



## Research Article

# Implementation of an Acute Care for the Elderly (ACE) Unit in a Community Hospital

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### Abstract

**Background:** "Baby boomers" represent 15% of the total population of the United States but 50% of its total healthcare expenses. The growth of this population will have a corresponding rise in demand for healthcare resources.

**Problem:** A small community hospital in Northern California has a more significant percentage of patients 65 years and older than other facilities within this delivery system. On the 24-bed intervention unit, an overall fall rate of 2.17 per 1000 patient days was present compared to a national fall rate of 3-5 falls per 1000 patient days. The baseline 30-day readmission rate for this unit of four patients per month, and the length of stay was 3.9 days. Patients on this unit had a discharge diagnosis of delirium of 18% compared to a national range of 3-16%.

**Methods:** Literature review revealed a geriatric model of care improved patient outcomes. A cost avoidance analysis was conducted, and the development and definition of inclusion/exclusion criteria and a microsystem assessment.

**Interventions:** An ACE unit pilot was implemented in this community hospital with key interventions of an ACE Steering Committee, physical modifications to the unit and daily multi-disciplinary rounds.

**Results:** Outcome data were collected on 51 patients admitted to the ACE unit between April 26, 2021 and August 31, 2021. The length of stay was reduced by two days, and no significant changes in the number of patients discharged with a delirium diagnosis occurred. One fall without injury was recorded for the unit, and there were no 30-day readmissions to the ACE unit.

**Conclusion:** The ACE unit in one community hospital improved outcomes with reduced falls, lengths of stay, and readmissions. Hospital

administrators and nursing leaders need to consider expanding the inclusion criteria and introducing ACE unit implementation with concurrent evaluation.

**Keywords:** Acute care for the elderly; Delirium; Falls; Geriatric; Length of stay; Outcomes

### Introduction

As a result of continued advancements in medicine, more people live longer. In 2014, there were 46.3 million Americans (14.5%) aged 65yo and older, and this will increase to about 98 million (23.5%) by 2060 [1]. This led to exponential growth in healthcare services to meet the increased demands and complex needs of patients over 65yo. Admitted patients over 65yo are at higher risk for hospital-associated complications [2]. The unfamiliar environment puts hospitalized patients at a higher risk for falls and delirium [3,4], and hospitalizations pose a future risk to patients when their functional independence is not restored before discharge [5]. Absent mitigating factors, associated medical costs will only rise, negatively impacting older adults' health and quality of life and further burdening the healthcare system.

Due to a more significant percentage of patients 65yo and older in this small community hospital than in other facilities within this delivery system, admission to a medical-surgical unit, also called usual care, is not sufficient to meet the needs of older adults. Acute Care for the Elderly (ACE) is a model of specialized care first implemented in the early 1990s [5]. It is one of the geriatric models of care that help older adults maintain their functional status by implementing an organized approach to acute care. The original Randomized Clinical Trials (RCTs) revealed the benefit of applying four basic principles to the care of older patients: (a) modified physical environment, (b) multidisciplinary care team, (c) daily medical review and (d) early discharge planning [5]. This model of care does not currently exist in this health care system.

### Methods/Interventions

The project was implementing an 8-bed ACE unit consisting of several interventions: physical modifications, daily multidisciplinary team management and rounds with a focus on cognitive and functional status, medical review and focus on early discharge. Informal discussions with Patient Care Services and medical staff leaders revealed support for an ACE unit. Although the literature supports a mobile ACE unit [6] this hospital had the physical space for a designated ACE unit, inclusive of a patient room converted into a socialization room for patient activities promoting maintenance of functional and mental ability. The multidisciplinary team consisted of a geriatrician, hospitalist, pharmacist, social worker, Patient Care Coordinator (PCC), geriatric Clinical Nurse Specialist (CNS), PCT and the bedside RN assigned to the patient.

Initial meetings were held with the unit's frontline staff, soliciting stakeholder support. The ACE Champions consisted of staff RNs interested in acute care of the elderly who were working on one of

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two medical/surgical floors. Education for the multidisciplinary team included the history of the ACE unit, geriatric syndrome and the rationale behind proposed interventions. The ACE Steering Committee was comprised of nursing leadership, physician leadership (including geriatrics and hospital-based services), and representatives from key departments, such as social work, patient care coordinator, physical/occupational therapy, pharmacy, spiritual care, and others.

