Frailty Identification and Care Pathway: An Interdisciplinary Approach to Care for Older Trauma Patients

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BACKGROUND: Frailty is a well-established marker of poor outcomes in geriatric trauma patients. There are few interventions to improve outcomes in this growing population. Our goal was to determine if an interdisciplinary care pathway for frail trauma patients improved in-hospital mortality, complications, and 30-day readmissions.

STUDY DESIGN: This was a retrospective cohort study of frail patients ≥65 years old, admitted to the trauma service at an academic, urban level I trauma center between 2015 and 2017. Patients transferred to other services and those who died within the first 24 hours were excluded. An interdisciplinary protocol for frail trauma patients, including early ambulation, bowel/pain regimens, nonpharmacologic delirium prevention, nutrition/physical therapy consults, and geriatrics assessments, was implemented in 2016. Our main outcomes were delirium, complications, in-hospital mortality, and 30-day readmission, which were compared with these outcomes in patients treated the year before the pathway was implemented. Multivariate logistic regression was used to determine the association of being on the pathway with outcomes.

RESULTS: There were 125 and 144 frail patients in the pre- and post-intervention cohorts, respectively. There were no significant demographic differences between the 2 groups. Among both groups, the mean age was 83.51 years (SD 7.11 years), 60.59% were female, and median Injury Severity Score was 10 (interquartile range 9 to 14). In univariate analysis, there were no significant differences in complications (28.0% vs 28.5%, respectively, $p = 0.93$); however, there was a significant decrease in delirium (21.6% to 12.5%, respectively, $p = 0.04$) and 30-day readmission (9.6% to 2.7%, respectively, $p = 0.01$). After adjusting for patient characteristics, patients on the pathway had lower delirium (odds ratio [OR] 0.44, 95% CI 0.22 to 0.88, $p = 0.02$) and 30-day readmission rates (OR 0.25, 95% CI 0.07 to 0.84, $p = 0.02$), than pre-pathway patients.

CONCLUSIONS: An interdisciplinary care protocol for frail geriatric trauma patients significantly decreases their delirium and 30-day readmission risk. Implementing pathways standardizing care for these vulnerable patients could improve their outcomes after trauma. (J Am Coll Surg 2019;228:852–860.

The American population is rapidly aging. By 2030, 1 in 5 Americans will be 65 years or older, and by 2050, there will be 18 million Americans over the age of 85—double the current population.[1] This demographic shift will be also be reflected among trauma patients: by 2050, 40% of all trauma patients will be over the age of 65.[2] Older

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patients are at higher risk of mortality and morbidity after trauma; however, age does not completely account for worse outcomes. Instead, frailty, the progressive decline of physiologic reserves and the accumulation of deficits, is a more reliable predictor of adverse outcomes.[3-7] Frail patients are more than twice as likely to experience in-hospital complications and discharge to skilled nursing facilities.[6] They are also more likely to experience loss of function and be readmitted for repeat trauma or to die within 6 months after discharge when compared with nonfrail patients.[6,8] Additionally, whereas 11% of older patients in the general population are frail, up to 50% of older geriatric trauma patients are frail, and as many as 78% have functional impairment before their injury.[6,9] Therefore, a growing number of frail older geriatric trauma patients will require specialized care to meet their complex medical needs.

Vulnerable older patients benefit from interdisciplinary models of inpatient care.[10] Interdisciplinary interventions that emphasize geriatric-centered care, such as nurse-driven protocols, orthogeriatric units, and geriatric co-management, have improved processes of care and outcomes for hospitalized older patients. Programs such as Hospital Elder Life Program (HELP) and the Nursing Improving Care of Healthsystem Elders (NICHE) rely on geriatric nurse specialists to educate peers about geriatric care, and have reduced delirium incidence, hospital length of stay, and patient complications.[11-13] Orthogeriatric units for patients with hip fractures focused on improving mobility, and standardized pain regimens have demonstrated reduced 6-month mortality and morbidity.[14] Interventions in older trauma patients have also delivered better functional outcomes and improvements in geriatric care processes; however, these efforts have focused largely on geriatric consultation rather than an interdisciplinary approach to care.[15,16]

At our urban level I trauma center, we hired a board-certified geriatrician to consult on our older trauma patients in 2014. Although there were meaningful improvements in care, which have been reported previously,[16] we noticed gaps in care when the geriatrician was unavailable and that recommendations from the geriatric team were not uniformly instituted. Therefore, we hypothesized that an interdisciplinary, standardized care pathway for frail patients admitted to our inpatient trauma floor could further improve outcomes among our older patients.

