



**MINNESOTA METROPOLITAN REGIONAL
TRAUMA ADVISORY COMMITTEE
MEETING AGENDA –**

Metropolitan Emergency Services Board
2099 University Ave West, St Paul
August 24, 2023, 7:00 a.m.

1. **Call to Order** – Committee Chair, Dr. Jonathan Gipson
2. **Approval of Agenda** – Dr. Gipson
3. **Approval of May 25, 2023 MMRTAC Minutes** – Dr. Gipson
4. **Old Business**
 - A. STAC Update – Chris Ballard
5. **New Business**
 - A. Regional document and transfer process for replantation.
 - a. Gray Book Requirement Chapter 4.25, Page 65.
 - B. Approval of the MMRTAC Geriatric Resource (**Page 6**)
 - C. Approval of the MMRTAC Pediatric Pelvis Resource v3. (**Page 27**)
 - D. Stop The Bleed Classes- Please send a list to Greg Hayes ghayes@emsmn.org so there is one master list.
6. **Updates**
 - A. 2023 Goals
 - a. Pediatric and Geriatric resources workgroups
 - b. Stop the Bleed In Schools Training
 - c. 2023 MN State Fair Booth- TOMORROW!!!!
 - i. Tourniquet Giveaways
 - d. EMS to ED Handoff- MIST format
 - B. Local Updates – Hospitals, System, EMS
 - C. Peds workgroup
 - D. Geriatric workgroup
7. **Adjourn**

2023 MMRTAC Meetings:

November 23rd-need to change

2023 STAC Meetings ([STAC Web Site](#)):

September 12
December 5



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Metropolitan Emergency Services Board
2099 University Ave West, St Paul
August 24, 2023, 7:00 a.m.

Minnesota Metropolitan Regional Trauma Advisory Committee Members:

Trauma Surgeon – Level I

Jonathan C. Gipson, MD (2023 Chair)
Uroghupatei Iyegha, MD
Chad J. Richardson, MD

Trauma Program Manager – Level I

Sherrie Murphy, RN

Trauma Surgeon – Level II

John McCormick-Deaton, MD

Trauma Program Manager – Level II

Tammy Gallagher, RN

Trauma Program Manager – Level III

Lindsay Miller, RN- Interim

Trauma Program Manager – Level IV

Dawn Rolling, RN

Process Improvement Specialist

Cori Sybrant, RN

EMS Representative – MREMSS

Tom Edminson, NRP

EMS Medical Directors

East – Bjorn Peterson, MD

West – Charles Lick, MD

Pediatric Trauma Specialist

Nathan Kreykes, MD

Trauma Surgeon – MN ACS-COT

Brian Myer, MD

Emergency Physician – ACEP

David Larson, MD

MESB EMS Coordinator

Greg Hayes, NREMT

**Minnesota Metropolitan Regional Trauma Advisory
Committee MMRTAC
May 25, 2023**

Attendance

Chris Ballard, Tammi Gallagher, Jon Gipson, Corrie Sybrant, John McCormick-Dean, Rachelle Damle, Charlie Lick, Uroghupatei Iyegha, Laura Anderson, Lisa Pearson, Laura Plasencia, Kim Killian, John Kregles, Heidi Altamiano, Robin Talley, Nancy Nyberg, David Larson, Melanie Smalley, Heidi Altamirano, Rachel Payne

Others Present

Greg Hayes

1. Call to order

Dr. Gipson, Chair called meeting to order. 7:04.

Recognize Dr Larson for his successful career and serving the EMS field.
Dr Gipson recognized the anniversary of the George Floyd murder and what that meant to our field and the positive outcomes.

2. Approval of Agenda/Minutes

There was an approval by Charlie Lick and a Second was by Dr. Gipson

3. Approval of Agenda/Minutes

4. Old Business

a. STAC Update

MMRTAC is updated from the March meeting. Chris provided an update for the next meeting. A Legislative update on the impact to MDH and a additional position of a Designation Coordinator. There will be continued discussion on the challenges faced by the healthcare system. The focus is on Rural hospital Administrators to help raise awareness on the trauma system and improve relationships. STAC will have some open positions. Chris suggested that individuals in this group think about filling an open position. Chris discussed the MN field triage guidelines to provide an update. The group is looking at making some updates to the current plan. STAC will be reviewing the Level 4 criteria as well as an updated list of patients for admission. Dr. Gipson asked for input from the hospitals in the room on the Level 4 criteria.

North Memorial/ Maple Grove uses a Green, Yellow, Red type of system for trauma patients.

Region's update is similar to the criteria as North Memorial to keep the doors

open to trauma.

Hennepin Healthcare is refusing more than they would like.

UMMC reporting the same issues with bed availability and working to spread out the patient load.

Childrens has been open and able to manage the surges.

Discussion of a telehealth concept for trauma. Concept not utilized but is an idea.

Chris Ballard discussed that there is a need to look at Level 3 Trauma centers to help with the patient volume issue. Discussion regarding the challenges that Surgeons at the lower-level hospitals are resistant to Trauma patients based off of specialty and skills. Recommendation would be a "State of the State" regarding Trauma services from MDH.

Dr. Gipson is looking for a workgroup to discuss and identify decision criteria to look at load leveling within the system related to trauma. The goal will be to refresh/ create criteria for Trauma transfers.

EMS Medical Directors meeting in September which might be a good opportunity to discuss this issue.

Issues were raised to MDH on trauma education for Nurses. The ER nurses have the training however the floor Nurses need the specialty training.

b. Minnesota State Fair update

Update given on the event. Looking for ideas for giveaways. Give away TQ's, stop the bleed kits, stickers, etc. Greg will investigate items.

5. New Business

a. Dr. David Larson Retirement- Replacement Nomination for Dr. Greg Peterson to represent the Emergency Physicians.

b. STAC Trauma Triage Guidelines

Discussion on the National Triage guideline. Chirs Ballard said that the STAC guidelines will be updated which will look different than the National Guidelines. Discussion on the challenges. Dr. Gipson suggested the Triage guidelines should include.

c. EMS Update

Update given on the EMS Plans as it relates to East and West MRCC developing a common procedure for notifications. No deadline yet for implementation. Issues discussed with the information from EMS to the Hospital through MRCC. The group was discussing more information than

currently being relayed.

Discussion on the challenges of responding to an act of violence and the coordination of disciplines. Based on the Uvalde report the struggles of a true Unified Command exist nationally and locally. The ask was to

d. Stop the Bleed (STB) in Schools

A few classes throughout the metro in the schools as well as public safety agencies. Community groups and church groups

e. 2023 Goals

i. Continue Pediatric and Geriatric resources workgroups

Update given on a resource document that identifies what nationally being done and resources. The hope is at the next MMRTAC meeting to have a draft review.

f. Web Site

Update given on the website and the

Dr Gipson made a motion to update the web site. Greg will work on updates.

g. EMS to ED Handoff- MIST format- not discussed – hold for next meeting

Update given by Dr McCormick find the old information on the patient hand off. Discussion on IMSIT AMBO

6. Updates

a. Local Updates – Hospitals, System, EMS

No Updates given.

Meet Adjourned 8:45am

Next meeting: August 24th

Adjournment at 9:00 a.m.



Minnesota Metropolitan Regional Trauma Advisory Committee has put together a resource document with a variety of geriatric trauma resources and considerations.

Purpose:

Provide a resource with a variety of geriatric care options for any level of Trauma Center. This resource includes multiple strategies on how to manage/care for geriatric trauma patients. Per the American College of Surgeons 2022 Standards, Resources for Optimal Care of the Injured Patient, Level I and II trauma centers must have care protocols for injured older adult.

Table of Contents/Protocols:

Contents

Identification of vulnerable geriatric patients 2

Identification of patients who will benefit from the input of a health care provider with geriatric expertise 3

Prevention, identification, and management of dementia, depression, and delirium 4

Process to capture and document what matters to patients, including preferences and goals of care, code status, advanced directives, and identification of a proxy decision maker 9

Medication reconciliation and avoidance of inappropriate medications..... 10

Screening for mobility limitations and assurance of early, frequent, and safe mobility..... 13

Implementation of safe transitions to home or other health care facilities 15

RESOURCES: 17

Identification of vulnerable geriatric patients

- **Tools:**
 - **Identification of Seniors At-Risk Tool (ISAR)**
 - 6 question survey
 - >1 positive response is considered high-risk
 - ≥ 2 has been associated with a greater likelihood of functional decline, nursing home admission, long-term hospitalization, or death.
 - **Frailty Score**
 - 5 criteria are evaluated
 - Patient receives 1 point for each criterion met
 - 0-1 = Not frail
 - 2-3 = Intermediate frail (Pre-frail)
 - 4-5 = Frail
 - **FRAIL**
 - 5 questions
 - Scoring: $\geq 3/5$ criteria met indicates frailty
1-2/5 indicates pre-or-intermediate frailty
0/5 indicates non-frail.
 - **PRISMA Frailty Assessment**
 - 7 questions
 - 3 or more “yes” answers indicate an increased risk for frailty and need for clinical review.
 - **Clinical Frailty Scale (CFS)**
 - 9 nine-point scale
 - Number of questions depends on the degree of frailty
 - 0 - 3 very fit to managing well
 - 4 - 6 vulnerable to moderately frail
 - 7 - 9 severe frailty to terminally ill
- **Things to consider with implementation:**
 - All patients noted to be at high-risk requiring admission to the hospital should be referred to case management upon admission with the risk assessment results communicated.
 - Concerns for elder abuse should be reported to MDH as a vulnerable adult

Identification of patients who will benefit from the input of a health care provider with geriatric expertise

Consider the following list to identify these patients who should get a specialty consult:

- Screening results that indicate frailty in 65 years and older
- Anyone \geq to 85 years of age
- Impaired cognition
- Delirium risk
- Impaired functional status
- Impaired mobility
- Malnutrition
- Difficulty swallowing
- Need for Palliative Care assessment

Prevention, identification, and management of dementia, depression, and delirium

DEMENTIA:

- **Prevention:** There are 12 potentially modifiable risk factors that have been found to be associated with dementia. These include hypertension, diabetes, obesity and lack of physical activity, smoking, high alcohol consumption, unhealthy diet, depression, traumatic brain injury, social isolation, air pollution, and hearing loss. Research has found that lifestyle modification aimed at specific risk factors could decrease the incidence of dementia by 40%.
- **Identification:** There is insufficient evidence to support dementia screening among people who do not exhibit signs of dementia. But early identification is important and when changes in cognition, behavior, mood, and/or function are observed or reported, screening should occur. Earlier detection allows for improved brain health, better management symptoms, and early capture of their care preferences. Diagnosis can be made with cognitive/neurological tests, brain scans, psychiatric evaluation, genetic testing, and CSF and blood tests.
 - When signs/symptoms of dementia are observed or reported, screen patients age 65 and over. It is recommended to establish clinical workflow integration for documentation within your EMR. There are various screening tool options available:
 - **Short BleSSed Test (SBT)**
 - Weighted six-item instrument designed to identify dementia.
 - Evaluates orientation, registration, and attention.
 - **Abbreviated Mental Test Score (AMTS)**
 - Can be used to rapidly assess elderly patients for the possibility of dementia
 - Consists of 10 questions, each worth one point.
 - Score of 6 or less is suggestive of delirium or dementia. Further testing is necessary to confirm a diagnosis.
 - **Rowland Universal Dementia Assessment Scale (RUDAS)**
 - 6-item scale that assesses the cognitive domains of memory, praxis, language, judgement, drawing, and body orientation.
 - **MiniCog**
 - Considered a routine ‘cognitive vital sign’ measure.
 - A composite of three-item recall and clock-drawing
- **Management:** The overall goal for managing dementia is to reduce suffering caused by the cognitive and accompanying symptoms while delaying progressive cognitive decline. This is most often done by using both pharmacologic and non-pharmacologic approaches. Ideas for these approaches are found below in the *Interventions* section.
- **Interventions**

- Implement a geriatric specific order-set to highlight care considerations for patients with dementia. Consider including items like: a pain assessment scoring tool for dementia patients, non-pharmacological treatments including music therapy, massage, sensory stimulation, and aromatherapy. Also include development of personal care routines and assurance of effective communication practices.
- If patients have not yet been started on medications aimed at symptomatic benefits for cognitive symptoms, ensure that they receive prompt follow-up after hospital discharge to be evaluated by their PCP.
- Provide a 4M's Educational Brochure to patients age 65 and over. [4M's Provider Toolkit](#) and [4M's Patient Brochure](#)
 - The four M's include: what **M**atters, **M**obility, **M**edication, and **M**ind. The intent is to provide a guide for older adults and their families to evaluate how they think about the 4M's and develop resources to help them proactively interact with their health care team.
- **Other Considerations**
 - Recommend follow-up with a PCP for further evaluation if concerns are noted.
 - Screening is only one small part of a comprehensive assessment and is not a conclusive diagnosis
 - If a person is acutely ill or is experiencing delirium, it is recommended that health-care providers postpone in-depth dementia assessments and a diagnosis until the person is stable and reversible causes are addressed.
 - Clinical guidelines suggest that depression be treated before a dementia diagnosis is made
 - Assessment for dementia should be conducted after delirium screening.

DEPRESSION:

- **Prevention:** The ability to prevent depression is unknown. However, it is necessary for health care providers to place their focus on identification.
- **Identification:** Health-care providers must be vigilant for depression among older adults, and assess for depression whenever risk factors or signs and symptoms are present. Unfortunately, depression is often not recognized, is under-diagnosed, and frequently goes untreated. Furthermore, few older adults actively seek treatment or see a mental health specialist to manage their depression. A detailed assessment for depression should occur when risk factors are present or when depression is suspected
 - When signs/symptoms of depression are observed or reported, screening should be completed. It is recommended to establish clinical workflow integration for documentation within your EMR. There are various screening tool options available:
 - **Geriatric Depression Scale**

- Provides a quantitative rating of depression
 - Available in [15-questions](#) or [30-question](#) versions. All questions are YES/NO
 - [Patient Health Questionnaire-2 \(PHQ-2\)](#)
 - “First Step” approach with two-question screening regarding the frequency of depressed mood and anhedonia over the past two weeks
 - If the patient has a positive screen (3 or above), proceed to further screening with the PHQ-9.
 - [Patient Health Questionnaire-9 \(PHQ-9\)](#)
 - Used for diagnosing, monitoring, and measuring the severity of depression
 - Nine question screening regarding the frequency of depressed mood and anhedonia over the past two weeks
- **Management:** Health-care providers should ensure that follow-up support and resources are available for older adults who are identified as having depression. Experts suggests that qualified health-care professionals may include a primary care practitioner, psychiatrist, or a psychogeriatric/geriatric mental health specialist. Other referrals to members of the health-care team may be necessary, especially to rule out or assess for co-morbid conditions that may mimic depression. If there is active suicidal ideation/risk of a person killing himself/herself, or if a person with depression presents a considerable immediate threat or harm to others, it is important to seek urgent attention from a qualified professional. A variety of pharmacological and non-pharmacological therapies with varying degrees of efficacy are available in clinical guidelines. When selecting treatment, health-care providers should start with the least invasive and most effective
 - **Interventions**
 - Implement a Geriatric specific order-set to include screenings and referrals for those identified as high likelihood or at risk for depression.
 - **Other Considerations:**
 - Due to the high prevalence of depression in people with dementia, health-care providers may need to consider the impact that co-morbid dementia has on individuals with depression. When these conditions co-exist, healthcare providers can offer many of the same interventions as they would for a person who only has depression, making any necessary adjustments to the approach and duration of the interventions.

DELIRIUM:

Delirium is defined as an abrupt change in the brain that causes mental confusion, emotional disruption, and/or perceptual disturbances. Delirium increases a patient’s risk of morbidity and mortality, contributes to longer length of stays, and increases health care costs. It develops over a short period

(hours to days) and fluctuates over time. Delirium is classified as: hyperactive, hypoactive, and mixed. Hypoactive delirium is often mistaken for depression or dementia. Delirium is often underrecognized.

- **Prevention (prevention and management interventions often overlap)**
 - Pre-Op optimization (pain control, med management, education)
 - Post-Op mobility and pain management
 - Lighting: Soft light is recommended, but exposure to nature light is also shown to be beneficial for recovery times and decreasing delirium.
 - Acoustic Orientation Improvements: private rooms or acoustically enhanced drapes, if necessary, for better communication and decrease levels of anxiety and delirium.
 - Sleep hygiene – promote quiet and uninterrupted sleep
 - Provide sensory aids (hearing aids, dentures, glasses)
 - Provide frequent re-orientation
 - Limit physical restraints
 - Provide patient and family education brochure on delirium

- **Identification**
 - Implement routine screenings for injured patients age 65 and over. It is recommended to establish clinical workflow integration for documentation within your EMR.
 - **4AT**
 - Include four items: **A**lertness – **A**bbreviated Mental Test-4 – **A**ttention – **A**cute Change or Fluctuating Course
 - Scored from 0 to 12. Each of the four categories are assessed and scored. The sum of the 4 scores is the total.
 - Can be used on patient too drowsy to engage in testing or conversation since a score is provided instead of N/A or not-testable.
 - **Confusion Assessment Measuring Instrument (CAM)**
 - This is considered the “gold standard” for screening for delirium
 - Has sensitivity of 94-100%, specificity of 90-95% and high interobserver reliability
 - **Nursing Delirium Screening Scale (Nu DESC)**
 - Continuous, observational five-item scale
 - **Recognizing Active Delirium As part of your Routine (RADAR)** p. 18-19
 - Three-step process to identify delirium in the elderly population
 - Observation of three signs of altered LOC and inattention with each medication delivery.
 - There are also outpatient/Emergency Department screening options available:
 - **Delirium Triage Screen**
 - **Brief Confusion Assessment Method Tool**

- **Management**

- It is important to treat delirium when it occurs. Prioritization must be given to the following items:
 - Pain assessment and management
 - Consider restlessness as an indicator of pain
 - Schedule acetaminophen
 - Utilize Ice/heat modalities
 - Activity and mobility
 - Providers need to place expectation of mobility on patient/staff/family
 - Up to chair for all meals
 - Walking 2-3 times per day
 - Update activity orders as needed – d/c bedrest orders
 - Sleep interventions and promotion
 - Shades open/lights on during day 8a-8p
 - Daytime activity/mobility to promote fatigue for sleep at night
 - Minimize nighttime interruptions (cluster cares)
 - Patient/Family education
 - Reduce lines/tethers
 - Sensory interventions
 - Cognitive stimulation/orientation
- Upon diagnosis of acute delirium, attention should be paid to underlying causes including, but not limited to:
 - Infections: Commonly due to UTI or pneumonia
 - Medications: Including: Anti-cholinergic medications, sedative/hypnotics, narcotics, and any new medication, especially if multiple medications have been recently added
 - Electrolyte imbalances
 - Alcohol/drug use or withdrawal
- **Interventions**
 - Implement a Geriatric specific order-set to include screenings and prevention measures, and precautions.
- **Other considerations**
 - New focal neurologic findings should guide an evaluation for stroke syndromes
 - Coordination of care, with special attention to directing interventions towards improving reversible causes and limiting factors that extend or cause delirium is the main goal.
 - As mental status changes wax and wane, delirium screening should be reevaluated on a regular basis.

Process to capture and document what matters to patients, including preferences and goals of care, code status, advanced directives, and identification of a proxy decision maker

- **Things to consider**

- Discuss with family, surrogates, and health care team and document in medical record the following items:
 - Patient's priorities and preferences regarding treatment options (including operative and nonoperative alternatives)
 - Postinjury risks of complications, mortality and temporary/permanent functional decline
 - Advance directives or living will and how these will affect initial care and life sustaining preferences
 - Identify surrogate decision maker, medical proxy or legal guardian
 - Make liberal use of palliative care options
 - In appropriate settings, hospice may be a positive, active treatment option
- Hold family meeting within 72 hours of admission to discuss goals of care

- **Tools**

- polst.org/form-patients POLST is portable medical orders of important treatment decisions. It is designed for patients with advanced disease, frailty, or terminal conditions.
- www.lightthelegacy.org Formerly Honoring Choices. Resource to find more information about healthcare directives. Forms are available in multiple languages

Medication reconciliation and avoidance of inappropriate medications

Document the patient's complete medication list, including over the counter and complementary/ alternative medications.

