



# Old Problem, New Solutions: Best Practices in Geriatric Trauma

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# ILOs



Identify why elderly patients are at risk



Identify abnormal geriatric vital signs and sequelae of trauma



Identify Validated Tools



Discuss under/overtriage



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## Case 1

- 71M PMHx lung CA and RCC w mets to brain, BIBS after slipping on patch of ice (from Truckee) 4 days ago. No LOC, didn't hit head. Still having back and L sided neck pain.
- PE: HR 50 (baseline), 126/66, 36.7, 17, 99%RA
- Axo3, normocephalic no e/o head trauma. L paraspinal neck ttp and L thoracic back ttp

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## Case 2

- 84M, PMHx seizures, Dm2 with CKD, peripheral neuropathy with b/l leg weakness L>R, BPH, spinal stenosis s/p L4-L5 laminectomy, BIBS for falls and L leg weakness.
- LLE weak x5 weeks-> >10 falls in 6d. Yesterday fell while golfing and today sitting fell backwards when trying to put on pants, hit head, no LOC, no AC
- He states it is due to L leg weakness
- PE: atraumatic head, axox3, LLE weaker than R





# Why do we care in the ED?

>65yo growing patient population

26% of total ED patient visits

Older Age=Independent RF

Post DC high rates of mortality

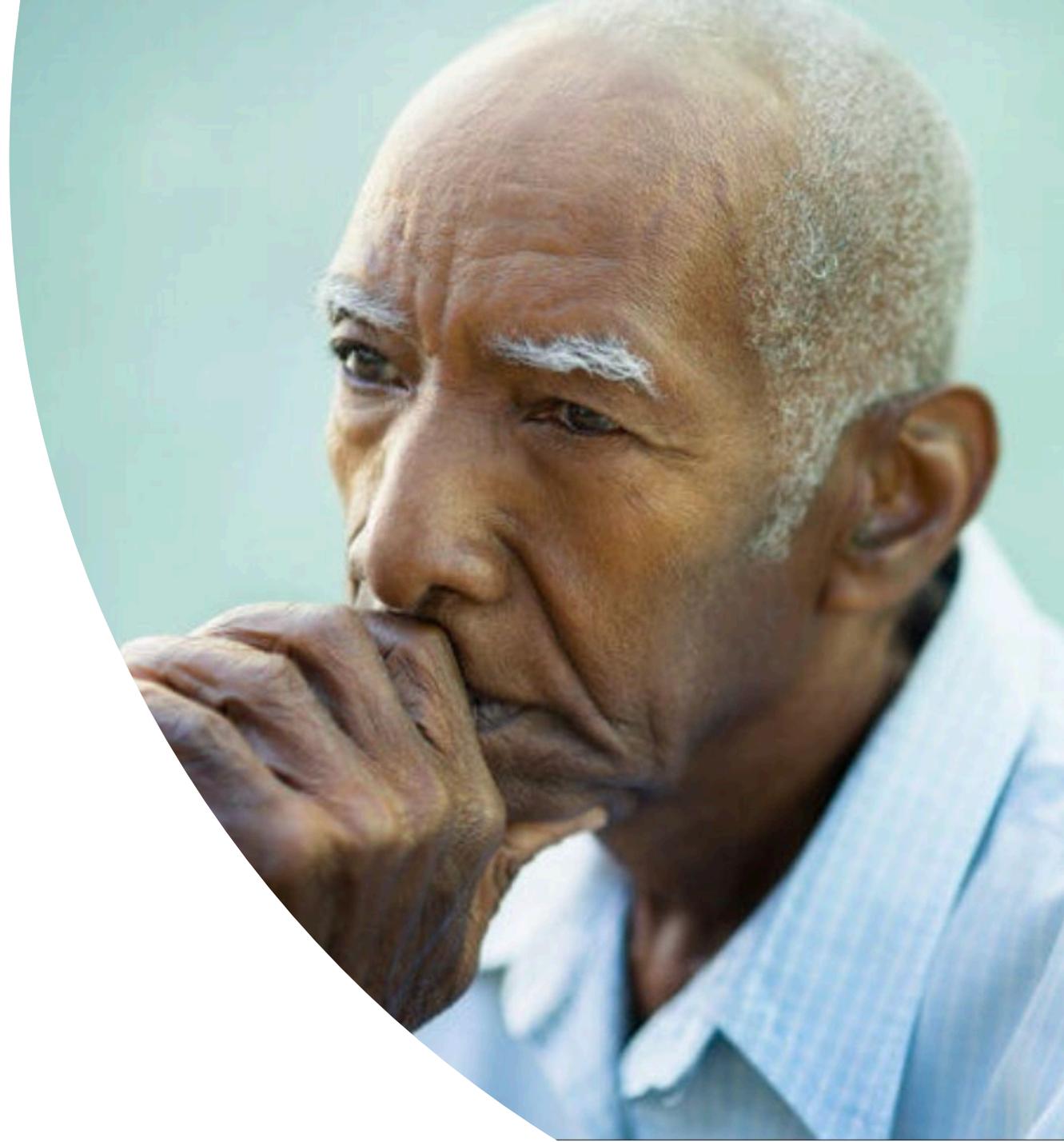
- 27% in one year (est. life expectancy 1.52ys compared to 18.79y) \*
- DC to SNF 53.7%, DC to home 13.5%



# Why so frail?

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- Decreased vision/hearing, loss of balance
- More comorbidities (osteoporosis, previous injuries)
- Polypharmacy