METHODS

Intervention

Pathway development

The primary goal of this study was to leverage existing resources in our trauma program to develop and test a standardized, evidence-based interdisciplinary pathway of care to reduce delirium and complications in frail geriatric trauma patients. The Frailty Identification and Care Pathway was created over a period of 6 months, after extensive literature review by an interdisciplinary team including representatives from trauma surgery, geriatrics, nursing, nutrition, physical and occupational therapy, speech and language pathology, social work, and care coordination.

Rollout of the pathway included extensive educational efforts for all the nurses, ancillary staff, residents, and attending staff who most frequently care for older patients on the trauma unit and in the ICU. Residents and physician assistants received an educational presentation and a pocket card for easy reference. Nursing appointed a nurse champion, peer education, and a paper checklist that served as a physical reminder of the components of the pathway and tasks for each shift. To address high rates of turnover among the clinical staff and trainees, we also developed an online, mandatory educational module for viewing before joining the trauma service. Finally, biweekly rounds attended by the residents, the trauma geriatrician, physical therapists, nutritionists, social workers, and nurses reinforced the pathway principles and allowed the trauma geriatrician to directly answer staff questions. This continuous informal education process provided all clinicians with the opportunity to learn more about geriatric-centered care and the decision-making process behind specific orders on the pathway, and fostered buy-in from clinical staff at all levels.

Elements of the pathway

Patients 65 years and older are screened for frailty by an admitting surgical resident in the emergency department on admission using the 5-item FRAIL Scale.[17] The FRAIL scale has been validated as a reliable method for ascertaining frailty in community dwelling elders and includes questions about fatigue, resistance, ambulation, illness, and weight loss in the previous 6 months.[7,17-19] Patients who screened positive for any 1 component of the scale or have a pre-existing cognitive impairment are entered onto the pathway. A standardized order set is used to alert clinicians as to which patients are on the pathway and to direct geriatric-focused care processes to promote early mobilization and nutrition, prevent delirium, and identify a health care proxy and existing advance directives. The orders also triggered consults for geriatrics, physical therapy, nutrition, and social work within 72 hours of admission (to account for gaps in weekend coverage). An interdisciplinary family meeting is offered to patients on the pathway with a hospital length of stay (LOS) $\geq$ 5 days to address medical and social issues around

non-home discharge, prognosis, and goals of care. All patients, regardless of the mechanism of injury, received fall prevention education before discharge. Elements of the pathway are described in Table 1. The pathway is restricted to patients who were admitted to and discharged from the trauma service and are located on a single floor including the 2 surgical ICUs and 2 step-down units, where most patients admitted to the trauma service receive care.

Study cohort

Patients were enrolled in the study April 1, 2015 through March 31, 2016 for the pre-intervention group, and October 1, 2016 through September 30, 2017 for the post-intervention group. The pathway was fully implemented on October 1, 2016. The 6-month gap represents a washout period in which elements of the pathway were rolled out on different parts of the trauma unit. Inclusion criteria in the pre- and post-intervention groups were as follows: patient 65 years or older admitted to the trauma service and survived more than 24 hours; patient admitted to and discharged from the trauma unit; and patient determined to be pre-frail or frail by a geriatrician's assessment. Patients admitted to the pathway but transferred to other services, or those who were determined to be robust after geriatric evaluation, were excluded from the analysis.

Data source

Data for intervention subjects were collected from the trauma registry, electronic health records (EHR), and the paper checklist that nurses completed on each shift. Data for the pre-intervention group were collected from the trauma registry and the EHR.

Study variables

Patient characteristics included age, sex, race, comorbidities, injury mechanism, Injury Severity Score, emergency department heart rate and systolic blood pressure, and status on the frailty pathway. Data on the number of physical therapy, nutrition, and social work consults were also collected to compare differences between the pre- and post-implementation groups.

