) scores. That is, patients with certain conditions (or more expensive conditions) reliably documented in the electronic health record (EHR) will generate a higher payment because that patient is predicted to cost more.²⁶ Thus, accurate and consistent documentation of dementia in the EHR can directly impact revenue to a health system.

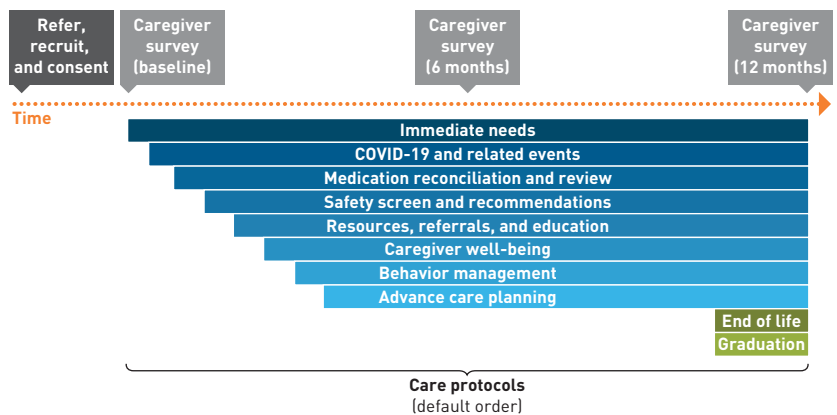
One reason for a less robust program return on investment (ROI) for dementia care involves patient risk stratification. Risk stratification is the process by which health data (medical history, particularly certain conditions and frequency of avoidable inpatient care) are used to proactively identify patients with very high health care utilization and expense that are often unnecessary.²⁷ Health systems can then proactively target specific patient populations to improve health and reduce unnecessary and costly care utilization.²⁸

Despite the critical importance of risk stratification in showing financial value, most of the collaborative dementia care programs mentioned earlier did not target and enroll patients using risk stratification. Consequently, this limited their ability to significantly impact cost and utilization end points—metrics that are often the most critical to scale programs in underresourced health systems. In one very large outpatient complex care management study, Price-Haywood et al noted significant reductions in utilization and cost of care only after employing a risk-stratification approach to patient enrollment.²⁹ Specifically, they noted that "...programs targeting high-need, high-cost patients must critically assess alignment of program objectives with identification of the population at risk."²⁹ In other words, care management programs seeking to demonstrate cost of care/utilization improvement must identify patients who can actually be impacted by the intervention.

TAKEAWAY POINTS

- ▶ Despite the growing number of managed Medicare beneficiaries with Alzheimer disease and related dementias, most studies examining the financial value of dementia care management programs have been in Medicare fee-for-service populations.
- ▶ After receiving a 12-month collaborative dementia care management program, participants had significantly improved total cost of care relative to a propensity-matched control group. Mean cost savings were \$475.80 per member per month or \$5709.60 annually per member.
- ▶ Dementia care management participants also had lower emergency department, outpatient, and professional utilization. After factoring in program cost, the return on investment was strong at 5.85.

FIGURE 1. The Care Ecosystem Model



Source: Adapted from Possin et al.³⁰

METHODS

Clinical Program

The Care Ecosystem program is a collaborative care model specifically designed for patients with dementia and their caregivers (together termed *dyads*).³⁰ The Care Ecosystem program is now implemented in 20 health systems across the US. In the context of a multidisciplinary team of dementia specialists, care is primarily provided by an unlicensed, specially trained care team navigator (CTN). The dementia CTN, supervised by licensed clinicians, conducts initial care assessment/plans for the dyad and provides telehealth support to the caregiver. Licensed clinical team members include a clinical neuropsychologist, a neurology nurse practitioner, and a clinical pharmacist. The program is designed to provide proactive support to overwhelmed caregivers via monthly scheduled telehealth visits addressing needs particular to that dyad (eg, management of challenging behaviors, caregiver education, medication reconciliation, advance care planning, caregiver burden). Caregivers can call their CTN anytime during regular business hours or the 24-hour nursing line. Participating dyads are enrolled for 1 year, with as-needed involvement after graduation. **Figure 1**³⁰ depicts the program model and care protocols.