Normal isn't  
"normal"

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- ABNORMAL in elderly
  - HR > 90
  - SBP < 110

ART  
mmHg sys/dia  
SpO2  
%

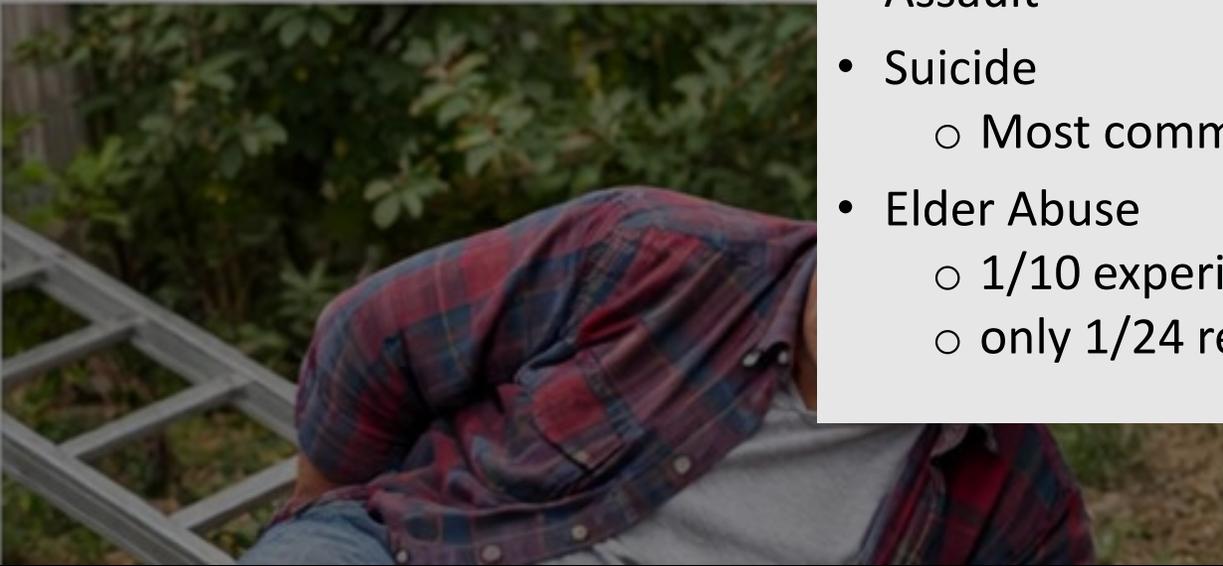
152/79  
95

Art  
mmHg sys/dia  
SpO2  
%

An elderly woman in a light blue sweater and beige pants is lying on a wooden floor, holding her knee in pain. A cane lies nearby.

# Mechanism of Injury

- Falls
  - 75% geri trauma
  - 80% of geri trauma admissions
  - >800k hospitalization, 3 million ED visits
- MVC
  - Vision changes, decreased driving ability
- Burns
  - 20% of all burn admissions
- Assault
- Suicide
  - Most commonly firearm
- Elder Abuse
  - 1/10 experience
  - only 1/24 report





Falls are BAD  
if >75yo

30.6% of all falls resulting in a fracture

23.6% resulting in mild traumatic brain injury

1.67 times more likely to be hospitalized

3.82 times the in-hospital mortality compared to younger patients



# GLF injuries



ICH



Ribs



Hips



Necks



Literally any bone



ICH **3-5% no AC, GCS15, no LOC have SDH**



Ribs



Hips



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Literally any bone

# GLF injuries



# ICH

- New Orleans excludes >60yo
- Canadian Head CT excludes >65yo
- **NEXUSII (2024):**
  - “Clinical evaluation is unreliable and frequently fails to identify patients with significant injuries”  
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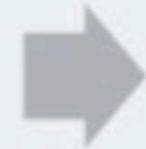
# The Falls Decision Rule

## History and examination

- The patient did not hit their head when they fell (according to patient, witnesses, examination)
- The patient remembers the events of the fall
- There is none new abnormality on neurological examination

## AND

- Clinical Frailty Scale score is  $< 5$



**No need  
for head  
CT scan**

# CLINICAL FRAILITY SCALE

	<b>1</b>	<b>VERY FIT</b>	People who are robust, active, energetic and motivated. They tend to exercise regularly and are among the fittest for their age.
	<b>2</b>	<b>FIT</b>	People who have <b>no active disease symptoms</b> but are less fit than category 1. Often, they exercise or are very active <b>occasionally</b> , e.g., seasonally.
	<b>3</b>	<b>MANAGING WELL</b>	People whose <b>medical problems are well controlled</b> , even if occasionally symptomatic, but often are <b>not regularly active</b> beyond routine walking.
	<b>4</b>	<b>LIVING WITH VERY MILD FRAILITY</b>	Previously "vulnerable," this category marks early transition from complete independence. While <b>not dependent</b> on others for daily help, often <b>symptoms limit activities</b> . A common complaint is being "slowed up" and/or being tired during the day.
	<b>5</b>	<b>LIVING WITH MILD FRAILITY</b>	People who often have <b>more evident slowing</b> , and need help with <b>high order instrumental activities of daily living</b> (finances, transportation, heavy housework). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation, medications and begins to restrict light housework.

