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Making your geriatric and palliative programs a strength: TQIP guideline implementation and the VRC perspective

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ABSTRACT

Background Older patients compose approximately 30% of trauma patients treated in the USA but make up nearly 50% of deaths from trauma. To help standardize and elevate care of these patients, the American College of Surgeons (ACS) Trauma Quality Improvement Program's best practice guidelines for geriatric trauma management was published in 2013 and that for palliative care was published in 2017. Here, we discuss how palliative care and geriatrics quality metrics can be tracked and used for performance improvement and leveraged as a strength for trauma verification.

Methods We discuss the viewpoint of the ACS Verification, Review, and Consultation and three case studies, with practical tips and takeaways, of how these measures have been implemented at different institutions.

Results We describe the use of (1) targeted educational initiatives, (2) development of a consultation tool based on institutional resources, and (3) application of a nurse-led frailty screen.

Discussion Specialized care and attention to these vulnerable populations is recommended, but the implementation of these programs can take many shapes.

Level of evidence V

outcome,⁷ and older trauma patients experience higher mortality despite lower injury burdens.⁸⁻⁹ It is undisputed that older patients do worse after injury than their younger counterparts.

As we strive to improve outcomes for injured older adults, we should recognize that provision of geriatric-focused care and palliative care can help achieve this objective. Palliative care refers to the prevention and relief of suffering for patients with advanced illness, based on patient and family needs, not prognosis. It focuses on communication, pain and symptom management, identifying goals of care, bereavement, and spiritual support.¹⁰ Evidence supports that parallel provision of palliative care with trauma care improves the quality of care for patients and their families and is associated with a decreased length of stay, decreased cost, and a decreased intensity of non-beneficial care at the end of life. Most importantly, this is accomplished without a change in mortality rate.¹¹

In 2005, the American College of Surgeons (ACS) affirmed that palliative care was an integral part of the care of all surgical patients.¹² In 2017, the ACS Trauma Quality Improvement Project (TQIP) published the Palliative Care Best Practices Guideline.¹¹ Combined with the 2013 TQIP Geriatric Trauma Management Guidelines¹³ (with updated guidelines planned for 2021), these guidelines serve as a framework for the most essential aspects of geriatric and palliative care to be incorporated into the trauma care. The purpose of this article was to discuss implementation of geriatrics and palliative principles in trauma centers. Herein we provide a perspective of the ACS Verification, Review, and Consultation (VRC) program as to how geriatric and palliative care-focused quality metrics can be tracked and used for performance improvement (PI) and leveraged as a strength for trauma verification, as well as examples of how palliative-focused and geriatric-focused measures have been successfully implemented at three institutions with organization-specific initiatives tailored to the environment in which they were implemented:

1. Educational initiatives and creation of a geriatric-focused inpatient unit.
2. Development of a tailored consultation trigger tool to triage consultations.
3. Application of a nurse-led frailty screen to guide and prioritize consultations.

INTRODUCTION

The older adult is the fastest-growing age group of the world's population. A 2015 report commissioned by the National Institute of Aging projects that the number of older adults worldwide will increase from 8.5% in 2015 to almost 17% by 2050, equating to over 1.6 billion people.¹ It is anticipated that injuries and injury-related deaths in the older adult will increase accordingly. The Centers for Disease Control and Prevention lists unintentional injuries in 2018 as the third leading cause of death for all age groups and seventh in individuals older than 65 years, up from fifth and ninth in 2009.² In the 2016 report from the National Trauma Data Bank, more than 30% of patients were over 64 years, but made up nearly 50% of trauma fatalities.³ With many trauma centers already exceeding that percentage of geriatric trauma, fatalities are likely to be higher.⁴⁻⁵ These injuries are costly; for non-fatal fall mechanisms, approximately \$50 billion is spent per year and is expected to increase as the population ages.⁶ Frailty is also a strong predictor of poor

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VERIFICATION, REVIEW, AND CONSULTATION PERSPECTIVE

The purpose of the Verification, Review and Consultation (VRC) program is to verify a hospital's compliance with the ACS standards for a trauma center as found in the *Resources for Optimal Care of the Injured Patient*.¹⁴ The VRC program is designed to assist hospitals in the evaluation and improvement of trauma care and to provide an objective, external review of institutional capabilities and performance.