TABLE 1. Baseline Demographic Characteristics of Ochsner Care Ecosystem Participants (n = 121) and the Matched Comparison Group (n = 121)

Variables	Care Ecosystem group (n = 121)	Matched comparison group (n = 121)
Age in years, mean (SD)	79.9 (8.2)	80.2 (9.1)
Sex, n (%)		
Female	71 (58.7%)	69 (57.1%)
Male	50 (41.3%)	52 (42.9%)
Race, n (%)		
African American	37 (30.5%)	45 (37.1%)
White	81 (66.9%)	72 (59.5%)
Other/refused	3 (2.5%)	4 (3.3%)
HCC risk score, mean (SD)	1.76 (1.03)	1.67 (0.98)
Baseline PMPM total cost of care, mean (SD)	\$1151 (\$1268)	\$1059 (\$1192)

HCC, Hierarchical Condition Category; PMPM, per member per month.

Source: Ochsner data, Epic (electronic health record) and Milliman (claims).

Study Design

This study was a pre-post analysis of participants enrolled in the Care Ecosystem program of Ochsner Health System in Louisiana from 2019 through 2021 compared with propensity-matched controls. The study was approved by the Ochsner Health Institutional Review Board. Participants or their legally authorized representatives provided informed consent prior to enrollment.

Study Population

Participants in Ochsner's Care Ecosystem program had to have received a diagnosis of dementia, be 55 years or older, live in the community, have a designated caregiver agreeing to also enroll in the program, live in Louisiana, and have had at least 1 emergency department (ED) visit or hospitalization in the 12 months prior to enrollment. Dyads were primarily recruited through direct physician referrals (eg, primary care, neuropsychologist, neurologist, and palliative care providers) and EHR chart review. Initial recruitment phone calls were made to 370 eligible dyads. Although we did not categorize specific reasons, approximately 28% did not enroll in Care Ecosystem after the recruitment phone call.

A total of 270 participants enrolled in Care Ecosystem from 2019 through 2021. Of those, 91 were withdrawn before the 12-month program was completed. Reasons were the following: (1) lost to follow-up (n = 38), (2) deceased (n = 31), (3) nursing home or assisted living facility placement (n = 19), and (4) voluntary withdrawal (n = 3). The remaining 179 dyads completed the 12-month program, with 121 (68%) having full claims data available for the 12-month pre- and postprogram financial analysis.

The control group (n = 121) was selected through propensity matching (1:1) using the nearest neighbor algorithm and the intervention inclusion criteria. The comparison cohort was matched by age, sex, race, ethnicity, number of chronic conditions, number of ED visits, composite risk score (risk of visiting the ED or being

admitted to the hospital within the next year), and baseline per-member per-month (PMPM) cost.

Data Sources and Outcome Measures

Sociodemographic and clinical data points were extracted using Clarity (an Epic reporting database tool). Insurance claims data were collected from Milliman MedInsight to obtain health care cost and utilization measures. Participant enrollment date was used to establish data collection time periods. Baseline data were health care costs and utilization 1 year prior to enrollment date, and postintervention data were gathered at program completion (1 year after enrollment date). A matching pseudoenrollment date was set for the control cohort during the same enrollment period of the participants. This was done to account for potential cohort effects, particularly during the COVID-19 pandemic.

The primary effectiveness outcome was based on total PMPM cost during 12 months of enrollment. Secondary outcomes included specific categories of PMPM costs and utilization including inpatient (IP), ED, outpatient (OP), professional (PROF), pharmacy (RX), and ancillary (ANC) services. These 6 defined areas are based on the Milliman Health Cost Guidelines, which place discrete health expenses into predefined groups for utilization reporting. Along with the total cost of care, we also examined the potential financial impact of risk score adjustments during 12 months of enrollment for both groups.

