

Original Investigation

Making It Safe to Grow Old: A Financial
Simulation Model for Launching MediCaring
Communities for Frail Elderly Medicare
Beneficiaries

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Policy Points:

- At age 65, the average man and woman can respectively expect 1.5 years and 2.5 years of requiring daily help with “activities of daily living.” Available services fail to match frail elders’ needs, thereby routinely generating errors, unreliability, unwanted services, unmet needs, and high costs.
- The number of elderly Medicare beneficiaries likely to be frail will triple between 2000 and 2050. Low retirement savings, rising medical and long-term care costs, and declining family caregiver availability portend gaps in badly needed services.
- The financial simulation reported here for 4 diverse MediCaring Communities shows lower per capita costs. Program savings are substantial and can improve coverage and function of local supportive services within current overall Medicare spending levels.

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Context: The Altarum Institute Center for Elder Care and Advanced Illness has developed a reform model, MediCaring Communities, to improve services for frail elderly Medicare beneficiaries through longitudinal care planning, better-coordinated and more desirable medical and social services, and local monitoring and management of a community's quality and supply of services. This study uses financial simulation to determine whether communities could implement the model within current Medicare and Medicaid spending levels, an important consideration to enable development and broad implementation.

Methods: The financial simulation for MediCaring Communities uses 4 diverse communities chosen for adequate size, varying health care delivery systems, and ability to implement reforms and generate data rapidly: Akron, Ohio; Milwaukie, Oregon; northeastern Queens, New York; and Williamsburg, Virginia. For each community, leaders contributed baseline population and program effect estimates that reflected projections from reported research to build the model.

Findings: The simulation projected third-year savings between \$269 and \$537 per beneficiary per month and cumulative returns on investment between 75% and 165%.

Conclusions: The MediCaring Communities financial simulation demonstrates that better care at lower cost for frail elderly Medicare beneficiaries is possible within current financing levels. Long-term success of the initiative will require reinvestment of Medicare savings to bolster nonmedical supportive services in the community. Successful implementation will necessitate waiving certain regulations and developing new infrastructure in pilot communities. This financial simulation methodology will help leadership in other communities to project fiscal performance. Since the MediCaring Communities model also achieves the Centers for Medicare and Medicaid Services' vision for care for frail elders (better care, healthier people, smarter spending) and since these reforms can proceed with limited waivers from Medicare, willing communities should explore implementation and share best practices about how to achieve fundamental service delivery changes that can meet the challenges of a much older population in the 21st century.

Keywords: frail elderly, Medicare, long-term care, financing.

JUST HALF A CENTURY AGO, VERY FEW ELDERLY PEOPLE LIVED long enough to become frail in old age or to survive long with dementia, and those few relied on family, charity, or locally supported facilities and services. Most families still included women at home who were expected to care for relatives. As late as 1965, when

Medicare, Medicaid, and the Older Americans Act were enacted, life expectancy was just 70.1 years of age.^{1,2} Causes of deaths, most of which were fairly abrupt, were primarily from strokes, heart attacks, infections, aggressive cancers, and injuries.³ Many physicians and surgeons did not think it appropriate to put frail or cognitively impaired elders through aggressive medical treatment.⁴

Enhanced prevention, healthier working environments, and provision of medical and surgical treatments into advanced age have given today's average 65-year-old 20.9 additional years of life.¹ Now, as the population largely avoids rapidly fatal events, Americans will instead experience frailty (characterized by diminished strength, endurance, and physiologic resilience). More than a third of people over the age of 85 have cognitive failure, and incidence continues to increase with age.^{5,6} At age 65, the average man and woman can now respectively expect 1.5 years and 2.5 years of needing help every day for activities of daily living (ADLs), such as eating, toileting, transferring, and dressing.¹

Family caregiving, estimated to provide two-thirds of all personal care for frail and disabled individuals, is under substantial strain. Increasingly, family caregivers have activity limitations, or they must work to secure their own retirement. Families are smaller and more dispersed. Housing is often unsuitable to allow families to find room for frail relatives. Furthermore, frail elders depend on complicated medications, treatments, and devices that stretch the capabilities of untrained family members.

The costs associated with needing considerable medical, pharmaceutical, and surgical services, adapted housing, and substantial or continuous support make frailty the most expensive phase of life for most Americans. For those who live to age 85, about one-third of lifetime expenditures on health problems still lies ahead.⁷ Medicare costs are highest when close to death, averaging \$69,947 in the last 2 years of life.⁸ A couple at age 65 faces average lifetime out-of-pocket expenditures of \$63,000 for long-term care (LTC), which is not covered by Medicare or Medigap insurance, and 5% of couples will spend more than \$260,000.⁹

Beyond the challenges of financing services, the reliability and quality of medical care and social supports for frail elders and their families are sorely deficient. Frail elders frequently receive inappropriate medication combinations and are subject to overtreatment, excessive imaging and diagnostic studies, and treatment protocols that were designed for much younger people with long prognoses.¹⁰ Frail elders also suffer from

underdiagnosis of serious symptoms such as delirium and dementia, inattention to their personal priorities, and lack of access to reliable supportive personal care, safe housing, good nutrition, and opportunities for social engagement with meaningful activities.^{11,12}