Assessment of care of the older trauma patient can occur at every stage of the VRC review. The consultation or verification visit starts with completion of the Pre-Review Questionnaire (PRQ) by the trauma hospital in preparation for the site visit. The PRQ specifically requests information on geriatric trauma activation criteria and geriatric trauma admissions. Further information regarding the hospital's care of the elderly is gleaned from the TQIP report. Currently, there are no type I or type II deficiencies (deficiencies at the time of review which threaten the trauma program's verification) associated with palliative or geriatric care. So why include palliative care and geriatric care metrics? Reviewers look for evidence that the program is invested in providing good trauma care for older patients as these metrics exemplify the delivery of high-quality care, especially as our trauma population ages. Programs should highlight their efforts in these areas, which can include their geriatric activation criteria, protocols for initiating palliative care consults, geriatric-specific treatment guidelines, and prevention programs that target the elder community.

Given the large volume of older injured patients present at most trauma centers, improvements in care around older patients are excellent opportunities to demonstrate the quality of an institution's PI processes. The PI process and TQIP benchmarking data are invaluable in determining areas where care may be improved. An effective PI process demonstrates 'loop closure', or clear documentation and institution-level data that identified opportunities for improvement lead to specific interventions that result in an alteration in conditions such that similar events are less likely to occur. [Figure 1](#) illustrates the continuous process of PI.¹⁴

To best use the geriatric and palliative care best practice guidelines in this patient population,^{11 13} the first step is to compare the institution's current practice to the best practice guideline to identify any gaps in care. Once gaps are identified, they must be prioritized. The next step is development or revision of management guidelines and determination of PI and outcome measures to monitor compliance and effectiveness. The Palliative Care Best Practice Guidelines include a suggested gap analysis; the updated version of the Geriatric Trauma Management Best Practice Guidelines, expected in 2021, will also include a suggested gap analysis.¹¹ Examples of elements considered in the palliative care gap analysis are shown in [table 1](#) and for geriatric management in [table 2](#).

Once gaps are identified, the PI process is used to evaluate compliance and to determine variance from the guideline. The process examines what went well, what opportunities were identified, and specific metrics to monitor compliance. Guidelines or protocols are monitored within the Performance Improvement and Patient Safety (PIPS) process. The VRC reviewers evaluate whether a protocol is not routinely followed, and this may reflect poorly on the perception of the quality of the center's care. By developing geriatric and palliative care guidelines and then monitoring them through the PIPS process to continue to improve care, the trauma center demonstrates an interest and commitment to the improvement of care for the geriatric patient.

IMPLEMENTATION STRATEGY: EDUCATION PERSPECTIVE FROM UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT HOUSTON (UT HOUSTON)

Identifying gaps

The TQIP Geriatric Trauma Management guidelines recommend that programs develop criteria for early geriatric consultation and include geriatric expertise on multidisciplinary trauma care teams. Given the critical shortage of geriatricians in the USA, with only about 7000 practicing currently, the UT Houston is not staffed to provide inpatient consultations by geriatricians which would be ideal to meet this guideline.

