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Early geriatric consultation increases adherence to TQIP Geriatric Trauma Management Guidelines

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Abstract

Background—The American College of Surgeons' Trauma Quality Improvement Program (TQIP) Geriatric Trauma Management Guidelines recommend geriatric consultation for injured older adults. However it is not known how or whether geriatric consultation improves compliance to these quality measures.

Methods—This study is a retrospective chart review of our institutional trauma databank. Adherence to quality measures was compared before and after implementation of specific triggers for geriatric consultation. Secondary analyses evaluated adherence by service: trauma service (Trauma) or a trauma service with early geriatric consultation (GeriTrauma).

Results—The average age of the 245 patients was 76.7 years, 47% were women, and mean Injury Severity Score was 9.5 (SD $\pm$ 8.1). Implementation of the GeriTrauma collaborative increased geriatric consultation rates from 2% to 48% but had minimal effect on overall adherence to TQIP quality measures. A secondary analysis comparing those in the post implementation group who received geriatric consultation (n=94) to those who did not (n=103) demonstrated higher rates of delirium diagnosis (36.2% vs 14.6%, $p < 0.01$) and better documentation of initial living situation, code status, and medication list in the GeriTrauma group. Physical therapy was

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consulted more frequently for GeriTrauma patients (95.7% vs 68.0%, $p<0.01$) Documented goals of care discussions were rare and difficult to abstract. A subgroup analysis of only patients with fall-related injuries demonstrated similar outcomes.

Conclusion—Early geriatric consultation increases adherence to TQIP guidelines. Further research into the long term significance and validity of these geriatric trauma quality indicators is needed.

Keywords

geriatrics; trauma; quality measures; TQIP; geriatric consultation

Introduction

Geriatric trauma patients have a higher risk of death than younger trauma patients and their care is complicated by comorbidities, pre-hospital medication use, atypical injury presentations and increased social service needs.^{1–5} This increased complexity requires time and attention to assessment, disposition, and care coordination which is often difficult on a busy trauma service. An increasing priority has been placed on developing models of care that better target older trauma patients' specific needs.

One model of care that has been explored is early geriatrician involvement. Geriatricians are uniquely qualified to care for medically-complex older adults. Geriatrician involvement in the care of trauma patients has been shown to improve inpatient care processes and long term outcomes. One study found that geriatrician involvement reduced long term functional decline after injury.⁶ A quality of care evaluation, measured by the Assessing Care of Vulnerable Elders (ACOVE) validated quality measures, found an increase in quality with geriatric consultation.⁷ However the aggregate of ACOVE quality measures does not include many quality measures of high importance to trauma surgeons, such as mortality, discharge to skilled nursing facilities, or code status. Another evaluation of a geriatric consultation model found that geriatricians decreased length of stay and decreased discharge to skilled nursing facilities for older adult trauma patients.⁸ These studies suggest that geriatrician involvement early on may improve outcomes for older trauma patients. However, there is still a lack of consensus on *which* outcomes and quality measures are most important to follow in this population.

In 2012, after the development of the aforementioned studies, the American College of Surgeons endorsed management guidelines for geriatric trauma patients.⁹ These guidelines were developed by the Trauma Quality Improvement Program (TQIP), which collates data from over 350 trauma centers in the US. The guidelines recommend changes to each phase of trauma care: the initial trauma evaluation, inpatient care, and discharge planning services. They also recommend the assistance of a geriatric specialist in a multi-disciplinary co-management or consultation model to better address the complex care needs of older adults.

We examined the effectiveness of implementing a geriatric consultation model of care, called the GeriTrauma collaboration. This involved educating the trauma physicians and care providers to consult the geriatric team early if an older patient had certain risk factors for

functional decline, delirium, and poor outcomes. We hypothesized that older trauma patients cared for by a GeriTrauma service would have higher quality of care as evidenced by improved adherence to TQIP Geriatric Trauma Management Guidelines. Our secondary outcome was ease of abstraction of these different quality indicators.