The Future for Frail Elders

Unless substantial changes in service delivery are initiated soon and implemented over the next decade, these challenges will worsen, and attendant costs for both families and government-financed health care systems will explode. The number of people older than 85, which stands as an indicator of the numbers likely to be frail, will double by 2036 and triple by 2050 as the Boomer generation becomes frail.¹³ Between 2010 and 2050, the number of people with Alzheimer's disease will nearly triple as well.⁶

Demographics and economic circumstances affecting families will make caregiving much more challenging and much less likely to be sufficient to meet the coming needs for home-based support. Today, the ratio of people of working age to elders stands at 7:1; by 2050, it will be less than 3:1.¹⁴

Current initiatives to improve medical care and social supports are inadequate. The number of geriatricians and other providers being trained, for example, is actually declining, and training concerning frail elder care for primary care physicians is not keeping pace with the demands of a fast-aging population.¹⁵

Existing Reform Initiatives

Multiple targeted initiatives have shown how to improve medical care, social support, integrated care plans, and costs. However, they have proven difficult to sustain or replicate in the context of a market that encourages volume of medical services over quality and that keeps the budgets for social supports and for medical care entirely separate.¹⁶ For example, the Financial Alignment Initiatives in 12 states for dual eligibles offer some possibilities of improvement with integrated services and budgets. Another less formal example, the increasing presence of navigators and coordinators for persons with complex needs in managed care plans, may help to better coordinate social and medical services and to highlight shortcomings in supply or quality of

community-based services.¹⁷ Finally, the joint Medicare-Medicaid Program of All-Inclusive Care for the Elderly (PACE) provides care management and plans service delivery based on beneficiaries' needs through the work of interdisciplinary care teams. While it enjoys a good reputation for quality, cost outcomes (Medicaid capitation 28% below predicted fee-for-service payments), reliability, and comprehensiveness, the program has been very slow to replicate; it has grown to serve just 35,000 elders in its approximately 30-year history.¹⁸ Whether these and other recent endeavors will measurably improve the quality of services, reduce health care costs, and be sustained and scaled to the population level is not yet clear.

In summary, because the American health care system does not customize for the category of frail elders, the United States faces substantial challenges in providing for the period of frailty that most Americans will encounter toward the end of longer lives. Current initiatives are unlikely to be adequately transformative to enable a much larger population of frail elderly Medicare beneficiaries to count on living comfortably and meaningfully in late old age at a cost that their families and the nation can sustain. A reliable and efficient care system for frail elders needs to have a much broader and more integrated scope of services. It also needs to avoid wasting resources on unwanted and burdensome medical treatments and to use those resources to build capacity for personal care and medical services in the home. Support for family caregivers must also be buttressed and included among other priority needs. The MediCaring Communities model focuses on practical implementation of these reforms, and does so within the constraints of current financing.

The MediCaring Communities Model

To be effective, service provision for frail elders must address the experience of frailty with reliable, supportive services and a care plan that reflects the frail person's situation and priorities. To achieve those ends, supportive services and medical care must be integrated, and high-value support services must be substituted for low-value medical interventions, which should be used rarely. The evolving health care delivery system must tailor its mission, goals, procedures, and personnel training to reflect this cohort's emerging priorities.

The US context in 2016 offers some advantages on which to build. First, all Americans are at risk of becoming frail and perhaps many can

be mobilized in their own self-interest. Second, the nation currently bears much of the responsibility for medical services and for safety-net supportive services through Medicare, Medicaid, veterans programs, and the Older Americans Act. By extension, therefore, the community has already accepted substantial responsibility for elder care. Third, research projects and demonstrations have already shown improvements in quality and reliability of medical care at lower cost, though the rigidity of current financing and clinical arrangements has discouraged sustaining these gains or spreading them broadly. Fourth, the magnitude of the oncoming rise in the numbers of frail elders creates an urgent and unprecedented need to build a more cost-effective and clinically appropriate system; otherwise, communities may be forced to abandon elders by failing to provide basic services (such as personal care and home-delivered meals) or by allowing long-term care demands to impair the overall economy by diverting ever more resources to health care.

Some characteristics of frail elders help illuminate a path toward better resolutions. First, the experience of old age typically includes awareness of the finitude of life and a practical approach to what can be achieved. Compared to younger people, elders are often much more realistic about the eventuality of death and are willing to weigh what is really most important in their time left.¹⁹ Often the choice selected by elders is not to endure additional burdensome medical interventions that have only small chances of meaningful success. With good information and competent counseling, they frequently choose the less aggressive course of medical care.

Second, frailty imposes reliance on a smaller circle of nearby resources. Personal care cannot be done at a distance, and traveling for medical opinions and interventions becomes increasingly difficult as frailty worsens. Frail elderly people are therefore profoundly dependent upon their community and the services that a community-anchored system can deliver to a largely homebound population. A waiting list for home-delivered meals, for example, means that needy elders must make do with whatever they can arrange. Similarly, if no home care aides are trained to serve persons with dementia, the elder's family simply does not have the opportunity to choose home-based care. As a final example, if a community has required "universal design" in new construction for many years, elders will more often have adaptations like lighting, handrails, and wheelchair access that make it possible to age in place. This focus on the local community makes it appealing to put some measure of

Table 1. MediCaring Communities Model Elements

1. Frail elders enrolled in a geographic community (>65 years old with 2+ ADLs and/or dementia, or 80+ years old)
2. Longitudinal, person-driven care plans
3. Medical care tailored to frail elders (including at home)
4. Incorporating health, social, and supportive services
5. Monitoring and improvement guided by a community board
6. Core funding derived from shared savings from current medical overuse

management and control of the service delivery system in the hands of individuals responsible for the community or region, rather than leaving the system mostly unmanaged, answering only to business opportunities and state and federal rules.