Examples of interventions proposed included physical plant modification, which allowed for safety and considered sensory impairment which required wall color changes and modified flooring, early ambulation, and multidisciplinary rounding. Geriatric patients often see colors and patterns differently as they age [7], early ambulation can assist with minimizing functional decline [5], and multidisciplinary rounding ensures the entire team is following the same plan of care [8]. Environment preparation for older adults, such as handrails in the hallways, visually contrasting floor coverings, enhanced lighting, and minimal clutter, is mentioned in several of the studies found in the literature review [2,5,9]. Flooring and some lighting were replaced in the ACE unit for this project. Although handrails for the hallways were requested, they were not installed before this project.

The ACE unit welcomed its first patients on April 26, 2021, collecting data for the following 120 days. Patients in the ED needing admission to the hospital were evaluated by a hospitalist and admitted using inclusion and exclusion criteria. Inclusion criteria (Appendix A):

- Age 75 years or older:
- Ambulatory
- Medical diagnosis

Once the admitting order was written, the house supervisor was notified of the admission. Patients and/or family members were consulted for permission before admittance to the ACE unit. The hospitalist entered notes into medical records regarding patient admissions to the ACE unit to help with identification. Upon admission, part of the RN patient assessment is performing the Confusion Assessment Method (CAM) and completing a fall risk assessment using the Schmid fall risk tool. In addition, the clinician assessed the level of function as CLOF, and the patient stated level of function was noted as PLOF. Multidisciplinary team rounds took place Monday through Friday, with some team members utilizing Microsoft Teams in place of in-person attendance. Attendance by team members at rounds was strong, and the team became more engaged as they became more familiar with the process. Attendance continued to be a barrier for nursing staff due to the time of rounds and lack of coverage for their other patients. Due to the resurgence of COVID-19, visitors were limited during most of the pilot period for the ACE unit. Ideally, family members would have participated in some aspects of the patient's care, such as assisting with ambulation and activities in the socialization room. However, patients relied exclusively on nursing and support staff to assist in getting them up to use the socialization room. A music therapy program was started, and the hospital was in the final stages of implementing a canine therapy program.

## Results

### CQI method and/or data collection instruments

Patients admitted to the ACE unit were tracked by bed number. We protected patients' confidentiality by eliminating any identifying

data (name, medical record number, or birth date). Data were collected from the incident reporting system, Medical Information Data Analysis System (MIDAS), for patient falls. Delirium was tracked using the CAM scoring system. Patients admitted to the ACE unit were compared to the baseline established in the database, and patients not admitted to the ACE unit but admitted to the same floor. Total census, readmissions, and LOS were obtained from the EHR and reported using Tableau software.

### Analysis

The initial steps of the intervention included locating the space for the project, developing inclusion and exclusion criteria and educating the team. No changes were made to the interventions during the 120-day pilot period. Chi-square was used to determine if being on the ACE unit was related to a fall or a delirium diagnosis. The data used were the two groups of patients: ACE unit patients and usual care patients, and the outcomes of falls and delirium. The Chi-Square was  $X^2 = 1.78$ ,  $p = 0.18$ , which suggests that the sample size was not large enough to demonstrate an association between the variables (Appendix B). Pearson's correlation demonstrated whether two variables correlate or relate to each other (Appendix C). Patients were identified by a geriatric consult that allowed them to be included in the data set. Any patient fall was reported using the MIDAS system. Delirium diagnoses were tracked via the EHR. The data were obtained from a Tableau report and analyzed using Excel.

A favorable variance from admission CLOF to discharge CLOF indicated improved function. The CLOF variance and the number of falls had a mildly positive correlation among the patients admitted to the ACE unit,  $r(3) = 0.24$ ,  $p = 0.7$ . For the same group of patients, the number of falls and a discharge diagnosis of delirium had a strong negative correlation,  $r(3) = -0.79$ ,  $p = 0.11$ . Finally, for the same group of patients, the CLOF variance and the patients with a discharge diagnosis of delirium had a mildly negative relationship,  $r(3) = -0.082$ ,  $p = 0.9$ . The average LOS was reduced from four days for the baseline/usual care group to 2 days for the ACE unit patients. There were no readmissions to the ACE unit during the pilot period; however, there were ten patients identified who had been admitted to the ACE unit during the pilot period and were readmitted to the hospital but did not meet ACE unit criteria and were not admitted with a delirium diagnosis. Further analysis of the readmitted patients is required.

Initially proposed staffing was an RN to patient ratio of one RN to four patients and one PCT for the unit. However, the PCT for this unit was not consistently provided due to challenges recruiting PCTS. The RN assigned to the ACE unit did not consistently have a PCT assigned. A Gantt chart was completed to track significant milestones for the project. Concurrent with physical plant modifications were meetings with front-line nursing and medical staff. The project was delayed due to COVID-19; however, that was factored into the Gantt chart. Therefore, the proposed implementation of the ACE unit in quarter 2 of 2021 was still correct. A post-implementation survey tool after the pilot period measured structure and process.