	<b>6</b>	<b>LIVING WITH MODERATE FRAILITY</b>	People who need help with <b>all outside activities</b> and with <b>keeping house</b> . Inside, they often have problems with stairs and need <b>help with bathing</b> and might need minimal assistance (cuing, standby) with dressing.
	<b>7</b>	<b>LIVING WITH SEVERE FRAILITY</b>	<b>Completely dependent for personal care</b> , from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~6 months).
	<b>8</b>	<b>LIVING WITH VERY SEVERE FRAILITY</b>	Completely dependent for personal care and approaching end of life. Typically, they could not recover even from a minor illness.
	<b>9</b>	<b>TERMINALLY ILL</b>	Approaching the end of life. This category applies to people with a <b>life expectancy &lt;6 months</b> , who are <b>not otherwise living with severe frailty</b> . (Many terminally ill people can still exercise until very close to death.)

## SCORING FRAILITY IN PEOPLE WITH DEMENTIA

The degree of frailty generally 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.

In **very severe dementia** they are often bedfast. Many are virtually mute.



[www.geriatricmedicineresearch.ca](http://www.geriatricmedicineresearch.ca)

Clinical Frailty Scale ©2005-2020 Rockwood, Version 2.0 (EN). All rights reserved. For permission: [www.geriatricmedicineresearch.ca](http://www.geriatricmedicineresearch.ca)  
Rockwood K et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

# The Falls Decision Rule

## History and examination

- The patient did not hit their head when

**Sensitivity 98.6% (95% CI 94.95%–99.6%),  
Specificity 20.3% (95% CI 19.1%–21.5%) and  
NPV 99.8% (95% CI 99.2%–99.9%)**

neurological examination

**AND**

- Clinical Frailty Scale score is  $< 5$

no need  
for head  
CT scan

## The Focused Falls Decision Rule

### History and examination

- The patient did not hit their head when they fell (according to patient, witnesses, examination)