These considerations give rise to the proposed MediCaring Communities model, a conjoining of 6 key elements (Table 1), which can each be achieved in a variety of ways, depending on the community.²⁰⁻²² The model is not a single intervention or program; rather, it is designed to be tailored to meet the unique needs of each location in which it is implemented. The MediCaring Communities model calls for a more fundamental reform in work processes, management, workforce development, and financing than most reform proposals, which often focus on changing payment incentives within existing structures and workflows.

First, planners and reformers—and the public generally—need to see the period of frailty as a phase of life that calls for a different prioritization of services and supports than earlier phases, and many of those services and supports are anchored in the community rather than in the medical care delivery system. Second, each frail elderly person must be viewed as having his or her own unique medical and living situation and priorities, along with their family; thus, the plan for services (commonly called a “care plan”) has to match individual needs. Third, the standard of medical care must reflect optimal care for this cohort, including mobilizing services to the home, rather than relying on professional quality standards that are more appropriate for younger cohorts. Fourth, the supportive services needed at this point in life must be addressed and integrated in goal setting and budgeting. Fifth, the community must have an active

role in monitoring its own performance and establishing priorities for improvements and investments.

The sixth and final core element, a way to finance the reforms, is the subject of our simulation reported here. The MediCaring Communities model uses the savings that result from more efficient provision of medical and long-term care in order to enhance the community's LTC supports, manage the system, and monitor progress toward the community's goals. The MediCaring Communities reform does not envision that these savings would meet all supportive care needs—private payment for those who can independently afford services will continue. The reform would, however, meet the most critical needs of those with constrained resources and would facilitate community dialogue and action around unmet needs and priorities. With this reform, pioneering communities across the country can shape a sustainable and improved system for serving frail elders, and then other communities' health and social care systems can incorporate the lessons learned. Already, many communities have leadership actively building local quality dashboards, engendering coalitions, implementing improvements known from research, and creating financing arrangements to help start this work.

The legal and financial concepts at issue and the potential structures to build upon are fairly straightforward. One option would be to use an accountable care organization (ACO) structure, which would require waiving some extant ACO rules in order to allow a community to enroll only frail elders in a defined geographic area and to adhere to the community's input regarding implementing organizational and care delivery priorities. A second option would be to build on the PACE model, assuming rules that now require implementation of PACE services by PACE providers for each beneficiary were altered, sharing of savings with non-PACE providers were permitted, and rapid enrollment were enabled. PACE might usefully link with programs like Independence at Home or Home Based Primary Care in order to serve the broader population that has not yet spent down to Medicaid and those who are not eligible for nursing home care under their state's Medicaid program.^{23,24} A general Medicare Advantage plan could sponsor a MediCaring program, provided that the beneficiaries could enroll in any month, that investment in social supports were allowed, and that quality measures more appropriately reflected the priorities of frail elders. Additional avenues for implementation might include, for example, a State

Innovation Model grant or a global hospital budgeting system, as seen in Maryland.

Our study tests the question of whether a MediCaring approach could yield substantial savings—and therefore demonstrate solvency and reform—by using a pragmatic and conservative financial simulation. We initially developed this financial simulation model with leaders from 4 diverse communities as part of a joint proposal to the Center for Medicare and Medicaid Innovation (CMMI). As required by CMMI, the financial simulation model was reviewed and certified as having reasonable assumptions and documentation by an independent actuary; our analysis was certified by an actuary at Ernst & Young.

Methods

For the simulation, we selected 4 communities on the basis of adequate size, diverse medical market environments, and the ability to commit to estimating effects and implementing improvements quickly: Akron, Ohio; Milwaukie, Oregon; northeastern Queens, New York; and Williamsburg, Virginia. Each had a track record of innovating to improve care of frail elders and each had a working relationship between leaders of the network of community elder services and health care providers. Each site first developed its plan for achieving the core elements of a MediCaring Community. These plans differed in details, but all included enrollment strategies targeting frail elders, community organizing to generate data and build a coalition voice to set priorities, comprehensive care planning, improved geriatric medical care (including 24/7 clinician being on call with the care plan in hand and the ability to serve patients in their homes), improved availability of critical supportive services, and workforce recruitment and development. Each site contributed baseline data and program effect estimates that modified and expanded upon reported research, US Census data, and the Health and Retirement Study.

We projected savings over a 3-year period for each of the sites, applying estimates and modifications to a financial reporting framework developed by CMMI.²⁵ The financial simulation model uses estimates of baseline population and per beneficiary per month (PBPM) costs for each type of service and predicts program impact for each kind of service. It then estimates the post-intervention service costs annually and the

predicted net savings at each site using 3 categories of data: (1) predicted program enrollment; (2) pricing and utilization estimates at baseline, including services under Medicare and Medicaid and health care–related services paid out of pocket; and (3) program effects on utilization, leading to savings. The model explicitly assumed that MediCaring Communities would not affect the unit cost of services, but only the service mix. Added evaluation and start-up expenses, including quality measure development, standard setting, provider education, consumer activation, and collaboration, were omitted from overall savings to derive our final return on investment (ROI) estimates.