Statistical Analysis

Prior to the analysis, we needed to account for the common problem of skewed cost distributions,³¹ especially high-cost outliers (ie, ± 3 SD from mean total PMPM cost). The intervention group had 5 outliers, and the propensity-matched control group had 7 outliers. We used winsorization to address outlier observations. Winsorization specifies a threshold and then transforms outliers so that their values (eg, total PMPM cost) are set to the specified threshold rather than excluding them entirely.³² Essentially, for the outliers, total PMPM cost is lowered and substituted with the highest value that is not an outlier. The postintervention cost PMPM threshold was \$4249.56, and the preintervention cost PMPM threshold was \$3691.28.

Continuous (cost and utilization) variables were compared 1 year pre- and 1 year post the index date for each group. Difference-in-differences (DID) analyses were employed to look at longitudinal changes in variables for each group. Before-and-after bivariate analysis used an independent sample *t* test to determine statistical significance (95% CI or $P < .05$).

RESULTS

Baseline demographic and cost/utilization data for the intervention and propensity-matched control groups are summarized in **Table 1**. Overall, our sample was predominantly female (intervention, 58.7%; control, 57.1%), White (intervention, 66.9%; control, 60.3%), and non-Hispanic (intervention, 97.5%; control, 96.6%).

Primary Outcome: Total Cost of Care

At baseline and after outlier adjustment, mean total PMPM cost of care for the Care Ecosystem group was \$1151 and for the matched comparison group was \$1058. After the 12-month intervention, the Care Ecosystem group's mean total cost of care increased by \$25.20 PMPM, whereas the matched comparison group increased by \$501 PMPM. The DID was significant (Figure 2), yielding estimated PMPM savings of \$475.80 (\$5709.60 per member per year) for the Care Ecosystem participants.

Within overall cost of care, we performed DID analyses on specific areas of PMPM cost including IP, ED, OP, PROF, ANC, and RX. At 12 months, Care Ecosystem participants had significant savings compared with controls for ED cost (\$27.46 PMPM saved), OP cost (\$233.46 PMPM saved), and PROF cost (\$139.74 PMPM saved). IP, ANC, and RX PMPM costs were not significantly different between groups (Table 2).

Secondary Outcomes: Utilization and HCC Risk

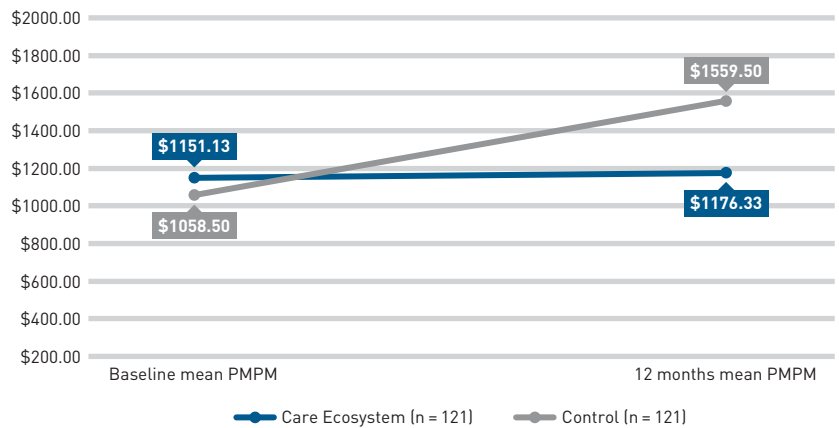
Health care utilization and HCC risk score differences were also analyzed (Table 2). Care Ecosystem had a significant effect on certain types of utilization at 12 months. Intervention participants had lower ED (−0.87 vs −0.05), OP (−3.41 vs +2.27), and PROF (−2.36 vs +4.78) services utilization (Table 2). Overall utilization (and specifically, IP utilization) was not significantly different. Last, we compared changes in HCC risk score calculation from baseline for both groups. Results indicated that Care Ecosystem participants' HCC risk scores increased by 0.341, whereas the control cohort's scores increased by 0.096. The DID was significant with an estimated net increase in HCC risk score of 0.245.

