DISCLOSURES, CONFLICTS OF INTEREST

None
OBJECTIVES

1. To understand why traumatic injury and its consequences in older adults are different than in adults.

2. To recognize the elements of and evidence for proactive geriatric medicine consultation and other geriatric trauma models in the trauma setting.

3. To apply the lessons learned to move geriatric trauma care forward in the Atlantic provinces.
OBJECTIVES

1. To understand why traumatic injury and its consequences in older adults are different than in adults.

2. To recognize the elements of and evidence for proactive geriatric medicine consultation and other geriatric trauma models in the trauma setting.

3. To apply the lessons learned to move geriatric trauma care forward in the Atlantic provinces.
Geriatric trauma IS different.

Pre-existing conditions, altered responses, atypical signs, and more serious injuries for same mechanism of injury.
Geriatric trauma IS different.

- **↑death**
  - Adults aged 65+ account for 51% of trauma deaths

- **↑LOS**
  - Mean of 13.5 vs 18.0 days

- **↑falls**
  - Account for 74% of major injury hospitalizations in adults aged 65+

*Canadian National Trauma Registry 2013 Report*
Geriatric trauma IS different.

**Frailty**
Better predictor than age or injury severity.

↑ **in-hospital complications**
Odds ratio 2.5, 95% CI 1.5-6.0

↑ **adverse discharge**
Odds ratio 1.6, 95% 1.1-2.4

FRAILTY
A STATE WITH HIGH VULNERABILITY TO ADVERSE HEALTH CARE OUTCOMES
CURRENT TRAUMA SYSTEMS WERE NOT DEVELOPED FOR THE OLDER ADULT IN MIND.
Under triage in the field.

Treatment at a trauma centre may not be associated with reduced risk of death.

Differences in trauma centre-specific mortality are most pronounced in older adults.

Current trauma systems were not developed for the older adult in mind.
Undertriage is increased in older adults, reaching 60% for those older than 90 years old.

Current trauma systems were not developed for the older adult in mind.
The risk of death is lower among older patients treated at trauma centres than among those treated at non-trauma centres, but this is only a trend.

- death in hospital RR 0.94 (0.56-1.61)
- death at 365 days RR 0.92 (0.67–1.28)

Current trauma systems were not developed for the older adult in mind.
Differences in trauma centre-specific mortality are most pronounced in geriatric trauma patients. median odds ratio = 1.40

Current trauma systems were not developed for the older adult in mind.
Treatment at hospitals with higher geriatric trauma proportion is associated with lower hospital mortality.

HR 0.71 (95% CI 0.54 to 0.94)

Current trauma systems were not developed for the older adult in mind.
Geriatric trauma IS different. It is complicated.

- Atypical presentation
- Frailty
- Processes suboptimal
- System variability
To understand why traumatic injury and its consequences in older adults are different than in adults.

To recognize the elements of proactive geriatric medicine consultation and the evidence for it in the trauma setting.

To apply the lessons learned to move geriatric trauma care forward in the Atlantic provinces.
A comprehensive geriatric assessment (CGA) is a multidimensional, interdisciplinary diagnostic process to determine the medical, psychological, and functional capabilities of a frail elderly person in order to develop a coordinated and integrated plan for treatment and long-term follow-up.

Source: J AM GERIATR SOC 1991;39:8S-16S.
The 5 M’s

- Mind
- Mobility
- Medications
- Multi-Complexity
- Matters Most
THERAPEUTIC HARMONIZATION
ALIGNING PROGNOSIS AND GOALS WITH CARE.
These were stunning results. If scientists came up with a device – call it an automatic defrailer – that wouldn’t extend your life but would slash the likelihood you’d end up in a nursing home or miserable with depression, we’d be clamoung for it …

We’d have pink ribbon campaigns to get one for every person over seventy-five …

Medical students would be jockeying to become defrailulation specialists …

Instead it was just geriatrics.

BEING MORTAL
ATUL GAWANDE
NNT = 33

to have one more older adult survive and return home at discharge.

Cochrane Database Syst Rev. 2017; CD006211.
# PROACTIVE CGA

<table>
<thead>
<tr>
<th>CASE FINDING</th>
<th>Case finding is done SYSTEMATICALLY based on pre-defined criteria and processes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARLY</td>
<td>Involvement is early -- before treatment decisions are made.</td>
</tr>
<tr>
<td>PREVENTION</td>
<td>Focus on prevention of geriatric syndromes.</td>
</tr>
<tr>
<td>DIRECT</td>
<td>Recommendations are implemented directly.</td>
</tr>
</tbody>
</table>
Cross-Specialty Collaborative Models

Early CGA in other settings has improved clinical outcomes.

18% Reduction in delirium after hip fracture. 50% vs 32%, p=.04

↓ LOS Reduction length of stay index in patients admitted to hospitalist service.