The simulation used 3 data sources: (1) estimates from research or national data not specific to particular communities; (2) estimates based on public data about the specific communities; and (3) community-specific estimates based on the experience of service providers in the participating communities.

We estimated the maximum number of frail elderly Medicare beneficiaries in each dominant hospital referral region encompassing the largest share of each community's Medicare population, starting with US Census data of the 65 and over population.²⁶ We included all older persons living in these areas, irrespective of their health insurance or any other characteristic, since the aim was to improve the services for the population of frail elders living in these communities. Analyses of the Health and Retirement Study showed that just under 10% of people 65 and older have 2 or more ADL dependencies,²⁷ so we used that estimate as the proportion of those 65 and older likely to be frail. We used dependency in 2 ADLs because this signals the onset of need for much more substantial attendance by a caregiver. This estimate includes some who have transient issues and excludes some who need constant attendance for cognitive failure without having become dependent in 2 ADLs, and we presumed that these inclusion/exclusion errors roughly balance. Other research confirms the validity of this estimate.²⁸⁻³⁰ We used this estimate of the prevalence of frailty in each geographic area as the upper bound for potential enrollment.

Each site provided its own estimate of enrollment for the first 3 years (April 2014-March 2017). Using past experience, the ceiling prevalence as calculated above, the experience of other teams, and the experience of research projects, site leaders estimated their likely rate of enrollment up to the 18th month, which was the target for starting steady state enrollment. The model used PBPM cost estimates in order to facilitate

quick measurement and review during program implementation. Using PBPM also reflects the fact that many start-up activities such as hiring, training, and developing quality measures are front-loaded. We also applied death³¹ and attrition³² rates to each site's population³³ to calculate total member months for each program for all 3 years of the proposed demonstration.

Baseline Payment and Utilization Estimates and Estimates of Impact

The baseline spending calculation for Akron, Ohio, for 2013 is illustrated in Table 2. For most services, data on payment per unit of service and rate of utilization at baseline—and their product, the baseline spending PBPM for each service—came from the spending and utilization data reported in the 2011 Centers for Medicare and Medicaid Services (CMS) geographic variation public use file for the area's dominant hospital referral region.³⁴ Because these data included only Medicare spending on these services and our goal was to estimate the total cost of care, we followed CMS's suggestion that deductibles and copayments be estimated at 20% of total costs.³⁵

For services not covered by Medicare, we used published literature, as referenced in Table 3, to anchor estimates of payment per unit of service and rate of utilization (and thus the product of the two: spending PBPM). We included Medicaid-covered LTC because savings in this large expense were predictable and substantial; we did not predict other Medicaid costs and savings because we expected those to be small and variable. The literature shows that efficiency improvements can yield reductions in LTC of -28% to -85% . Most of these studies looked at patients who were newly enrolled in LTC, rather than a cross-section of LTC utilization across a population. Because MediCaring is a community-wide intervention and because changing the pattern of use of institutional LTC would lag behind changing that of hospitalization, we felt that the literature was overly optimistic. Therefore, we opted to use a conservative estimate (-5%), although some prospective MediCaring Communities would be justified to model their savings using a higher one.

When the data provided utilization estimates for the overall Medicare population (rather than just the frail elder cohort), we multiplied utilization PBPM by the PACE frailty adjuster (2.39) to account for the

Table 2. Baseline Spending Estimation for Frail Elders in Akron, Ohio, for 2013

Service	Unit of Service	Payment per Unit	Utilization Rate PBPM	Medicare Spending PBPM
Inpatient hospitalization ³⁴	Covered stays	\$11,435	0.08	\$881
Outpatient hospitalization ³⁴	Visits	\$289	1.02	\$295
Emergency services ³⁴	Visits	\$571	0.12	\$70
Professional primary care ¹⁶	Visits	\$83	3.00	\$249
Professional specialty care ¹⁶	Visits	\$156	0.76	\$118
Diagnostic imaging/x-ray ³⁴	Events	\$44	0.82	\$36
Laboratory services ³⁴	Tests	\$31	1.51	\$47
Durable medical equipment ³⁴	Events	\$151	0.42	\$63
Dialysis procedures ³⁴	Hemodialysis equivalent treatment	\$297	0.40	\$118
Skilled nursing facility ³⁴	Covered days	\$522	0.54	\$281
Long-term acute hospitalization/inpatient rehabilitation ³⁴	Covered stays	\$30,977	0.00	\$105

Continued

Table 2. Continued

Service	Unit of Service	Payment per Unit	Utilization Rate PBPM	Medicare Spending PBPM
Home health ³⁴	Visits	\$3,135	0.03	\$99
Hospice ³⁴	Episodes	\$13,344	0.01	\$98
Vision ^a	Spending/user	\$116	0.08	\$10
Dental ^a	Spending/user	\$267	0.12	\$31
Ambulance ³⁶	Transports	\$361	0.09	\$33
Transportation ^a	Spending/user	\$54	0.06	\$4
Medicaid-covered LTC ³⁷	Per diem	\$477	4.31	\$2,056
Outpatient Rx ^{38,b}	PBPM	\$346	2.39	\$828
Professionally administered Rx ³⁴	PBPM	\$16	2.39	\$39
Total	—	—	—	\$5,459^c

^a Baseline estimates acquired through phone surveys of local retailers and service providers.