Methods

Study Design

This study, approved by our Institutional Review Board, was a retrospective chart review designed to evaluate the effect of geriatric consultants using trauma quality measures.

Intervention

A multidisciplinary team involving geriatric inpatient consultants, trauma surgeons, and emergency medicine physicians developed a collaborative model for involvement of the geriatric consultation team with an early proactive approach. Recognizing the difficulties in having geriatricians assess every older trauma patient (geriatric consultation rates in the prior studies range from 40–69% of all older trauma patients),^{7,8,10} we focused our care model on older adults with geriatric syndromes or specific needs. The TQIP guidelines suggest using the Identifying Seniors at Risk tool (ISAR), which has been evaluated in other settings for identifying higher risk patients for likelihood of functional decline or poor long-term outcomes.¹¹ While this tool does assess for memory deficits, difficulties with activities of daily living (ADLs), and polypharmacy, our team felt that this did not appropriately identify other important geriatric syndromes (delirium, urinary incontinence, and falls) that have been associated with benefit from comprehensive geriatric assessment. Therefore, our own institutional geriatric consultation triggers were developed. Although the predominant criterion was age ≥ 65 years old, additional factors were considered in determining the appropriateness of a consult: concern for delirium, polypharmacy, falls, a history of cognitive impairment (including dementia), mobility issues, the presence of impairments in multiple ADLs and any suspicion of elder mistreatment (Figure 1). Surgical residents and trauma physicians were educated on these criteria for consultation. Exclusions from geriatric consultation included patients with concern for imminent death and patients who were admitted and discharged over the weekend when geriatric consultants were not available.

The hospital's inpatient geriatric consult team, consisting of a fellowship-trained Geriatrician and a Geriatric advanced nurse practitioner, evaluated the patient early in the admission, typically within 24 hours of presentation. Patients were evaluated by the geriatric team wherever they were in the hospital including in the ICU, the Emergency Department, or a regular floor bed. A standardized note template was used to prompt for evaluations of delirium, elder abuse/neglect, and other geriatric syndromes. Follow-up was typically daily until resolution or discharge date occurred. The GeriTrauma program was implemented July 2014.

Study Setting and Population

Our institution is a level 1 academic trauma center. All adults ≥ 65 years old in our institution's Trauma Databank admitted to the trauma service with a >24 hour inpatient stay

were included. There were no other exclusion criteria. Two 6-month intervals were evaluated: before and after implementation of the GeriTrauma collaboration (July 2013 to December 2013 and July 2014 to December 2014). These dates were chosen to include a representative sample of standard of care trauma patients as well as patients cared for by the GeriTrauma collaboration. The decision to involve the geriatric consultant team was made by the trauma team physicians.

Study Protocol

Our institutional Trauma databank was queried for all patients that met study criteria with the study time periods. Data was obtained from the trauma databank and our electronic medical record system (EPIC®, Epic Systems Corporation, Verona, Wisconsin). Study data were collected and managed using the Research Electronic Data Capture (REDCap) program hosted at our institution.¹² REDCap is a secure, web-based application designed to support data capture for research studies. Chart abstraction was done by trained, semi-blinded chart reviewers (medical students, residents, and research assistants) using a standardized abstraction form reviewed by the study team, following retrospective review guidelines.¹³ The chart reviewers were not told which data elements were the TQIP outcome measures, but they were aware that this was an assessment of quality of care. Patient demographics were confirmed and the complete chart of the patient's stay was reviewed. This included review of medication lists, medication administration records, emergency department charts and physician, nurse, consultation, physical/speech therapy, case manager, and social work notes. We chose specific quality measures from the TQIP Geriatric Trauma Management Guidelines that span the hospitalization (Table 1). Ten percent of charts were re-reviewed for accuracy and evaluated for inter-rater reliability.