↓ complications Reduction in pneumonia, delirium, pressure sores, pain, and catheter-use in elective orthopedic surgery.

multimorbidity
dementia
depression
cataracts
anxiety
stroke
hypertension
polypharmacy
osteoporosis
insomnia
colon cancer
osteoaarthritis
seizure
cirrhosis
seizure
parkinsons
benign prostatic hypertrophy
presbycusis
constipation
hip fracture
myelodysplastic syndrome
diabetes mellitus
macular degeneration
macular degeneration
functional decline
osteoarthritis
hip fracture
chronic kidney disease
hypothyroidism
hip fracture
functional decline
insomnia
constipation
constipation
presbycusis
constipation
pain
falls
falls
pain
incontinence
incontinence
evidence
evidence
91yo from a nursing facility admitted with the following clinical picture:

OA | KYPHOSIS
A.Fib | STAINS | J. HEARING

FALL (UNWITNESSED) | ETC + +

DIGITAL UMA +
C5 COMPLEX II
KNOWN D.B.M.
MULTIPLE P.AIN

PACER/VERBATI
HEMATOMA

BEDREST. COLLAR WITHDRAWAL

CHRONIC URINE - FOLEY - DELIRIUM
RETENTION - AGITATED - RESTRAINTS

SONNOLENT | LOZAZAPAM +
Discharge planning

Sensory impairment

Cognition

Nutrition

Fall risk

Mood

Mobilization

Decubitus risk

Pain

Delirium

Other medical complications

Continence

Beers criteria

Restraints

Comorbidities

Fall risk

Sensory impairment

Cognition

Nutrition

Mood

Mobilization

Decubitus risk

Pain

Delirium

Other medical complications

Continence

Beers criteria

Restraints

Comorbidities

Fall risk

Sensory impairment

Cognition

Nutrition

Mood

Mobilization

Decubitus risk

Pain

Delirium

Other medical complications

Continence

Beers criteria

Restraints

Comorbidities

Fall risk

Sensory impairment

Cognition

Nutrition

Mood

Mobilization

Decubitus risk

Pain

Delirium

Other medical complications

Continence

Beers criteria

Restraints
New ways to mend seniors

A project at St. Michael's Hospital is improving how the most fragile recover from bad accidents

THERESA BOYLE
HEALTH REPORTER

From her bed at St. Michael's Hospital, Johanna Reimann recounts with remarkable clarity the events that landed her here in late June.

The Etobicoke woman hit a rock face on the side of the highway while driving home from her Parry Sound cottage. Emergency service workers, who used the Jaws of Life to extricate her from her crumpled car, told her while she was lying on a stretcher, staring up into the sky, to be on the lookout for a medevac helicopter. If it was orange, they said, she would be airlifted to St. Mike's; if it was white, she would be taken to a local hospital.

Two weeks later, Reimann, 76, is counting her blessings it was an orange helicopter on the horizon that fateful day. In being transported to St. Mike's, she ended up at the only hospital in Canada with a geriatrician on its trauma team.

Every patient over the age of 60 who comes into the trauma unit is seen by a geriatrician who works alongside the typical team of surgeons, anesthesiologists, intensivists and trauma nurses.

The Geriatric Trauma Consultation Service was introduced in 2007 at the urging of Dr. Avery Nathens, director of the hospital's trauma unit.

A year earlier, the New England Journal of Medicine published a study, on which Nathens worked, which found trauma centres performed better than community hospitals in treating all patients — except seniors.

Nathens says that study, and others he has worked on since, highlight the fact that trauma units need to do a better job of meeting the needs of elderly patients.

Reimann suffered 11 broken bones including both legs and her left arm. She also sustained some damage to her kidneys and spleen, as well as numerous lacerations. She underwent five hours of emergency surgery and now has a long pin sticking through her right foot, holding the bones together.

SENIORS continued on GT4

The Toronto Star, August 2 2011
The PROACTIVE GERIATRIC TRAUMA CONSULTATION SERVICE
SYSTEMATIC IDENTIFICATION
age 65+ admission to trauma
EARLY

comprehensive geriatric assessment within 72 hours of admission
The proactive geriatric trauma consultation service team: geriatrician, CNS
Collaborators: trauma team, family MD, pharmacy, social network, community services
- Electronic consultation notes and orders
- Verbal communication
- Weekly interdisciplinary rounds
SYSTEMATIC DATA COLLECTION
evaluation and quality improvement
An Evaluation of a Proactive Geriatric Trauma Consultation Service

Magda Lenartowicz, MD,* Meredith Parkovnick, MSc,† Amanda McFarlan, BA, † Barbara Haas, MD, ‡ Sharon E. Straus, MD, MSc, § Avery B. Nathens, MD, PhD, MPH, || and Camilla L. Wong, MD, MHSc§

Objective: To describe and evaluate an inpatient geriatric trauma consultation service (GTCS).

Background: Delays in recognizing the special needs of older trauma patients may result in suboptimal care. The GTCS is a proactive geriatric consultation model aimed at preventing and managing age-specific complications and discharge planning for all patients 60 years or older admitted to the St Michael’s Hospital Trauma Service.

Methods: This was a before and after case series of patients admitted pre-GTCS (March 2005–August 2007) and post-GTCS (September 2007–March 2010). Study data were derived from a review of the medical records and