^b Rx = prescription medications.

^c Totals, subtotals, and the absolute change are subject to rounding to the nearest \$1.

Table 3. The MediCaring Program Effect Estimate for Costly Services, With Supporting Evidence

Service	Literature Estimates			MediCaring Program Effect for Simulation
	Site Estimate	Estimate	Notes	
Inpatient Hospitalization	-10% to -20%	-27 to -66%	2009; NY Independence at Home Act Testimony ³⁹	-25%
		-8% to -33%	2012; demonstrations to cut risky hospitalization ⁴⁰	
		-10%	2006; resource use among elders receiving acute care ⁴¹	
		-17%	2011; hospital admissions/savings with INTERACT II ⁴²	
		-18%	2009; 2-year Geriatric Resources for Assessment and Care of Elders (GRACE) implementation ¹⁶	
		-36%	2011; fee-for-service (FFS) readmissions with Care Transitions Intervention ⁴³	
		-61%	2012; readmissions after psychosocial counseling ⁴⁴	
		7%	2009; 2-year GRACE implementation ¹⁶	
		-10%	2009; 2-year GRACE implementation ¹⁶	
		-35% to -59%	2009; NY Independence at Home Act Testimony ³⁹	
Outpatient Hospitalization Emergency Services	-10% to -30%	-10%	2009; 2-year GRACE implementation ¹⁶	10%
				-25%

Continued

Table 3. Continued

Service	Site		Literature Estimates		MediCaring Program Effect for Simulation
	Estimate	Estimate	Estimate	Notes	
Primary care	20%	-1%	2009; 2-year GRACE implementation ¹⁶		30%
Professional	-20%	-36%	2009; 2-year GRACE implementation ¹⁶		-15%
Specialty care		-53%	2005; hospital-at-home model ⁴⁵		
Skilled nursing	-20% to -30%	-15%	2012; cost-containing care transition strategies ⁴⁶		-20%
Home health	5% to 20%	20%	2012; cost-containing care transition strategies ⁴⁶		10%
Hospice	5% to 75%	67%	2013; advance care planning and quality outcomes ⁴⁷		10%
Ambulance			Estimates obtained through local survey		-25%
Transportation			Estimates obtained through local survey		100%
Medicaid-covered LTC	-85%	-71%	2012; diversion of nursing-home-eligible persons to home and community-based services (HCBS) ⁴⁸		-5%
		-72%	2006; interventions for Alzheimer's patients' spouses ⁴⁹		

increased complexity facing Medicare service providers for services to the frail elderly, compared to the overall Medicare population.⁵⁰ PACE now uses an improved formula for risk adjustment, but it requires information on each enrollee, which would make it difficult to use in our simulation—and difficult for communities to use in their own subsequent modeling. On average, the PACE adjustment for frailty is now higher, about 2.53, so our estimates of potential savings may be more conservative than they would be if we used the new PACE adjustment formula.

All baseline payment and utilization data were standardized to 2011 to match the CMS public use file. To estimate payment for these services from April 2014 to March 2017, we applied annual inflation factors using the actual (2012) and forecasted (2013-2017) Medicare market basket for care setting (when available) or, alternatively, the medical urban consumer price index (CPI-U).^{51,52} This process generated the payment per service. The product of PBPM utilization and payment per service resulted in spending by service, and the sum of those elements across services yielded baseline spending PBPM for each site.

Literature on existing care coordination programs for elderly Medicare beneficiaries provided estimates of most of the potential differences in spending between the baseline and proposed spending by a MediCaring Community for most care settings (the central columns of Table 3). The leaders in the 4 communities considered these estimates and their experience and context and made projections that they were confident they could reach within 18 months (the second column of Table 3). In discussion among the sites, we settled on a final estimate of impact to be applied across all sites, which is presented in the right-hand column of Table 3. We settled on an especially conservative estimate of reducing Medicaid-covered LTC costs because our teams at the 4 sites felt that full effects would take longer than 18 months to manifest and because the estimates depended upon state and local factors. We assumed that MediCaring's full efficiency would not be achieved in the first year of the program but would be phased in over time as the necessary infrastructure and protocols became established in the pilot communities. In the first year, we assumed 50% of the modeled change in spending would be achieved, with 90% and 100% of the steady state change in spending in years 2 and 3, respectively.

Program impacts were multiplied by baseline spending to predict spending after MediCaring Community implementation. We first

calculated PBPM spending for each service category for each year of the proposed demonstration for the baseline (as if there had been no intervention) and then computed PBPM spending under the MediCaring Community intervention (the “program effect”). The difference in total PBPM spending between the baseline and the program effect constituted gross savings.

Program Costs and Net Savings

All sites provided estimates of the cost to administer a MediCaring Community program for each year over the 3-year period. Costs were divided into direct patient care costs (including care planning and coordination), initial development costs, ongoing operational costs, and costs associated with using subcontractors, such as local Area Agencies on Aging, to provide enhanced supportive services. Because each community had somewhat different strategies, opportunities, and challenges, expenditures varied substantially across sites. Net savings were the gross savings minus the program costs.