Measurements

The primary outcome was the proportion of accomplished TQIP Geriatric Trauma quality indicators (Table 1). To provide a baseline comparison of the patients in each group, ISS and the Ageless Charlson Comorbidity Index (CCI), a weighted numerical tally of comorbidities validated in ED patients, were calculated.^{14,15} Delirium screening was defined as any documentation of a specific screening tool such as the Confusion Assessment Method- ICU, or if the provider notes (physicians, nurse practitioners, nurses, physical therapists, etc.) mention in the text that the patient was or was not delirious. Delirium presence was defined as a diagnosis of delirium on the official diagnosis list at discharge or in the provider notes. A goal of care discussion was defined as any documentation by providers of a discussion or conversation with family or patient about possible outcomes and/or code status. Discharge to a higher level of care was defined as a change in care needs, e.g. community dwelling or assisted living facility discharged to a skilled nursing facility. Discharge to acute rehabilitation center was also considered a higher level of care than community dwelling or assisted living facility. This data point was only available for those patients whose initial residence was documented. Hospital readmissions and 90-day mortality were noted, but this data was only available if the patient returned to our health system.

Data Analysis

Data was analyzed using SAS 9.3 (SAS Institute Inc., Cary, NC), Stata v.13 (StataCorp, College Station, TX), and Microsoft Excel 2013 (Microsoft Corp, Redmond, WA). Descriptive statistics included means and standard deviation, and proportions with 95% confidence intervals (CIs) as appropriate. Cohen's kappa was calculated for inter-rater reliability. Student t-test and chi square tests were used to evaluate for significance.

Initial analysis was a comparison of adherence to the quality measures before and after GeriTrauma collaborative implementation. There was a significant difference in sample size between the time periods (48 geriatric trauma patients in the pre-implementation 6 month period and 197 in the post-implementation 6 month period). Our second analysis therefore focused only on the post implementation period and compared the patients by service (Trauma vs GeriTrauma). In an effort to further reduce confounding factors, we also performed a subgroup analysis limiting the sample to only those patients who met criteria for geriatric consultation. This subgroup analysis included both pre and post implementation patients. We used the geriatric consultation trigger of a fall-related injury, as a fall as the cause of injury is a discrete variable that is easily identifiable (inter-rater reliability: 97.5% agreement, kappa 0.94). The subgroup analysis of patients on the trauma service with a fall-related injury was conducted in the same manner as the primary analysis.

Results

Patient population

A total of 391 charts were reviewed. Six were excluded based on length of stays <24 hours and another 140 were excluded for admission to a non-trauma service. Of the 245 qualifying patients, 76.7 years, 47% were women, and 92% were Caucasian. The average Injury Severity Score (ISS) was 9.5 (SD ± 8.1), and overall inpatient mortality was 7.5%. After implementation of the GeriTrauma collaborative, 47.7% received a consultation. Using the criteria of fall, delirium, or history of dementia, 55.6% of patients qualified for consultation.

Reliability of abstraction

Reviewers had good inter-rater reliability on concrete concepts such as age and ISS score (95% agreement and 100% agreement, respectively), but decreased agreement in other areas such as delirium diagnosis (88% agreement, kappa 0.49) and initial medication list documented (72% agreement, kappa 0.29). Fall as a cause of injury had high agreement (97.5% agreement, kappa 0.94). The lowest agreement was on goals of care discussion documentation, primarily due to the low number of events (78% agreement, kappa -0.125).

Pre- and post- analysis

As mentioned, the pre-implementation sample of geriatric trauma patients was much smaller than anticipated, n=48 compared with the post-implementation sample of 197 geriatric trauma patients. There was no significant difference in patient characteristics between the two-time periods pre-and post- implementation of the GeriTrauma collaborative (Table 1). The average age (76.4 vs 77.5, p=0.42), percent female (41.7% vs 48.7%, p=0.38), ISS scores (9.9 vs. 9.4, p=0.71), and CCI scores were similar (1.9, vs 1.4, p=0.08). However, the

groups differed significantly in mortality and length of stay. Overall consultation rates substantially increased with implementation of GeriTrauma collaborative from 2% to 48% ($p<0.01$). There was a trend towards improved initial documentation of code status; however, there was no significant difference in adherence in other TQIP quality measures.

