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Acute Care For Elders Units Produced Shorter Hospital Stays At Lower Cost While Maintaining Patients' Functional Status

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Abstract

Acute Care for Elders Units offer enhanced care for older adults in specially designed hospital units. The care is delivered by interdisciplinary teams, which can include geriatricians, advanced practice nurses, social workers, pharmacists, and physical therapists. In a randomized controlled trial of 1,632 elderly patients, length-of-stay was significantly shorter—6.7 days per patient versus 7.3 days per patient—among those receiving care in the Acute Care for Elders Unit compared to usual care. This difference produced lower total inpatient costs—\$9,477 per patient versus \$10,451 per patient—while maintaining patients' functional abilities and not increasing hospital readmission rates. The practices of Acute Care for Elders Units, and the principles they embody, can provide hospitals with effective strategies for lowering costs while preserving quality of care for hospitalized elders.

Hospitalization often marks a critical transitional event for elderly people that may culminate in disability or death.^{1,2} At the same time, it affords a unique opportunity to intervene and to simultaneously address multiple medical, functional, and social issues.

In the 1990s a new system of care for hospitalized elders, called Acute Care for Elders, was developed at the University Hospitals of Cleveland by several of the authors of this article.³

This system of care, built on the successes achieved through other effective programs such as geriatric evaluation and management⁴ and comprehensive geriatric assessment,⁵ was specifically designed to address the needs of acutely ill elders from the moment of admission to the hospital.

The Acute Care for Elders program uses a multidisciplinary approach to integrate principles of quality improvement and comprehensive geriatric assessment with the goal of helping hospitalized elders maintain or achieve functional independence in basic activities of daily living.³ The four key elements of the program are a specially designed hospital environment, with such features as carpeted floors, raised toilet seats, and a parlor for dining and visiting between patients and family members;^{3,6-8} patient-centered care designed to promote independent functioning; early discharge planning, with the goal of returning the patient to his or her home; and regular review of medical care to reduce avoidable complications resulting from hospitalization.

The Acute Care for Elders program was initially tested in a randomized controlled trial in a university hospital setting, where it resulted in improved patient functioning and a greater likelihood of being discharged to home, without increasing costs.⁶ It was subsequently tested in a second randomized controlled trial, conducted at a community-based hospital. In that context, Acute Care for Elders had a smaller impact on patient functioning, but it improved process-of-care measures—such as the use of nursing care plans, physical therapy consultations, and lack of restraints—and improved satisfaction on the part of patients, families, doctors, and nurses without increasing costs.⁷

A third randomized controlled trial found no effect on patient functioning; however, length-of-stay and cost were significantly lower in the Acute Care for Elders group, suggesting greater efficiency of care. In addition, hospital readmission rates did not increase.

The findings from the third trial were of less interest in the late 1990s, when the study was completed, than today because there was less concern then about issues related to cost. Therefore, they were published only in abstract form,⁹ and the study was mainly used as a source for observational data analyses.¹⁰⁻¹³ (For additional examples of works citing the study, see the online Technical Appendix.)¹⁴

In this article we present the full results of the third trial and discuss the policy implications of the findings in the context of today's medical care climate and the current efforts to restrain the rate of growth of Medicare spending. Over the past fifteen years, much of the inpatient care for older patients has shifted to hospitalists,¹⁵ physicians who provide general medical care only in the hospital. Hospitalist care is associated with shorter lengths-of-stay and lower costs during hospitalization.¹⁶ However, recent studies have suggested that these benefits may be offset by greater use of medical care and higher costs after hospitalization, including increased hospital readmission rates.^{17,18}

The findings from our study suggest an alternate approach to reducing length-of-stay and costs that does not increase readmission rates after discharge. We hypothesize that the interdisciplinary team approach and focus on patient functioning enable more efficient provision of care for older patients in the hospital and smoother transitions to home.

The Acute Care for Elders model could conceivably be combined with the hospitalist approach through appropriate training. Modest hospital renovations would also be needed to create the model's full environment.

The current study, combined with our prior studies, suggests that Acute Care for Elders Units and the practices embodied in the system of care can provide hospitals with effective

strategies for reducing costs while preserving or improving quality of care for hospitalized elders. Widespread adoption of this model could result in systemwide cost savings and higher-value care for older adults during hospitalization.