ROI Calculation

ROI is a financial ratio that communicates an investment's potential profitability. The calculation involves the net financial benefit of the program divided by the program cost (Table 3). Program cost factored in the following: 1 full-time CTN per 75 dyads, a fixed percentage of time allocated for non–full-time staff (eg, program coordinator, neuropsychologist, nurse practitioner), a per diem rate for the clinical pharmacist, and an organizational rate for facilities and administrative costs. Mean PMPM cost was \$81.28, or \$118,018.56 for 121 members over 12 months.

Estimated financial benefits included cost of care savings and improved risk payments significantly different from those of the matched controls (Table 3). Because estimated financial benefits represent an average of PMPM benefits, the actual financial benefits can vary significantly within health systems. Specifically, health systems have shared risk arrangements that result in different contractual savings discounts by each capitated payer. This can

FIGURE 2. Mean PMPM Total Cost of Care at Baseline and 12 Months After Enrollment



PMPM, per member per month.

Source: Ochsner data, Epic [electronic health record] and Milliman [claims].

yield more or less savings depending on the insurance payer's tolerance for risk. After factoring in our health system's blend of payers and adjusting for contracted savings discounts, the total financial benefit over 12 months was \$808,175.40. When considering program cost and adjusted financial benefits, ROI remained quite strong at 5.85 (Table 3).

DISCUSSION

This investigation of a collaborative dementia care program within an entirely value-based care population demonstrates very favorable cost and utilization outcomes and overall ROI. Dementia care management services provided over 12 months resulted in minimal cost/utilization growth for the intervention group. More importantly, when compared with a closely matched control group, the Care Ecosystem participants' total cost of care was \$475 lower PMPM, or \$5700 per member per year. Additional cost savings were also evident in ED PMPM costs (\$27 lower per month), OP PMPM costs (\$233 lower per month), and PROF PMPM costs (\$139 lower per month). Although IP cost/utilization was not improved, there were overall fewer visits to the ED and other sites of care in the intervention group.

This study's results build on prior dementia care management research¹⁶ but show relatively better findings within various cost metrics. A core reason for this is likely our use of a population stratification model³³ to prioritize and enroll patients. Specifically, our program selected patients whose care needs—such as higher ED and IP utilization—matched a key program objective: reducing health care utilization/expense by helping caregivers avoid unnecessary ED visits and hospitalizations. Carefully matching patient needs with program goals is particularly important when assessing the financial performance of a care management program. Enrolling patients with low utilization/cost in a program designed to reduce

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TABLE 2. Cost, Utilization, and Risk Score DID Analysis at 12 Months for Ochsner Care Ecosystem and Usual Care Groups

Variables	Care Ecosystem group (n = 121)		Matched comparison group (n = 121)		DID
	PMPM cost preintervention	PMPM cost post intervention	PMPM cost preintervention	PMPM cost post intervention	
Cost variables					
All costs	\$1151.13	\$1176.33	\$1058.50	\$1559.50	-\$475.80*
IP cost	\$330.17	\$387.00	\$314.50	\$526.25	-\$154.92
ED cost	\$50.26	\$26.09	\$29.91	\$33.20	-\$27.46**
OP cost	\$323.00	\$186.94	\$246.58	\$343.98	-\$233.46**
PROF cost	\$243.83	\$210.93	\$230.33	\$337.17	-\$139.74**
ANC cost	\$108.19	\$204.83	\$82.86	\$144.57	\$34.93
RX cost	\$96.35	\$94.96	\$114.30	\$118.19	-\$5.28
Utilization variables	Mean preintervention	Mean post intervention	Mean preintervention	Mean post intervention	DID
All visits	50.5	53.4	54.05	63.3	-6.35
IP visits	0.45	0.36	0.55	0.64	-0.18
ED visits	1.63	0.76	0.85	0.8	-0.82**
OP visits	15.88	12.47	13.94	16.21	-5.68**
PROF visits	23.26	20.9	21.93	26.71	-7.14**
ANC visits	14.15	17.21	12.67	16.07	-0.34
Risk score	Mean preintervention	Mean post intervention	Mean preintervention	Mean post intervention	DID
HCC risk score change	1.762	2.103	1.676	1.772	0.245**

ANC, ancillary services; DID, difference-in-differences; ED, emergency department; HCC, Hierarchical Condition Category; IP, inpatient; OP, outpatient; PMPM, per member per month; PROF, professional services; RX, pharmacy.