Analysis by care team

To determine the effects of early geriatric consultation, we analyzed the sample by care team after implementation: GeriTrauma ($n=94$) vs. Trauma ($n=103$). The GeriTrauma patients were slightly older than the Trauma group (Table 3). There were smaller differences in the demographic characteristics between the groups in regards to gender and comorbidities. Falls were the cause of injury in the majority of GeriTrauma patients whereas motor vehicle collisions and other causes of trauma were more common on the Trauma service. ISS were similar (8.7 vs 10.1, $p=0.83$), however the Trauma service cared for higher rates of ICU patients (28.7% vs 42.7%, $p=0.06$). ICU length of stay did not differ significantly between the two service groups.

Initial Documentation

The GeriTrauma service had significantly higher levels of initial code status documentation (97.9%, vs 85.4%, $p<0.01$). There was also a trend towards higher rates of documentation of prehospital factors such as preinjury level of care and home medication list, with GeriTrauma patients having >90% compliance with all initial documentation measures, versus 77–85% documentation in the Trauma group.

Inpatient Quality Measures

Geriatrician involvement improved care by multiple quality indicators (Table 3). Physical therapy was involved more when geriatricians were involved in care (95.7%, vs 68.0%, $p<0.01$). In regards to potentially inappropriate medication use, there was a trend toward decreased benzodiazepine use on the GeriTrauma service as compared to Trauma (28.7% vs. 39.8%, $p=0.10$).

Delirium screening and diagnosis occurred with greater frequency in the GeriTrauma patients (45.7% vs 32.0%, $p=0.05$, and 36.2% vs 14.6%, $p<0.01$ respectively). In regards to ICU delirium specifically, 78.9% of ICU patients were screened and 43.6% of ICU patients were diagnosed with delirium. In comparison, 12.2% of non-ICU patients were diagnosed with delirium. The Trauma service screened 1.7% of non-ICU patients for delirium, as compared to 28.4% of patients on GeriTrauma ($p<0.01$). The presence of delirium did not affect mortality, but there was a significant difference in length of stay (11.7 days for those diagnosed with delirium, versus 4.2 days for those without delirium, $p<0.01$).

Our study found high variability in advance care planning across initial and inpatient quality domains. As noted above, the GeriTrauma service was most likely to document an initial code status. However, documentation of goals of care discussions was low overall (5.3% vs 17.5%, $p<0.01$) and this variable showed poor reliability with abstraction.

Discharge Quality Measures

GeriTrauma patients were discharged to a higher level of care (skilled nursing facility) more frequently (51.2% vs 24.0%, $p<0.01$); however this was limited by the lack of an initial level of care documented for 19% of Trauma patients. There were no significant differences in overall length of stay or 90-day readmissions between the Trauma and GeriTrauma groups. A diagnosis of delirium was associated with longer length of stay as noted above.

Subgroup analysis of only patients with fall-related injuries

A fall was the most common injury mechanism ($n=170$). A comparison of geriatric trauma patients with fall-related injuries showed similar results to the analysis by care team (Table 4). The GeriTrauma service had a higher rate of delirium screening (42.3% vs 26.1%, $p=0.03$) and diagnosis (34.6% vs 15.2%, $p<0.01$) as compared to the Trauma group. With regards to rehabilitation, 94.9% of GeriTrauma patients had a physical therapy consultation compared to 68.5% on Trauma ($p<0.01$). Discharge measures including length of stay and discharge to a higher level of care were similar.