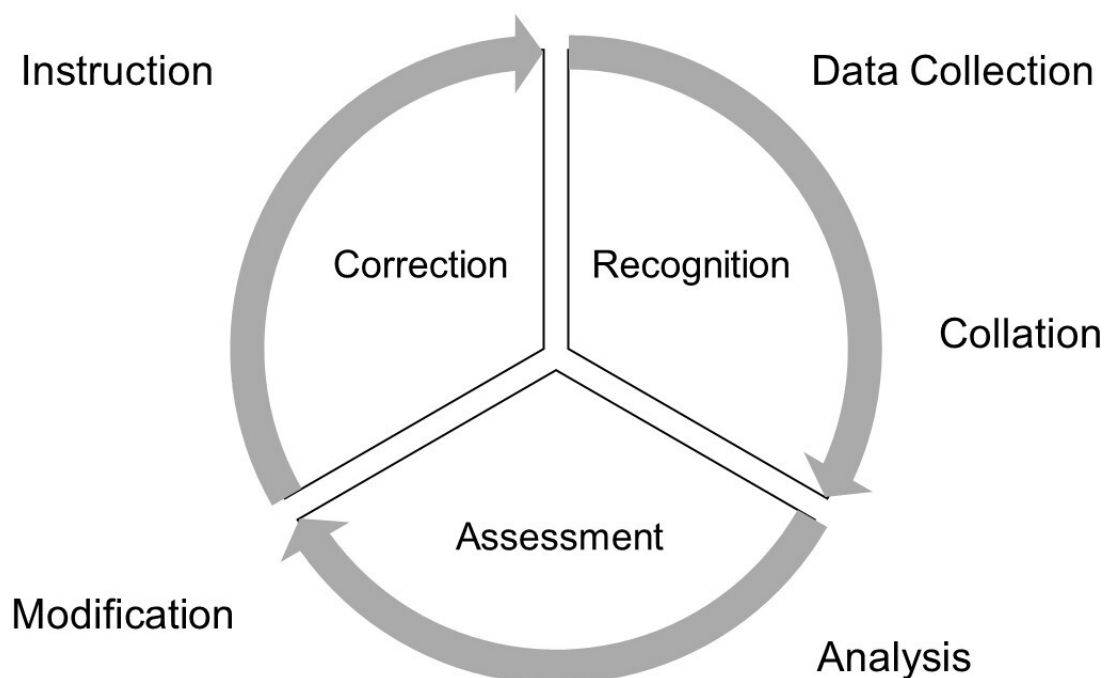


Figure 1 Continuous process of performance improvement.

Table 1 Examples of palliative care gap analysis*

Palliative care guideline	Met	Partially met	Unmet	Status	Comments
Screen/identify early at-risk ED patients.					
Communicate difficult news after sudden traumatic death.					
Early goals of care conversations.					
Obtain advance directives and Medical Orders for Life-Sustaining Treatment (MOLST)/Physician Orders for Life-Sustaining Treatment (POLST) forms.					
Family presence in resuscitation.					
Assess all seriously ill patients for palliative care needs.					
Palliative care is delivered in conjunction with curative, life-prolonging or disease-modifying trauma care.					
Palliative care is delivered by an interdisciplinary team.					
Pain and symptom management, communication, and prognostication are provided.					
Patients and families receive education about their condition, its impact on prognosis, and healthcare trajectory.					
A predictive or prognostic tool is used for estimating survival time and tracking palliative care needs.					
Identification of the surrogate or proxy decision maker is documented on patient's medical record within 24 hours of admission.					
The advance care plan is discussed and developed with patient/family within 72 hours.					
Family meetings are used early to discuss outcomes, expectations and goals of care.					
Psychosocial/emotional support is assessed and a plan is created.					

*Adapted from the American College of Surgeons Trauma Quality Improvement Project Palliative Care Best Practices Guidelines (https://www.facs.org/-/media/files/quality-programs/trauma/tqip/palliative_guidelines.ashx, accessed October 5, 2020).

In an effort to address this deficit, the institution focused on targeted education and processes for our teams in geriatric and palliative principles of care such as management of polypharmacy, delirium prevention and treatment, recognition of malnutrition and dysphagia, and skills related to having difficult conversations such as goals of care and end-of-life planning. Given the shortfall in available geriatricians, there is a nationwide push to educate all providers to attain competency in the care of older adults, and therefore there are a breadth of resources available to train and educate our workforce in these principles.¹⁵

Implementation

As a major academic institution, UT Houston has trainees at all levels with well-established venues for education, including departmental grand rounds, resident and student didactic sessions, service conferences, and journal clubs. These existing forums were used to target department-wide education, incorporating three to four speakers on geriatric and palliative topics each year within grand rounds. Additionally, the residency program used a commercially available online curriculum