### Return on Investment (ROI)

A review of the proposed outcomes was analyzed with the Area Finance Officer (AFO). Although readmissions and LOS were not originally included in the outcome measurements, the literature supported a reduction in LOS and readmissions by implementing an ACE unit [5,10]. The daily cost for a medical admission was \$2,260. The

LOS was 3.9 for a patient over the age of 75 with a medical diagnosis. In analyzing the baseline for LOS, it was determined that a reduction of 0.5 patient days would result in cost avoidance of \$1,130 per patient, or \$271,200 pro-rated from May through December.

The average number of readmissions for patients over the age of 75 was 4 per month, with an associated cost of \$11,300 per readmission. If the ACE unit could reduce that by 2 per month, that would represent a cost avoidance of \$22,600 or \$180,800 pro-rated from May through December. The actual cost avoidance based upon a reduction in LOS of 2 days equaling \$18,080 occurred for the pilot period. Although there were no readmissions to the ACE unit, there were 10 readmissions of patients who had been on the ACE unit. This averaged 2.5 readmissions per month during the pilot, which is 1.5 readmissions less than baseline, for a cost avoidance of \$28,250 per month of the pilot.

## Discussion

This project aimed to decrease harm and maintain functional status for older hospitalized adults by implementing the ACE unit model of care. A key finding from the data analysis was the strong negative correlation between falls and a discharge diagnosis of delirium, indicating that the ACE unit, with intentional care planning designed to minimize harm, was relevant to the project's aim. The mildly positive correlation between the CLOF variance and falls also demonstrated relevance. The mildly negative relationship between the CLOF variance and a delirium diagnosis showed no strong relationship between the CLOF variance from admission to discharge and a diagnosis of delirium.

The lack of readmissions to the ACE unit and the reduction in LOS showed further relevance. The organized approach to the care of older adults, including an early focus on discharge planning and attempting to return patients to their baseline location, is in line with the aim of the ACE unit. However, the cost of readmission to the hospital, not just the ACE unit, was the factor in the ROI in this project and bore further analysis and discussion. The project's strength was applying the evidence-based research to a demographic that matched the results shown in the literature review. Before the project, a gap analysis was completed, comparing the current state to the ideal state. Identified gaps included lack of awareness by senior leadership and medical staff about the ACE model, lack of specific education available to staff and available space. Presentations on the ACE model of care were given to leadership and medical staff, and the geriatric CNS offered numerous sessions for both nursing and allied health personnel. The issue of space was addressed by increasing the minimum age to 75yo to mitigate the volume of potential ACE patients.

Regular meetings with the ACE RN champions were crucial to this project. The ACE RN champion group remained committed to improving the care of older adult hospitalized patients. A key lesson was related to communication, as the post-project survey revealed that some staff did not feel fully informed of the goals for the ACE unit. The ACE RN champions determined that the evening and night shift staff did not feel adequately informed about the ACE project. An improved communication strategy will be developed to address this issue.

New possibilities included the ongoing refining of admission criteria. One consideration included reducing the minimum age to 70. Fine-tuning and spreading the ACE model to other facilities will be more feasible once the workload and census at other facilities have decreased.

## Limitations

There were no identified risks or barriers to the implementation of the project. Factors that may have limited the internal validity included the low number of patients, with the pilot period having 51 patients. It was predicted that the eight ACE unit beds would be full; however, excluding telemetry patients and raising the age hindered that goal. The onset of the fourth wave of COVID-19 impacted this hospital differently than hospitals within the region-wide organization. The vaccine percentage for the county in which the hospital is located was as high as 90% for eligible recipients by June 2021 [11] making it the highest vaccinated county in California [12]. The result was available beds which were filled by patients with COVID-19 from other facilities more highly impacted, thus limiting the rooms available for patients meeting the criteria for the ACE unit. A further limitation was that ACE unit nurses were not exclusively focused on ACE unit patients. The mix of COVID-19 patients with ACE patients also brought about the potential risk for cross-contamination. Since the physical ACE unit is not able to reserve patients for which the unit is designed, a mobile ACE may be considered in the future [6].

## Conclusion

The critical review and appraisal of the literature described herein support implementing a standardized approach to assessing and caring for elderly patients in an ACS, using some or all of the same components recommended by experienced authors. The literature supports optimizing care processes to improve patient experiences and provider satisfaction by introducing the ACE model of care in an acute hospital setting. Working with the hospitalist service and a geriatrician offered an appropriate clinician/provider model for the ACE unit. Implications for practice are substantial, with further refinement of the model by the continued partnership with the staff geriatrician and appropriate staffing support for the unit. The original recommendation was inclusion of patients 65 and older. However, upon consultation with the staff geriatrician and analysis of demographic information regarding the percentage of patients over the age of 65 for this hospital service area, the decision was made to increase the age to 75 for admission to the ACE unit, so the demand for beds was not likely to be exceeded. The anticipated census was not realized previously, and the age limit for inclusion will be lowered to 70. Another implementation for practice is the partnership developed with the members of a multidisciplinary team, geriatrician and PCS leadership.