Discussion

This study assessed the effect of the GeriTrauma collaboration on quality indicators for geriatric trauma care. This collaborative approach greatly increased geriatrician involvement in the care of trauma patients and improved adherence to several quality measures.

Assessing geriatric trauma care by adherence to TQIP Geriatric Trauma Management Guidelines may be a reasonable method of evaluating quality of care. However, less discrete variables such as discussion of goals of care were difficult to abstract, and poor initial documentation may decrease the reliability of data at discharge. Prior to full implementation of a quality assessment program based on the TQIP guidelines, research into better ways to document and abstract this data is needed. This study's findings add support to the use of a collaborative model during inpatient care for older adults; however, longer-term prospective studies are needed to determine which quality measures are associated with improved long term outcomes for these vulnerable trauma patients.

This data also identified areas of poor adherence to the TQIP measures at our institution. Documentation of goals of care discussions is minimal. This does not mean that these discussions did not occur, but that they were not clearly documented. This may have been affected by another limitation of our chart extraction: our institution's EMR has the options for "Full Code- unverified" and "Full Code- verified" to be chosen, however these were both listed as "Full Code" in our abstraction sheet. Therefore, there could be a large number of physicians who choose "Full Code- verified" instead of documenting a code discussion conversation. This may explain why the GeriTrauma team had an almost 100% documentation of initial code status, as compared to approximately 85% on the Trauma, yet minimal documentation of goals of care discussions was found. If Trauma clinical practice guidelines continue to prioritize goals of care discussions, then it will be important to standardize an approach to documentation. Scheduled interdisciplinary family meetings with or without involvement of a Palliative Medicine consultant, or incorporating electronic medical record (EMR) changes can improve documentation.^{16,17} For example, creating a

special note type in the EMR labeled “goals of care” that could be easily searchable, or changing note templates to provide a designated goals of care area would assist with abstraction.¹⁸ Also, the advent of Advanced Care Planning billing options will allow for the opportunity to clearly identify whether these discussions are occurring by CPT codes and may encourage health care teams to improve their documentation. Prior to incorporation into a national QI system such as the Trauma databank, these other methods should be evaluated and a standardized approach validated.

Similarly, our inter-rater reliability on delirium diagnosis was acceptable but could also be improved. Prior studies have highlighted the difficulty of abstracting delirium diagnoses from chart review, and this difficulty does limit our conclusions.^{19,20} Methods to improve recognition on chart review include standardized templates that pull in CAM-ICU and non-ICU scores from the nursing notes and increasing the coding of delirium as a diagnosis. Our overall delirium prevalence in the GeriTrauma group was 36%, similar to prevalence estimates reported by other investigators which adds some validity to our data despite the difficulties in abstracting this variable.¹⁰ Our difficulties with documentation and abstraction may also be due to true non-adherence.

Another quality indicator we evaluated was inpatient mortality. Our study found no significant effect on inpatient mortality with geriatric consultation. A recent evaluation of mortality rates at trauma centers found that those who self-report as having adopted the TQIP guidelines had no difference in geriatric trauma mortality rates than the non-adopters.²¹ Variations in implementation or adherence could account for this lack of affect, but there is likely a baseline mortality rate that is not preventable for older adults with traumatic injuries. We would propose 90-day mortality or functional decline as possible better outcome measures for this population.

This retrospective review is limited by charting inadequacies, lack of randomization, and inability to control for physician preference for geriatric involvement. Geriatric consultation was suggested for any patient who met criteria, but some trauma surgeons may have declined to involve them for reasons we cannot abstract from the charts. Additionally, we did not control for frailty, which may be as an important an indicator of trauma mortality as ISS and comorbidity scores.²² We were unable to control for all confounding variables. This contributed to our decision to limit our analytics and limit our inference about the efficacy of this program. Finally, we relied on Trauma databank registrars for some of our data. Trauma registries may be subject to variation in ISS or other factors.²³ Our trauma registrars have a minimum of 4 years of experience and participate in continuing education and internal registry validation efforts to minimize chart abstraction anomalies so any discrepancies are minimal.