ROI resulted from dividing the net savings by the total expenditures for each site and in aggregate across sites. In calculating communities’ ROIs, we chose to omit demonstration-associated costs that would apply to the entire MediCaring Community program. Such programmatic start-up costs include background development expenditures (eg, legal expenses, materials for community coaching, and submission of waivers), formal evaluation, coordination among sites, and dissemination. We estimated these aggregate start-up and demonstration-associated costs at \$4.4 million, front-loaded over 3 years.

Results

Eligible population estimates at baseline were 855 in Milwaukie, 2,825 in Queens, 4,651 in Williamsburg, and 7,226 in Akron. Leaders in Akron predicted that first-year enrollment would account for 6.4% of maximum eligible member months and that 39.9% of maximum eligible member months would be captured by the third year. Williamsburg’s experience allowed leaders there to estimate 30.5% of maximum eligible months captured in the third year, while the Queens team’s strategy created sequential enrollment limits during implementation and capped

enrollment at 62.9%. Milwaukie expected 97.7% of maximum enrollment in year 3.

Table 2 shows the estimation of baseline payment, utilization, and costs for 2013 for the Akron site. We constructed a similar table for the other sites (not included).

The estimated PBPM spending in Akron in 2013, without an intervention, was \$5,459. The largest component was Medicaid-covered LTC, which, at \$2,056 PBPM, accounted for 37.7% of PBPM spending. Inpatient care cost \$881 PBPM (16.1% of total PBPM spending), and outpatient prescription medications accounted for \$828, or 15.2%. Vision, dental care, and transportation—nonmedical services of particular importance to frail elders—accounted for only 0.8% of total PBPM spending. Similar baseline estimate methods for 2013 found \$4,590 PBPM spending in Milwaukie, \$7,036 in Queens, and \$4,392 in Williamsburg.

Table 3 shows the program impact estimates and the supporting evidence justifying them. The references from the literature in the middle columns illuminate the wealth of studies showing improvement in care and reduction in costs, which mostly have not been sustained or spread. The financial simulation model projected 25% savings from reducing use of inpatient hospital care and emergency services (including ambulance); 15% savings in professional specialty care; 20% savings in skilled nursing facility care; and 5% savings in Medicaid-covered LTC services. Seven nonprescription categories and both prescription categories did not change. Professional primary care, hospice, home health, outpatient hospital services, and transportation all increased, by 30%, 10%, 10%, 10%, and 100% respectively.

Per Beneficiary Per Month Savings

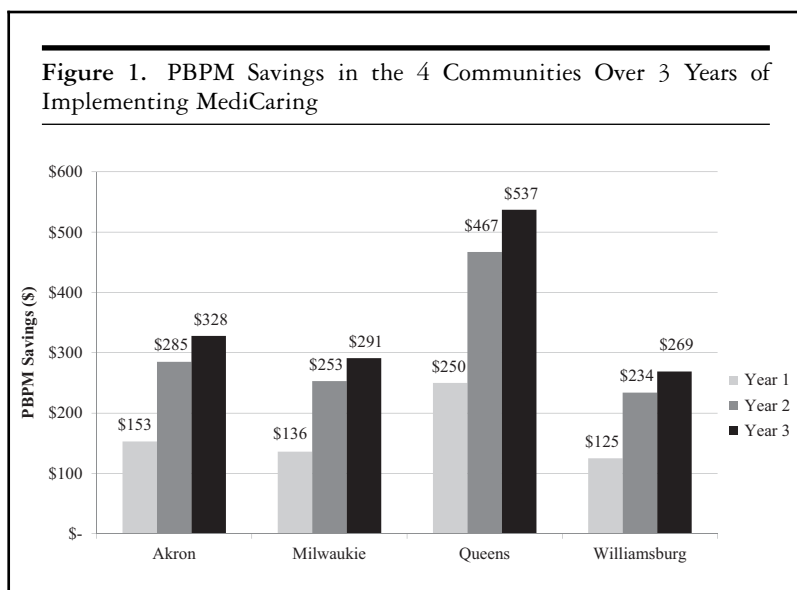
Table 4 presents the calculations for Akron in the third year with stable enrollment and full effect of the intervention, showing savings of \$328 PBPM, or 5.4%. Figure 1 shows the PBPM savings predicted by the financial simulation model in all 4 communities. In Akron, PBPM savings were predicted to be \$153 in the first year. Savings rose 86.3% to \$285 in the second year and rose another 15.1% (to \$328) in the third year. Savings increased over time because of increasing enrollment, reduced start-up costs, and our assumption of limited effectiveness in the first and second years. Percent reduction in total cost of care in

Table 4. Year 3 (2016-2017) Total Cost of Care and Estimated PBPM Savings in Akron, Ohio