Study Data And Methods

PARTICIPANTS

Study participants were community-dwelling adults, age seventy or older, who were admitted for at least two days for an acute medical illness to the general medical service of a private, nonprofit teaching hospital from August 1993 to May 1997. A total of 1,632 patients were enrolled, of whom 858 were randomized to the Acute Care for Elders intervention group and 774 were randomized to the usual-care control group. Additional details are provided in the Technical Appendix.¹⁴

Members of the intervention group were housed and received their care in a separate inpatient unit that had been renovated to provide the Acute Care for Elders environment. Interdisciplinary team rounds were conducted daily by the medical director (a geriatrician) and a geriatric clinical nurse specialist with bedside nurses, physicians, social workers, and physical therapists. Patients were assessed daily for fall risk, mobility, self-care, skin integrity, nutrition, incontinence, confusion, depression, and anxiety; and nursing care plans were implemented as needed. In addition, medications and procedures were reviewed for appropriateness by the medical director.

The usual-care group was housed and received care in the general inpatient unit, in which younger and older patients resided together. About one year after the trial had begun, the usual-care unit was relocated to a new building that included several physical renovations similar to the Acute Care for Elders Unit, such as private spaces for family and team meetings, as well as carpeted hallways and rooms.

In addition, several of the Acute Care for Elders protocols, such as skin care assessment and reduced use of restraints, were implemented throughout the hospital before the end of the study. Thus, the persistent and key differences between Acute Care for Elders and usual-care groups in this study were the separate inpatient unit for older patients and the team-based approach to care.

OUTCOMES

The primary outcomes for the present analyses were length-of-stay and cost, which were obtained from hospital financial records. Cost data were determined using the Cost Management Information System, a proprietary cost accounting system that assigns resource-based costs to each service or procedure performed for a patient.¹⁰ These costs differ from hospital charges in that they more closely reflect the true costs of care in terms of resources consumed and personnel time.

The online Consumer Price Index inflation calculator¹⁹ was used to obtain conversion rates for each year of the study (1994–98), and these were used to convert actual costs from the year of discharge to equivalent costs in 2011.

Secondary outcomes in the present analyses consisted of change between admission and discharge in the ability to perform basic activities of daily living, such as bathing, dressing, using the toilet, transferring from bed to chair, and eating; instrumental activities of daily living, such as shopping, cooking, performing household chores, using transportation, managing money, managing medications, and using the telephone; and mobility, such as

self-reported difficulty walking to a table, walking inside the house, walking a block, walking uphill or upstairs, and running a short distance.

Additional secondary outcomes included inhospital process-of-care measures, such as physical therapy consults, orders for bed rest, use of physical restraints, and documentation of discharge planning; in-hospital mortality; discharge destination (to home or institutional facility); and three-month readmission rates.

Standard statistical procedures were used to compare baseline characteristics and outcomes of participants in the Acute Care for Elders intervention and usual-care control group (for example, *t*-tests for continuous variables and chi-square tests for categorical variables). Differences between the groups in length-of-stay and cost were examined using Wilcoxon rank-sum tests to account for nonnormal distributions of these variables. Additional details related to the study methods are provided in Technical Appendix Exhibit 1.¹⁴

LIMITATIONS

The current effort also has several limitations. The most important is that the study was completed more than a decade ago, raising concern as to whether its results apply today. We believe that in all likelihood, the findings are even more relevant today for several reasons.

First, given basic demographic changes, the patient population seen at most hospitals today is probably older and sicker compared to the population seen ten years ago. Therefore, a greater proportion of patients probably are appropriate candidates for Acute Care for Elders, which could result in even greater cost savings in today's hospitals.

Second, many of the key components of the Acute Care for Elders protocol are not "usual care" at most hospitals, even though they are considered standards of care. Among these are medication reconciliation and decreased use of catheters. The protocol also emphasizes patient-centered care and a team-based approach—which increasingly are recognized as important for patient and provider satisfaction and ensuring smooth transitions and continuity of care, although they have not yet become routine.

Also noteworthy is the fact that the general medical Acute Care for Elders Unit that was developed for the first study continues to operate with some of the same nurses, and a surgical unit was added. In addition, the hospital in which the Acute Care for Elders Unit is housed, University Hospitals Case Medical Center, achieved Magnet status from the American Nurses Credentialing Center, which recognizes health care organizations for high-quality care and nursing excellence, as well as several Beacon Awards for Excellence from the American Association of Critical-Care Nurses for excellence in critical care.

Another limitation is that our cost data are restricted to the inpatient setting and did not include postdischarge costs. Data on such costs would have been informative, given the Bundled Payments for Care Improvement initiative recently announced by the Center for Medicare and Medicaid Innovation.²⁰ Under this initiative, reimbursement would be based on a patient's total episode of care rather than on services provided. Four models have been proposed for defining "episode of care," one of which would involve a single, bundled payment for both in-patient and postacute care.