Patient outcomes

The main outcomes of interest were delirium, major complications, as described by the Trauma Quality Improvement Project,[20] in-hospital mortality, and 30-day readmission to our institution. Patients in the pre- and post-intervention groups were considered to have delirium if they had documented positive Confusion

Table 1. Elements of the Frailty Identification and Care Pathway

Pathway domain	Clinical care	Consult
Delirium prevention	• Confusion assessment method • Nurse assessment every 8 h • Nonpharmacologic management of delirium • All meals out of bed and early ambulation • Bowel regimen to avoid constipation • Nurse stool assessments every shift • Avoid stool softener • Minimize opiate use • Nurse bedside speech and swallow screen • Avoid overnight vital signs	Geriatrics
Mobility	• Early ambulation • Meals out of bed	Physical therapy
Medication management/prognostic assessment	• Medication review • Comprehensive geriatric assessment • Vitamin D screening • Assessments every shift	Geriatrics
Reducing other complication	• Early nutrition • Vitamin D screening • Aspiration precaution • Head of bed elevated • Meals out of bed • Hydrogen peroxide mouth swab	Nutrition; speech and language pathology
Social needs/goal setting	• Identify a health care proxy (within 24 h) • Establish code status (within 24 h) • Family meeting (if stay exceeds 5 d)	Social work (if living alone)
Injury prevention	• Fall prevention education	–

Method Assessment (CAM) screening conducted by the geriatrician at least once during their hospital stay, if delirium was listed as part of the patient's problem list, or if there were treatments specifically ordered for delirium at any point during their hospital stay.[21]

Statistical analysis

Baseline demographic, clinical, and injury characteristics of the pre- and post-pathway groups were compared using Wilcoxon rank sum tests for continuous variables and Fisher's exact tests for categorical variables. Absolute risk reduction values were calculated to determine the changes in patient outcomes after the intervention. Multivariate logistic regression was used to determine the association of being on the pathway with outcomes. Interactions were tested between relevant variables. Models were adjusted for patient age, sex, race, and Injury Severity Score.

A post-hoc power analysis was performed to determine the sample size needed to detect significant differences in outcomes between the patient groups having a power $(1 - \beta)$ of 80%. Data analyses were performed using Stata 14, and the threshold for statistical significance was set at $p < 0.05$.

RESULTS

A total of 269 patients were included for analysis; 125 in the pre-intervention group and 144 in the post-intervention group. There were 242 patients $\geq$ 65 years old in the trauma registry during the pre-intervention period. Of these, 150 received a geriatric assessment and 125 were considered pre-frail or frail. There were 218 patients $\geq$ 65 years old in the trauma registry during the intervention period. Of these, 204 were screened for frailty by a resident, 190 screened positive, and 161 were admitted to the trauma unit and evaluated by the geriatrician. Patients excluded from the analysis were transferred to other services (n = 6) or deemed robust after geriatric assessment (n = 11), resulting in the final 144 patients included in the post-intervention group.

There were no significant demographic differences between the 2 groups. Most patients were female (63.2% and 58.3%, respectively), white (92.8% and 88.1%), and had sustained a fall (92.8% and 86.1%). The mean Injury Severity Score (ISS) was similar in both groups (Table 2). After implementation of the pathway, consults for physical therapy, nutrition, and social work increased significantly ($p < 0.05$) (eTable 1). Before the intervention, 21.6% of patients had delirium, 28.0% experienced complications, in-hospital mortality was 7.2%, and 9.6% were readmitted within 30 days. After the intervention, 12.5% were diagnosed with delirium during their stay ($p = 0.04$), while 28.5% experienced complications ($p = 0.93$). Mortality decreased to 4.1% ($p = 0.28$), and readmission within 30 days significantly decreased ($p = 0.01$). After the intervention, absolute risk reduction was 9.1%, 3.0%, and 6.8%, for delirium, in-hospital mortality, and readmission, respectively (Table 3).

Multivariate logistic regression demonstrated that patients on the pathway had significantly reduced risks of delirium (odds ratio [OR] 0.44, 95% CI 0.22 to 0.88) and readmission (OR 0.25, 95% CI 0.07 to 0.84). Moreover, female patients had a significantly reduced risk of developing delirium (OR 0.33, 95% CI 0.16 to 0.64) or a complication (OR 0.37, 95% CI 0.22 to 0.64) (Table 4). Age, race, and ISS were not significant predictors of the main outcomes.

Post-hoc power analyses showed that to detect a 5% decrease in delirium, we needed a total sample of 956. To detect a 5% decrease in in-hospital mortality and readmissions, we needed sample sizes of 548 and 810, respectively. Therefore, the study was underpowered to detect differences in key patient outcomes.