- **Tools**

- [BEERS Criteria](#) - identifies potentially inappropriate medication use in adults over age 65
- Pharmacy medication reconciliation
 - Ideas of where to find current med list
 - Surescript- used for exchange of health information between health care organizations and pharmacies
 - Care everywhere
 - Clinic notes- anticoagulation clinic, psychiatric
 - Skilled nursing facility/group home medication administration record
- Medication list will be screened by both the nurse and provider for:
 - Polypharmacy >5 medications
 - Presence of high-risk medications
 - See "Beers criteria" as example of high risk medications
- MTMS - [Medication Therapy Management Services \(state.mn.us\)](http://state.mn.us) – pharmacists work with patients and providers to solve problems related to medications in the outpatient setting.

Services include the following:

- Performing or obtaining necessary assessments of the member's health status
- Face-to-face or telehealth encounters done in any of the following:
 - Ambulatory care outpatient setting
 - Clinics
 - Pharmacies
 - Member's home or place of residence if the member does not reside in a skilled nursing facility
- Formulating a medication treatment plan
- Monitoring and evaluating the member's response to therapy, including safety and effectiveness
- Performing a comprehensive medication review to identify, resolve and prevent medication-related problems, including adverse drug events
- Documenting the care delivered and communicating essential information to the member's other primary care providers
- Providing verbal education and training designed to enhance member understanding and appropriate use of the member's medications
- Providing information, support services and resources designed to enhance patient adherence with the patient's therapeutic regimens

- Coordinating and integrating medication therapy management services within the broader health care management services being provided to the member

Eligible Members: Medical Assistance (MA) and MinnesotaCare (fee-for-service and managed care) members are eligible for MTMS if they are all of the following:

- An outpatient (not inpatient or in an institutional setting)
- Not eligible for Medicare Part D
- Taking a prescription medication to treat or prevent one or more chronic conditions

- **Pain Management Strategies**

- Use elderly-appropriate medications and dosing.
- Avoid Benzodiazepines.
- Consider early use of non-narcotics including scheduled Tylenol, NSAIDs, adjuncts and IV Ketamine tramadol.
- Monitor use of narcotics; consider early implementation of patient-controlled analgesia.
- Epidural or regional algesia may be preferable to other means for patients with multiple rib fractures to avoid respiratory failure.

- **Things to consider**

- Geriatric patients are at high-risk for adverse events related to medications. The aging population tends to take more medications, have more co-morbidities, and have differing response to medications when compared to their younger cohorts.
- The normal aging physiology often leads to change in metabolism with medications as well as problematic response to “normal” medication dosing.
- Medication list should be obtained and completed as accurately as possible, taking advantage of patients, caretakers, and medical record resources.
- Patients taking more than 5 medications, any high-risk medications, or presenting with signs or symptoms of adverse drug events should be managed with a multi-disciplinary approach focused on improving patient outcomes.
- Establish medication “reconciliation” tool
- High risk medication list may be hospital specific and should minimally include:
 - Anticoagulants and antiplatelets
 - Anti-hyperglycemics
 - Cardiac medications including digoxin, amiodarone, B-blockers, Ca channel blockers
 - Diuretics
 - Narcotics

- Anti-psychotics and other psychiatric medications
- Immunosuppressant medications, including chemotherapy agents
- Multi-disciplinary team including pharmacy should work with provider to minimize drug-drug interactions, minimizing polypharmacy and high-risk medications
- Discontinue non-essential medications
- Continue medications with withdrawal potential
- Speech and swallow eval to assure ability to swallow pills
- Palliative care or pain service consult
- Embed decision support tools and alerts within the electronic health record for potentially inappropriate medication is prescribed

Screening for mobility limitations and assurance of early, frequent, and safe mobility

Trauma is one of the leading causes of death in the geriatric population. Falls, even relatively minor impact falls, often represent a major traumatic mechanism in the geriatric population and can lead to significant morbidity and mortality compared to younger patients.

- **Tools**

- Assessing baseline current functional status in ambulatory patients
 - **Short simple screening test** for functional assessment – TQIP Geriatric Guideline appendix
 - 4 question survey
 - If **no** to any of the questions, then a more in-depth evaluation should be performed including full screening of ADLs and IADLs.
- Assessing gait and mobility impairment and fall risk in ambulatory patients
 - **Timed up and Go Test (TUGT)** – TQIP Geriatric Guideline appendix [TUG \(cdc.gov\)](https://www.cdc.gov)
 - Patient asked to perform 5 tasks
 - Any difficulty getting up from chair or takes more than 15 seconds to complete task then pt is at high risk for fall.
 - **Adult Bedside Mobility Assessment Tool (BMAT)** for Nurses [BMAT \(myamericannurse.com\)](https://myamericannurse.com)
 - Assesses ability to sit, stretch, stand, and walk.
 - Includes a safety screen assessment.
 - Simple instructions for the screening clinician, with a pass/fail determination which stops the assessment or moves through the 4 areas.
 - [4-Stage Balance Test \(cdc.gov\)](https://www.cdc.gov)
 - Simple test
 - Assess balance while standing in 4 different positions for 10 seconds.
- Initiate a comprehensive evaluation for geriatric patients presenting after a fall or for those who may be at high risk for future falls.
- An appropriate tool is a direct, easily implemented tool to screen for risk of falls
- In traumatically injured patients, functional ability, including gait and fall risk, should be assessed as early as possible and compared with established baseline function.

- **Things to Consider**

- The appropriate evaluation of a patient who either has fallen or is high risk of falling involves not only a thorough assessment for traumatic injuries, but an assessment of the cause of the fall and estimation of future fall risk.

- The goal of the evaluation of a patient who has fallen or is at increased risk of falling is to diagnose and treat traumatic injuries, discover, and manage the predisposing causes of the fall, and ultimately to prevent complications of falling and future falls.
- If the patient was a healthy 20-year-old, would he/she have fallen? If answer is “no,” then an assessment of the underlying cause of the fall should be more comprehensive and should include:
 - History is the most critical component of the evaluation of a patient with, or at risk for, a fall. Several studies and authorities have suggested that there are several key elements to an appropriate history in patients that fall. Key historical elements include:
 - Age greater than 65
 - Location and cause of fall
 - Difficulty with gait and/or balance
 - Number of previous falls
 - Time spent on floor or ground
 - LOS/AMS
 - Near/syncope/orthostasis
 - Melena
 - Specific comorbidities such as dementia, Parkinson’s, stroke, DM, hip fracture and depression
 - Visual or neurological impairments such as peripheral neuropathies
 - Alcohol use
 - Medications
 - ADL’s
 - Appropriate footwear
 - Although there is no recommended set of diagnostic tests for the cause of a fall, a low threshold should be maintained for obtaining an EKG, complete blood count, standard electrolyte panel, measurable medication levels and appropriate imaging.
 - Develop a plan for early mobilization. Ensure ambulation within 48 hours of admission.

Implementation of safe transitions to home or other health care facilities

- **Tools**
 - Emergency Department
 - Evaluate patient's gait
 - Get up and go test
 - In-patient
 - Physical and Occupational Therapy Consult
 - IDEAL Discharge Planning Overview, Process, and Checklist
 - Includes five key elements for assessment.
 - Checklists integrate safe discharge planning process beginning the day of admission.
 - [IDEAL Discharge Planning Tool](#)

- **Things to Consider**
 - Patients not able to rise from the bed, turn, and steadily ambulate out of the ED should be reassessed. Admission should be considered if patient safety cannot be assured.
 - Begin developing plan for transition to posthospital care or special unit care in the immediate postinjury period.
 - Assess following discharge planning issues early during hospitalization
 - Home environment, social support, and possible needs for medical equipment and/or home health services.
 - Patient acceptance/denial of nursing home or skilled nursing facility placement
 - Provide the patient and caregiver with a written discharge document which includes:
 - Discharge diagnosis
 - Medications and clear dosing instructions and possible reactions
 - Documentation of reconciliation between outpatient and inpatient medications
 - Direction for wound care
 - Instructions for diet (nutrition plan) and mobility
 - Needs for PT/OT
 - Contact information for patients physician or clinic
 - Establish an appointment with continuity physician, specialty physicians, or clinic
 - Clear documentation of incidental findings
 - Documentation of follow up appointment with telephone contact
 - Communicate results of hospitalization with patient's primary care provider (PCP)
 - Provide PCP with discharge summary
 - Provide the receiving facility with a discharge summary prior the patients departure from the hospital as well as verbal communication with the receiving facility.

- For patients discharged to home:
 - Arrange for home health visit or follow-up phone call within 1-3 days of discharge to assess.
 - Pain control
 - Tolerance of food, liquids
 - Ability to ambulate
 - Mental status
 - Understanding of post discharge instructions/medications

RESOURCES:

- Geriatric Emergency Department Accreditation Program (GEDA) [Geriatric Emergency Department Accreditation \(acep.org\)](#)
- TQIP – Geriatric Best Practice Guideline [geriatric guidelines.pdf \(facs.org\)](#)
- American Geriatrics Society [BEERS Criteria 2023](#)

(Identification of Seniors at Risk) ISAR Screening questions

ISAR Screening Questions	No	Yes
1. Before the illness or injury that brought you to the Emergency, did you need someone to help you on a regular basis?	0	1
2. In the last 24 hours, have you needed more help than usual?	0	1
3. Have you been hospitalized for one or more nights during the past six months?	0	1
4. In general, do you have serious problems with your vision that cannot be corrected with glasses?	0	1
5. In general, do you have serious problems with your memory?	0	1
6. Do you take six or more different medications every day?	0	1
	Total	/6

Scoring: Score of ≥ 2 is a positive test

Frailty Score: Operational Definition ¹³	
Criteria	Definition
Shrinkage	Unintentional weight loss ≥ 10 pounds in past year
Weakness	Decreased grip strength
Exhaustion	Self-reported poor energy and endurance
Low physical activity	Low weekly energy expenditure
Slowness	Slow walking
Interpretation of the Frailty Score	
The patient receives 1 point for each criterion met.	
0-1	= Not Frail
2-3	= Intermediate Frail (Pre-frail)
4-5	= Frail
Frail patients are at much higher risk of adverse health outcomes.	
Intermediate frail patients are at elevated risk (less than frail ones) but are also at more than double the risk of becoming frail over 3 years.	