### AND

- There is none new abnormality on neurological examination



**No need  
for head  
CT scan**

## The Focused Falls Decision Rule

### History and examination

The patient did not hit their head when

**A** **Sensitivity of 95.0%**  
**(95% CI 90.0%–97.0%),**

- There is none new abnormality on neurological examination



**No need  
for head  
CT scan**



# GLF injuries



ICH

3-5% no AC, GCS15, no LOC have SDH  
NEXUSII, Falls Decision Rule



Ribs

**Each rib fx Inc mortality by 19% and PNA by 27%**  
**2x mortality vs younger w same injury**



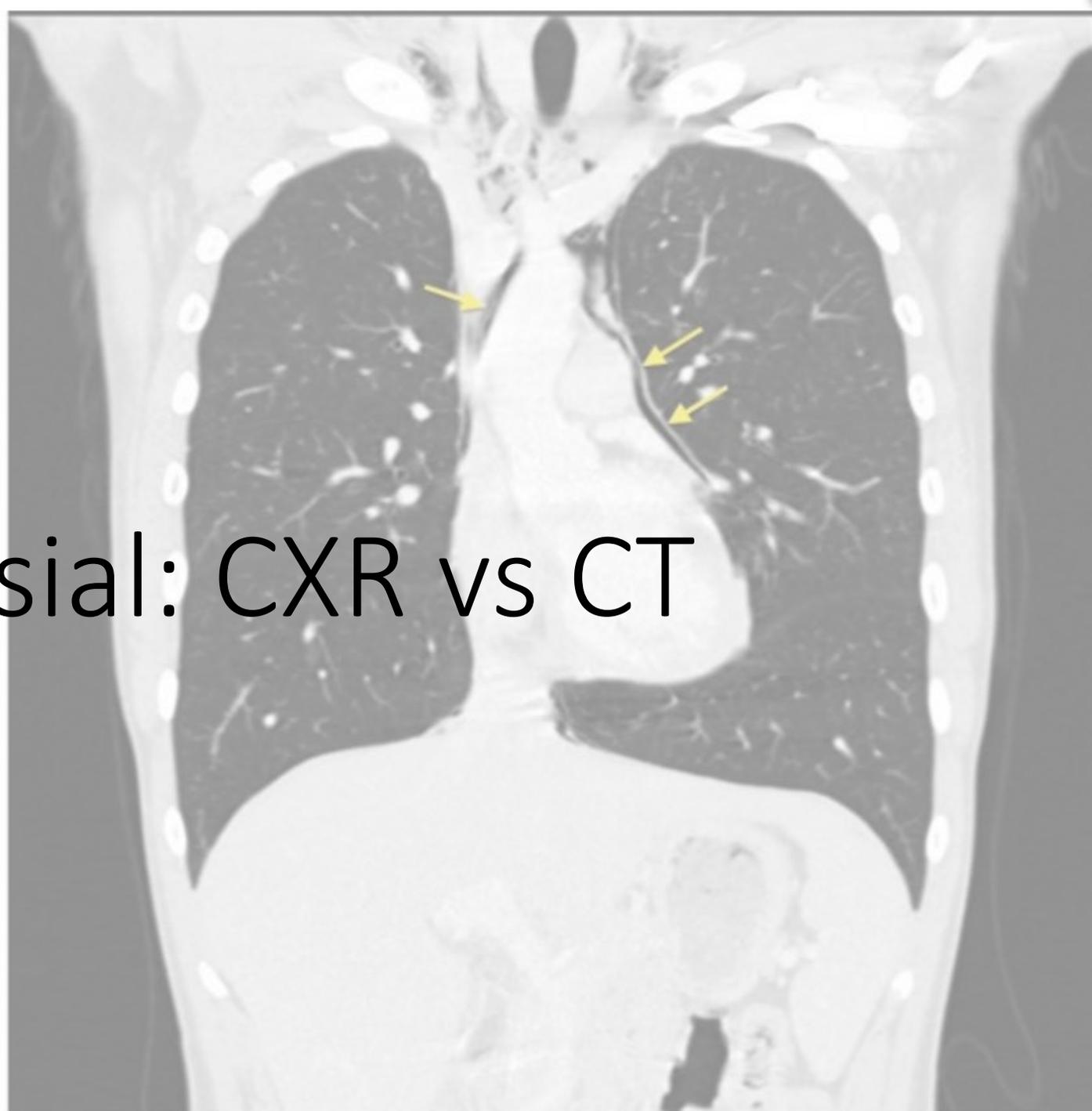
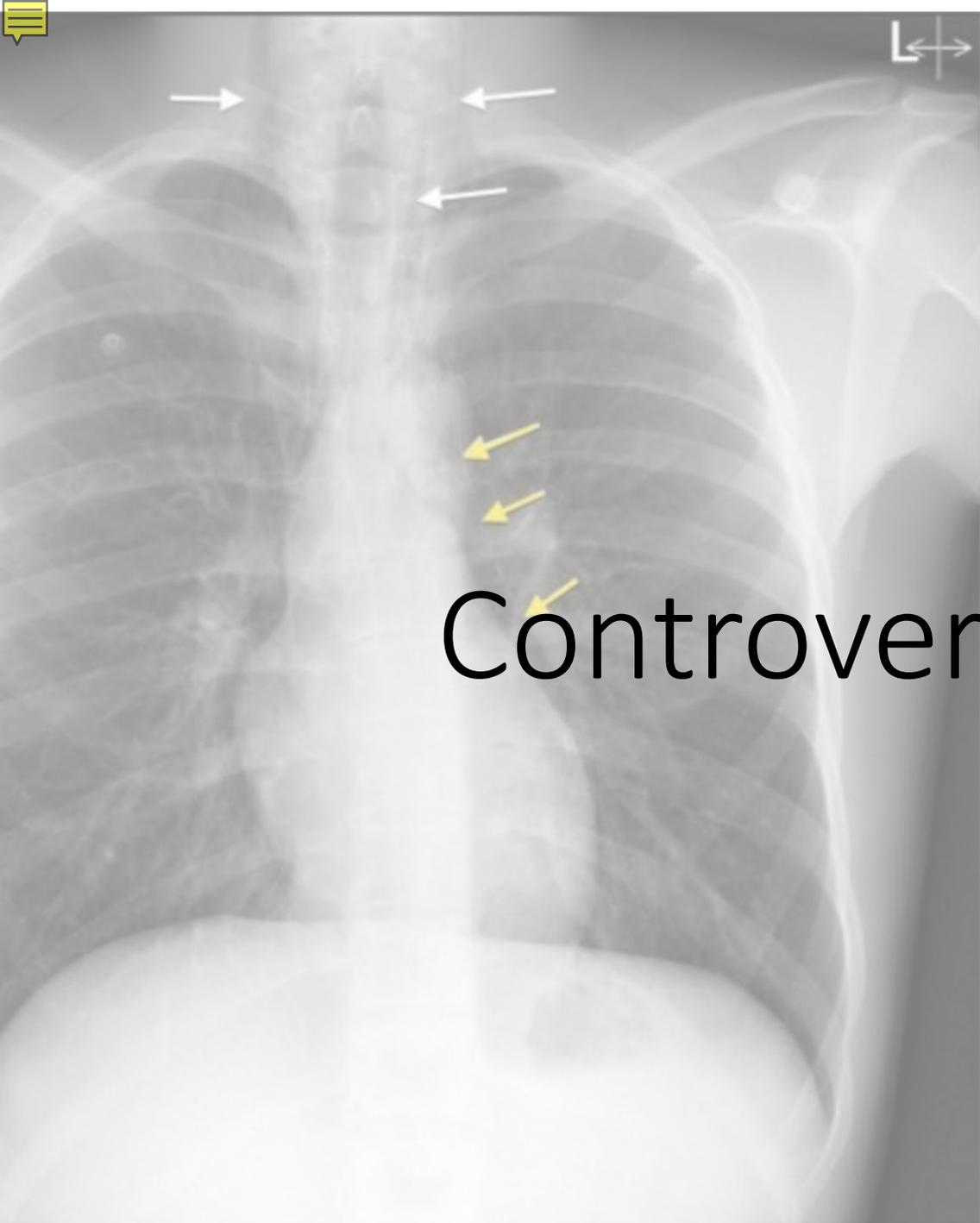
Hips



Necks



Literally any bone



Controversial: CXR vs CT

# NEXUS Chest CT

## Clinically Major Thoracic Injuries

Abnormal chest X-ray CXR showing any thoracic injury (including clavicle fracture) or widened mediastinum	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
Distracting injury	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
Chest wall, sternum, thoracic spine, or scapular tenderness	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes

## All Thoracic Injuries

Rapid deceleration mechanism Fall from >20 feet/6.1 m or MVA at >40 mph/64.4 km/hr with sudden deceleration.	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
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All MAJOR AND MINOR criteria are ABSENT - no Chest CT by NEXUS Chest.