Table 2. Demographic and Admission Characteristics of Patients before and after the Frailty Implementation and Care Pathway

Characteristic	Pre-intervention group (n = 125)	Post-intervention group (n = 144)	p Value
Age, y, mean (SD)	84.26 (6.71)	82.87 (7.40)	0.11
Female, %	63.20	58.33	0.41
White, %	92.80	88.19	0.20
Mechanism fall, %	92.80	86.11	0.07
Systolic blood pressure in emergency department, mmHg, mean (SD)	148.92 (35.71)	150.23 (33.11)	0.76
Heart rate in emergency department, beats/min, mean (SD)	78.38 (17.25)	83.21 (15.57)	0.01*
Injury Severity Score, mean (SD)	11.46 (5.96)	11.78 (6.18)	0.65

*Significant.

Table 3. Patient Outcomes after Implementation of the Frailty Identification and Care Pathway

Patient outcome	Pre-intervention group, % (n = 125)	Post-intervention group, % (n = 144)	p Value	Absolute risk reduction, %
Delirium	21.60	12.50	0.04*	9.1
Major complication	28.00	28.47	0.93	−0.4
In-hospital mortality	7.20	4.17	0.28	3.0
Readmission within 30 d	9.60	2.78	0.01*	6.8

*Significant.

DISCUSSION

Geriatric-centered interdisciplinary care has an important role in improving outcomes for hospitalized older trauma patients. Our study showed that early identification of frailty and the implementation of a standardized, interdisciplinary clinical pathway on the trauma service significantly reduced the rates of delirium and readmission within 30 days. The success in implementing this pathway without incurring additional resources other than educational materials indicate that this model, or elements of this model, may be feasible in other settings.

Our work corroborates the work of others in demonstrating that care pathways targeted to the needs of geriatric trauma patients improve outcomes. Mangram and colleagues[22] showed that a dedicated geriatric trauma unit, which included dedicated physical space, a geriatric trauma activation with immediate hospitalist evaluation, and hospitalist co-management for medical illnesses and preoperative clearance, was associated with decreased mortality, complications, and reduced hospital length of stay. Others showed that a geriatric consult-based intervention improved performance on established quality measures for older trauma patients and was also associated with better long-term functional outcomes at 6 months.[15,23] Our own study showed that a triggered geriatric consult model was associated with improved documentation of delirium, hospital mortality, readmissions, and length of stay.[16]

Here, we extend our previous findings by demonstrating that geriatric-directed interdisciplinary care processes improved outcomes over geriatric consultation alone. Our study is unique in that the intervention was targeted based on frailty rather than age. Because frailty is associated with worse outcomes in older trauma patients, directed care to meet the needs of the most vulnerable patients allows for more efficient resource use. Furthermore, in this pathway, geriatric care processes such as delirium prevention, early mobilization, and aspiration prevention were put in place before geriatric consultation and without creating a dedicated geriatric unit. Identifying approaches to incorporating geriatric processes of care into routine trauma care and educating trauma clinicians about principles of geriatric medicine, is increasingly important, as a national shortage of geriatricians and geriatric resource programs in trauma centers makes geriatric consultation alone an unrealistic way to meet the special demands of geriatric trauma patients.[9,24]

Delirium is one of the most common complications in older patients and it significantly increases hospital length of stay, discharge to an institution, and 6-month mortality.[17,24] The Hospital Elder Life Program, which targets cognitive, visual, and hearing impairment, sleep deprivation, and dehydration, reduced delirium incidence by 34% in general medicine patients over the age of 70.[25] This and other multicomponent geriatric programs, such as NICHE, have reduced the delirium incidence in nontrauma geriatric patients.[12] Frail geriatric trauma patients not only have pre-existing neuropsychiatric and medical conditions that increase risk for delirium, they also have complex injuries requiring specialized care that may make it difficult to implement proven nonpharmacologic delirium prevention methods, such as avoiding

Table 4. Multivariate Logistic Regression to Determine the Association of the Frailty Identification and Care Pathway and Outcomes

Variable	Outcome, odds ratio (95% CI)			
	Delirium	Major complication	Mortality	Readmission
Frailty pathway	0.44 (0.22−0.88)*	0.97 (0.55−1.68)	0.57 (0.19−1.70)	0.25 (0.07−0.84)*
Age	0.98 (0.94−1.03)	1.00 (0.96−1.04)	1.08 (0.99−1.18)	0.97 (0.90−1.04)
Female sex	0.33 (0.16−0.64)*	0.37 (0.22−0.64)*	0.40 (0.13−1.20)	2.01 (0.62−6.53)
Nonwhite race	2.02 (0.72−5.62)	1.03 (0.40−2.64)	0.65 (0.08−5.23)	0.74 (0.08−6.07)
Injury Severity Score	1.01 (0.95−1.06)	1.01 (0.97−1.06)	0.98 (0.89−1.07)	1.06 (0.98−1.14)

Model adjusted for age, sex, race, and Injury Severity Score.
*Significant.

catheterization, canceling vital signs overnight, and early ambulation.[26] Additional hospital and operative factors, such as admission to ICUs and use of anesthesia, make delirium especially difficult to prevent and treat in this population.[11,17] Our study showed that translating evidence-based geriatric protocols predicated on prevention, early recognition, and nonpharmacologic management of delirium from medical to trauma patients is a highly promising approach to reducing delirium in the latter.