Table 2 Examples of geriatric care gap analysis

Geriatric trauma management guideline	Met	Partially met	Unmet	Priority	Comments
Trauma registry criteria include same height falls.					
Geriatric trauma management activation protocol is documented.					
Geriatric specific resuscitation guidelines are documented.					
Geriatric guidelines address the changes in the Glasgow Coma Scale (GCS), and dementia assessment is documented.					
Specific lab values for geriatric trauma resuscitations are documented.					
Pain management guidelines for geriatric trauma patients are documented.					
Specific precautions to prevent hypothermia and skin injury are documented.					
Time frames for frailty assessment are documented.					
Capacity assessment guidelines are documented.					
Goals of care are documented in the phases of care.					
Prognostic tools are available to assist in documentation.					
Guidelines include assessment, interventions, and reversal agents for anticoagulation management, as well as restarting therapy after operative interventions.					
Medical management and reconciliation guidelines define when and how often this is completed and documented.					
Beers criteria are included in the medication management					
Guideline includes geriatric trauma intensive care unit admission criteria and is documented.					

*Adapted from the updated American College of Surgeons Trauma Quality Improvement Project Geriatric Trauma Management Best Practice Guideline, currently submitted for publication.

(Surgical Council on Resident Education (SCORE), available at surgicalcore.org) with sections dedicated to geriatric surgery and/or geriatric trauma. Collaboration with the palliative care team and Graduate Medical Education (GME) education office resulted in small group sessions to teach difficult conversation skills such as advanced directives, goals of care, and end-of-life decisions. Continuing medical education was offered to entice faculty to attend. Geriatric-focused hospitalists attended the yearly intern bootcamp to teach basics of geriatric care principles and give tips for handling urgent geriatric issues on call. Additionally, the medical school curriculum created dedicated sessions on geriatric medicine, and geriatric surgery lectures were added to clerkship didactics. Geriatric specialists within our faculty regularly provide instruction, which leverages the expertise of colleagues and builds collaborative relationships for future quality improvement projects.

To supplement the educational initiatives, geriatric protocols are also regularly discussed at trauma multidisciplinary meetings. In 2012, the ‘Silver Unit’ was opened—a new unit focusing on the older trauma patient. Rather than increasing the allotment of trauma beds, an existing trauma floor was designated for preferential admission of patients aged 55 years and older. This unit accommodates a lower ratio of patient to nurse and patient to technician. Nurses apply to staff the unit and there is typically a waitlist for openings. The Silver Unit medical director is a geriatric-focused trauma surgeon, and geriatric hospitalists either consult or are primarily care for many of the admissions. Although a higher quality of care was initially attributed to the lower nurse to patient ratios, cultural shifts have been noted through this approach. Residents now commonly discuss the frailty or resiliency of older patients when deciding whether they warrant admission to the Silver Unit. Nurses use the Silver Unit for focused education on malnutrition as well as for recognizing and assessing delirium and frailty. This unit is a hospital-wide and national leader for geriatric trauma patient-centered initiatives.

Key takeaway

Geriatric principles can be incorporated into existing care structure and educational activities, customized to the needs of the institution, and use existing strengths and collaborative stakeholders. It is crucial to collaborate not only with geriatric specialists, but also with all stakeholders that can champion these efforts. Nearly every type of caregiver has a role to play. Finding champions will help identify gaps in care and create programs that will be both successful and sustained over time. Tailored definitions of institutional success should include both short-term and long-term goals. Long-term goals maintain focus in the right direction, but short-term goals generate quick ‘wins’ to build momentum, document progress, and provide motivation for the longer goals. Most importantly, this is not a solo journey—leveraging existing resources provided the opportunity to maximize educational opportunities.

STRATEGY: CONSULTATION TOOL PERSPECTIVE FROM METROHEALTH MEDICAL CENTER

Identifying gaps

MetroHealth Medical Center is a public and community-focused hospital in Cleveland, Ohio, which is a busy level I trauma center. Prior to an implementation project to focus improvement of care in geriatrics and palliative care, geriatric care was noted by the VRC to be a weakness in the trauma center. To address this weakness, a process was developed and implemented to provide and track more comprehensive care for these patients.