Major injury: 99.2% sensitive, 31.7% specific

Major or minor injury: 90.7% sensitive, 37.9% specific

Copy Results 

Next Steps 



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Hips

**3x mortality than those without hip fx**

**• (in every death category)**

**Inpatient mortality is 4% and over 12mth 20-25%**



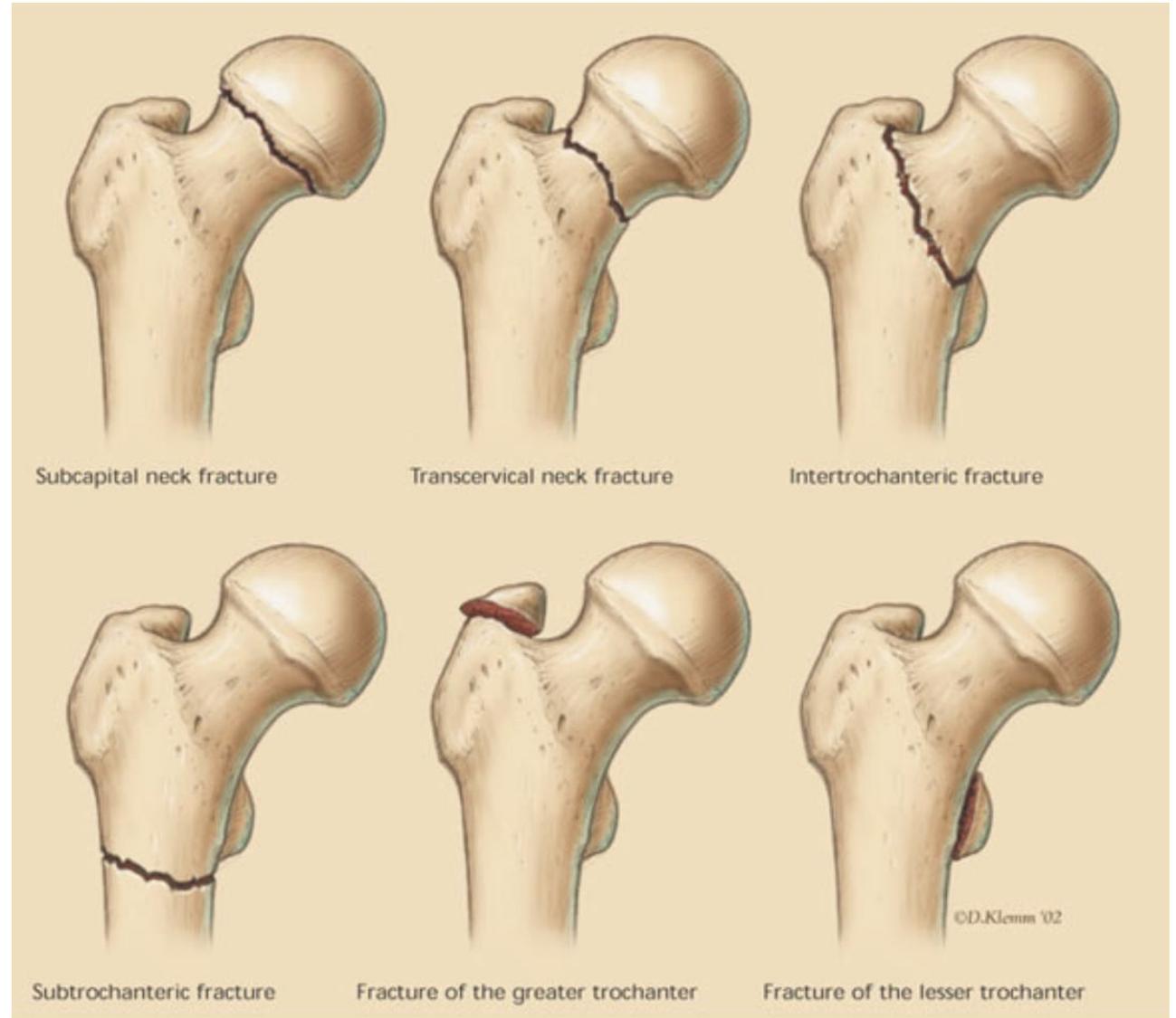
Necks



Literally any bone

# Hip Fractures

- Classic: shortened, externally rotated
  - OFTEN not classic!!! Some have no problem walking on it and have vague sx
- 3x mortality than those without hip fx (in every death category)
- Inpatient mortality is 4% and over 12mth 20-25% \*\*
- Worse outcomes if non-op



## ED ROLES AND GUIDELINES

Patient arrives to ED w/ suspected Hip Fx

### ED Nurse

- RN places "Nursing Triage **Hip Fracture Symptoms Protocol**" (orderset 728):
  - Labs, NPO, EKG, X-rays, pain, etc.
- After nursing and ED MD eval, Xrays should be obtained as quickly as possible (PRIOR to paging Hip Fracture Team).

### ED Resident

- Assesses the patient as a suspected hip fracture patient.
- Places Hip Fx Order Set and any additional orders.
- **In addition to hip and pelvis, order femur X-ray.**
- **ED Resident/Attending confirms hip fracture.**
- After fracture is confirmed by ED MD, the MD asks ED Clerk to page Stanford or PAMF Hip Fracture Team.
- If no response from Ortho Resident after 2 Team Pages within 30 mins, ask ED Clerk to page Ortho Attending.

### ED Clerk

- ED Clerk will page a short message "HipFx" with Patient MRN and Room Number: Please respond within 30 mins" to the Emergency Department.