Delays in recognizing the special needs of older trauma patients may result in suboptimal care. Postinjury complications in the elderly trauma patient negatively impact survival and contribute to longer lengths of stay in survivors and nonsurvivors than in younger trauma patients. Management of geriatric trauma patients is challenging because the validity of standard injury scores such as the Injury Severity Score is uncertain and the elderly have more comorbidities resulting in more in-hospital complications and medical consultations. The optimal management of these patients remains unclear. A comprehensive geriatric assessment is a multidimensional, interdisciplinary diagnostic process to determine the medical, psy-
<table>
<thead>
<tr>
<th>Issue</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory impairment</td>
<td>40.7%</td>
</tr>
<tr>
<td>Pain</td>
<td>30.1%</td>
</tr>
<tr>
<td>Med review</td>
<td>29.7%</td>
</tr>
<tr>
<td>Mobilization</td>
<td>26.9%</td>
</tr>
<tr>
<td>Discharge planning</td>
<td>17.1%</td>
</tr>
<tr>
<td>Nutrition</td>
<td>15.0%</td>
</tr>
<tr>
<td>Mood disorder</td>
<td>14.6%</td>
</tr>
<tr>
<td>Other medical</td>
<td>8.9%</td>
</tr>
<tr>
<td>Delirium/dementia</td>
<td>26.8%</td>
</tr>
<tr>
<td>Continence</td>
<td>26.4%</td>
</tr>
<tr>
<td>Restraints</td>
<td>4.9%</td>
</tr>
<tr>
<td>Decubitus ulcer</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

Proactive Geriatric Trauma Consultation Service

CGA within 72 hours of admission by a clinical nurse specialist and geriatrician, verbal and written communication of recommendations, weekly interdisciplinary meetings with the trauma team, and measurement of quality indicators.

Reduction in delirium. 50.5% vs 40.9%, p<.05

Reduction in discharge to long term care. 6.5% vs 1.7%, p=0.03

Reduction in consultations to Internal Medicine (p=.04) and Psychiatry (p=.02).

AGREEMENT

Adherence to recommendations was 93%.
Sustainability of a proactive geriatric trauma consultation service

Background: Proactive geriatric trauma consultation service (GTCS) models have been associated with better delivery of geriatric care and functional outcomes. Whether such collaborative models can be improved and sustained remains uncertain. We describe the sustainability and process improvements of an inpatient GTCS.

Methods: We assessed workflow using interviews and surveys to identify opportunities to optimize the referral process for the GTCS. Sustainability of the service was assessed via a prospective case series (July 2012 and December 2013). Study data were derived from a review of the medical record and trauma registry database. Metrics to determine sustainability included volume of cases seen, staffing levels, rate of adherence to recommendations, geriatric-specific clinical outcomes, trauma quality indicators, consultation requests and discharge destination.

Results: Through process changes, we were able to ensure every eligible patient was referred for a comprehensive geriatric assessment. Compared with the implementation phase, volume of assessments increased and recommendation adherence rates were maintained. Delirium and/or dementia were the most common geriatric issue addressed. The rate of adherence to recommendations made by the GTCS team was 88.2%. Only 1.4% of patients were discharged to a nursing home.

Conclusion: Workflow assessment is a useful means to optimize the referral process for comprehensive geriatric assessment. Sustainability of a GTCS was demonstrated by volume, staffing and recommendation adherence.
Proactive Geriatric Trauma Consultation Service Sustainability

After 6-7 years, the program has demonstrated sustainability on several measures.

- **Volumes**: 6.9 ± 2.7 patients seen per month.
- **Funding**
- **Adherence**: 88.2% recommendation adherence rate
- **Outcomes**: 1.4% discharged to long term care

Quality of Care Delivered Before vs After a Quality-Improvement Intervention for Acute Geriatric Trauma

Lillian Min, MD, MSHS, Henry Cryer, MD, PhD, FACS, Chiao-Li Chan, MSW, Carol Roth, RN, MPH, Areti Tillou, MD, MSeD, FACS

BACKGROUND: Older trauma-injury patients had improved recovery after we implemented routine geriatric consultation for patients aged 65 years and older admitted to the trauma service of a Level I academic trauma center. The intervention aimed to improve quality of geriatric care. However, the specific care processes that improved are unknown.

STUDY DESIGN: We conducted a prospective observation comparing medical care after (December 2007 to November 2009) vs before (December 2006 to November 2007) implementation of the geriatric consult-based intervention. To measure quality of care (QOC), we used 33 previously validated care-process quality indicators (QIs) from the Assessing the Care of Vulnerable Elders (ACOVE) study, measured by review of medical records for 76 geriatric consult (GC) vs 71 control group patients. As prespecified subgroup analyses, we aggregated QIs by type: geriatric (eg, delirium screening) vs nongeriatric condition—based care (eg, thrombosis prophylaxis) and compared QI scores by type of care. Last, we aggregated QI scores into overall, geriatric, and nongeriatric QOC scores for each patient (number of QIs passed/number of QIs eligible), and compared patient-level QOC for the GC vs control group, adjusting for age, sex, ethnicity, comorbidity, and injury severity.

RESULTS: Sixty-three percent of the GC patients vs 11% of the control group patients received a geriatric consultation. We evaluated 2,505 QIs overall (1,664 geriatric type and 841 nongeriatric QIs). In general, fewer geriatric-type QIs were passed than nongeriatric QIs (71% vs 81%; p < 0.001). We provided better overall QOC to the GC (77%) than control group patients (73%; p < 0.05). However, the difference was not statistically significant after multivariable adjustment (p = 0.08). We improved geriatric QOC for the GC (74%) compared with the control group (68%; p < 0.01), a difference that was significant after multivariable adjustment (p = 0.01).

CONCLUSIONS: Geriatricians and surgeons can collaboratively improve geriatric QOC for older trauma patients. (J Am Coll Surg 2015;220:820–830. © 2015 by the American College of Surgeons)
Better recovery of function in the year following traumatic injury (p<.01).
Improved advanced care planning and reduced intensive care readmission rates.
Proactive Geriatric Trauma Consultation Service

Other studies of geriatric trauma collaborations have demonstrated improved outcomes.