Frailty Score ¹⁴⁻¹⁵																									
Patient receives one point for each criterion (0-5)																									
Frailty Criteria	Definition																								
Weight loss	Unintentional weight loss ≥ 10 pounds in the past year.																								
Decreased grip strength (weakness)	Grip strength in the lowest 20th percentile by gender and BMI. Three trials are performed with a hand-held dynamometer and the average value is used. <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">Men</th> <th colspan="2">Women</th> </tr> <tr> <th>BMI</th> <th>Kg Force</th> <th>BMI</th> <th>Kg Force</th> </tr> </thead> <tbody> <tr> <td>≤ 24</td> <td>≤ 29</td> <td>≤ 23</td> <td>≤ 17</td> </tr> <tr> <td>24.1-26</td> <td>≤ 30</td> <td>23.1-26</td> <td>≤ 17.3</td> </tr> <tr> <td>26.1-28</td> <td>≤ 30</td> <td>26.1-29</td> <td>≤ 18</td> </tr> <tr> <td>> 28</td> <td>≤ 32</td> <td>> 29</td> <td>≤ 21</td> </tr> </tbody> </table>	Men		Women		BMI	Kg Force	BMI	Kg Force	≤ 24	≤ 29	≤ 23	≤ 17	24.1-26	≤ 30	23.1-26	≤ 17.3	26.1-28	≤ 30	26.1-29	≤ 18	> 28	≤ 32	> 29	≤ 21
Men		Women																							
BMI	Kg Force	BMI	Kg Force																						
≤ 24	≤ 29	≤ 23	≤ 17																						
24.1-26	≤ 30	23.1-26	≤ 17.3																						
26.1-28	≤ 30	26.1-29	≤ 18																						
> 28	≤ 32	> 29	≤ 21																						
Exhaustion	For the following two statements: <ol style="list-style-type: none"> "I felt that everything I did was an effort." "I could not get going." The patient is asked: "How often in the last week did you feel this way?" <p>0 = rarely or none of the time (<1 day) 1 = some or a little of the time (1-2 days) 2 = a moderate amount of the time (3-4 days) 3 = most of the time</p> The criterion is met if patient answers 2 or 3 to either statement.																								
Low physical activity	Weekly energy expenditure, determined with the short version of the Minnesota Leisure Time Activities Questionnaire in the lowest 20th percentile by gender: Men: <383 kcal/week. Women: <270 kcal/week.																								
Slowed walking speed	Walking speed in the lowest 20th percentile by gender and height. Time is measured for a distance of 15 feet at normal pace. The average of three trials is used. <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">Men</th> <th colspan="2">Women</th> </tr> <tr> <th>Height</th> <th>Time</th> <th>Height</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>≤ 173 cm</td> <td>≥ 7 sec</td> <td>≤ 159 cm</td> <td>≥ 7 sec</td> </tr> <tr> <td>> 173 cm</td> <td>≥ 6 sec</td> <td>> 159 cm</td> <td>≥ 6 sec</td> </tr> </tbody> </table>	Men		Women		Height	Time	Height	Time	≤ 173 cm	≥ 7 sec	≤ 159 cm	≥ 7 sec	> 173 cm	≥ 6 sec	> 159 cm	≥ 6 sec								
Men		Women																							
Height	Time	Height	Time																						
≤ 173 cm	≥ 7 sec	≤ 159 cm	≥ 7 sec																						
> 173 cm	≥ 6 sec	> 159 cm	≥ 6 sec																						

FRAIL Scale

Frailty Criteria	Definition
Fatigue	How much of the time during the past 4 weeks did you feel tired? 1 = All of the time, 2 = Most of the time, 3 = Some of the time, 4 = A little of the time, 5 = None of the time. Scores 1-2 = 1, Scores 3-5 = 0.
Resistance	By yourself and not using aids, do you have any difficulty walking up 10 steps without resting? 1 = Yes, 0 = No
Ambulation	Do you have difficulty walking one block? 1 = Yes, 0 = No
Illnesses	Do you have any of these illnesses: hypertension, diabetes, cancer (other than a minor skin cancer), chronic lung disease, heart attack, congestive heart failure, angina, asthma, arthritis, stroke, and kidney disease?) Five or greater = 1, fewer than 5 = 0


Loss of weight	Loss of weight (Have you lost more than 5 percent of your weight in the past year?) Yes= 1, No = 0
Total	/5

Scoring: $\geq 3/5$ criteria met indicates frailty
 1-2/5 indicates pre-or-intermediate frailty
 0/5 indicates non-frail.

PRISMA Frailty Assessment

PRISMA Frailty Assessment	No	Yes
1. Are you older than 85 years?	0	1
2. Are you male?	0	1
3. In general, do you have any health problems that require you to limit your activities?	0	1
4. Do you need someone to help you on a regular basis?	0	1
5. In general, do you have any health problems that require you to stay at home?	0	1
6. If you need help, can you count on someone close to you?	0	1
7. Do you regularly use a stick, walker, or wheelchair to move about?	0	1
Total		/7

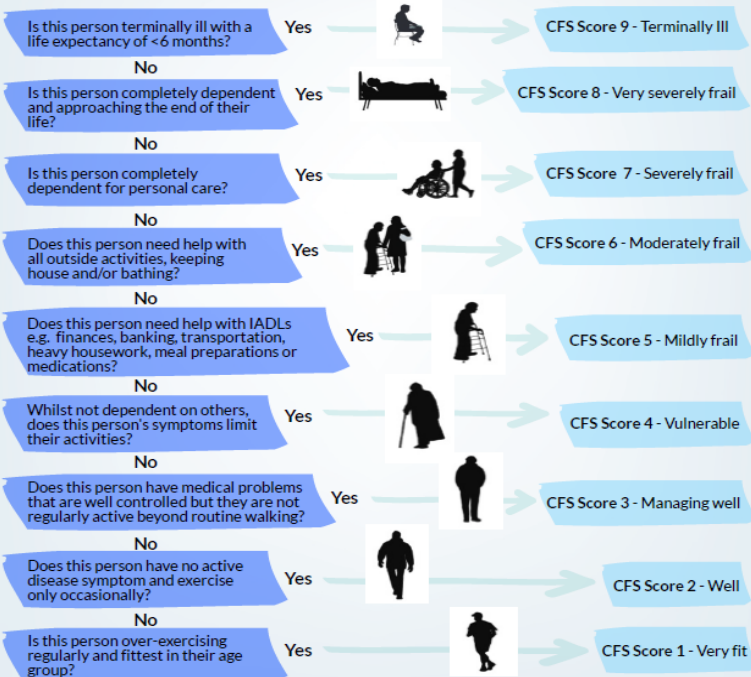
Scoring: If the respondent had 3 or more “yes” answers, this indicates an increased risk of frailty and the need for further clinical review.



Acute Frailty Network

The Clinical Frailty Scale (CFS)

A Quick Reference Guide - Flowchart



Severe Frailty CFS 7-9 Think about supportive care versus cure, advance care planning, recognition that enhanced supportive care is an active intervention in itself offering improved quality of life and, sometimes quantity of life. Comprehensive Geriatric Assessment must be completed.

Moderate Frailty CFS 6 Actively seek out and manage frailty syndromes e.g. falls, fragility fractures, cognitive impairment, continence and/or polypharmacy issues. Use the 4AT to screen for delirium in patients with dementia and/or delirium. The presence of one or more frailty syndromes should trigger Comprehensive Geriatric Assessment (CGA).

Fit/Mild Frailty CFS 1-5 Plan care as usual but address reversible issues such as sarcopenia and nutrition. Consider social prescribing and where relevant, e.g. elective care, make a plan for “prehabilitation”.

Align this with guidance on management of Acute Frailty at www.acutefrailty.org.uk

A version of the CFS is now available on the App Store, designed to help frontline staff calculate a clinical frailty score.

<http://www.acutefrailtynetwork.org.uk/> - CFS App

Assessing Baseline and Current Functional Status in Ambulatory Patients

Short Simple Screening Test for Functional Assessment^{8,9}

Ask the patient the following four questions:

1. *Can you get out of bed or chair yourself?*
2. *Can you dress and bathe yourself?*
3. *Can you make your own meals?*
4. *Can you do your own shopping?*

Interpretation of Functional Screening Test

If NO to any of these questions, more in-depth evaluation should be performed, including full screening of ADLs and IADLs.

Deficits should be documented and may prompt perioperative interventions (for example, referral to occupational therapy and/or physical therapy) and proactive discharge planning.

Assessing Gait and Mobility Impairment and Fall Risk in Ambulatory Patients¹⁰⁻¹²

Timed Up and Go Test (TUGT)

Patients should sit in a standard armchair with a line 10 feet in length in front of the chair. They should use standard footwear and walking aids and should not receive any assistance.

Have the patient perform the following commands:

1. *Rise from the chair (if possible, without using the armrests)*
2. *Walk to the line on the floor (10 feet)*
3. *Turn*
4. *Return to the chair*
5. *Sit down again*

Interpretation of TUGT

Any person demonstrating difficulty rising from the chair or requiring more than 15 seconds to complete the test is at high risk for falls. Consider preoperative referral to physical therapy for more detailed gait assessment.

Screening for Severe Nutritional Risk¹⁶

Risk Factors for Severe Nutritional Risk

- BMI <18.5 kg/m²
- Serum albumin <3.0 g/dL (with no evidence of hepatic or renal dysfunction)
- Unintentional weight loss >10%–15% within 6 months

Interpretation of Nutritional Screening

If YES to any above criterion, then the patient is at severe nutritional risk and should, if feasible, undergo a full nutritional assessment by a dietician to design a perioperative nutritional plan to address deficits.

- [Optimal Resources for Geriatric surgery](#)
- [GeriatricsCareOnline.org](#)
- [HealthinAging.org](#)
- [Minnesota Elder Justice Center \(elderjusticemn.org\)](#) provides support, information and resources to older and vulnerable adults and their loved ones around issues of abuse, neglect and financial exploitation.
- [MN Senior Services and Resources | Senior LinkAge Line / Minnesota.gov](#) – web resource for seniors living in MNshort

I'll work on this, but wanted to get it sent out to everyone for one last final proof

Ideas for formatting: if right click and go to link second section place in this document. ?? will try at work.

Make each section start with its own page.

Editable PDF – book mark it and link it to below. Maybe can do it in word.