The process consisted of a needs assessment, development of a strategy for directed consultations, and initiation of a feedback and process development with the trauma team. Several gaps were identified that were barriers to using existing consultants, including reluctance of the trauma team to call consultants, general misunderstanding from both the trauma team and the consultants about the nature of consultation requests, as well as identified processes that were prone to causing miscommunication. This led to development of a geriatric assessment and consultation tool implemented by the trauma team.

Implementation

The needs assessment was performed as a retrospective review over a 3-year period to identify potential areas for improvement.¹⁶ We studied the use of multidisciplinary team meetings, palliative care consult use, and code status changes in trauma patients who died of all ages. This study demonstrated that early multidisciplinary care had tangible benefits: fewer patients died as ‘full code’, and there was more use of comfort measures; we also noted these services were used earlier in younger patients but were delayed in older patients. Data review led to increased buy-in from the team to change practice; reluctance to call consultants decreased after learning that geriatric and palliative care services were both underused and beneficial.

Potential process changes were then discussed with three consultant groups: a geriatric-focused internal medicine service, geriatrics, and palliative care. All three had bandwidth for more consultations and had distinct strengths and weaknesses that could be applied to specific care pathways. Palliative care wanted to assist with patients of all ages who needed acute goals of care conversations or end-of-life discussions, while geriatrics wanted to be consulted for non-acute advanced care planning and had strong ties to outpatient healthcare networks to provide continuity of care. The internal medicine service wanted to be called for preoperative optimization and acute medical management questions but was not available for goals of care planning or transition to the outpatient setting. A nuanced understanding of strengths and limitations of each service helped ensure that consultant questions were properly directed to the most appropriate services.

After the consultant feedback was relayed to the trauma team, a tool was adopted with a flowsheet to aid a decision about whether a consultation might be appropriate and which service would be best used (figure 2). Trauma attendings wanted to continue to direct consultations. The flowsheet tool is added to notes for patients aged 65 years and older through a template that includes the triggers and prompts the primary team to document why a consult was not called when criteria were present. Feedback from this process has been positive from both sides. Consultants are responsive and skilled at addressing our targeted questions. Palliative care is consulted for our acutely ill patients and helps facilitate multidisciplinary family meetings. Geriatrics has been skilled at adjudicating the need for long-term anticoagulation, clarifying goals of care in frail but stable patients, often documenting code status changes prior to discharge to skilled nursing facilities and continuing these conversations with patients and families after discharge. Geriatrics has also helped to reduce polypharmacy and alert the trauma team of potential medication interactions.

Since implementation of this process, both palliative care and geriatric consults have been tracked in the trauma registry to determine whether consultations increased and are appropriate. These measures are included in trauma process improvement

Screening Tool:

Patient is ≥ 65 years with any of the following:

- Possible or likely death this hospitalization
- Anticipated severe functional limitations at recovery
- Multiple uncontrolled comorbidities
- Existing DNR-CC with possible reversal (such as rescind for surgery)
- You would not be surprised if this patient died in the next 6 months

Consultant Flow Chart:

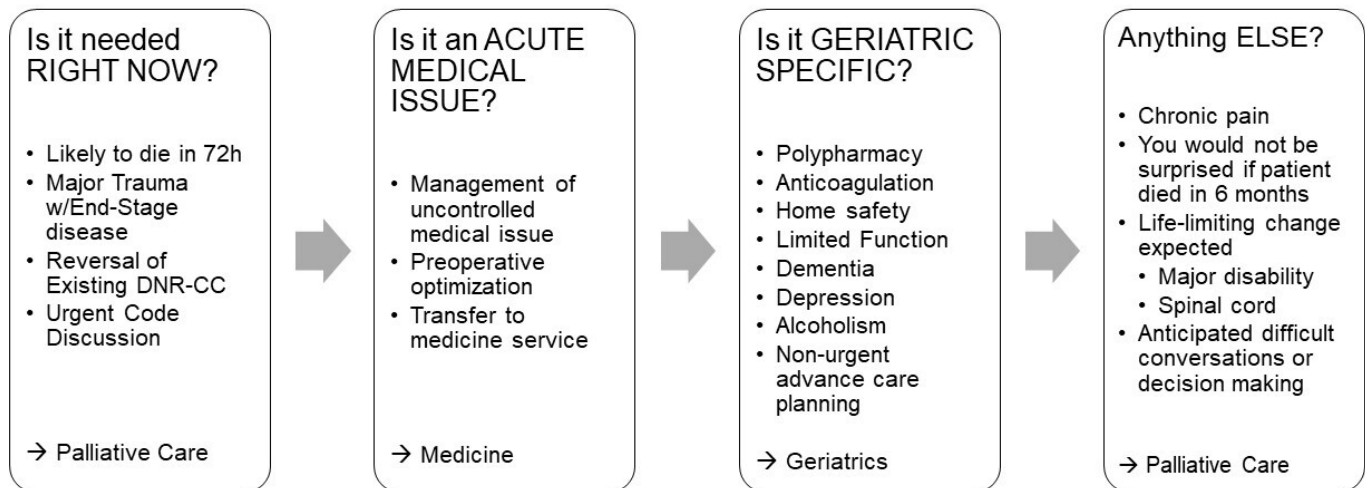


Figure 2 Trigger tool and flowchart of consultations. DNR-CC: Do Not Resuscitate-Comfort Care

reports. Palliative care and geriatrics outcomes are regularly discussed at trauma PI meetings to identify missed opportunities for improvements and support ongoing use of this tool, and representatives regularly attend weekly multidisciplinary trauma meetings to identify opportunities to improve in real-time.

Key Takeaways

Development of this tool not only codified and clarified our consultation process but also improved communication in both directions between the trauma team and the consultants. This process, which is not automated by design, requires human engagement and therefore regular reinforcement and continuous education of the trauma team to ensure that opportunities are not missed. This occurs through updated data and reminders for the trauma team. With unified goals, our consultants also notify the trauma team if they notice that consult requests are decreasing so that the process can be emphasized. The goal will be to continually improve the process through repeated data analysis and feedback to all involved parties.

IMPLEMENTATION STRATEGY: FRAILTY SCREEN: PERSPECTIVE FROM HARBORVIEW MEDICAL CENTER (HMC) Identifying gaps

HMC is the regional level I trauma and burn center for Washington state, Wyoming, Alaska, Montana, and Idaho. Nearly 1000 older adults are admitted to HMC annually, and 30% are severely injured requiring intensive care unit (ICU) care. The trauma surgical group identified the lack of a standardized pathway to engage geriatric medicine and palliative care, as well

as the limited bandwidth of these clinical services, as the main barriers to consistent multidisciplinary care for seriously injured older adults. Based on the guideline recommended in the TQIP Geriatric Trauma Management Guidelines, a frailty screen was implemented to stratify allocation of geriatric and palliative care services to patients in greatest need.¹⁷

Implementation

The decision of which frailty screening tool to use was based on ease of use in the context of a busy trauma center and on adaptability to other clinical settings. The Canadian Study of Health and Aging Clinical Frailty Scale (CFS) is one of the most commonly used frailty screening tools across specialties.¹⁸ The CFS combines comorbidities, function, and cognition into a judgement-based assessment ranging from 1 (very fit) to 9 (terminally ill).¹⁹ Within the older trauma population, CFS has been shown to predict mortality, discharge disposition, and hospital readmissions.²⁰⁻²² The 9-point scale is accompanied by a visual analogue with matching descriptions of items that can be readily observed, and thus is able to be completed expeditiously at the bedside.

Representatives from trauma surgery, anesthesia, geriatrics, and palliative medicine devised a consultation guideline based on a combination of age and frailty. Patients 80 years and older and patients younger than 80 and living with mild-moderate frailty received a geriatrics consultation. Patients of any age living with severe-very severe frailty received a combination of geriatrics and palliative care consultations. This structure is based on the understanding that geriatricians provide primary palliative

care by identifying surrogate decision makers, discussing code status, and elucidating goals of care. This structure preferentially reserves palliative care consultation for the patients with the poorest prognosis, preserving the limited bandwidth of that service in this system.