Increased DNR and DNI status (38.2% vs 10.2%, p < .01)

Better functional status at one year (p < .05)

Improved geriatric quality indicators (74% vs 68%, p < .01)

GERIATRIC TRAUMA

PROACTIVE. Systematic case finding, early involvement, focus on geriatric syndrome prevention, and direct implementation.

COLLABORATIVE. Address trauma complexity with frailty complexity.

IMPACT. Reduce delirium, improve geriatric quality indicators, preserve function, and decrease discharge to long term care.
OBJECTIVES

1. To understand why traumatic injury and its consequences in older adults are different than in adults.

2. To recognize the elements of and evidence for proactive geriatric medicine consultation and other geriatric trauma models in the trauma setting.

3. To apply the lessons learned to move geriatric trauma care forward in the Atlantic provinces.
You are invited to coffee with trauma. Hallway conversations to follow.
RESEARCH (EVALUATION) DRIVES SUSTAINABILITY

When you have positive, measurable, published, impact, everyone will want to keep the collaboration model going.
What was challenging.

TRYING TO SPEAK THE SAME LINGO.
There is so much to learn about the other field.
There must be mutual respect for one another’s domain of expertise.
The secret sauce.

CONSISTENCY for CONTINUITY

same clinical nurse specialist (geriatrics)
same nurse practitioner (trauma)
EVERYONE WANTS IN.

geriatric cardiology
geriatric nephrology
perioperative geriatrics
geriatric oncology
Did you know? There are only 261 geriatricians in Canada.

Number of geriatricians per province/territory:
- 0
- 1-20
- 21-40
- 41-60
- 61-80
- 81+

1 Geriatrician serves 20,914 Senior Citizen Patients*

*Statistics Canada-2012
Use geriatric-specific trauma field triage criteria.

- lowers mortality in individuals with ISS <10; OR = 0.81 (0.70-0.95)
- more individuals discharged home; OR = 1.06 (1.01-1.11)

Effect of Geriatric-Specific Trauma Triage Criteria on Outcomes in Injured Older Adults: A Statewide Retrospective Cohort Study

Jeffrey M. Caterino, MD, MPH,* Nicole V. Brown, MS,† Maya W. Hamilton, BA,‡ Brian Ichwan, MD,§ Salman Khalidina, MBBS,* David C. Evans, MD,¶ Subrahmanyan Darbha, MS,* Ashish R. Panchal, MD, PhD,* and Manish N. Shah, MD, MPH**

[See Editorial Comments by Timothy F. Platts-Mills, Christopher S. Evans, and Jane H. Brice]

OBJECTIVES: To evaluate the effect on outcomes of the Ohio Department of Public Safety statewide geriatric triage criteria, established in 2009 for emergency medical services (EMS) to use for injured individuals aged 70 and older.

Design: Retrospective cohort study of the Ohio Trauma Registry.

Setting: All hospitals in Ohio.

Participants: Individuals aged 70 and older in the Ohio Trauma Registry from January 2006 through December 2011, 3 years before and 3 years after criteria adoption (N = 34,499).

Measurements: Primary outcomes were in-hospital mortality and discharge to home. Criteria effects were assessed using chi-square tests, multivariable logistic regression, interrupted time series plots, and multivariable segmented regression models.

Results: After geriatric criteria were adopted, the proportion of older adults qualifying for trauma center transport increased from 44% to 58%, but EMS transport rates did not change (44% vs 45%). There was no difference in unadjusted mortality (7.1% vs 6.6%) (P = .10). In adjusted analyses, subjects with an injury severity score (ISS) less than 10 had lower mortality after adoption (3.0% vs 2.5%) (odds ratio (OR) = 0.81, 95% confidence interval (CI) = 0.70–0.95, P = .01). Discharge to home increased after adoption in the adjusted analysis (OR = 1.06, 95% CI = 1.01–1.11, P = .02). There were no time-dependent changes for either outcome.

Conclusion: Although the proportion of older adults meeting criteria for trauma center transport substantially increased with geriatric triage criteria, there were no increases in trauma center transports. Adoption of statewide geriatric triage guidelines did not decrease mortality in more severely injured older adults but was associated with slightly lower mortality in individuals with mild injuries (ISS <10) and with more individuals discharged to home. Improving outcomes in injured older adults will require further attention to implementation and use of geriatric-specific criteria.


Key words: geriatric; trauma; triage

Individuals aged 65 and over account for 13% of the U.S. population and more than 25% of all hospital admissions for trauma.1,2 By 2050, 40% of all individuals admitted to the hospital for trauma will be older adults.3,4 Injured older adults have greater morbidity and mortality than younger adults with similar injuries. They have greater anxiety, longer

Early geriatric consultation increases adherence to TQIP Geriatric Trauma Management Guidelines

Lauren T. Southerland, MD,a,* Tanya R. Gure, MD,b Daniel I. Ruter, BS,c Michael M. Li, BA,c and David C. Evans, MD, FACSd

aDepartment of Emergency Medicine, The Ohio State University, Columbus, OH
bDepartment of Internal Medicine, Division of General Internal Medicine and Geriatrics, The Ohio State University, Columbus, OH
cThe Ohio State University College of Medicine, Columbus, OH
dDepartment of Surgery, The Ohio State University, Columbus, OH

ARTICLE INFO

Article history:
Received 22 November 2016
Received in revised form
31 January 2017
Accepted 23 March 2017
Available online 31 March 2017

Keywords:
Geriatrics
Trauma
Quality measures
TQIP
Geriatric consultation

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 ±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 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.