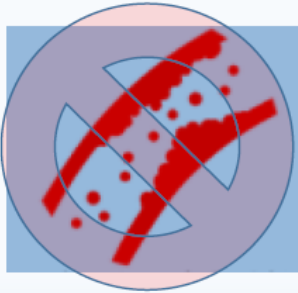
Pediatric Trauma Resources: Chest, Abdomen, and Pelvis



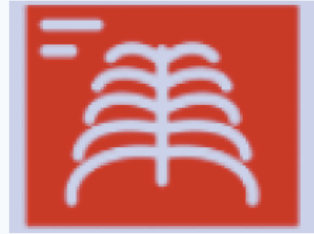
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Thoracic CT Rarely Indicated in Children



- Chest computed tomography (CCT) advocated in adult blunt trauma due to higher incidence of aortic injuries
- Traumatic vasculature injuries rare in children



- Majority of injuries can be identified and intervened on from chest radiography (CXR)



- CCT identifies more injuries but rarely changes clinical management



- CCT associated with increased lifetime cancer risk (references), equivalent to 150 CXR
- Screening with abnormal silhouette may decrease CCT use without missing significant vascular injuries

Chest Wall Injuries

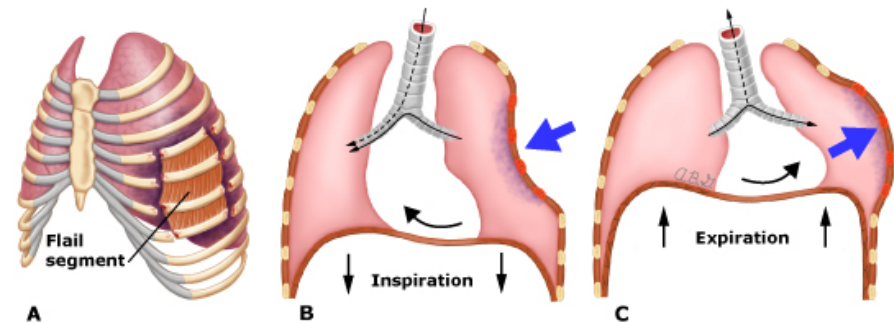
Rib Fractures

- Children ≤ 3 years of age with rib fractures and without a history of high-force trauma warrant evaluation for physical child abuse
- Posterior rib fractures in young children without history of high-force trauma are highly concerning for physical child abuse
- Children with multiple rib fractures warrant admission to a pediatric trauma center for pain control, age-appropriate pulmonary physiotherapy

Flail Chest

- Require respiratory support
- Intubation and positive-pressure ventilation needed for children with respiratory distress or failure

Flail chest pathophysiology



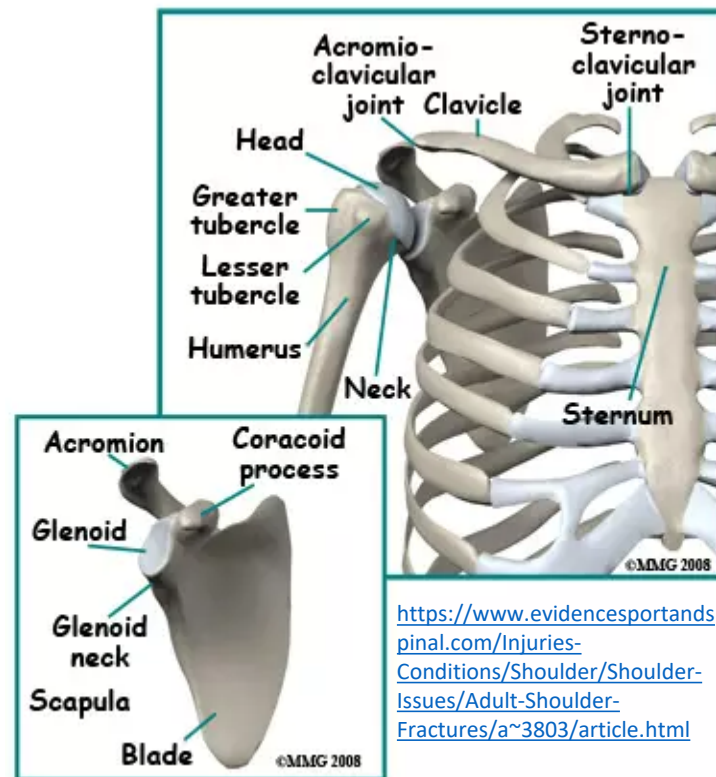
(A) Flail chest occurs when multiple rib fractures result in a loss of stability of the chest wall. The loss of continuity with the remainder of the rib cage causes the flail segment to move paradoxically.

(B) Pressure within the chest is negative during inspiration, causing the flail segment to retract.

(C) With expiration, intrathoracic pressure becomes positive and the flail segment bulges.

Isolated Sternal Fractures

- ECG and cardiac monitoring warranted in patients with blunt cardiac injury or sternal fracture
- Computed tomography angiography (CTA) is recommended in patients with suspected posterior sternoclavicular fractures or dislocations
- Can be managed as outpatient if ECG and chest imaging are normal, patient is comfortable
- Admission at a pediatric trauma center is warranted for children who require more aggressive pain control or have associated injuries



Scapular Fractures

- Most children with scapular fractures have serious injuries that require admission at a pediatric trauma center
- Non-displaced or minimally displaced scapular fractures can often be treated non-surgically with a sling due to the number of muscle attachments supporting the scapula
- Displaced fractures of the scapular neck, and displaced glenoid fractures may require open reduction

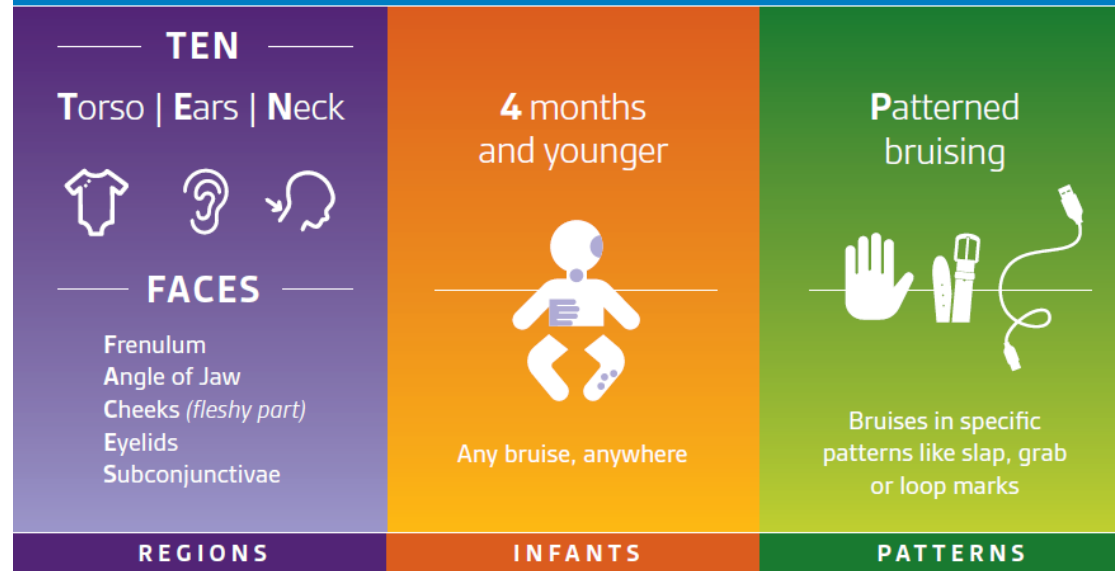


TEN-4-FACESp

Bruising Clinical Decision Rule for Children < 4 Years of Age

When is bruising concerning for abuse in children < 4 years of age?

If bruising in any of the three components (Regions, Infants, Patterns) is present without a reasonable explanation, strongly consider evaluating for child abuse and/or consulting with an expert in child abuse.



Unexplained bruises in these areas most often result from physical assault.

TEN-4-FACESp is not to diagnose abuse but to function as a screening tool to improve the recognition of potentially abused children with bruising who require further evaluation.

Reference: Pierce MC, Magana JM, Kaczor K, Lorenz DJ, Meyer G, Bennett, BL, Kanegaye JT. The prevalence of bruising among infants in pediatric emergency departments. *Ann Emerg Med* 2016;67:1-8. doi: 10.1016/j.annemergmed.2015.06.021 PMID: 26233923



Disclaimer: This guideline is designed for general use with most patients; providers should use their independent clinical judgment. This guideline is not intended to be a substitute for professional medical advice, diagnosis, or treatment.

Evaluation of Abdominal Trauma in Child Physical Abuse (NAT) Guideline

Injury Associations with Inflicted Abdominal Trauma



Suspected abuse with severe TBI or unconscious



Child < 2y with isolated duodenal injury (100%), 3-5y (54%)



Unexplained hollow viscus injury with sepsis (late presentation)



Suspected abuse with acute rib (26%) or spinal fractures (100%)



Suspected abuse with abdominal tenderness or pain; bruising is absent in 80%

Screening Tests to Evaluate for Inflicted Abdominal Trauma



Liver Function Tests

AST/ALT > 80 IU/L



Pancreatic enzymes

Amy/Lip > 80 IU/L



CT A/P with IV contrast is most sensitive. Ultrasound will miss injuries and is not adequate



References:

<https://childprotection.rcpch.ac.uk/child-protection-evidence/visceral-injuries-systematic-review/>

https://www.facs.org//media/files/qualityprograms/trauma/tqip/abuse_guidelines.ashx

Summary of features associated with Child Abuse identified during the initial trauma evaluation



Historical factors

- Children who present with a change in behavior, + skeletal injuries, subdural hemorrhage with suspicious history
- injury inconsistent with history
- delay in seeking care

Bruising

- TEN-4 bruising (Bruising in children <4 years on trunk, ears, neck) 97% sensitive, 84% specific for child abuse
- "When you don't bruise, you don't bruise."