Frailty screening was implemented in the trauma ICU. Bedside nurses were provided with a brief training by the clinical nurse educator and visual analogue scales were laminated for bedside use. An order to complete frailty screening was entered as part of the admission order set. Initially, the nurses documented the frailty screening on a paper hardcopy and were asked to discuss the frailty score as a clinical datapoint on morning rounds. Compliance with this approach was low and revisions were implemented based on nurse feedback provided during plan-do-study-act cycles. A frailty screening flag was developed in the electronic health record that prompted recording of the frailty score on ICU admission. With implementation of the frailty screening and the consultation protocol, the determination of consultation processes remained the responsibility of the ICU team.

Frailty screening is monitored monthly by the HMC geriatric clinical council, an interdisciplinary group with strong information technology support. A patient care dashboard was developed for monitoring of quality and process metrics related to injured older adults and was made available to all stakeholders via the HMC intranet. Tracking of process metrics includes geriatric and palliative care consultations, patients assessed for frailty, and code status documentation. Tracking of outcome metrics include rapid responses, ICU readmissions, and hospital readmissions within 30 days. Additionally, the dashboard allows examination of metrics using filters for age groups, languages, race and ethnicities, and ethnic backgrounds, with a function to compare metrics between these groups. The geriatric council is able to set target goals on the dashboard, and monitor trends in these metrics over time.

Key takeaways

Within the past 3 years since frailty screening was implemented, compliance has increased to 88%. Geriatric medicine is consistently consulted on over 50% of seriously injured older adults, and palliative care consultation has remained unchanged. The success of this initiative is largely attributable to nursing buy-in, frailty screening flags in the Electronic Health Record, and compliance monitoring by a multidisciplinary group using a patient care dashboard.

CONCLUSIONS

In this article, the implementation of geriatrics and palliative principles in trauma centers is discussed. In addition to the discussion of how quality metrics can be tracked and used for PI and leveraged as a strength for trauma verification from the perspective of the ACS VRC, three examples of how palliative and geriatric focused measures have been successfully implemented were provided. These three institutions performed gap analysis and then implemented organization-specific initiatives tailored to the environment in which they were achieved. Some of the key takeaways from these experiences is the realization that geriatric and palliative care principles can be incorporated into existing educational forums and structure and can be customized to the needs of the institution. Taking advantage of existing strengths and collaborative stakeholders and identifying champions will create programs and approaches that will be successful and sustained.

Opportunities such as those described earlier provide thoughtful and evidence-based treatment for older patients, including geriatric-focused medical care and dedication to palliative care principles. This starts with trauma centers thoughtfully leveraging their existing structure and the dedication to the PI process. These are fantastic opportunities for trauma teams to develop tailored effective programs specific to their institution's resources. This paper outlines not only the reasons to incorporate geriatric and palliative measures into trauma PI but also provides specific examples of institution-specific implementation to help programs develop and operationalize and evaluate effective and sustainable processes to improve the care of the geriatric trauma patient.

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Data availability statement Data sharing is not applicable as no datasets are generated and/or analyzed for this study. *n/a*.