Minimizing hospitalizations for older adults is of critical importance. Thirty-day readmission rates are considered an indicator of hospital care quality, and account for an additional $15 billion of annual health care spending.[26] Although readmission rates vary by hospital, older adults typically experience higher readmission rates than younger adults, and 13% of Medicare beneficiaries with an injury-related admission are readmitted within 30 days of discharge.[27] Post-hospitalization syndrome, due to physiologic disruptions such as sleep-wake cycle disturbance, immobility, and inadequate nutrition during hospitalization, is an acquired, transient period of vulnerability that is associated with readmission for reasons unrelated to the initial diagnosis and is likely a driver of readmission in older trauma patients.[28] Previous geriatric co-management and interdisciplinary geriatric protocols in injured patients have also reduced 30-day readmission rates.[11,29] Similarly, the Frailty Identification and Care Pathway was designed to specifically reduce delirium, improve mobility, and mitigate physiologic disruptions that can prolong hospitalization and linger after hospital discharge.

Recently, a smaller study by Engelhardt and colleagues[30] described implementation of a care pathway for frail trauma and emergency general surgery patients that was also associated with decreased readmission rates. Although some components of the 2 pathways overlapped, such as using a specialized order set, they differed regarding the timing and type of specialist consults, injury prevention, and patient follow-up. In our pathway, we prioritized a nutrition consultation because of the widespread prevalence of malnutrition among hospitalized elders and its association with delirium,[31] and also included fall prevention education because most patients sustained a fall as their index injury, and frail patients are more likely to fall in the months after hospitalization.[8] Furthermore, fall prevention education for this large subset of our trauma patients supports our commitment to injury prevention as a level I trauma center.[32]

Interestingly, Engelhardt and associates[30] reported that fewer than 30% of screened patients in their study were frail, whereas more than 90% of our patients screened positive for frailty or pre-frailty. As in our study, it is difficult to ascertain which pathway elements were most effective at reducing readmissions. Nonetheless, promising results in both studies suggest that structured care processes, including frailty screening, mitigate the adverse effects of trauma in older adults by reducing hospital days, and therefore, lowering excessive health care costs.[10,29,33]

Identifying frail elders in a busy clinical setting is a vexing problem. Controversy exists as to the most feasible and accurate approach to diagnosing frailty in older surgical patients.[34] Joseph and coworkers[35] validated the Trauma Specific Frailty Index (TSFI), a 15-item scale that predicts adverse outcomes in older patients. The TSFI, adapted from the 50-item frailty index, which is too time-consuming to use in the emergency setting, includes variables such as mood, sexual activity, and health attitude, which may be difficult to obtain in the emergency department or from surrogates. To our knowledge, ours is the first study demonstrating that surgical residents can feasibly screen for frailty in the emergency department. Part of this success stems from the simplicity of the FRAIL questionnaire. This tool is an optimal fit for a busy emergency department because it is an easy-to-remember mnemonic that can be learned quickly without overburdening clinicians with details, and it includes information frequently available from proxies. Because the proportion of geriatric trauma patients will continue to grow, it is crucial that surgeons can recognize the most vulnerable patients to expedite delivery of the most appropriate care.

This study has several limitations. First, it was underpowered to assess the impact of the frailty pathway on mortality and the rate of complications. The prevalence of mortality in the pre-intervention cohort was already low, so it would have required a much larger sample size to show the meaningful reduction in mortality. The same can be said for complications other than delirium. Additionally, although we demonstrated a reduced 30-day readmission rate, many patients come to our tertiary center from outside of Boston and they may be readmitted to other institutions, leading us to underestimate readmission rates among the cohort. Nonetheless, readmissions were determined the same way in the pre- and post-intervention cohorts, and transfer patterns to our trauma center did not change over the study period. Unfortunately, we were unable to conduct pre-injury or post-discharge assessments on our patients, including patient-centered outcomes such as quality of life, functional capabilities, difficulties with activities of daily living, and cognitive function.[11] These outcomes are critically important to fully characterize the impact of the Frailty Identification and Care Pathway on older patients and their caregivers. Finally, we conducted this study at a

single level I trauma center, where more than 50% of our patients are older than 65 years and approximately 90% are white, limiting the generalizability of our findings. Pragmatic multicentered studies are needed to adequately address these limitations and demonstrate that the findings could be replicated in other settings.