Study Results

Study participants had a mean age of eighty-one years. Two-thirds were female, and 40 percent were black. Eighty-four percent were living in their own home or a relative's home

prior to admission, whereas 16 percent were admitted from a boarding home, assisted living facility, nursing home, or skilled nursing facility.

Study participants were admitted for a variety of reasons, including pulmonary problems (21 percent), gastrointestinal problems (20 percent), cardiovascular problems (14 percent), pneumonia or infection (13 percent), neurologic problems (11 percent), and other issues (21 percent). Common coexisting conditions included congestive heart failure (27 percent), dementia (18 percent), chronic lung disease (17 percent), stroke or transient ischemic attack (17 percent), and history of myocardial infarction (14 percent).

Comparisons of the characteristics of study participants in the Acute Care for Elders group and the usual-care control group are provided in Technical Appendix Exhibit 2.¹⁴ There were no significant differences between the groups at admission.

LENGTH-OF-STAY AND COST

Length-of-stay was significantly reduced in the Acute Care for Elders intervention group (6.7 days per patient) compared to the usual-care control group (7.3 days per patient) (Exhibit 1). Over the course of the study, this resulted in fifty-eight fewer days of hospitalization for every hundred patients admitted to Acute Care for Elders versus usual care.

In addition, costs were significantly lower in the Acute Care for Elders group (\$9,477 per patient) compared to the usual-care group (\$10,451 per patient), for a cost savings of nearly \$1,000 per patient (Exhibit 2). Over the course of the study, this resulted in cost savings of \$97,400 for every hundred patients admitted to Acute Care for Elders versus usual care. Length-of-stay and cost were highly correlated with each other ($r = 0.91$).

SECONDARY OUTCOMES

There were no significant differences between the Acute Care for Elders and usual-care groups in patient functioning at discharge (Exhibit 3). Most other secondary outcome measures—such as proportions of bed rest orders during hospitalization or discharges to an institution instead of home—also did not differ greatly between the groups (Exhibit 4). In addition, three-month hospital readmission rates were similar.

Discussion

In this randomized controlled trial of 1,632 acutely ill, hospitalized elders, we found that caring for patients in a dedicated Acute Care for Elders Unit instead of offering usual care resulted in greatly reduced lengths-of-stay and in cost savings. At the same time, in both arms of the study, there were similar levels of patient independence at discharge and similar three-month hospital readmission rates. We believe that these findings are important, given current efforts to achieve higher-value care and cope with financial constraints on hospitals. Obtaining better value for the dollars expended—and even spending less—are important policy objectives for Medicare.

PRIOR STUDIES

This study contributes to the literature on the Acute Care for Elders model in several ways. First, the evaluation methods used in this trial were similar to those used in two prior trials of Acute Care for Elders Units, enabling comparisons across the three trials.

The first study included 651 acutely ill elders who were hospitalized from 1990 to 1992 at the same medical care center as the current study. It found that patients cared for in the

Acute Care for Elders Unit were significantly more likely than the usual-care group to experience improvements between admission and discharge in the ability to perform basic activities of daily living (34 percent versus 24 percent; $p = 0.05$).⁶ The Acute Care for Elders group also had shorter lengths-of-stay than the usual-care group (7.3 days versus 8.3 days) and lower costs (\$10,289 versus \$12,412), although these differences were not significant.

The second trial included 1,531 acutely ill elders who were hospitalized at a community teaching hospital from 1994 to 1997.⁷ In this study, the Acute Care for Elders group was significantly less likely than the usual-care group to experience declines in the ability to perform basic activities of daily living or to be discharged to a nursing home (34 percent versus 40 percent; $p = 0.05$). Although not mentioned in the original publication, the Acute Care for Elders group also had slightly shorter lengths-of-stay (6.1 days versus 6.3 days) and lower costs (\$5,639 versus \$5,754). However, these differences were not significant (unpublished data).

Taken together, these three trials showed a consistent pattern in which the Acute Care for Elders model was associated with shorter hospital lengths-of-stay and, consequently, lower costs. Although this association was significant only in the current study, the pattern was present in all three.

Two recent meta-analyses have found that although there is some evidence that Acute Care for Elders and other comprehensive geriatric assessment programs are associated with shorter lengths-of-stay and lower costs in the inpatient setting, variability between the studies makes the findings difficult to interpret.^{21,22} The results of the current study add to the weight of evidence that Acute Care for Elders Units reduce both length-of-stay and cost.