This study suggests a benefit from proactive geriatrician evaluation for older trauma patients through a collaborative model with specific criteria for consultation. Our study found that multiple areas of care were improved with the involvement of the geriatric team. Delirium screening and detection was significantly improved, particularly in the non-ICU setting. Given that delirium is associated with increased morbidity and mortality,^{24,25} delirium screening and diagnosis are likely important quality measures that deserve priority via TQIP.

In addition, process measures that promote mobility such as referral to inpatient and community-based physical therapy are likely have an important role in maximizing physical function post-injury for older trauma patients.^{6,11,26} Our data is also suggestive that process measures that promote safe-prescribing and avoiding potentially inappropriate medications may be an important focus of TQIP quality measures as well, but future research focused on pharmacy data is needed.

Conclusions

Geriatric consultation increases quality of care as defined by compliance with TQIP Geriatric Trauma Management Guidelines. Challenges in data quality and reliability will be problematic if the TQIP guidelines are used as a measure of quality and performance. National consensus on approaches to care delivery, improved charting, and recognition will be needed.

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Patients ≥ 65 years old with:

- Cognitive impairment or dementia
- Risk for functional decline due to geriatric syndromes
- Delirium
- Urinary incontinence
- Falls
- Low body mass index (BMI)

Figure 1.
Geriatric Consultation Criteria were developed to encourage trauma surgery teams to focus geriatric resources on vulnerable patients.

Table 1
Quality Measures abstracted from the ACS TQIP Geriatric Trauma Management Guidelines

Initial admission measures	Inpatient Measures	Discharge Measures
Code status Initial medication list Initial living situation	Delirium screening Delirium diagnosis Mobilization (physical therapy consultation) Benzodiazepine use Bowel regimen Goals of care discussion ICU stay	Length of stay Discharge medications Discharge to higher level of care 90-day readmission rates

A comparison of older adult trauma patients in the timeframes before and after GeriTrauma collaborative implementation reveals a significant increase in geriatric consultation, but no substantial increase in adherence to TQIP guidelines.

Table 2

	Pre-Implementation (n=48)	Post-Implementation (n=197)	p value
Demographics and Injury Severity:			
Age, years (mean, st dev)	76.4 ±8.5	77.5 ±8.4	0.42
Injury Severity Score (mean, st dev)	9.90 ±7.8	9.41 ±8.2	0.707
Charlson Comorbidity Index (CCI, mean)	1.90 [1.4–2.4]	1.43 [1.2–1.7]	0.08
Fall as a cause of injury	66.7% [53.3–80.0]	70.0% [63.7–76.4]	0.65*
ICU stay	39.6% [25.7–53.4]	36.0% [29.3–42.7]	0.40*
ICU length of stay (days)	6.8 [2.4–11.2]	5.5 [4.1–7.0]	0.49
Geriatrics Consultation	2.0% NA	47.7% [40.7–54.7]	<0.01
Initial Documentation:			
Initial code status	87.5% [78.1–96.9]	91.4% [87.4–95.3]	0.04*
Home medication list	89.6% [80.9–98.2]	83.8% [78.6–88.9]	0.51*
Home number of medications [^]	8.4 [6.9–10.0]	9.0 [8.2–9.8]	0.50
Preinjury level of care (community or skilled facility)	87.5% [78.1–96.9]	83.8% [78.6–88.9]	0.78*
Inpatient quality measures:			
Goals of care discussion	10.4% [1.8–19.1]	11.7% [7.2–16.2]	0.77
Bowel regimen given	81.3% [70.2–92.3]	74.6% [68.5–80.7]	0.17
Delirium screening	33.3% [20.0–46.7]	38.6% [31.8–45.4]	0.50
Delirium diagnosed	6.6% [3.1–21.9]	24.9% [18.8–30.9]	0.07