Service Category	Without MediCaring Costs	With MediCaring Costs	Percent Change ^b	Absolute Change ^b
Inpatient Hospitalization	\$966	\$725	-25.0%	-\$242
Outpatient Hospitalization	\$331	\$364	10.0%	\$33
Emergency Services	\$78	\$59	-25.0%	-\$20
Professional Primary Care	\$270	\$351	30.0%	\$81
Professional Specialty Care	\$127	\$108	-15.0%	-\$19
Diagnostic Imaging/X-ray	\$40	\$40	0.0%	\$0
Laboratory Services	\$52	\$52	0.0%	\$0
Durable Medical Equipment	\$71	\$71	0.0%	\$0
Dialysis Procedures	\$132	\$132	0.0%	\$0
Skilled Nursing Facility	\$315	\$252	-20.0%	-\$63
Long-term Acute Hos- pitalization/Inpatient Rehabilitation	\$118	\$118	0.0%	\$0
Home Health	\$107	\$118	10.0%	\$11
Hospice	\$110	\$121	10.0%	\$11
Vision	\$11	\$11	0.0%	\$0
Dental	\$35	\$35	0.0%	\$0
Ambulance	\$37	\$28	-25.0%	-\$9
Transportation	\$3.63	\$7.26	100.0%	\$3.63
Medicaid-Covered LTC	\$2,307	\$2,191	-5.0%	-\$115
Non-Rx^a Subtotal^b	\$5,111	\$4,782	-6.4%	-\$328
Outpatient Rx	\$902	\$902	0.0%	\$0
Professionally Administered Rx	\$43	\$43	0.0%	\$0
Drugs/Part B Drugs				
Rx Subtotal^b	\$945	\$945	0.0%	\$0
Total^b	\$6,056	\$5,727	-5.4%	-\$328

^aRx = prescription medications.

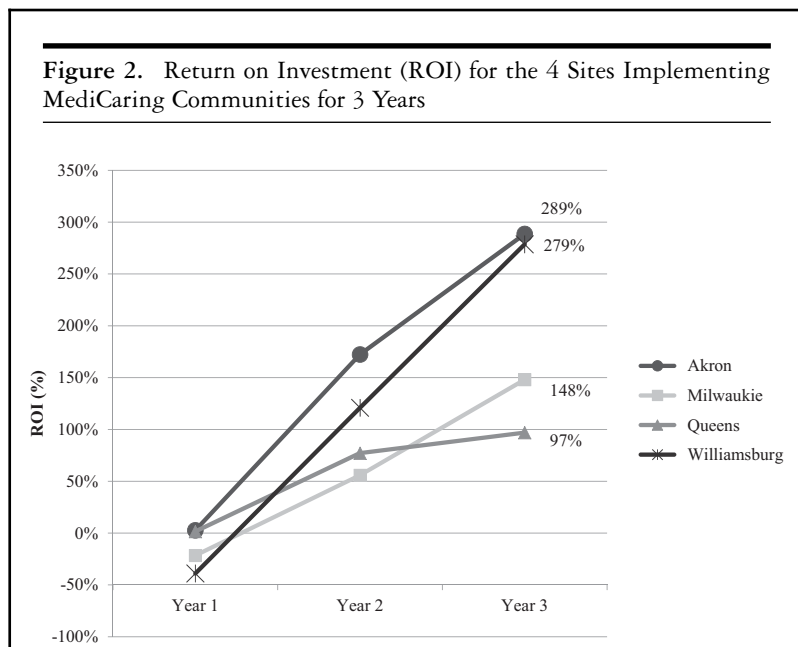
^bTotals, subtotals, and the absolute change are subject to rounding to the nearest \$1. The percent change is subject to rounding to the nearest 1/10th of 1 percent.



the other sites was 5.7%, 6.9%, and 5.5% in Milwaukie, Queens, and Williamsburg, respectively. The PBPM savings in the third year was \$291 for Milwaukie, \$537 for Queens, and \$269 for Williamsburg. The net savings, estimated quite conservatively and accounting for increased expenditures associated with the program across 3 years, totaled approximately \$17 million in Akron, \$3 million in Milwaukie, \$6 million in Queens, and \$5 million in Williamsburg.

Return on Investment

As indicated in Figure 2, the 4 sites implementing MediCaring Communities would initially achieve low or negative ROIs due to start-up costs and low early enrollment. First-year ROIs ranged from 3% in Akron to -39% in Williamsburg. By the second year, the lowest ROI was in Milwaukie with 56%. In the third year, the average ROI across all 4 communities was 203%. Cumulative ROI, consisting of summed ROIs from all 3 projected years, ranged from 75% in Milwaukie to 165% in Akron. Cumulative net savings from the 4 communities was projected to be just over \$11 million by the end of the second year. The cumulative savings over all 3 years from the 4 communities was estimated to be \$31



million, with ongoing annual savings (at steady enrollment and with no additional improvements and no more start-up costs) projected to reach \$24 million (in 2011 dollars)—a 246% ROI—in the fourth year and in each subsequent year.

Discussion

The MediCaring Community financial simulation model indicates that a redesign of care delivery to match the priorities of frail elders is achievable without new funding. By modeling how medical and LTC savings can be returned to the community, the financial simulation shows that it is plausible, even under conservative efficiency estimates in lean systems and even with only a modest proportion of eligible elders enrolling, to engineer substantial reforms without an influx of new money.

The simulation projected meaningful PBPM savings and positive ROIs in all 4 communities. The majority of sites' PBPM savings were generated from reductions in utilization of inpatient hospitalization

services (−\$242 in Akron), skilled nursing facility care (−\$63 in Akron), and Medicaid-covered LTC (−\$115 in Akron). Under the simulation, primary care, hospice, home care, outpatient hospital services, and transportation would increase, and each site would reach positive ROI in or before the second year of implementation. Combined, the sites' savings estimates totaled \$31 million in the 3-year period. Following the 3-year implementation period, communities' pooled savings were predicted to be \$24 million per year, a 246% ROI. This confirms that the sixth MediCaring Community component—the ability to reinvest shared savings to bolster local supportive services—plausibly will yield funds to manage the local data and to invest in improved supportive services.