A second important finding in the current study was that the observed reductions in length-of-stay and cost did not result in increased hospital readmission rates after discharge. This finding is in contrast to studies of hospitalist care. Such studies have found that although hospitalists discharge patients more quickly and at lower cost,¹⁵ these results are offset by higher medical utilization and costs after discharge, including more emergency department visits and hospital readmissions.^{17,18}

Third, the original findings of functional improvement were not replicated in the current study. One possible explanation is that usual care at the hospital changed as a result of the first Acute Care for Elders trial.⁶ This hypothesis is supported by the fact that several changes in the usual-care group were known to have occurred during the current trial, including physical renovations similar to Acute Care for Elders Units when the usual-care unit was relocated, and implementation of several Acute Care for Elders protocols on that unit, such as skin care assessment and reduced use of restraints.

Another plausible explanation is that the fidelity of the intervention declined over time. This result is a distinct possibility, given that the original Acute Care for Elders Unit leadership assumed new responsibilities, and a new medical director was hired about one year after the current trial began. Effects on functional outcomes might also have varied in the three studies because of chance or bias.

Regardless of the reason why the original finding was not replicated, together these three studies suggest that the impact of Acute Care for Elders Units on patient functioning probably varies with both the fidelity with which the intervention is administered and the state of usual care at the hospital.

COUNTERINTUITIVE FINDINGS

In the current study, we found that two process-of-care measures—physical therapy consultation and discharge planning documentation—were less common in the Acute Care for Elders intervention group than in the usual-care control group. We hypothesize that these might reflect greater efficiency of the interdisciplinary team on the Acute Care for Elders Unit, which included a social worker and a physical therapist. These team members often provided informal consultations to the whole Acute Care for Elders interdisciplinary team, obviating the need for formal consultation and enabling more efficient targeting of formal consultation to those patients most likely to benefit.

Similarly, discharge planning, with the goal of returning patients to their homes whenever possible, was an integral component of the Acute Care for Elders program that was implemented by the interdisciplinary team on admission, in contrast to the conventional approach of delaying planning until near the time of discharge. Because discharge planning discussions were ongoing within the team rather than performed by a single health professional on a single occasion, they would not have always been documented in the medical record.

Potential Implementation Barriers

Findings from this study and other studies conducted over the past twenty years consistently suggest that Acute Care for Elders Units enable the provision of higher-value care to older adults who are hospitalized. Yet these units are far from universal.²³

In this section we discuss not only potential barriers to implementation of Acute Care for Elders but also possible ways to overcome those barriers, based on our experience and the work of other investigators who have worked with the Acute Care for Elders model.

LACK OF APPROPRIATE INCENTIVES

One of the greatest barriers to implementation of Acute Care for Elders is concern about costs. Despite studies such as this one showing that Acute Care for Elders Units were associated with lower costs of care, the creation of such a unit requires hospital directors to take a leap of faith by investing in hospital renovations, new medical staff, and ongoing interdisciplinary team training. This leap would be easier if reimbursement rates were higher for hospitals with Acute Care for Elders Units. However, this change is unlikely to occur in the current health care setting.

An alternative incentive would be to include patient function as a hospital performance measure. Current measures typically focus on processes of care, such as length-of-stay or hospital readmission rates. Focusing on these objectives, although laudable, might have unintended consequences and might not directly address the core issues of providing the best quality of care for each patient and maintaining quality of life.

For example, as noted earlier, hospitalists were found to be very effective in reducing length-of-stay and lowering costs. However, in the process they shifted costs from inpatient care for an acute episode to postdischarge care. Performance measures that explicitly focus on improving or maintaining patient functioning and safely discharging patients to the home setting could motivate hospitals to adopt programs such as Acute Care for Elders.

Another potential incentive would be sponsorship of a dissemination program. For example, the Center for Medicare and Medicaid Innovation could create an initiative to support dissemination of evidence-based programs to improve functioning in hospitalized elders,

similar to their current initiative to reduce avoidable hospitalizations among nursing home residents.

SHORTAGE OF APPROPRIATELY TRAINED STAFF

Another key barrier to implementation of the Acute Care for Elders model is the need for a geriatrician to serve as an institutional leader and for an interdisciplinary team trained in geriatrics and the Acute Care for Elders model. Most medical personnel—including nurses, nurse assistants, physicians, physician assistants, and pharmacists—do not receive adequate training in geriatrics.²⁴ Although geriatric training is slowly being incorporated into curricula for health care professionals, the amount and consistency of training remains limited.²⁵

Creation of additional Acute Care for Elders Units could help address this important national need for personnel trained in the provision of care to acutely ill geriatric patients by providing a team-based model for training and education of medical staff. In fact, the original vision of Acute Care for Elders was that it would serve as a convenient training site and a mechanism for facilitating implementation of best-care practices throughout a medical center.³

In addition, online training resources could be developed to facilitate initial and ongoing training of Acute Care for Elders teams. For example, the Nurses Improving Care for Healthsystem Elders program, which is complementary to Acute Care for Elders and focuses on the role of the geriatric resource nurse, provides extensive training and resources through its online knowledge center.²⁶ Comparable online training resources for Acute Care for Elders could greatly facilitate the training of medical personnel in the model's practices.