Conclusions: 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.

© 2017 Elsevier Inc. All rights reserved.
The G-60 Unit Model

- Decreased ICU LOS
- Decreased LOS
- Decreased complications (AKI, CHF, UTI, pneumonia, respiratory failure)
Opportunities.

Refinement.

Current research focus on using pre-trauma frailty to refine patient selection criteria.
Clinical Frailty Scale*

1. **Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2. **Well** – People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g. seasonally.

3. **Managing Well** – People whose medical problems are well controlled, but are not regularly active beyond routine walking.

4. **Vulnerable** – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being “slowed up”, and/or being tired during the day.

5. **Mildly Frail** – These people often have more evident slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6. **Moderately Frail** – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.

7. **Severely Frail** – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8. **Very Severely Frail** – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. **Terminally Ill** - Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise evidently frail.

**Scoring frailty in people with dementia**

The degree of frailty corresponds to the degree of dementia. Common symptoms in mild dementia include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In moderate dementia, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In severe dementia, they cannot do personal care without help.


© 2007-2009. Version 1.2. All rights reserved. Geriatric Medicine Research, Dalhousie University, Halifax, Canada. Permission granted to copy for research and educational purposes only.
Pre-admission frailty is associated with adverse discharge destination.

- moderate to severe frailty, OR=5.3; 95% CI 2.1-13.5; \(P<.001\)

- age OR=1.1; 95% CI 1.0-1.1; \(P=0.006\)

- three or more comorbidities OR=2.8; 95% 1.1-7.3; \(P=0.04\)
Tip for collaborative care models.

GRASSROOTS APPROACH

The passion has to come from the FRONTLINE from both sides of the field.
... and they lived happily ever after.
Acknowledgements

St. Michael’s Hospital Geriatric Trauma Consultation Service Design, Implementation and Evaluation

Dr. Maria Zorzitto, Geriatrician
Dr. Sharon Straus, Geriatrician
Dr. Avery Nathens, Trauma Surgeon
Dr. Barbara Haas, Trauma Surgeon
Lee Ringer, CNS
Anne Stephens, CNS
Amanda McFarlan, Trauma Registry and Quality Coordinator, SMH
Raghda Al Atia
Magda Lenartowicz
Meredith Parkovnick
Christina Valiaveetil
Holly Lee
Thom Ringer
Annie Cheung

St. Michael’s Hospital Geriatric Trauma Consultation Service Evaluation Funding

Division of Trauma, St. Michael’s Hospital
Department of Medicine, St. Michael’s Hospital
Keenan Research Centre of the Li Ka Shing Knowledge Institute of St. Michael’s Hospital
AHSC AFP Innovation Fund, Ontario Ministry of Health and Long-term Care
Department of Medicine Strategic Innovation Fund, University of Toronto
Thank you.
Geriatric Trauma Panel

Pamela Jarrett MD, FRCP, FACP
Geriatrician
Horizon Health Network Saint John
Associate Professor of Medicine Dalhousie
and Memorial University
Most hospitals in New Brunswick are currently designated as trauma centres meaning that they have an important, but differing role to play in the care of seriously injured patients. New Brunswick’s trauma centres are designated by the Province using the most recent Trauma Association of Canada’s definitions. These definitions range from Level V (basic emergency care) to Level I and II (most complex care).
What’s the Big Picture?

Percentage of Trauma Registry Discharges 65 years of age and older

- 2014-15 = 46.8%
- 2015-16 = 48.7%
### Seniors and Serious Injury

#### What is this telling us?
- Almost a third of ISS>12 patients are seniors
- With respect to seniors: Higher proportion of younger seniors have ISS >12
- Within each senior age grouping for all discharges: – a significant number have ISS >12

<table>
<thead>
<tr>
<th>Cases Included in the NB Trauma Registry</th>
<th>April 2014 to March 2015</th>
<th>April 2015 to March 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Discharges in Registry</td>
<td>2417</td>
<td>2672</td>
</tr>
<tr>
<td>Total Discharges &gt;64</td>
<td>1131 46.79%</td>
<td>1302 48.73%</td>
</tr>
<tr>
<td>65 to 74</td>
<td>312 27.59%</td>
<td>347 26.65%</td>
</tr>
<tr>
<td>75 to 84</td>
<td>415 36.69%</td>
<td>470 36.10%</td>
</tr>
<tr>
<td>85 +</td>
<td>404 35.72%</td>
<td>485 37.25%</td>
</tr>
<tr>
<td>Total ISS&gt;12 in Registry</td>
<td>218</td>
<td>234</td>
</tr>
<tr>
<td>Proportion ISS&gt;12</td>
<td>72 33.03%</td>
<td>64 27.35%</td>
</tr>
<tr>
<td>65 to 74</td>
<td>34 10.90%</td>
<td>27 7.78%</td>
</tr>
<tr>
<td>75 to 84</td>
<td>24 5.78%</td>
<td>18 3.83%</td>
</tr>
<tr>
<td>85 +</td>
<td>14 3.47%</td>
<td>19 3.92%</td>
</tr>
</tbody>
</table>
How Are Seniors Injured?