Burns

- Up to 25% children admitted to burn centers have been abused
- Most intentional burn injury is from scalds to buttocks, perineum, bilateral lower limbs, feet, unilateral limbs, multiple contact burns, or clearly demarcated edges
- Any burn in age < 5

Intracranial Injury

- PEDIBIRN clinical prediction rule, 96% sensitive, 43% specific for AHT 1+ feature in child <3 years
- PredAHT clinical prediction rule, 72% sensitive, 86% specific for AHT 3+ features in child < 3 years

Oral Injury

- Frenulum injury + non-ambulating child concerning for child abuse
- Lip injury is extremely common in accidental trauma and does not justify a child abuse workup

Abdominal Injury

- Hollow viscus injury, particularly duodenal injury, in children <4 year., combined hollow viscus + solid organ injury
- intra-abdominal injury may be found without bruising but in the presence of elevated LFTs

Skeletal Injury

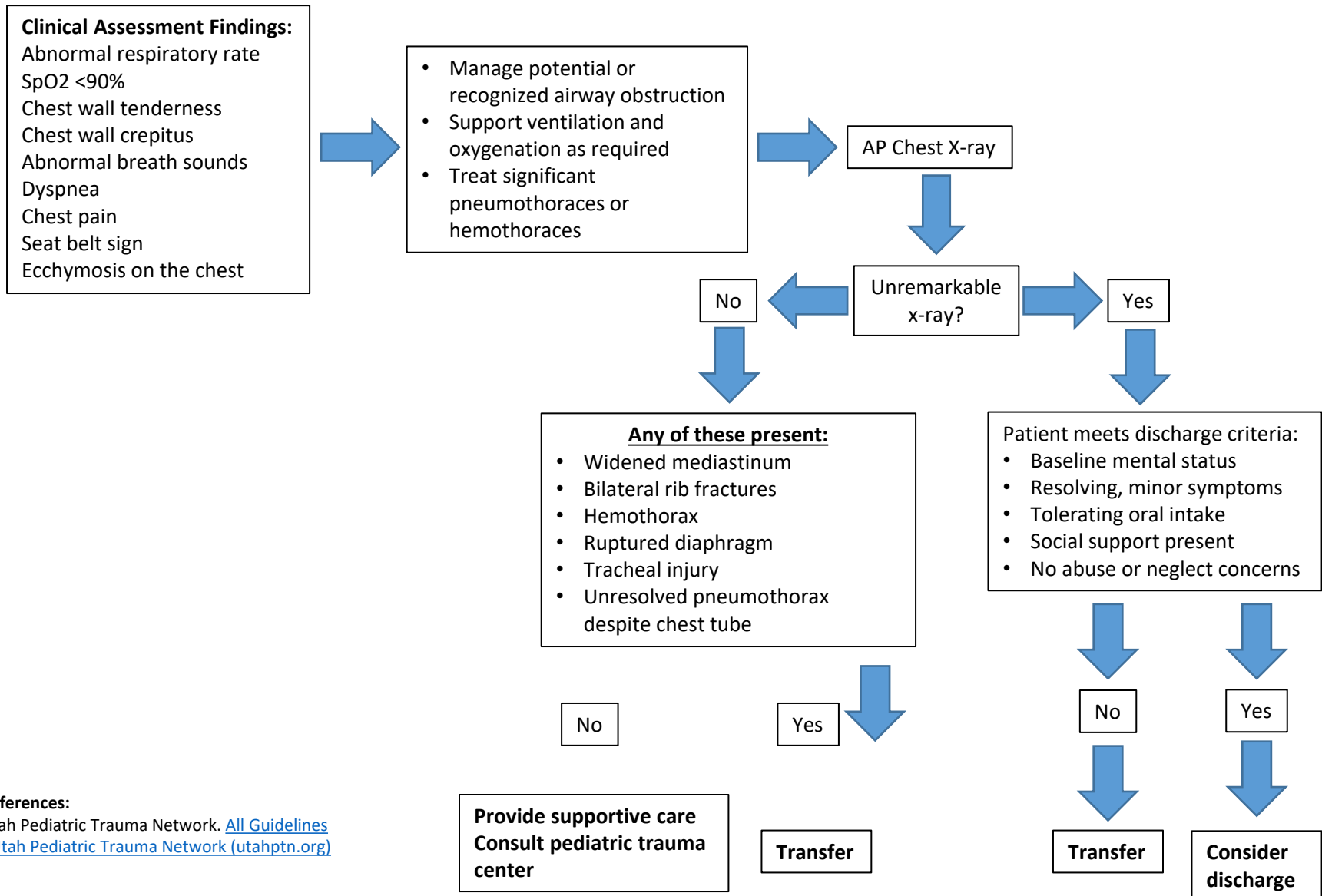
- Fracture patterns inconsistent with degree of mobility and child age
- Skeletal survey to screen for occult fractures is indicated for any child <2 years with suspected abuse

Escobar, M. A., Flynn-O'Brien, K. T., et al... (2017). The association of nonaccidental trauma with historical factors, examination findings, and diagnostic testing during the initial trauma evaluation. *Journal of Acute Care Surgery*, 82(6), pp. 1147-1157

Reference: Pediatric Trauma Society. <https://pediatrictraumasociety.org/multimedia/files/guidelines/Summary-of-features-Abstract.pdf>



Pediatric Blunt Chest Injury Guideline

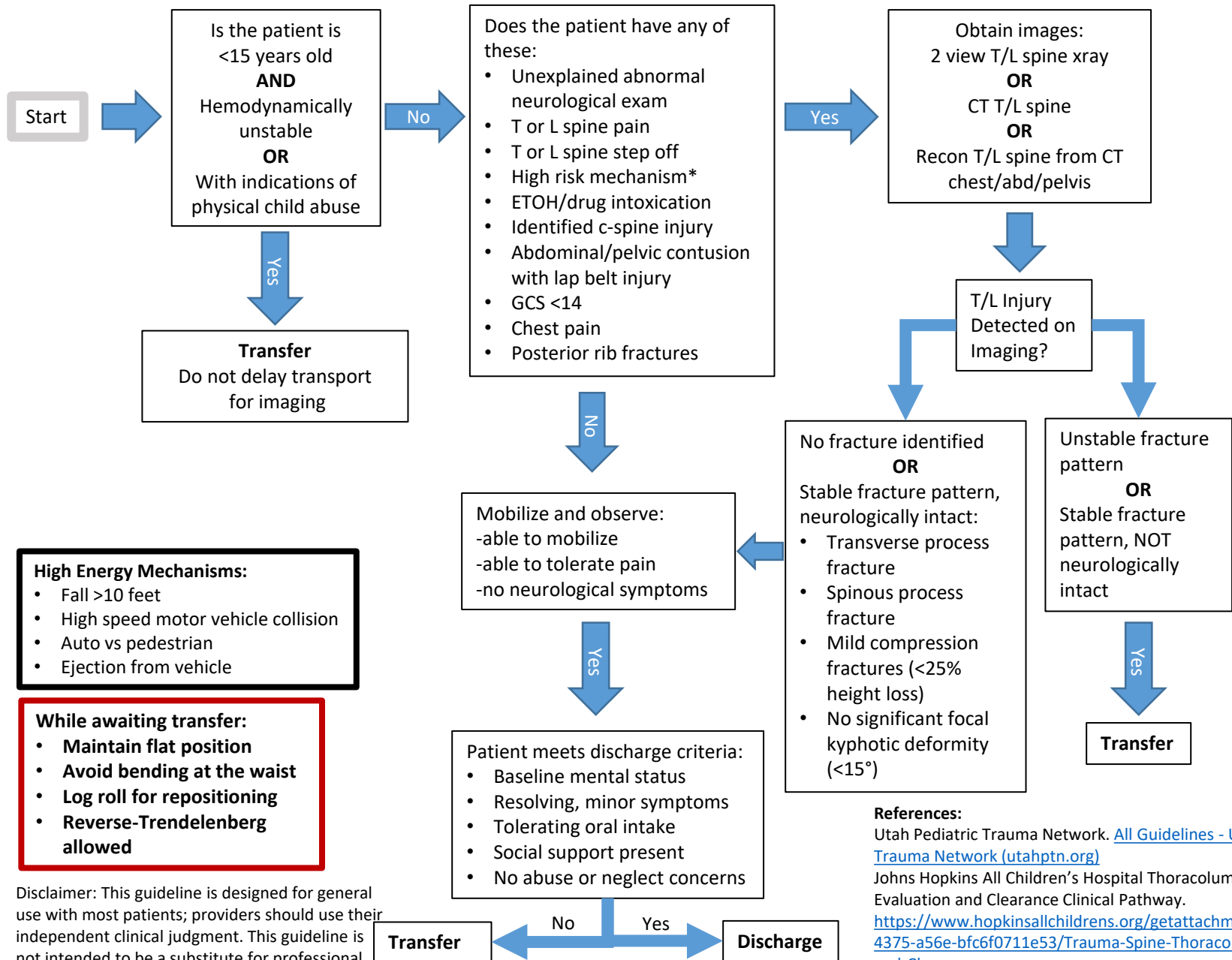


References:

Utah Pediatric Trauma Network. [All Guidelines](#)
- [Utah Pediatric Trauma Network \(utahptn.org\)](#)



Pediatric Thoracolumbar Spine Evaluation Clinical Guideline



Disclaimer: This guideline is designed for general use with most patients; providers should use their independent clinical judgment. This guideline is not intended to be a substitute for professional medical advice, diagnosis, or treatment.