BED OCCUPANCY RATE

Yet another potential concern is that the creation of a separate Acute Care for Elders Unit might make it more difficult to achieve 100 percent occupancy throughout the hospital because empty beds on the unit presumably would not be available for younger patients. In our experience, however, Acute Care for Elders Units need not have empty beds. Most hospitals with a hundred beds or more have more patients who are admitted for medical emergencies than can be accommodated on a single unit and therefore might benefit from an Acute Care for Elders Unit.

In addition, Acute Care for Elders Units can care for surgical as well as medical patients, although the published results of the model's impact are limited to medical patients. Concerns about bed capacity and occupancy rates can be minimized through careful planning and estimation of the current and projected numbers of patients who would be eligible for care in an Acute Care for Elders Unit.

DUAL STANDARDS OF CARE

A related concern is that some patients who are eligible for Acute Care for Elders might not be admitted because of lack of beds, potentially leading to differences in the quality of care received by different patients. This concern could be addressed by training medical staff throughout the hospital on Acute Care for Elders protocols and principles of care. These practices would then be applied to appropriate patients on usual-care units.

ALTERNATIVES TO A DEDICATED UNIT FOR ELDERS

In some cases, it might not be feasible to create a dedicated Acute Care for Elders Unit, but hospitals could adapt the model to meet their specific needs. For example, Mount Sinai Medical Center, in New York City, has developed a mobile Acute Care for Elders Unit, in

which the care team of geriatric experts attends to elderly patients wherever they are located in the hospital, obviating the requirement for these patients to be housed within a dedicated unit.²⁷ In addition, Aurora Health Care, in eastern Wisconsin, has developed a software program called Acute Care for Elders (ACE) Tracker. The program generates a checklist of issues to address with older hospitalized patients, and geriatricians are available for electronic consultation when needed.²⁸

A recent meta-analysis found that care provided on a dedicated Acute Care for Elders Unit achieves better patient outcomes than care provided by mobile teams.²² However, both the mobile team and the tracker system have been associated with improvements in care efficiency through either lower costs or improved process measures.^{27,28}

Acute Care for Elders programs also could be combined with other geriatric programs to create a comprehensive geriatric service line.²⁹ These other evidence-based programs for older patients could include Hospital at Home,³⁰ the Hospital Elder Life Program for delirium prevention,³¹ palliative care,³² and posthospitalization transition programs.³³

Discussion And Conclusion

TAKING ADVANTAGE OF CURRENT POLICY INITIATIVES

Hospitals with Acute Care for Elders Units also might make ideal partners for some of the new initiatives being introduced through the Centers for Medicare and Medicaid Services and the Center for Medicare and Medicaid Innovation, including accountable care organizations and bundled payment models. Acute Care for Elders Units may offer hospitals a strategy for providing shorter and less costly care to acutely ill Medicare patients, while preventing functional decline during the hospital stay and not increasing readmission rates. As a result, the units could help meet the quality and cost benchmarks that are the underlying mechanism driving accountable care organization initiatives.

Acute Care for Elders Units could also play a prominent role in Medicare's national pilot program on payment bundling. This Medicare policy initiative, still in the planning stages, will feature single payments to participating providers for entire episodes of care.³⁴

Evidence from the current study suggests that Acute Care for Elders Units may enable hospitals to lower costs during acute stays without increasing costs after discharge. The model could be applied across a wide spectrum of medical conditions—such as chronic obstructive pulmonary disease and congestive heart failure—that in all likelihood define patient groups for episode-based payment purposes.³¹ Indeed, an important strength of the model is that it is well suited to the wide variety of medical conditions that characterize the hospitalized older population, as evidenced by the many different reasons for admission observed in the current study.

CONCLUSION

In the current study, an established Acute Care for Elders Unit was found to reduce hospital length-of-stay and costs while maintaining patient outcomes and not increasing hospital readmission rates. These findings, combined with other studies performed over the past twenty years, consistently show that these units are associated with the provision of higher-value care for older adults in the hospital.

Given current health reform efforts and constraints on Medicare funding, the findings suggest that more widespread implementation of Acute Care for Elders Units could result in major systemwide cost savings while preserving quality of care for older hospitalized patients. ■

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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In this month's *Health Affairs*, Deborah Barnes and coauthors write about their analysis of a randomized controlled trial of elderly patients treated in Acute Care for Elders Units—hospital units that provide interdisciplinary care through teams in specialized settings. Lengths-of-stay were almost a day shorter and costs about 9 percent lower than for patients treated in standard units. The authors recommend broader use of Acute Care for Elders Units to lower costs while preserving the quality of care for hospitalized elders.