Cases in the NB Trauma Registry

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>April 2014 to March 2015</th>
<th>April 2015 to March 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall</td>
<td>MVC</td>
</tr>
<tr>
<td>Fall</td>
<td>998</td>
<td>63</td>
</tr>
<tr>
<td>MVC</td>
<td>88.24%</td>
<td>5.57%</td>
</tr>
<tr>
<td>Other</td>
<td>65 to 74</td>
<td>23.55%</td>
</tr>
<tr>
<td>75 to 84</td>
<td>37.27%</td>
<td>30.16%</td>
</tr>
<tr>
<td>85 +</td>
<td>39.18%</td>
<td>4.76%</td>
</tr>
</tbody>
</table>

What is this telling us?

- The VAST MAJORITY are FALLS
- Falls are the leading cause of injury admission in all age groups
- ~40 % of seniors admitted with a FALL are 85+
How Long Do They Stay In Acute Care?

Cases in the NB Trauma Registry

<table>
<thead>
<tr>
<th>Age Group</th>
<th>April 2014 to March 2015</th>
<th>April 2015 to March 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Length of Stay (days)</td>
<td>20.06</td>
<td>21.07</td>
</tr>
<tr>
<td>65 to 74</td>
<td>14.94</td>
<td>13.92</td>
</tr>
<tr>
<td>75 to 84</td>
<td>20.95</td>
<td>18.68</td>
</tr>
<tr>
<td>85 +</td>
<td>22.98</td>
<td>28.51</td>
</tr>
</tbody>
</table>

What is this telling us?

- Average Length of Stay (LOS) increases with age (other factors involved?)
- For those 85+: Average LOS appears to be increasing
Cases in the NB Trauma Registry

<table>
<thead>
<tr>
<th>Discharge Disposition</th>
<th>Home</th>
<th>Another Facility</th>
<th>Died</th>
<th>Home</th>
<th>Another Facility</th>
<th>Died</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>761</td>
<td>261</td>
<td>109</td>
<td>813</td>
<td>371</td>
<td>112</td>
</tr>
<tr>
<td>65 to 74</td>
<td>31.67%</td>
<td>18.77%</td>
<td>20.18%</td>
<td>33.09%</td>
<td>17.79%</td>
<td>9.82%</td>
</tr>
<tr>
<td>75 to 84</td>
<td>37.19%</td>
<td>38.70%</td>
<td>28.44%</td>
<td>35.55%</td>
<td>37.20%</td>
<td>36.61%</td>
</tr>
<tr>
<td>85 +</td>
<td>31.14%</td>
<td>42.53%</td>
<td>51.38%</td>
<td>31.37%</td>
<td>45.01%</td>
<td>53.57%</td>
</tr>
</tbody>
</table>

What is this telling us?

- Good news: Majority of seniors with injury are discharged home >60%
- After injury ~25% of all seniors are discharged to another facility for further care – with need increasing with age
- Bad news: Regardless of injury severity – there is >50% mortality in 85+ age group & mortality for all seniors is high
GA ≠ CGA

1. SCREENING
2. ASSESSMENT
3. GOAL-DIRECTED INTERVENTION
4. FOLLOW-THROUGH

} geriatric assessment

} CGA
<table>
<thead>
<tr>
<th><strong>PROACTIVE CGA</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CASE FINDING</strong></td>
</tr>
<tr>
<td>Case finding is done SYSTEMATICALLY based on pre-defined criteria and processes.</td>
</tr>
<tr>
<td><strong>EARLY</strong></td>
</tr>
<tr>
<td>Involvement is early -- before treatment decisions are made.</td>
</tr>
<tr>
<td><strong>PREVENTION</strong></td>
</tr>
<tr>
<td>Focus on prevention of geriatric syndromes.</td>
</tr>
<tr>
<td><strong>DIRECT</strong></td>
</tr>
<tr>
<td>Recommendations are implemented directly.</td>
</tr>
</tbody>
</table>
GERIATRIC ISSUES
ADDRESSED

Sensory impairment 40.7%
Pain 30.1%
Discharge planning 17.1%
Nutrition 15.0%
Mood disorder 14.6%
Other medical 8.9%
Med review 29.7%
Mobilization 26.9%
Delirium/dementia 26.8%
Continence 26.4%
Restraints 4.9%
Decubitus ulcer 0.4%

Ann Surg 2012;256: 1098–1101
Clinical Frailty Scale

1. **Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2. **Well** – People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g. seasonally.

3. **Managing Well** – People whose medical problems are well controlled, but are not regularly active beyond routine walking.

4. **Vulnerable** – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being “slowed up”, and/or being tired during the day.

5. **Mildly Frail** – These people often have more evident slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6. **Moderately Frail** – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.

7. **Severely Frail** – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8. **Very Severely Frail** – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. **Terminally Ill** – Approaching the end of life. This category applies to people with a life expectancy < 6 months, who are not otherwise evidently frail.

**Scoring frailty in people with dementia**

The degree of frailty corresponds to the degree of dementia. Common symptoms in mild dementia include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In moderate dementia, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In severe dementia, they cannot do personal care without help.

So where do we go from here?

• Focus on trying to understand the premorbid frailty level on arrival to hospital
• Try to individualize care based on frailty
• Build frailty assessment into the assessment process upon arrival to hospital
So where do we go from here?