Pediatric Thoracolumbar Spine Evaluation Spinal Precautions Logroll Guidelines



- Patients with suspected spinal cord injury should be transported immobilized, so please remain cognizant of board times
- Protect the spine by keeping the patient flat
- Limit board time to < 2 hours
- Only use the rigid board for patient movement; do not use slider board
- Reassess sensory/motor function with every turn, every transfer, and as needed
- Keep suction and airway equipment readily available for patients on logroll precautions
- Evaluate for risk for pressure injuries
- Consider placing pillow beneath the knees for comfort if the patient has no lower extremity trauma or other contraindication

References:

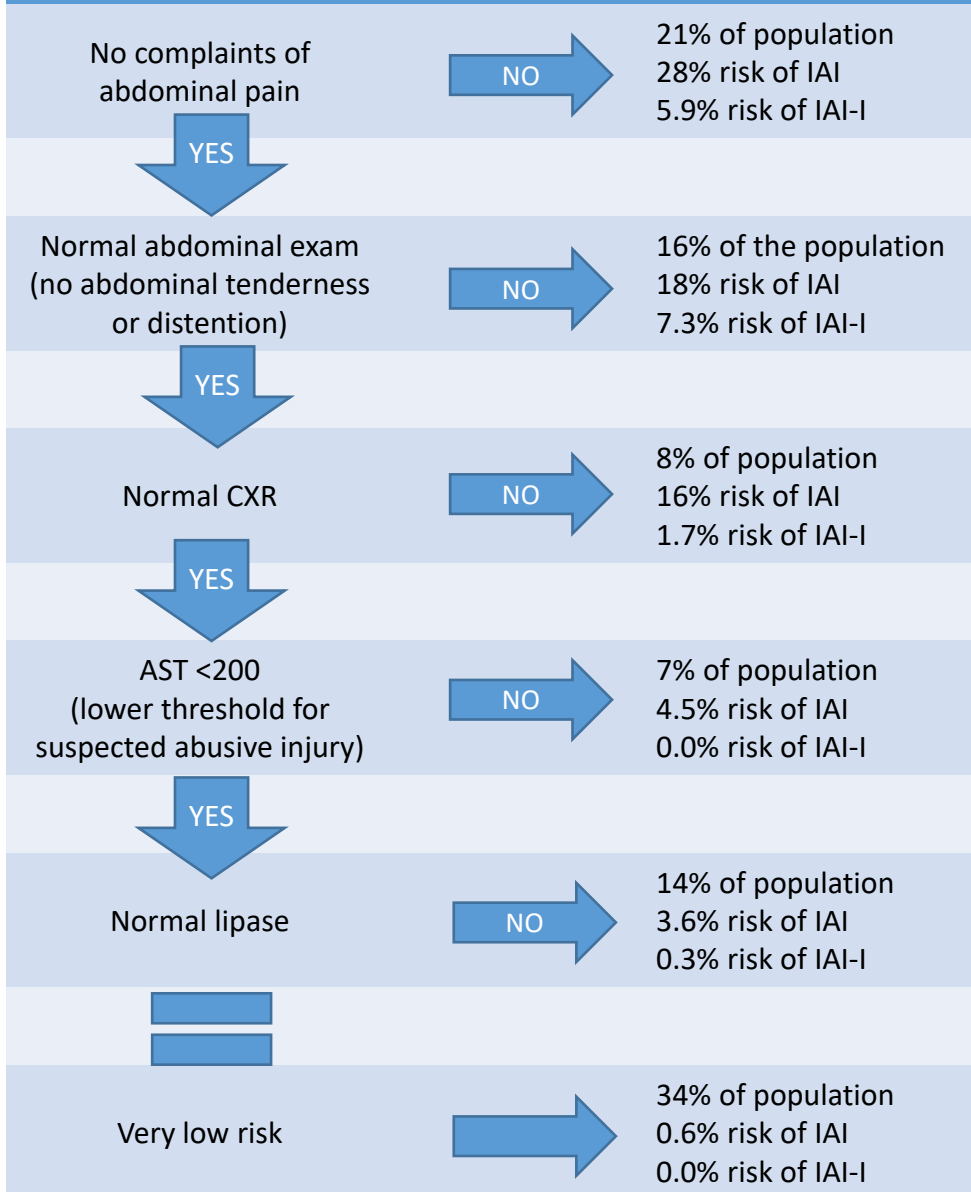
Utah Pediatric Trauma Network. [All Guidelines - Utah Pediatric Trauma Network \(utahptn.org\)](https://www.utahptn.org)

Johns Hopkins All Children's Hospital Thoracolumbar Spine Evaluation and Clearance Clinical Pathway. <https://www.hopkinsallchildrens.org/getattachment/f312cf3d-6898-4375-a56e-bfc6f0711e53/Trauma-Spine-Thoracolumbar-Evaluation-and-Cleara>

DRAFT 8/2023



5-Element Prediction Model Evaluating Risk of Intra-Abdominal Injury (IAI) and IAI Requiring Intervention (IAI-I)



Tools for Determining Need for Abdominal CT in Children with Blunt Abdominal Trauma

PECARN 7-Element Criteria for Omitting Abdominal CT:

- Must be GCS 14-15
- No abdominal pain
- No vomiting
- No abdominal tenderness
- No chest wall tenderness
- No abdominal bruising
- Normal breath sounds bilaterally

CT= computed tomography; GCS= Glasgow Coma Scale; PECARN = Pediatric Emergency Care Applied Research Network.

Modified from Holmes, et al. Identifying Children at Very Low Risk or Clinically Important Blunt Abdominal Injuries. Ann Emerg Med 2013. Taken from Notrica. Evidence-based management of pediatric solid organ injury. Seminars in Ped Surg 2022.

5-Element Prediction Model is modified from Streck CJ, et al. Identifying Children at Very Low Risk for Blunt Intra-Abdominal Injury in whom CT of the Abdomen Can Be Avoided Safely. J Am Coll Surg 2017;224(4):449-58 e3.

Disclaimer: This guideline is designed for general use with most patients; providers should use their independent clinical judgment. This guideline is not intended to be a substitute for professional medical advice, diagnosis, or treatment.

Nonoperative management of blunt liver and spleen injury in children: Evaluation of the ATOMAC guideline using GRADE

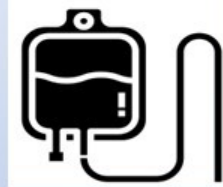
J Trauma Acute Care Surg 2015 79(4): 683-93

David M. Notrica, MD, James W. Eubanks III, MD, David W. Tuggle, MD, Robert Todd Maxson, MD, Robert W. Letton, MD, Nilda M. Garcia, MD, Adam C. Alder, MD, MSCS, Karla A. Lawson, PhD, Shawn D. St Peter, MD, Steve Megison, MD, and Pamela Garcia-Filion, PhD, MPH,
Phoenix, Arizona

Key Recommendations



Manage per hemodynamic status not grade



Early transfusion for shock, before intervention.
Transfusion threshold <7g/dL



Angioembolization can be used, but not indicated for contrast blush alone



ICU admission should be based on hemodynamic status, not injury grade



Short bed rest (1 day or less) is OK if stable and unchanged Hb level



Consider failure of NOM if >40ml/kg (4U) blood is transfused: time for intervention



Discharge < 24 hours is OK if stable and no evidence of ongoing bleeding

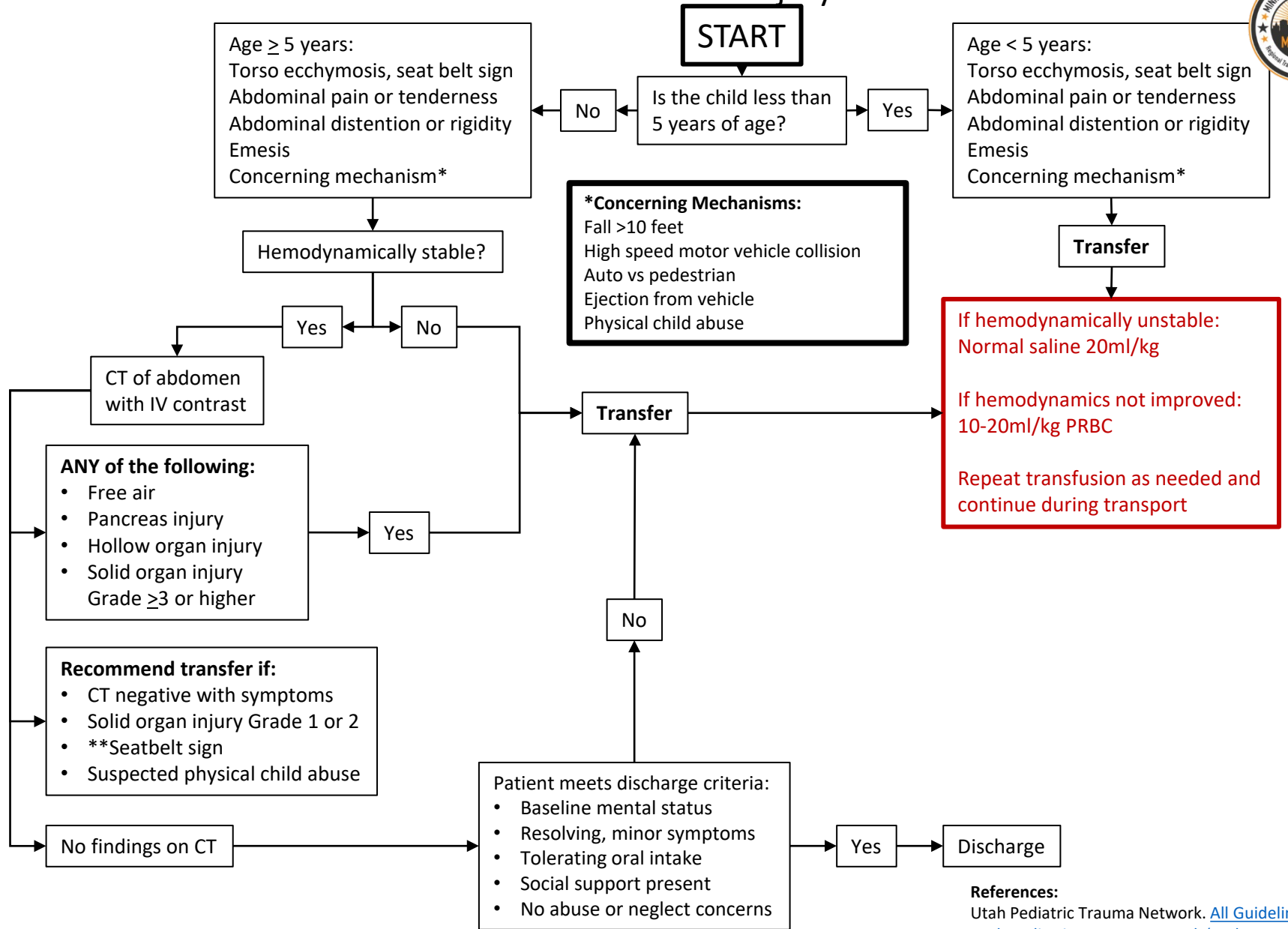


Routine surveillance re-imaging is usually not necessary

References: Pediatric Trauma Society. <https://pediatrictraumasociety.org/multimedia/files/guidelines/Liver-Visual-Abstract.jpg>

DRAFT 8/2023

Pediatric Isolated Blunt Abdominal Injury Clinical Guideline



**Treatment should be dictated by clinical exam and concern. Bowel injury may take 12-24 hours to present.

DRAFT 8/2023

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References:
Utah Pediatric Trauma Network. [All Guidelines - Utah Pediatric Trauma Network \(utahptn.org\)](http://AllGuidelines-UtahPediatricTraumaNetwork(utahptn.org))

Pediatric Pancreatic Injury



Most frequently caused by blunt trauma resulting from physical child abuse, motor vehicle crashes, or bicycle/handlebar injuries; relatively rare injury

Epigastric, right upper quadrant, or back pain are most common symptoms reported by patients. Serial clinical examination is an important part of ongoing care for patients with duodenal-pancreatic injury.