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NOTES

1. Creditor MC. Hazards of hospitalization of the elderly. *Ann Intern Med.* 1993; 118(3):219–23. [PubMed: 8417639]

2. Covinsky KE, Pierluissi E, Johnston CB. Hospitalization-associated disability: “she was probably able to ambulate, but I’m not sure.” JAMA. 2011; 306(16):1782–93. [PubMed: 22028354]
3. Palmer RM, Landefeld CS, Kresevic D, Kowal J. A medical unit for the acute care of the elderly. J Am Geriatr Soc. 1994; 42(5):545–52. [PubMed: 8176151]
4. Rubenstein LZ, Stuck AE, Siu AL, Wieland D. Impacts of geriatric evaluation and management programs on defined outcomes: overview of the evidence. J Am Geriatr Soc. 1991;39(9 Pt 2):8S–16S.
5. Stuck AE, Siu AL, Wieland GD, Adams J, Rubenstein LZ. Comprehensive geriatric assessment: a meta-analysis of controlled trials. Lancet. 1993; 342(8878):1032–6. [PubMed: 8105269]
6. Landefeld CS, Palmer RM, Kresevic DM, Fortinsky RH, Kowal J. A randomized trial of care in a hospital medical unit especially designed to improve the functional outcomes of acutely ill older patients. N Engl J Med. 1995; 332(20):1338–44. [PubMed: 7715644]
7. Counsell SR, Holder CM, Liebenauer LL, Palmer RM, Fortinsky RH, Kresevic DM, et al. Effects of a multicomponent intervention on functional outcomes and process of care in hospitalized older patients: a randomized controlled trial of Acute Care for Elders (ACE) in a community hospital. J Am Geriatr Soc. 2000; 48(12):1572–81. [PubMed: 11129745]
8. Covinsky KE, Palmer RM, Kresevic DM, Kahana E, Counsell SR, Fortinsky RH, et al. Improving functional outcomes in older patients: lessons from an Acute Care for Elders unit. Jt Comm J Qual Improv. 1998; 24(2):63–76. [PubMed: 9547681]
9. Landefeld CS, Palmer RM, Fortinsky RH, Kresevic DM, Kowal J. A randomized trial of Acute Care for Elders (ACE) in the current era: lower hospital costs without adverse effects on functional outcomes at discharge. J Gen Intern Med. 1998; 13(suppl):45.
10. Covinsky KE, King JT Jr, Quinn LM, Siddique R, Palmer R, Kresevic DM, et al. Do Acute Care for Elders units increase hospital costs? A cost analysis using the hospital perspective. J Am Geriatr Soc. 1997; 45(6):729–34. [PubMed: 9180668]
11. Fortinsky RH, Covinsky KE, Palmer RM, Landefeld CS. Effects of functional status changes before and during hospitalization on nursing home admission of older adults. J Gerontol A Biol Sci Med Sci. 1999; 54(10):M521–6. [PubMed: 10568535]
12. Walter LC, Brand RJ, Counsell SR, Palmer RM, Landefeld CS, Fortinsky RH, et al. Development and validation of a prognostic index for 1-year mortality in older adults after hospitalization. JAMA. 2001; 285(23):2987–94. [PubMed: 11410097]
13. Chuang KH, Covinsky KE, Sands LP, Fortinsky RH, Palmer RM, Landefeld CS. Diagnosis-related group-adjusted hospital costs are higher in older medical patients with lower functional status. J Am Geriatr Soc. 2003; 51(12):1729–34. [PubMed: 14687350]
14. To access the Appendix, click on the Appendix link in the box to the right of the article online
15. Kuo YF, Sharma G, Freeman JL, Goodwin JS. Growth in the care of older patients by hospitalists in the United States. N Engl J Med. 2009; 360(11):1102–12. [PubMed: 19279342]
16. Wachter RM, Goldman L. The hospitalist movement 5 years later. JAMA. 2002; 287(4):487–94. [PubMed: 11798371]
17. Howrey BT, Kuo YF, Goodwin JS. Association of care by hospitalists on discharge destination and 30-day outcomes after acute ischemic stroke. Med Care. 2011; 49(8):701–7. [PubMed: 21765377]
18. Kuo YF, Goodwin JS. Association of hospitalist care with medical utilization after discharge: evidence of cost shift from a cohort study. Ann Intern Med. 2011; 155(3):152–9. [PubMed: 21810708]
19. Bureau of Labor Statistics. CPI inflation calculator [Internet]. BLS; Washington (DC): May 15. 2012 cited Available from: <http://data.bls.gov/cgi-bin/cpicalc.pl>
20. Center for Medicare and Medicaid Innovation. Bundled payments for care improvement [Internet]. Innovation Center; Baltimore (MD): May 10. 2012 last updated cited 2012 May 15 Available from: <http://innovation.cms.gov/initiatives/bundled-payments/index.html>
21. Baztán JJ, Suárez-García FM, López-Arrieta J, Rodríguez-Mañas L, Rodríguez-Artalejo F. Effectiveness of acute geriatric units on functional decline, living at home, and case fatality among older patients admitted to hospital for acute medical disorders: meta-analysis. BMJ. 2009; 338:b50. [PubMed: 19164393]