#### Stanford HipFx Team:

7am - 5pm: 23122 (Hospitalist) + (ORTHOAEDIC SURG/GENERAL

ORTHO)+(2PAIN) Regional Anesthesia

5pm - 7am :27111(Medicine) + (ORTHOAEDIC SURG/GENERAL

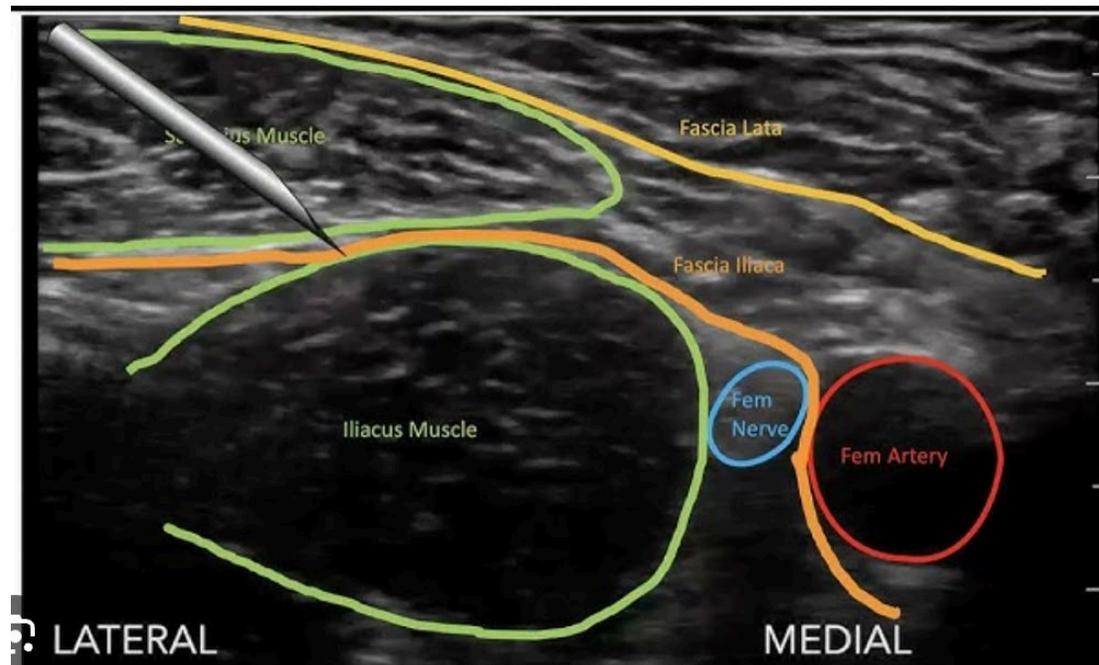
ORTHO)+(2PAIN) Regional Anesthesia

#### PAMF HipFx Team:

24 hrs: 25900 (PAMF hospitalist) + (ORTHO)+(2PAIN) Regional Anesthesia

## Rapid Repair Hip Fracture Protocol Continued

- Orthopedic Resident responds in person to ED within 30 minutes or calls ED if delay
- Anesthesia fellow responds in person to ED within 30 minutes or calls ED if delay
- Medicine resident/PAMF/Ortho Hospitalist will be involved in discussion for disposition of patient to Medicine vs Ortho per Medicine/Orthopedic admission agreement
- Pain Control
  - If patient requires medication for pain control prior to regional block-
    - Consider non narcotic medication first (e.g. IV Tylenol)
    - If narcotics required, low dose Fentanyl can be considered if no contraindications (Avoid morphine/dilaudid if possible)
  - Regional Nerve Block (catheter-based) will be performed by the anesthesia fellow and attending
  - If single injection femoral nerve block is required, the procedure can be performed by an ED resident under supervision of the Regional Anesthesia fellow/attending





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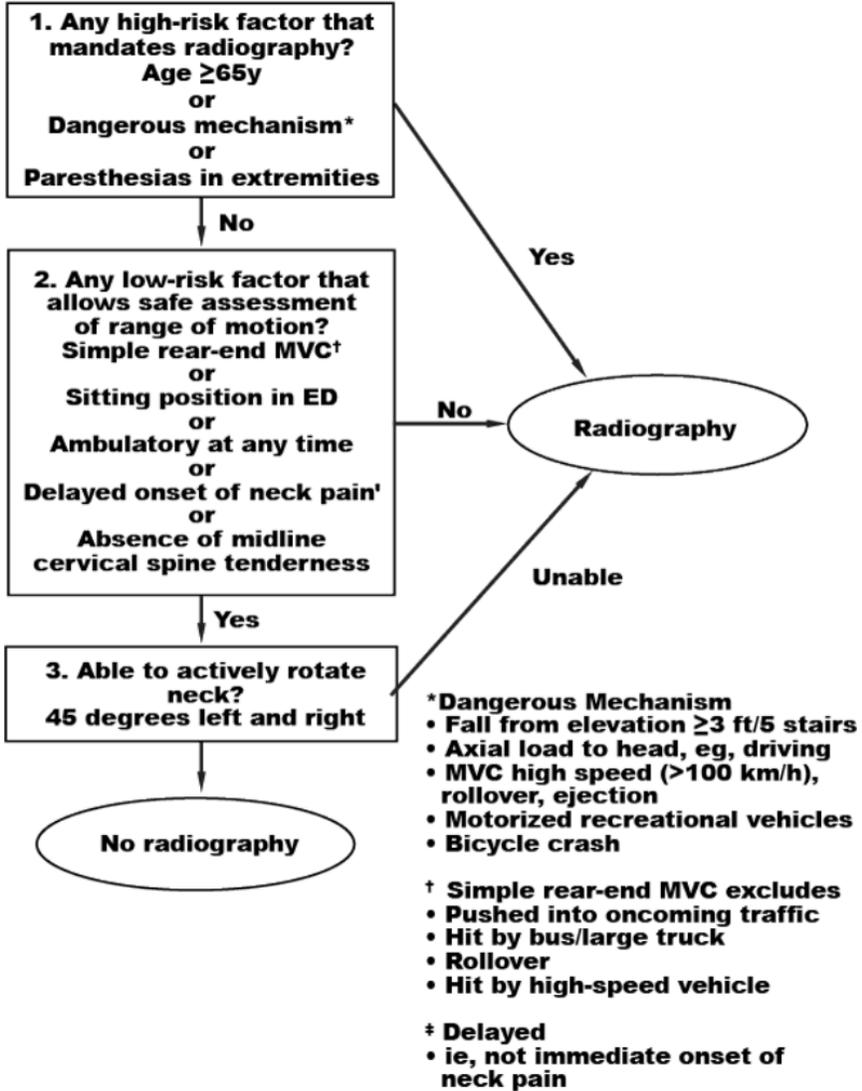
**>50% are from GLF**  
**60% are C1/C2**  
**Only 45% have ttp, 21% no neck pain, 3% ASX**