MRCP is preferred in pediatrics to evaluate for pancreatic parenchymal or pancreatic duct lesions. ERCP can also be used for diagnosis and treatment in patients with suspected pancreatic duct or extrahepatic biliary tree injuries.

Non-operative management should be treatment of choice for AAST grade I-III injuries, although some grade III patients may require operative management.

Reference: Coccolini F, Kobayashi L, Kluger Y, Moore EE, Ansaloni L, Biffl W, Leppaniemi A, Augustin G, Reva V, Wani I, Kirkpatrick A, Abu-Zidan F, Cicuttin E, Fraga GP, Ordonez C, Pikoulis E, Sibilla MG, Maier R, Matsumura Y, Masiakos PT, Khokha V, Mefire AC, Ivatury R, Favi F, Manchew V, Sartelli M, Machado F, Matsumoto J, Chiarugi M, Arvieux C, Catena F, Coimbra R; WSES-AAST Expert Panel. Duodeno-pancreatic and extrahepatic biliary tree trauma: WSES-AAST guidelines. *World J Emerg Surg.* 2019 Dec 11;14:56. doi: 10.1186/s13017-019-0278-6. PMID: 31867050; PMCID: PMC6907251.

Guideline for Non-Operative Management of Pediatric Pancreatic Injuries

Initial Management



Baseline pancreatic enzymes then avoid serial labs



Pancreatic ascites at presentation: consider pancreatic duct stent



Initiate early oral diet when tenderness improves (clears → low fat)



If diet not tolerated, keep NPO until symptoms improve

Created by Smalllike



Ultrasound at 1 week if still symptomatic (avoid re-imaging earlier in course or if no symptoms)

Organized Fluid Collection



Observe organized fluid collection if small and minimal symptoms



Initiate TPN, keep NPO until symptoms resolve



Consider percutaneous or endoscopic drainage* or ERCP/stent for large cysts (>7cm) or persistent symptoms

Created by Smalllike

* Repeated aspiration or clamped drain may help to avoid persistent drainage and shorten course



Persistent pseudocyst >4-6 weeks → endoscopic cyst-gastrostomy

Created by Smalllike

Discharge and Follow-Up



Discharge based on symptom improvement, not labs or imaging



Follow-up imaging only if symptomatic



3-6 month follow-up to check for pancreatic insufficiency



Content author: Bindi Naik-Mathuria, MD, MPH

Naik-Mathuria B et al. J Trauma Acute Care Surg 2017; 83(4):589-596.



Rosenfeld EH et al. Pediatr Surg Int 2019; 35(8): 861-867.

Rosenfeld EH et al. J Pediatr Surg 2017; 2017;S0022-3468(17)30660-7.


References: Pediatric Trauma Society. <https://pediatrictraumasociety.org/multimedia/files/guidelines/Pancreas-Visual-Abstract.pdf>

Diagnosis, Evaluation, and Management of Hollow Viscus Injuries in Children

MVC hi-speed
Lap belt use only

Injury mechanisms




Handlebar injury




Blunt force to abdomen

CT with IV contrast is most sensitive




Evaluation

Must rule out spine fx with seat belt sign




*Note that CT can be completely normal if done soon after injury



Free air, thickened bowel wall, free fluid, mesenteric hematoma, loss of bowel wall enhancement, etc.




Seat belt bruising (11-25% correlation with HVI)





Abdominal pain or tenderness

Physical Findings




Abdominal distention or mass



Handlebar bruising


Surgery is always required for HVI


Delayed signs of HVI → diagnostic laparoscopy

Management

Observation for abdominal wall bruising even with negative CT



Delay in surgery >6h does not lead to worse outcomes



Naik-Mathuria B. Hollow viscus blunt abdominal trauma in children. UpToDate 2020.

Reference: Pediatric Trauma Society. <https://pediatrictraumasociety.org/multimedia/files/guidelines/HVI-Visual-Abstract.jpg>



Pediatric Blunt Urological Injuries



Renal trauma occurs in 10-20% of all pediatric blunt abdominal trauma cases

Causes of renal injury:

Rapid deceleration forces or a direct blow to flank, causing crushing of the kidney against the ribs or vertebral column, resulting in contusion or laceration

Contributing factors in children:

- decreased amount of peri-renal fat
- incompletely ossified lower ribs
- weaker abdominal muscles
- relative size of the kidneys is large compared to the rest of the body

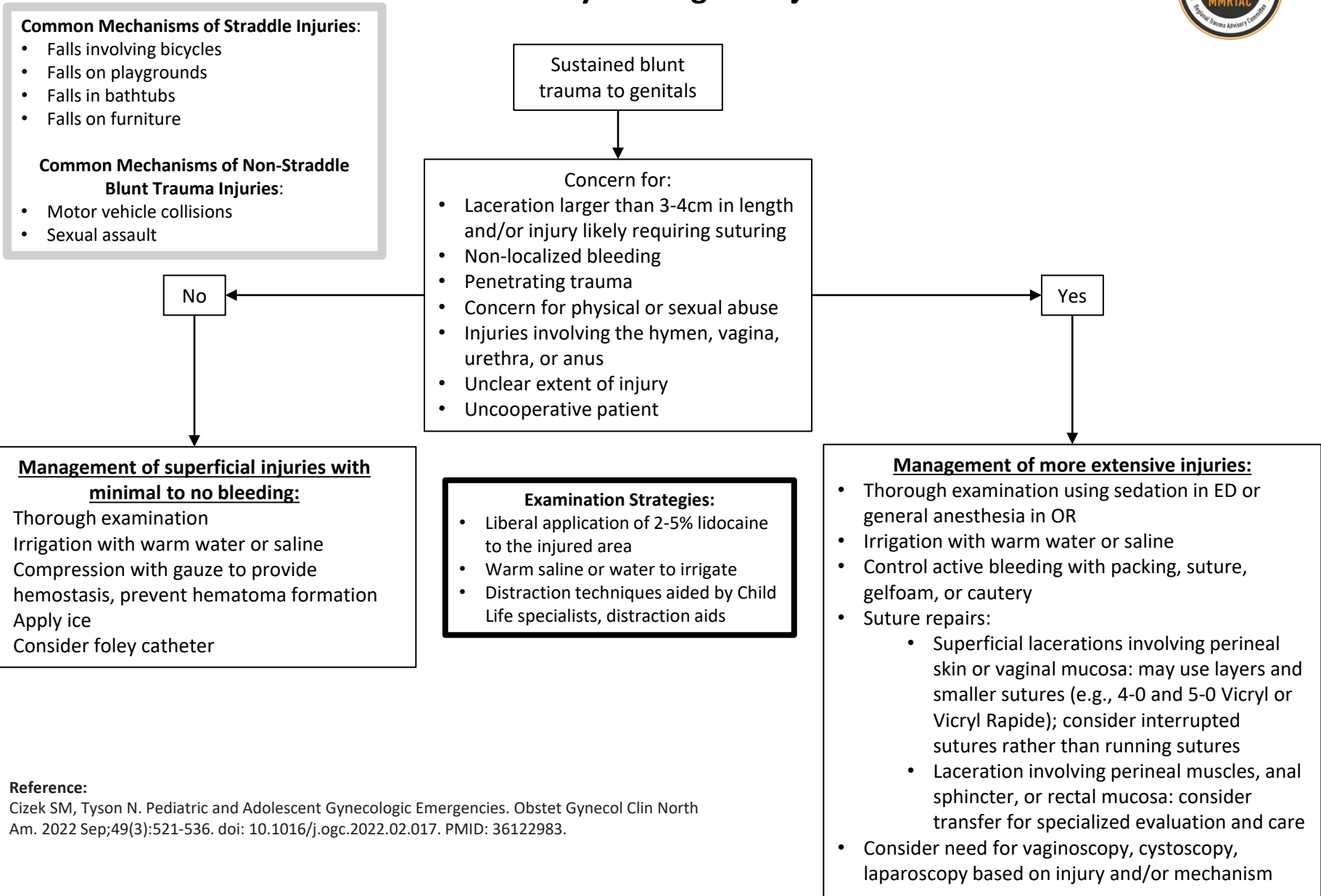
- Most renal injuries can be managed non-operatively
- Hemodynamically stable children with high-grade (AAST III-V) renal injuries with ongoing or delayed bleeding may require angioembolization and/or surgery
- Renal injuries involving the ureteric pelvic junction (AAST grade V) identified on the excretory or delayed phase CT with contrast extravasation may warrant urgent surgical evaluation
- Injury to the bladder, ureters or urethra are most commonly seen in children with other significant abdominal injuries or pelvic fractures
- Children with a history of renal injuries should have additional blood pressure checks to evaluate for posttraumatic hypertension

References:

Hagedorn JC, Fox N, Ellison JS, Russell R, Witt CE, Zeller K, Ferrada P, Draus JM Jr. Pediatric blunt renal trauma practice management guidelines: Collaboration between the Eastern Association for the Surgery of Trauma and the Pediatric Trauma Society. *J Trauma Acute Care Surg.* 2019 May;86(5):916-925. doi: 10.1097/TA.0000000000002209. PMID: 30741880.

Singer G, Arneitz C, Tschauener S, Castellani C, Till H. Trauma in pediatric urology. *Semin Pediatr Surg.* 2021 Aug;30(4):151085. doi: 10.1016/j.sempedsurg.2021.151085. Epub 2021 Jul 14. PMID: 34412884.

Pediatric Gynecological Injuries



Reference:

Cizek SM, Tyson N. Pediatric and Adolescent Gynecologic Emergencies. *Obstet Gynecol Clin North Am.* 2022 Sep;49(3):521-536. doi: 10.1016/j.ogc.2022.02.017. PMID: 36122983.