Savings and Opportunity Costs

In the financial simulation, the PBPM savings arose from reductions in service utilization, primarily in hospital-based services and LTC. PBPM savings were highest in Queens, the system with the second-highest utilization pre-MediCaring (at \$10,083 in annual Medicare spending per beneficiary, compared to \$10,200 in Akron). Savings are influenced by sites' implementation plans, indirect and in-kind costs, and existing levels of care coordination. Available funding for community reinvestment is partially dependent on sites' administrative costs and therefore varies based on site characteristics and implementation strategies. Because the literature suggests that there is no correlation between a region's health expenditures and patient health outcomes or satisfaction, MediCaring Communities can manage and improve care quality while generating savings.⁵³ Even communities projecting slim ROIs can use the MediCaring Community program to generate substantial improvements in elder care. A community with a slim ROI would gain a better system while operating at the same cost as in the previous system. Such a community might not, however, return sufficient shared savings to use for monitoring, management, and expanding supportive services.

We deliberately constructed the financial simulation model conservatively in order to determine whether cautious assumptions would yield sufficient savings to be worth pursuing. Actual savings may be higher than those predicted. A more complex model would take account of issues such as proximity to death and the effect of enrollment strategies, and these would generally increase the savings estimate.⁴⁷ Currently, an example of more aggressive interventions can be found in a company

that contracts with managed care plans, bundled payment programs, and ACOs to reduce Medicare post-acute care costs; the company reports an average of 45% savings in services delivered in the 90 days after hospitalization, a period that encompasses 23% of Medicare fee-for-service outlays.⁵⁴ MediCaring Communities differ in that they take responsibility for the elderly population's entire array of service needs—not just those covered by Medicare in the 90 days after hospitalization. However, the experience of such companies—which allocate some savings to profits—does help to benchmark and validate the conservative estimates presented in this article.

The financial simulation model does not include the potential for other cost savings. For example, because the system shifts care from hospitals to home- and community-based care (74% of Akron PBPM savings were generated from reductions in inpatient hospitalizations), MediCaring Communities may well face less pressure to build more hospital beds because demand will rise more slowly with the increasing elderly population. Growth of the dual eligible population could also be attenuated if elderly Medicare beneficiaries spent down to Medicaid more slowly because they received better and more efficient community-anchored care through a MediCaring Community.

Partnership with Government and Private Sector Required for MediCaring Communities

To be implemented widely, MediCaring Communities will require a degree of strategic foresight and partnership with government and other key stakeholders. First, the model will necessitate that the federal government allow for care delivery by a locally organized provider entity that (1) operates within a specific geographic area; (2) targets enrollment to frail elderly Medicare beneficiaries; and (3) delivers a broader array of services that necessarily span multiple programs and payers. As such, MediCaring Communities would require waivers from CMS to bypass regulations that now prevent tailoring services efficiently—for example, provisions that prohibit PACE and hospice providers from contracting to offer a la carte services (eg, caregiver respite or adult day services) rather than bundled services.

Second, MediCaring Communities will need to be permitted to encourage greater efficiency in home-delivered services through organizing agreed-on service areas. Being able to direct in-home nursing agencies

or physicians, for example, to focus on serving beneficiaries in a given contiguous area (as opposed to an entire metropolitan area) can engender substantial efficiencies through reducing travel time and eliminating most minimum length-of-service per visit requirements.

Third, pioneer MediCaring Communities will require assistance to help develop sound quality metrics and performance outcomes, accounting procedures, clinical standards, and methods of evaluation. The cost of these tasks is not included in the calculations of savings and ROIs here. For example, the great majority of quality metrics now in use are poorly designed to assess accurately the health and needs of frail elderly Medicare beneficiaries. Therefore, Medicare and MediCaring Communities will need to create and test improved metrics. Additionally, because rigid adherence to conventional clinical standards that were designed for younger adults often harms elderly beneficiaries, more appropriate clinical protocols need to be developed and disseminated.

MediCaring Communities will need reliable arrangements with CMS for accounting procedures that calculate shared savings. These arrangements will require federal and state government and private sector collaboration. Once established, these standards can help guide MediCaring Communities and related community governance structures in monitoring and managing performance and help alleviate any concerns that may arise about payment increases. Finally, government can partner with MediCaring Communities and other interested stakeholders to develop evaluation methodologies that examine population performance at the community level, a noted departure from the current practice of focusing on the performance of individual providers. Social impact bonds, local tax revenues, philanthropy, and “pay for success” programs may be able to assist with financing some of these tasks.

In summary, this simulation yields two key conclusions. First, better care for frail elderly Medicare beneficiaries is possible at lower or comparable cost to Medicare. Second, improvements to the health care system could be bolstered if part of the savings were to be reinvested, via MediCaring Communities, in the services that frail elders need. The nation is ill-equipped to manage the future needs of the frail elderly, and to fail to address the issues highlighted in this article is to invite calamity for the growing numbers of frail elders in the United States and other countries. This article outlines a cost-beneficial and—in the end—humane approach to avoiding an impending breakdown in the health care delivery and social services sectors that will eventually touch us all.

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