	Pre-Implementation (n=48)	Post-Implementation (n=197)	p value
Benzodiazepines given	39.6% [25.7–53.4]	34.5% [27.9–41.2]	0.51
Physical Therapy consult	79.2% [67.7–90.7]	81.2% [75.8–86.7]	0.75
Surgery Required	27.1% [14.5–39.7]	20.8% [15.1–26.5]	0.35
Discharge number of medications	11.0 [9.3–12.6]	11.5 [10.6–12.3]	0.68
Change in medications [^] (median)	+2.5 [1.4–3.6]	+2.8 [2.1–3.5]	0.62
Discharge quality measures:			
Length of stay (days)	8.0 [5.0–10.9]	5.6 [4.7–6.5]	0.05
Inpatient Survival (%)	100% NA	91.4% [87.4–93.5]	0.04
Discharged to higher level of care [€]	33.3% [20.0–46.7]	23.9% [18.8–30.9]	0.02
90 day readmissions	16.7% [6.1–27.2]	13.2% [8.5–19.7]	0.53

Unless specified, data is reported in proportions with 95% confidence intervals in brackets.

[^]p values are from student t test except where marked.

^{*}p value calculated via chi square analysis. p value calculated via Wilcoxon Rank Sum test due to non normative distribution

[€]Only includes patients with a pre-injury level of care documented who survived to discharge.

[^]Only includes patients with an initial or home medication list documented.

After implementation, a comparison of the patients cared for by the GeriTrauma collaborative versus the Trauma team alone demonstrates improved compliance in initial documentation and delirium screening.

Table 3

Demographics and Injury Severity:	GeriTrauma (n=94)		Trauma (n=103)		p value
Age, years (mean, st dev)	79.5	±7.5	75.7	±8.7	<0.01
Injury Severity Score (mean, st dev)	8.7	±6.02	10.1	±9.7	0.83 [†]
Charlson Comorbidity Index (CCI, mean)	1.7	[1.3–2.1]	1.2	[0.9–1.5]	0.03
Fall as a cause of injury	83.0%	[75.4–90.6]	58.3%	[47.0–66.1]	<0.01 [*]
ICU stay	28.7%	[19.6–37.9]	42.7%	[33.2–52.3]	0.06 [*]
ICU length of stay (days)	4.70	[2.9–6.5]	6.00	[3.9–8.2]	0.39
Initial Documentation:					
Initial code status	97.9%	[95.0–100]	85.4%		<0.01 [*]
Home medication list	91.5%	[85.8–97.1]	76.7%	[68.5–84.9]	<0.01 [*]
Home number of medications [^]	9.3	[8.2–10.4]	8.7	[7.6–9.8]	0.48
Preinjury level of care (community or skilled facility)	90.4%	[84.5–96.4]	77.7%	[69.6–85.7]	0.02 [*]
Inpatient quality measures:					
Goals of care discussion	5.3%	[0.8–9.9]	17.5%	[10.1–24.8]	<0.01
Bowel regimen given	78.7%	[70.4–87.0]	70.9%	[62.1–79.6]	0.19
Delirium screening	45.7%	[35.7–55.8]	32.0%	[23.0–41.1]	0.05
Delirium diagnosed	36.2%	[26.5–45.9]	14.6%	[7.8–21.4]	<0.01
Benzodiazepines given	28.7%	[19.6–37.9]	39.8%	[30.4–49.3]	0.10

	Geriatric Trauma (n=94)		Trauma (n=103)	
Physical Therapy consult	95.7%	[91.7–99.8]	68.0%	[58.9–77.0]
Surgery Required	20.2%	[12.1–28.3]	21.4%	[13.4–29.3]
Discharge number of medications	11.9	[10.8–13.0]	11.1	[9.7–12.4]
Change in medications [^]	2.80	[2.0–3.5]	2.90	[1.8–4.0]
Discharge quality measures:				
Length of stay (days)	6.0	[4.7–7.3]	5.2	[3.9–6.6]
Inpatient Survival (%)	95.7%	[90.0–99.7]	87.4%	[81.0–93.8]
Discharged to higher level of care [€]	51.2%	[40.5–61.9]	24.0%	[14.3–33.7]
90-day readmissions among survivors	13.3%	[6.3–20.4]	15.5%	[8.1–23.0]

Unless specified, data is reported in proportions with 95% confidence intervals in brackets. p values are from student t test except where marked.