• Early Comprehensive Geriatric Assessment
  – Who can do this?
• Prevention of common geriatric syndromes in hospital
• Research focus on how Frailty impacts Trauma Outcomes
Field Trauma Triage Guidelines

1A Immediate Life Threats:
- Inability to ventilate patient if required or
- Glasgow Coma Scale <8 or
- Systolic blood pressure <60 mmHg or
- Decreased breath sounds on either or both sides

Yes

No

1

- Glasgow Coma Scale = 14 or
- Systolic blood pressure = 90 mmHg or
- Respiratory rate <10 or N95 Breaths/Minute (20 in infant <1 year)

Yes

No

2

Anatomic Criteria:
- All penetrating injuries to the head, neck, chest, abdomen, groin, or extremities proximal to elbow and knee
- Pelvis
- Two or more proximal long bone fractures
- Closed, depressed, or rangulated fracture
- Amputation proximal to wrist and ankle
- Pelvic fractures
- Open or depressed skull fracture
- Paralysis
- Burn

Yes

No

3

High-Risk Auto Crash
- Intoxication = 30 cm impact site = 46 cm on any side
- Ejection partial or complete from automobile
- Death in same passenger compartment
- VehicleIntegrity data consistent with high risk of injury

Yes

No

Special Considerations:
Patients requiring high index of suspicion – revisit steps 1-3 if any of the following apply:
- Age <0 years or >15 years
- Anticoagulation and Bleeding Disorders
- Prior Sensitive Extremity Injury
- End Stage Renal Disease
- Pregnancy >20 Weeks
- Simultaneous presentation of several multi-trauma patients
- EMS Provider Judgment

Yes

No

4

CALL 1-888-790-9222
Anatomic Criteria – Any of the following:

- All penetrating injuries to the head, neck, eye, chest, back, abdomen, groin, or extremities proximal to and including elbow or knee
- Multiple rib fractures or thorax deformity
- Two or more proximal long-bone fractures
- Crushed, de-gloved, mangled or pulseless extremity
- Amputation proximal to wrist or ankle
- Pelvic fractures
- Skull deformity or suspected skull fracture
- Head trauma among those <18 years or > 65 years AND loss of consciousness OR amnesia OR disorientation
- Head trauma in patient of any age with bleeding disorder or anticoagulant use
- Signs or symptoms of spinal cord injury
- Significant burn or scald
- Pregnancy ≥ 20 weeks with any incident history of trauma to chest, back, abdomen or pelvis
Geriatric Trauma

Atlantic Trauma and Emergency Medicine Conference
September 21, 2017

Judah Goldstein PCP, PhD
EHS Research Coordinator
Population Ageing

- The population is ageing
  - NS has the oldest population in Canada
EMS Use in Nova Scotia

Responses per 1000 population

Age Category (years):
- 15-64
- 65-69
- 70-74
- 75-79
- 80-84
- 85-89
- 90-94
- 95 and older

Responses per 1000 population:
- 0
- 100
- 200
- 300
- 400
- 500
- 600
Nova Scotia Health Authority Zones

- Cumberland Regional Health Care Centre
- Aberdeen Hospital
- St. Martha's Regional
- Cape Breton Regional
- Valley Regional
- New Glasgow
- Antigonish
- Colchester East Hants Health Centre
- QEII Health Sciences Centre
- IWK Health Centre
- NS Medical Examiner Service

NSHA Zones:
- Western
- Northern
- Eastern
- Central

City/Town with regional hospital

 nova scotia health authority
Nova Scotia

88.1% of Nova Scotians have access to regional trauma care within one hour of prehospital time.

Access to Trauma Care
A recent study of data from the NSTR found that 88.1% of the Nova Scotia population can access level III trauma care from their residence within 60 minutes of prehospital time.

Potential Access to Regional Care in Nova Scotia

Travel Time
- 0 to 15 mins
- 15 to 120 mins

*Figure created by Dr. Gavin Tansley using data from the NSTR and EHS.*

Tansley et al. 2017 CJEM
Major Trauma Outcomes 2014-15

73% Alive
27%

- 17% Died at scene
- 3% Died in the Emergency Department
- 8% Died in hospital
Major Trauma in Nova Scotia:
Most Common Mechanism of Injury by Age Group
(2013/14)

Motor vehicle crashes are most common in the younger age groups, while falls are most prominent in seniors.
Trauma in Older Adults

- Mortality (adjusting for Injury Severity Scale) increases at age 70 - geriatric trauma (Bonne and Schuerer 2013 Clin Geriatr Med)
- More older adults living independent, active lives
- Geriatric trauma accounts for 23% of trauma admissions, fifth leading cause of death
- Blunt trauma
- Often under-triaged
Trauma in Older Adults: Local Data

- Trauma - 14.5% of EMS responses (2010), second most prevalent complaint

### Types of Trauma in NS

<table>
<thead>
<tr>
<th>Age</th>
<th>Penetrating Trauma</th>
<th>Hip Trauma</th>
<th>Head Trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-69</td>
<td>&lt;10</td>
<td>69</td>
<td>76</td>
</tr>
<tr>
<td>70-74</td>
<td>&lt;10</td>
<td>86</td>
<td>67</td>
</tr>
<tr>
<td>75-79</td>
<td>&lt;10</td>
<td>172</td>
<td>86</td>
</tr>
<tr>
<td>80-84</td>
<td>0</td>
<td>251</td>
<td>109</td>
</tr>
<tr>
<td>85-89</td>
<td>0</td>
<td>269</td>
<td>99</td>
</tr>
<tr>
<td>90-94</td>
<td>0</td>
<td>197</td>
<td>64</td>
</tr>
<tr>
<td>95+</td>
<td>0</td>
<td>81</td>
<td>25</td>
</tr>
</tbody>
</table>