22. Ellis G, Whitehead MA, Robinson D, O'Neill D, Langhorne P. Comprehensive geriatric assessment for older adults admitted to hospital: meta-analysis of randomised controlled trials. *BMJ*. 2011; 343:d6553. [PubMed: 22034146]
23. Jayadevappa R, Bloom BS, Raziano DB, Lavizzo-Mourey R. Dissemination and characteristics of Acute Care for Elders (ACE) units in the United States. *Int J Technol Assess Health Care*. 2003; 19(1):220–7. [PubMed: 12701953]
24. National Research Council. *Retooling for an aging America: building the health care workforce*. National Academies Press; Washington (DC): 2008.
25. Bardach SH, Rowles GD. Geriatric education in the health professions: are we making progress? *Gerontologist*. Mar 6.2012 Epub ahead of print.
26. Nurses Improving Care for Health-system Elders. Knowledge center [Internet]. NICHE; New York (NY): May 15. 2012 cited Available from: http://nicheprogram.org/knowledge_center
27. Farber JI, Korc-Grodzicki B, Du Q, Leipzig RM, Siu AL. Operational and quality outcomes of a mobile acute care for the elderly service. *J Hosp Med*. 2011; 6(6):358–63. [PubMed: 21834119]
28. Malone ML, Vollbrecht M, Stephenson J, Burke L, Pagel P, Goodwin JS. Acute Care for Elders (ACE) tracker and e-Geriatrician: methods to disseminate ACE concepts to hospitals with no geriatricians on staff. *J Am Geriatr Soc*. 2010; 58(1):161–7. [PubMed: 20122048]
29. Siu AL, Spragens LH, Inouye SK, Morrison RS, Leff B. The ironic business case for chronic care in the acute care setting. *Health Aff (Millwood)*. 2009; 28(1):113–25. [PubMed: 19124861]
30. Shepperd S, Doll H, Angus RM, Clarke MJ, Iliffe S, Kalra L, et al. Avoiding hospital admission through provision of hospital care at home: a systematic review and meta-analysis of individual patient data. *CMAJ*. 2009; 180(2):175–82. [PubMed: 19153394]
31. Rubin FH, Neal K, Fenlon K, Hassan S, Inouye SK. Sustainability and scalability of the hospital elder life program at a community hospital. *J Am Geriatr Soc*. 2011; 59(2):359–65. [PubMed: 21314654]
32. Morrison RS, Dietrich J, Ladwig S, Quill T, Sacco J, Tangeman J, et al. Palliative care consultation teams cut hospital costs for Medicaid beneficiaries. *Health Aff (Millwood)*. 2011; 30(3):454–63. [PubMed: 21383364]
33. Coleman EA, Parry C, Chalmers S, Min SJ. The care transitions intervention: results of a randomized controlled trial. *Arch Intern Med*. 2006; 166(17):1822–8. [PubMed: 17000937]
34. Sood N, Huckfeldt PJ, Escarce JJ, Grabowski DC, Newhouse JP. Medicare's bundled payment pilot for acute and postacute care: analysis and recommendations on where to begin. *Health Aff (Millwood)*. 2011; 30(9):1708–17. [PubMed: 21900662]