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REFERENCES

- World's Older Population Grows Dramatically. National Institutes of Health. <https://www.census.gov/content/dam/Census/library/publications/2016/demp/p95-16-1.pdf>. (28 sep 2020).
- Ten leading causes of death and injury. Centers for Disease Control and Prevention. <https://www.cdc.gov/injury/wisqars/LeadingCauses.html> (28 sep 2020).
- Annual Report of the National Trauma Data Bank (NTDB). American College of Surgeons. <https://www.facs.org/-/media/files/quality-programs/trauma/ntdb/ntdb-annual-report-2016.ashx> (28 Sep 2020).
- Taylor CA, Bell JM, Breiding MJ, Xu L. Traumatic Brain Injury-Related Emergency Department Visits, Hospitalizations, and Deaths - United States, 2007 and 2013. *MMWR Surveill Summ* 2017;66:1–16.
- Newgard CD, Caughey A, McConnell KJ, Lin A, Eckstrom E, Griffiths D, Malveau S, Bulger E. Comparison of injured older adults included in vs excluded from trauma registries with 1-year follow-up. *JAMA Surg* 2019;154:e192279.
- Florence CS, Bergen G, Atherly A, Burns E, Stevens J, Drake C. Medical costs of fatal and nonfatal falls in older adults. *J Am Geriatr Soc* 2018;66:693–8.
- Joseph B, Pandit V, Zangbar B, Kulvatunyou N, Hashmi A, Green DJ, O'Keeffe T, Tang A, Vercruyse G, Fain MJ, et al. Superiority of frailty over age in predicting outcomes among geriatric trauma patients: a prospective analysis. *JAMA Surg* 2014;149:766–72.
- Gowing R, Jain MK. Injury patterns and outcomes associated with elderly trauma victims in Kingston, Ontario. *Can J Surg* 2007;50:437–44.
- Brown CVR, Rix K, Klein AL, Ford B, Teixeira PGR, Aydelotte J, Coopwood B, Ali S. A comprehensive investigation of comorbidities, mechanisms, injury patterns, and outcomes in geriatric blunt trauma patients. *Am Surg* 2016;82:1055–62.
- Mosenthal AC, Weissman DE, Curtis JR, Hays RM, Lustbader DR, Mulkerin C, Puntillo KA, Ray DE, Bassett R, Boss RD, et al. Integrating palliative care in the surgical and trauma intensive care unit: a report from the improving palliative care in the intensive care unit (IPAL-ICU) project Advisory board and the center to advance palliative care. *Crit Care Med* 2012;40:1199–206.

- 11 ACS TQIP Palliative Care Best Practice Guidelines. American College of Surgeons Committee on Trauma. https://www.facs.org/-/media/files/quality-programs/trauma/tqip/palliative_guidelines.ashx (3 Dec 2020).
- 12 Statement of Principles of Palliative Care. American College of Surgeons. 2005. <https://www.facs.org/About-ACS/Statements/50-Palliative-care> (17 Dec 2020).
- 13 ACS TQIP Geriatric Trauma Management Guidelines. https://www.facs.org/-/media/files/quality-programs/trauma/tqip/geriatric_guidelines.ashx (28 Dec 2020).
- 14 *Resources for optimal care of the injured patient*. Chicago, IL: American College of Surgeons, 2014.
- 15 Callahan KE, Tumosa N, Leipzig RM. Big 'G' and Little 'g' Geriatrics Education for Physicians. *J Am Geriatr Soc* 2017;65:2313–7.
- 16 Bhangu JK, Young BT, Posillico S, Ladhani HA, Zolin SJ, Claridge JA, Ho VP. Goals of care discussions for the imminently dying trauma patient. *J Surg Res* 2020;246:269–73.
- 17 ACo S. AcS TQIP geriatric trauma management guidelines. 2013.
- 18 Church S, Rogers E, Rockwood K, Theou O. A scoping review of the clinical frailty scale. *BMC Geriatr* 2020;20:393.
- 19 Rockwood K, Song X, MacKnight C, Bergman H, Hogan DB, McDowell I, Mitnitski A. A global clinical measure of fitness and frailty in elderly people. *CMAJ* 2005;173:489–95.
- 20 Curtis E, Romanowski K, Sen S, Hill A, Cocanour C. Frailty score on admission predicts mortality and discharge disposition in elderly trauma patients over the age of 65 Y. *J Surg Res* 2018;230:13–19.
- 21 Hatcher VH, Galet C, Lilienthal M, Skeete DA, Romanowski KS. Association of clinical frailty scores with Hospital readmission for falls after index admission for trauma-related injury. *JAMA Netw Open* 2019;2:e1912409.
- 22 Hamidi M, Haddadin Z, Zeeshan M, Saljuqi AT, Hanna K, Tang A, Northcutt A, Kulvatunyou N, Gries L, Joseph B. Prospective evaluation and comparison of the predictive ability of different frailty scores to predict outcomes in geriatric trauma patients. *J Trauma Acute Care Surg* 2019;87:1172–80.