A well-planned, multifaceted, and evidence-based project is ready for implementation utilizing systems thinking, interprofessional collaboration and patient-centered care. The ACE model is the right solution to pilot test for the older adult population at this hospital, which has designated unit for bed capacity and socialization room, senior leader and physician support, and experienced, enthusiastic nurse program planners and clinical specialists. Lessons learned will be tracked, and opportunities for replication across regional sites are recommended as the ACE unit project aims to maximize quality outcomes and minimize the functional decline of elderly patients in an ACS.

## Funding

The implementation of the ACE unit was supported by both local and regional leadership, and, in turn, the minor physical plant modifications, furniture, and education were supported by the local facility budget. Although the organization did not influence the unit's design, the implementation of the project was a strong team effort. The reporting of data was done by a regional data analyst who also assisted with some interpretation of the data.

## References

1. Colby SL, Ortman JM (2014) Projections of the Size and Composition of the U.S. Population: 2014 to 2060. Census Bureau, Washington, DC., USA.
2. Fox MT, Sidani S, Persaud M, Tregunno D, Maimets I, et al. (2013) Acute care for elders components of acute geriatric unit care: Systematic descriptive review. *J Am Geriatr Soc* 61: 939-946.
3. Collier R (2012) Hospital-induced delirium hits hard. *CMAJ* 184: 23-24.
4. Dykes PC, Carroll DL, Hurley A, Lipsitz S, Benoit A, et al. (2010) Fall prevention in acute care hospitals: A randomized trial. *JAMA* 304: 1912-1918.
5. Palmer RM, Landefeld CS, Kresevic D, Kowal J (1994) A medical unit for the acute care of the elderly. *J Am Geriatr Soc* 42: 545-552.
6. Hung WW, Ross JS, Farber J, Siu AL (2013) Evaluation of the mobile acute care of the elderly (MACE) service. *JAMA Intern Med* 173: 990-996.
7. Warner C (2018) The importance of color and pattern in senior living design. Warner Design Associates, California, USA.
8. Yoo JW, Kim S, Seol H, Kim SJ, Yang JM, et al. (2013) Effects of an internal medicine floor interdisciplinary team on hospital and clinical outcomes of seniors with acute medical illness. *Geriatr Gerontol Int* 13: 942-948.
9. Landefeld CS, Palmer RM, Kresevic DM, Fortinsky RH, Kowal J (1995) 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* 332: 1338-1344.
10. Barnes DE, Palmer RM, Kresevic DM, Fortinsky RH, Kowal J, et al. (2012) Acute care for elders units produced shorter hospital stays at lower cost while maintaining patients' functional status. *Health Aff (Millwood)* 31: 1227-1236.
11. County of Marin (2021) Marin reaches 90% of eligible vaccine recipients. County of Marin, California, USA.
12. Hwang K (2021) Marin is the most vaccinated county in California, but cases are surging in one community. Here's why. *San Francisco Chronicle*, San Francisco Chronicle, California, USA.

Inclusion	Exclusion
Age 75 years or older	Alcohol Abuse
Ambulatory	elderly patient with no rehabilitation potential
Medical Diagnosis	1:1 sitter (no active psychiatric behavior, ETOH, suicidal, and combative)
Pneumonia	*Actively delirious (disruptive behavior)
UTI	*Severe dementia (with behavioral disturbance, non-redirectable)
Anemia	Isolation
Dehydration	comfort care
COPD	placement issues
Infection	long-term care
	stroke
	telemetry
	surgical patients

**Appendix A: Inclusion criteria**

Note: \* = with consultation by geriatrician

Variable	Fall	Delirium diagnosis
ACE Unit*	2	10
Non-Ace Unit (usual care)**	5	79

**Appendix B: Chi-Square.**

Note: \*n = 51 ACE patients.

\*\*n = 285 non-ACE or usual care patients

	Falls	Admits w/ delirium final Dx
T score CLOF Variance	0.246878039	-0.08161444
	Falls	T score CLOF Variance
Admits w/ delirium final Dx	-0.79056942	-0.08161444
	Admits w/delirium final dx	T score CLOF Variance
Falls	-0.79056942	0.246878039

**Appendix C: Pearson's Correlation Coefficient.**



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