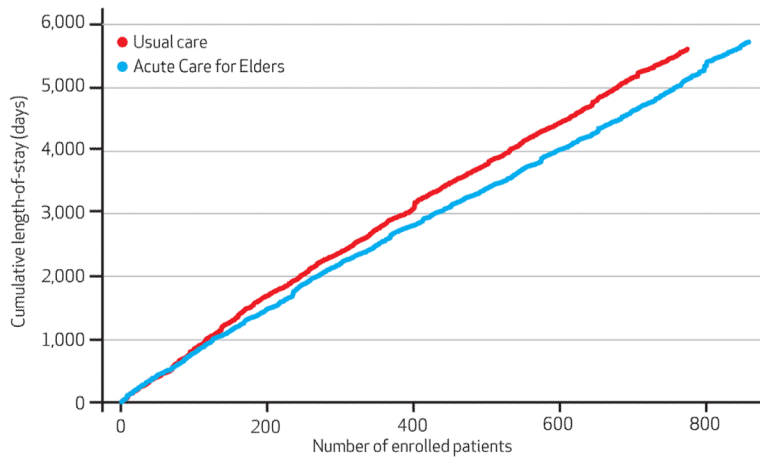


EXHIBIT 1. Cumulative Length-Of-Stay In Acute Care For Elders Intervention Versus Usual-Care Group, Per Patient Enrolled

SOURCE Authors' analysis of study data.

NOTES Cumulative length-of-stay is plotted chronologically as a function of number of patients enrolled. Mean length-of-stay was significantly shorter in the Acute Care for Elders intervention group (6.7 days per patient) than in the usual-care control group (7.3 days per patient) ($p = 0.004$).

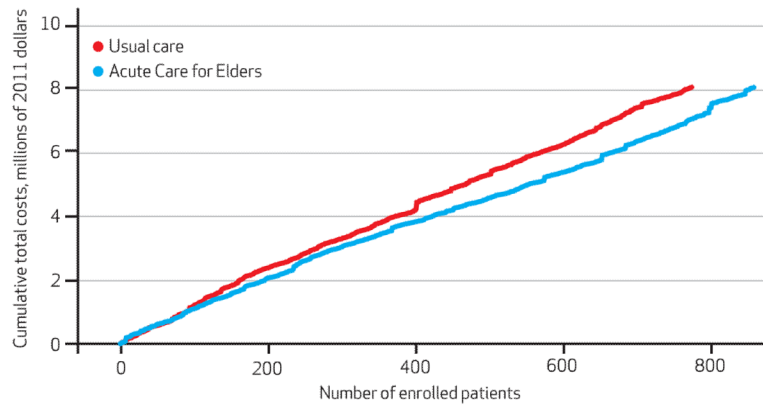


EXHIBIT 2. Cumulative Cost Of Acute Care For Elders Intervention Versus Usual Care, Per Patient Enrolled

SOURCE Authors' analysis of study data.

NOTES Cumulative costs are plotted chronologically as a function of the number of patients enrolled. Mean costs were significantly lower in the Acute Care for Elders intervention group (\$9,477 per patient) than in the usual-care control group (\$10,451 per patient) ($p < 0:001$).

EXHIBIT 3**Changes In Patients' Functional Ability From Admission To Discharge, Acute Care For Elders (ACE) Intervention And Usual-Care Groups**

Functional ability	ACE patients (n = 858)	Usual-care patients (n = 774)
BASIC ACTIVITIES OF DAILY LIVING		
Improved	23%	25%
Maintained	60	56
Declined	17	20
INSTRUMENTAL ACTIVITIES OF DAILY LIVING		
Improved	33	35
Maintained	46	47
Declined	20	18
MOBILITY		
Improved	28	30
Maintained	40	39
Declined	32	31

SOURCE Authors' analysis of study data.

NOTES Differences between Acute Care for Elders intervention group and usual-care group were not significant. Data missing as follows: basic activities of daily living (46, ACE; 31, usual care); instrumental activities of daily living (202, ACE; 169, usual care); mobility (208, ACE; 176, usual care). Detailed data are provided in Technical Appendix Exhibit 2 (see Note 14 in text).

EXHIBIT 4**Comparison Of Process-Of-Care Measures In Acute Care For Elders (ACE) Intervention And Usual-Care Groups**

Measure	ACE patients	Usual-care patients
Physical therapy consult	40%	46% ^a
Bed rest order	36	35
Physical restraints	11	13
Discharge planning documentation	47	59 ^a
In-hospital mortality	5	3
Discharged to home	70	69
Three-month hospital readmission	20	19

SOURCE Authors' analysis of study data.

NOTES Data missing as follows: physical therapy consult (205, ACE; 224, usual care); bed rest order (108, ACE; 119, usual care); physical restraints (16, ACE; 19, usual care); discharge planning documentation (15, ACE; 19, usual care); discharged to home (22 ACE; 19, usual care), three-month hospital readmission (412, ACE; 347, usual care). *p* values based on chi-square tests excluding missing values. Detailed data are provided in Technical Appendix Exhibit 3 (see Note 14 in text). Sample sizes for ACE intervention and usualcare groups are in Exhibit 3.

^aSignificant difference between ACE and usual care (*p* = 0.05).