* p value calculated via chi square analysis.

^χ p value calculated via Wilcoxon Rank Sum test due to non normative distribution

[€] Only includes patients with a pre-injury level of care documented who survived to discharge.

[^] Only includes patients with an initial or home medication list documented.

Subgroup analysis of all patients on the trauma service with injuries from falls found better delirium screening and lower benzodiazepine use in the GeriTrauma group.

Table 4

GeriTrauma and fall-related injuries (n=78)					Trauma team and fall-related injuries (n=92)		p value
Demographics:							
Age, years (mean, st dev)		80.1	±7.3	78.1	±8.8	0.12	
Injury Severity Score (mean, st dev)		8.8	±5.9	10.4	±7.9	0.467	
Charlson Comorbidity Index (CCI, mean)		1.8	[1.4–2.2]	1.6	[1.2–1.9]	0.29	
ICU stay		25.6%	[16.0–35.3]	38.0%	[28.1–48.0]	0.10*	
ICU length of stay		3.3	[2.7–3.9]	6.0	[4.5–7.5]	0.15	
Initial Documentation:							
Initial code status		97.4%	[93.9–100]	85.9%	[78.7–93.0]	<0.01*	
Home medication list		93.6%	[88.2–99.0]	82.6%	[74.9–90.4]	0.03*	
Home number of medications [^]		10.2	[9.1–11.3]	9.2	[8.2–10.2]	0.25	
Preinjury level of care (community or skilled facility)		92.3%	[86.4–98.2]	80.4%	[72.3–88.5]	0.03*	
Inpatient quality measures:							
Goals of care discussion		5.1%	[0.2–10.0]	16.3%	[8.8–23.9]	0.03	
Bowel regimen given		78.2%	[69.1–87.4]	70.7%	[61.4–80.0]	0.36	
Delirium screening		42.3%	[31.4–53.3]	26.1%	[17.1–35.1]	0.03	
Delirium diagnosed		34.6%	[24.1–45.2]	15.2%	[7.9–22.6]	<0.01	
Benzodiazepines given		24.4%	[14.8–33.9]	40.2%	[30.2–50.2]	0.03	
Physical Therapy consult		94.9%	[90.0–99.8]	68.5%	[59.0–78.0]	<0.01	

	GeriTrauma and fall-related injuries (n=78)		Trauma team and fall-related injuries (n=92)	
Surgery	14.1%	[6.4–21.8]	20.7%	[12.4–28.9]
Discharge number of medications	12.1	[10.0–12.4]	11.2	[10.0–12.4]
Change in medications [^]	+2.1	[1.5–2.8]	+2.2	[1.5–2.9]
Discharge quality measures:				
Length of stay (days)	5.1	[3.9–6.3]	5.7	[4.1–7.3]
Inpatient Survival (%)	94.9%	[90.0–99.8]	90.2%	[84.1–96.3]
Discharged to higher level of care	46.5%	[35.0–58.0]	34.8%	[23.9–45.6]
90-day readmissions among survivors	14.7%	[11.0–29.6]	14.5%	[9.3–25.6]

Unless specified, data is reported in proportions with 95% confidence intervals in brackets. P values are from student t test except where marked.

* p value calculated via chi square analysis.

χ² p value calculated via Wilcoxon Rank Sum test due to non normative distribution

€ Only includes patients with a pre-injury level of care documented who survived to discharge.

^ Only includes patients with an initial or home medication list documented.