Goldstein et al. unpublished
Geriatric Major Trauma  
April 1, 2015 – March 31, 2016

All Major Trauma = 884

Gender – 60% Male  
Age (mean) – 76.9

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total Cases (n=263)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expired prior to hospital arrival</td>
<td>31 (12%)</td>
</tr>
<tr>
<td>Total Admitted</td>
<td>217 (93.5%)</td>
</tr>
<tr>
<td>Common Mechanisms</td>
<td></td>
</tr>
<tr>
<td>Falls</td>
<td>171</td>
</tr>
<tr>
<td>MVC</td>
<td>35</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>12</td>
</tr>
<tr>
<td>Mean Length of Stay</td>
<td>29.2 days</td>
</tr>
<tr>
<td>Discharged to LTC (of admitted)</td>
<td>11 (5.1%)</td>
</tr>
<tr>
<td>Arrived by air</td>
<td>27 (11.6%)</td>
</tr>
<tr>
<td>Treated in Tertiary Care</td>
<td>167 (72.4%)</td>
</tr>
</tbody>
</table>
Fitness and Frailty

**Frailty** – multidimensional, extreme vulnerability
- Frailty can be measured by a *deficit accumulation index* (0-1.0) (e.g. 11/44=0.25) (Mitnitski and Rockwood 2001)

**What does frailty have to do with trauma?**
- Frailty index – strong independent predictor of outcomes (death, LTC placement) in major trauma (Joseph et al. 2014)
- State of health before the injury
- Both acuity and frailty are important
Injury Patterns

• Falls
  – Long bone injuries
  – Head injuries
  – C-spine injuries
  – Pelvic fractures

• MVC
  – Chest (25%)
• Compared to those <65:
  – Larger % of falls lead to serious injury (e.g. TBI)
  – Same level falls lead to more serious injury
  – More frequent head/neck, chest, pelvic, and extremity injuries
  – Higher fall-related death rate
  – Falls are the most common cause of EMS use in the presence of dementia
Risk Factors for Multiple Falls

- History of previous falls
- Psychoactive medications
- Impaired hearing or vision
- Poor balance
- Impaired mobility
Fall Management

• Identify the cause (risk factors, collateral, underlying medical cause)
• Assess injuries
• Discuss falls risk
• Plan (referral programs, Lifeline)
EHS Fall Referral Program

- EHS has partnered with Falls Prevention within several communities in Nova Scotia to help identify older adults at risk for serious injury from falls.

- Paramedics identify and enroll people 65y or older whose chief complaint was a fall and are not being transported to hospital.

- Clinical Support Desk assists crews with enrollment – send referral

- Falls Prevention begins follow-up services.

Courtesy of T. Dobson
Information Exchange

Paramedic crews chart information to assist Falls Prevention:
- How often patient falls.
- Recent medication changes or illnesses.
- Condition of residence.
- Care giver support, if any.

Falls Prevention then calls the patient to discuss enrollment plan and schedules a home visit.

http://www.gov.ns.ca/health/ehs/

Courtesy of T. Dobson
Patients Approached
40

Enrolled
31

- Falls 28 Days Post Enrollment
  10 Patients (32%)
  Number of Falls - 13
  1.3/Patient

- NO Falls 28 Days Post Enrollment
  21 Patients (68%)

Declined
9

- Falls 28 Days After Declining
  5 Patients (56%)
  Number of Falls = 6
  1.2/Patient

- NO Falls 28 Days Post Declining
  4 Patients (44%)

Courtesy of T. Dobson
Benefits of Program

• In the past this patient population would be missed.

• Paramedics are ensuring these patients receive timely interventions to prevent a sentinel event.

• This is a very simple program that makes use of current capacity in delivering extra care.

http://www.gov.ns.ca/health/ehs/  

Courtesy of T. Dobson
Falls Prevention Programs

Comans et al. 2013 – Observational, pilot study
Population: Older adults (65 years +) living in the community that had a recent fall
Intervention: EMS referral pathway to a community falls-prevention team
Comparison – standard care
Outcome – reduced EMS responses

Results: only 17/638 referrals in two years
  – Intensive education on program
  – Fallers – mean age 81, 61% female, trip/slip main cause (26%)
  – Inappropriate referrals (advanced dementia)
• Issues – lack of study resources, not regionalised, staff turn-over
Conclusion: Falls program did not translate into EMS referrals
Logan et al. 2010 BMJ –RCT

**Population:** 60 years, live at home, recent fall with EMS use, participants identified post response*

**Intervention:** multifactorial falls team

**Comparison:** usual practice

**Outcome:** falls rate

**Results:** 204 enrolled

- 55% reduction in rate of falls in intervention group
- Time to first fall less in intervention group
Novel EMS protocol to safely prevent unnecessary EMS transports: Case Review

- **Eligibility:**
  - Ground level fall
  - Able to consent

- **Tier 3 criteria – Safe for non transport**
  - Simple contusion or skin tear
  - No complaint
  - No obvious injury
  - No hip pain, full ROM
  - Ambulatory

- **Needs to be prospectively refined and validated**

Williams et al. 2014 PEC