* $P < .05$; ** $P < .01$.

Source: Ochsner data, Epic (electronic health record) and Milliman (claims).

TABLE 3. Care Ecosystem Net Savings and ROI^a

Variables	PMPM	Annual per member	Totals (n = 121)	Adjusted totals (n = 121)
Program benefits				
Cost of care savings	\$475.80	\$5709.60	\$690,861.60	\$572,387.40
Risk payment improvement	\$196.00	\$2352.00	\$284,592.00	\$235,788.00
Total benefits	—	—	—	\$808,175.40
Cost				
Total program cost	\$81.28	\$975.36	\$118,018.56	—
Total benefit after cost and adjustments ^b	\$475.31	\$5703.78	—	\$690,156.84

PMPM, per member per month; ROI, return on investment.

^aROI = 5.85 [ie, \$690,156.84 / \$118,018.56].

^bAdjusted cost of care benefits minus program cost.

Source: Ochsner data, Epic (electronic health record) and Milliman (claims).

Turning now to total financial benefit, this is the first dementia care management study to our knowledge showing significant ROI (Table 3) within a fully capitated patient population. In reviewing our ROI calculation, we find 2 important considerations for dementia care management programs when calculating total financial value: cost savings and revenue generation.

For most care management programs, the chief financial performance metric is usually reducing total cost of care. Dementia, unlike many other chronic conditions, occurs later in life (generally after age 75 years) and worsens over time. Total cost of care, in turn, increases annually.¹¹ As a result, reducing the overall cost of care is more challenging relative to other conditions. Instead, demonstrating what costs would have been without care management—as with our financial analysis—may be a better financial metric when calculating ROI in this population.

Aside from using total cost of care when determining ROI, we also explored whether Care Ecosystem generated additional financial value in the form of increased revenue based on improved coding/documentation. At baseline, Care Ecosystem patients and matched controls had similar mean HCC risk scores (1.76 and 1.68, respectively). After 12 months of care management, Care Ecosystem patients had significantly higher risk scores (Table 2) even though the matched control group had much higher costs of care. This resulted in significant additional revenue because our program has ongoing documentation about a patient's dementia diagnosis, which critically factors into a patient's risk score and, subsequently, payment amounts for health systems. This is an important addition to determining care management ROI because dementia is inconsistently addressed and documented in primary care³⁴ despite significant financial consequences for health systems.³⁵

Limitations

Several study elements may limit generalizability, including (1) lack of randomization,

utilization and cost is unlikely to show benefit regardless of the program's efficacy. Future dementia care management programs aiming to show utilization/cost benefit should enroll patients who need a reduction in these metrics.

(2) data that are limited to a single health care organization in a single geographic area and may not be similar to other regions or systems, and (3) the exclusive inclusion of participants for whom we can access all health care claims data, which is largely determined

by insurance carrier. As an individual's insurance carrier can be linked to socioeconomic status and other important demographic and regional variables, there may be differential patterns of health care utilization, clinical need, and potential for program benefit in populations with different insurance carriers, again potentially limiting the generalizability of our findings even within the same geographic area. Although our control group was pulled from the EHR and was not composed of individuals who declined program enrollment, there still may be important differences between dyads who were flagged for inclusion by referring doctors and those who were not, including fewer unmet caregiving needs. Specific interventions are not standard across participants, instead being designed to vary according to their clinical needs, and as such this analysis does not provide information about which program elements drive change in cost. Finally, our program tracks outcomes only to 12 months, so we do not know whether the observed benefit and cost savings are sustained after dyads graduate. A program capable of sustained benefit post enrollment can produce much higher cost savings than a program requiring continuous enrollment.

CONCLUSIONS

After more than a decade of research into dementia care management, we further highlight the financial viability of dementia care support programs. Future analyses must also examine the durability of financial benefit past 12 months along with exploring additional financial benefits, such as improved health care utilization in caregivers. ■

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