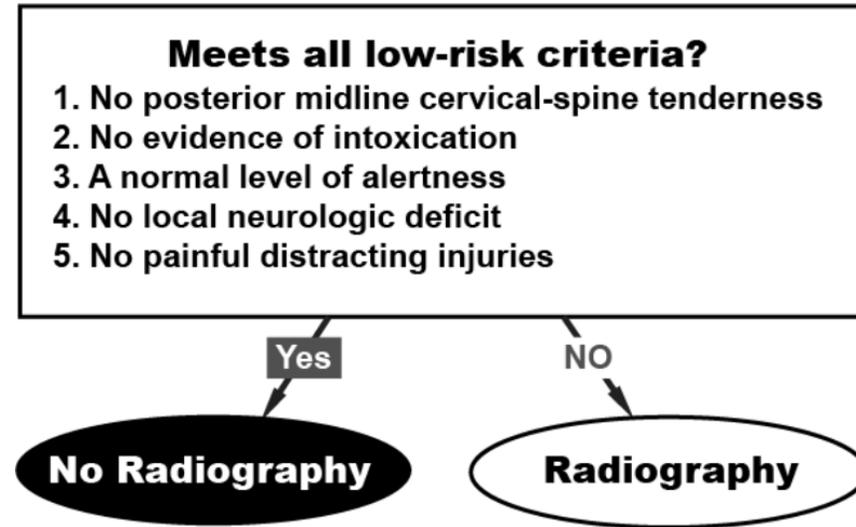
Literally any bone

## Canadian Cervical Spine Rule

For alert (GCS score=15) and stable trauma patients when cervical spine injury is a concern



## NEXUS Low Risk Criteria



Sensitivity 66-84% vs 99.6%

# Modified NEXUS

- Add
  - Any change in baseline mental status
    - (doesn't have to be GCS15)
  - Any evidence of trauma to the head/face
    - If yes, can't clear via NEXUS

**Sensitivity 100%,  
Specificity 12.6-47.7%**





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Necks

>50% are from GLF  
60% are C1/C2  
Only 45% have ttp, 21% no neck pain, 3% ASX  
Modified NEXUS rule



Literally any bone

Over 75, 1/3 break something



## EMS Triage

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- 20-50% undertriaged
- 34% less likely to die in a trauma center

GERIATRICS/ORIGINAL RESEARCH

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# Geriatric-Specific Triage Criteria Are More Sensitive Than Standard Adult Criteria in Identifying Need for Trauma Center Care in Injured Older Adults

Brian Ichwan, BS; Subrahmanyam Darbha, MS; Manish N. Shah, MD, MPH; Laura Thompson, MD, MPH;  
David C. Evans, MD; Creagh T. Boulger, MD; Jeffrey M. Caterino, MD, MPH\*

*\*Corresponding Author. E-mail: [jeffrey.caterino@osumc.edu](mailto:jeffrey.caterino@osumc.edu).*

**Table 1.** Differences between Ohio’s 2009 geriatric trauma triage criteria and adult trauma triage criteria for EMS providers.<sup>23</sup>

<b>Geriatric Triage Criteria (Age ≥70 Years)*</b>	<b>Corresponding Adult Triage Criteria</b>
<b>Physiologic</b>	
Systolic blood pressure less than 100 mm Hg, or absent radial pulse with carotid pulse present	Systolic blood pressure less than 90 mm Hg, or absent radial pulse with carotid pulse present
GCS score ≤14 in trauma patient with a known or suspected traumatic brain injury	GCS score ≤13
<b>Anatomic</b>	
Fracture of 1 proximal long bone sustained from motor vehicle crash Injury sustained in 2 or more body regions	Fractures of 2 or more proximal long bones No corresponding adult criteria
<b>Cause of injury</b>	
Pedestrian struck by motor vehicle	No corresponding adult criteria
Fall from any height, including standing falls, with evidence of a traumatic brain injury*	No corresponding adult criteria

\*Traumatic brain injury is defined as decrease in level of consciousness from baseline, unequal pupils, blurred vision, severe or persistent headache, nausea or vomiting, or change in neurologic status.<sup>23</sup>