CONCLUSIONS

Early recognition of frailty and implementation of a specialized, interdisciplinary pathway can significantly reduce delirium incidence and 30-day readmissions in frail geriatric trauma patients. Institutions with large volumes of geriatric trauma patients should implement pathways such as this so that they are adequately prepared to provide comprehensive and effective care necessary for this growing, vulnerable patient population.

Author Contributions

Study conception and design: Bryant, Tulebaev, O'Mara, McDonald, Salim, Cooper

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Invited Commentary

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In this important article, Bryant and colleagues compare outcomes for managing frail trauma patients. The interdisciplinary care protocol that they established and implemented had a significant impact on the delirium and 30-day readmission risk for frail patients. These improvements represent meaningful quality metrics for older patients, and in other studies, have been associated with a reduction in overall mortality.[1] Additionally, the authors have demonstrated that this care pathway can be implemented with education and use of pre-existing multidisciplinary teams. Overall, this work represents a principal contribution to the literature to help address the specific needs of geriatric trauma patients. It provides guidance in the idiosyncrasies of managing the aging trauma population, and the need for trauma centers to mobilize resources for this highly specific resource-intensive population.

According to the National Trauma Data Bank (NTDB), the percentage of trauma patients older than 65 years has risen from 18.11% in 2005, to 30.75% in 2016.[2] Additionally, multiple studies have verified that frailty, not age, is a more specific measure of overall poor prognosis when presenting for emergent medical care. Dr Cooper's group previously demonstrated pioneering work on the subject of multidisciplinary care and pathways for frail patients seeking emergency surgical intervention. This work is a natural progression of the maturity of the author's system, and an effort to share interventions that are widely applicable to other centers that may be more resource limited. They are sincere in their motivations to improve the outcomes of patients where "coverage gaps" in subspecialty consultation exist, an issue facing most centers in today's health care market.

There are several striking elements mentioned in the manuscript, but they are not emphasized. First and foremost is the age of the patients. Although the inclusion criteria were patients more than 65 years of age and with a positive screen for frailty, the actual mean age of the patients was 83.5 years. This reflects a national trend that the population older than 65 years is increasing, but the octogenarian patient population is expanding exponentially. The rates for positive screening were also impressively high (83% and 93%), respectively, between the pre- and post-intervention groups, demonstrating the prevalence of this problem. In addition to being older than 80 years with a positive screen for frailty, the Injury Severity Score (ISS) of 10 is rather low. This emphasizes the conundrum that despite minimal injury, these patients are at high risk for failure. Identifying these individuals early is a key aspect to overall success.

Next, implementation of the screening tool by junior surgeons (and potentially advanced practice providers) should allow for greater provider screening compliance. Leveraging the electronic medical record to improve compliance with protocols without the need for additional staff to consult/oversee the care of this patient population makes this a viable solution applicable across a wide array of trauma centers.

Finally, the resource use required for this type of intervention was fairly minimal and was more of a resource alignment and reorganization than a cost of adding more individuals. Both Mangram and colleagues[3] and Olufajo and associates[4] previously described improved outcomes with creation of specialized units and service lines, respectively. Although these are meaningful contributions to the literature, they are not applicable to many centers. Many centers cannot justify the increased cost associated with additional faculty or the volume to maintain specialized care units. However, this work replicates improved care outcomes at "the cost of education alone."

The authors have taken an innovative approach with appropriation of resources to dramatically improve outcomes in a vulnerable patient population. Although they did not show a statistically significant improvement in mortality, in larger, multi-institutional trials with a more diverse population, this work is likely to demonstrate even more dramatic improvement in care.

eTable 1. Consults before and after the Frailty Implementation and Care Pathway

Consult	Pre-intervention group (n = 125), %	Post-intervention group (n = 144), %	p Value
Physical therapy	92.00	100	0.003*
Nutrition	19.20	89.58	<0.001*
Social work	45.60	53.47	0.03*

*Significant.