# ACS 2023 Update: Best Practices Geriatric Trauma Management

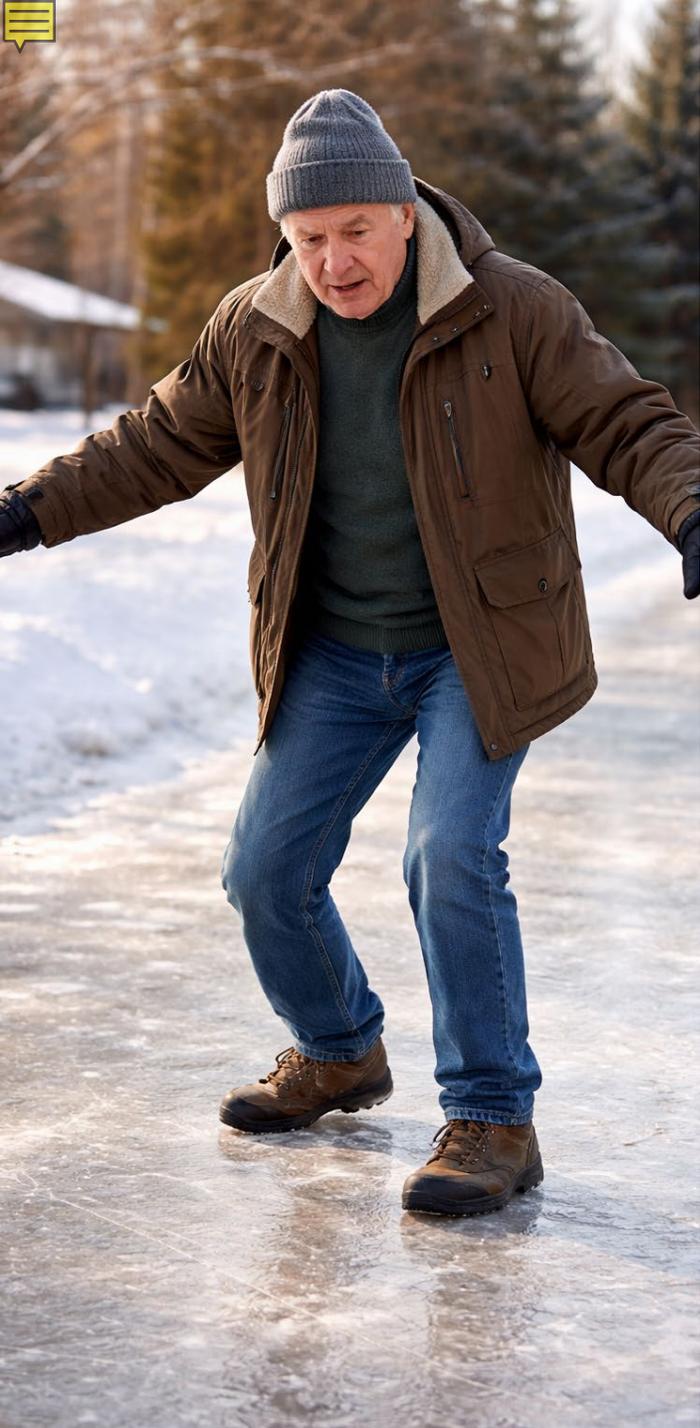
## **Box 1.** Geriatric Trauma Activation Criteria

- GLF for patients on antithrombotic agents
- SBP less than 110
- Heart rate above 90
- SI greater than 1
- GLF patients not on anticoagulants with GCS < 14 and signs of head trauma

- Add Frailty F to ABCDE

# 15 Variable Trauma Specific Frailty Index

Comorbidities					
Cancer History	Yes (1)			No (0)	
Coronary Heart Disease	MI (1)	CABG (0.75)	PCI (0.5)	Medication (0.25)	None (0)
Dementia	Severe (1)	Moderate (0.5)		Mild (0.25)	No (0)
Daily Activities					
Help with grooming	Yes (1)			No (0)	
Help with managing money	Yes (1)			No (0)	
Help doing housework	Yes (1)			No (0)	
Help toileting					
Help walking	Wheelchair (1)	Walker (0.75)		Cane (0.5)	No (0)
Health Attitude					
Feel less useful	Most time (1)	Sometimes (0.5)		Never (0)	
Feel sad	Most time (1)	Sometimes (0.5)		Never (0)	
Feel effort to do everything	Most time (1)	Sometimes (0.5)		Never (0)	
Feel lonely	Most time (1)	Sometimes (0.5)		Never (0)	
Falls	Within last month (1)	Present not in last month (0.5)		None (0)	
Function					
Sexually active	Yes (0)			No (1)	
Nutrition					
Albumin	<3g/dL (1)			> 3g/dL (0)	
SCORE					
<b>SCORE</b>	<b>FI (Score/15)</b>			<b>&gt;0.25 = Frail</b>	



Cases ReRun





# Ideal Plan

Appropriately triaged

AFED

Full med rec

- Reduce polypharmacy if possible (d/w PharmD)

Full PE (1 and 2dary surveys AGAIN)- do your job!

ICS

PT/OT

Prevent Falls

- USPSTF recs for exercise (PT/OT)
- Orthostatics
- Consider Timed Up &Go Test screening for ALL patients >65

# RECAP



At Risk



SBP<110, HR>90



Break everything



Triaged ideally to GED