Click to edit Master title style

Trauma Triage

Asher Brand, MD

- Some of this presentation comes from the educational power point available for educational use from CDC.
- My comments are added and try to separate my comments from CDC's material.
- Slides without CDC identifiers are mine

Field Triage Decision Scheme: The National Trauma Triage Protocol

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Injury Prevention and Control
Division of Injury Response

Objectives

- Review the importance of accurate field triage
- Discuss changes to the 2006 Field Triage Decision Scheme
- Review the New CDC guidelines released earlier this year
- Case Based Group Discussions

Published: January 2011

Available for FREE at:
www.cdc.gov/FieldTriage

Contains the complete Document

RISK OF DEATH GOES FROM 7.5 in a 100 to 9.5 in 100 NNT=53

"If you are severely injured, care at a Level I trauma center lowers your risk of death by 25%."

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

A National Evaluation of the Effect of Trauma-Center Care on Mortality

Ellen J. MacKenzie, Ph.D., Frederick P. Rivara, M.D., M.P.H., Gregory J. Jurkovich, M.D., Avery B. Nathens, M.D., Ph.D., Katherine P. Frey, M.P.H., Brian L. Egleston, M.P.P., David S. Salkever, Ph.D., and Daniel O. Scharfstein, Sc.D.

ABSTRACT

BACKGROUND
Hospitals have difficulty justifying the expense of maintaining trauma centers without strong evidence of their effectiveness. To address this gap, we examined differences in mortality between level 1 trauma centers and hospitals without a trauma center (non–trauma centers).

METHODS
Mortality outcomes were compared among patients treated in 18 hospitals with a level 1 trauma center and 51 hospitals non–trauma centers located in 14 states. Patients 18 to 84 years old with a moderate-to-severe injury were eligible. Complete data were obtained for 1104 patients who died in the hospital and 4087 patients who were discharged alive. We used propensity-score weighting to adjust for observable differences between patients treated at trauma centers and those treated at non–trauma centers.

RESULTS
After adjustment for differences in the case mix, the in-hospital mortality rate was significantly lower at trauma centers than at non–trauma centers (7.6 percent vs. 9.5 percent; relative risk, 0.80; 95 percent confidence interval, 0.66 to 0.98), as was the one-year mortality rate (10.4 percent vs. 13.8 percent; relative risk, 0.75; 95 percent confidence interval, 0.60 to 0.95). The effects of treatment at a trauma center varied according to the severity of injury, with evidence to suggest that differences in mortality rates were primarily confined to patients with more severe injuries.

CONCLUSIONS
Our findings show that the risk of death is significantly lower when care is provided in a trauma center than in a non–trauma center and argue for continued efforts at regionalization.

Source: MacKenzie EJ, Rivara FP, Jurkovich GJ, et al. A national evaluation of the effect of trauma-center care on mortality. *N Engl J Med*. 2006 Jan 26; 354(4):366-78.

McKenzie, et.

- This major study did not look at rural areas. The authors:

"NSCOT IS A STUDY OF THE FFECTIVENESS OF TRAUMA CENTERS IN URBAN AND SUBURBAN AMERICA, OR RESULTS CANNOT BE READILY EXTRAPOLATED TO RURAL AREAS OF THE COUNTRY" P377

25% mortality - MacKenzie

Impressive to be sure

Moderately to severely injured

Only looked at in-hospital deaths

Not at destination hospital

All hospitals in large metro areas

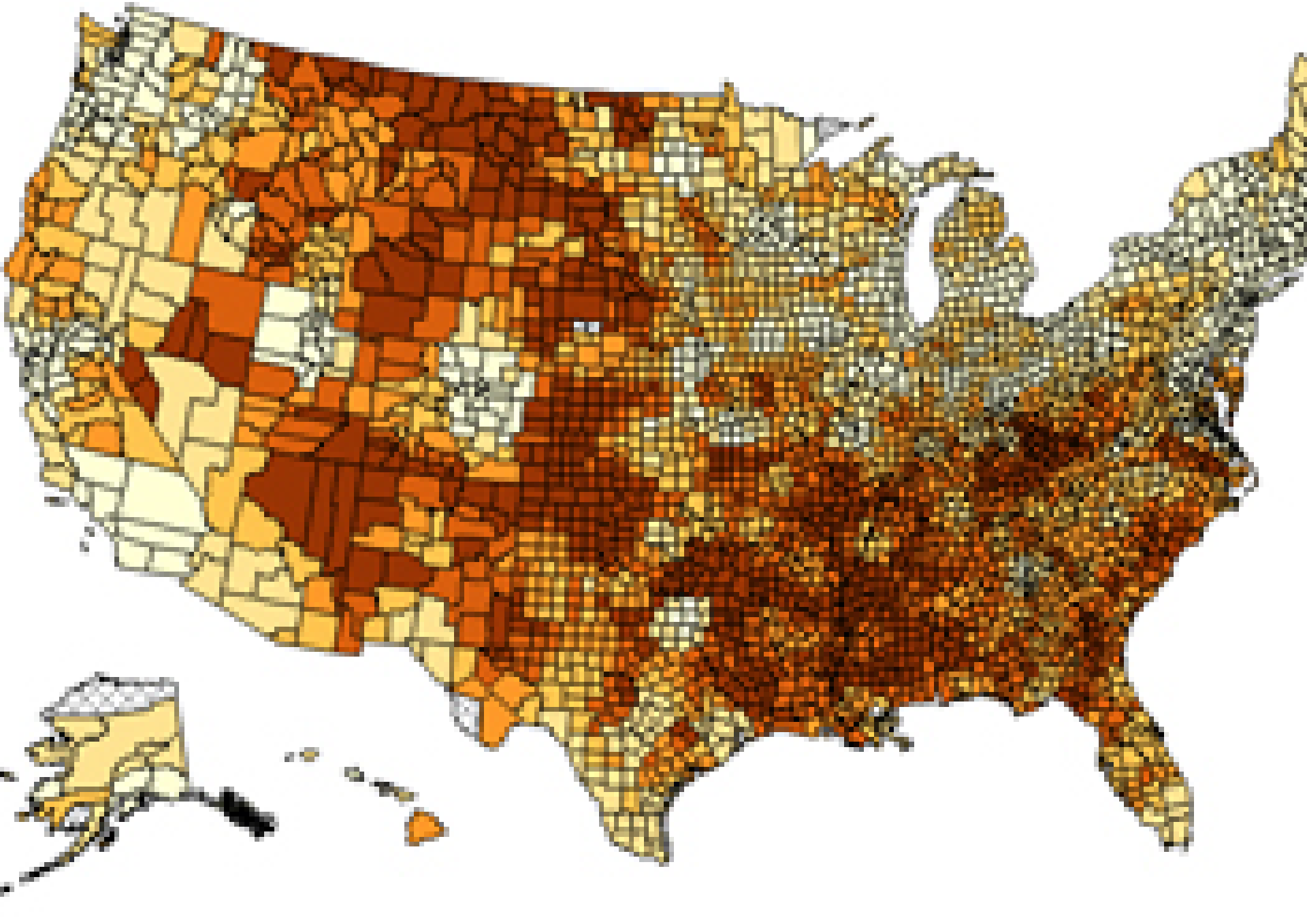
Often misquoted

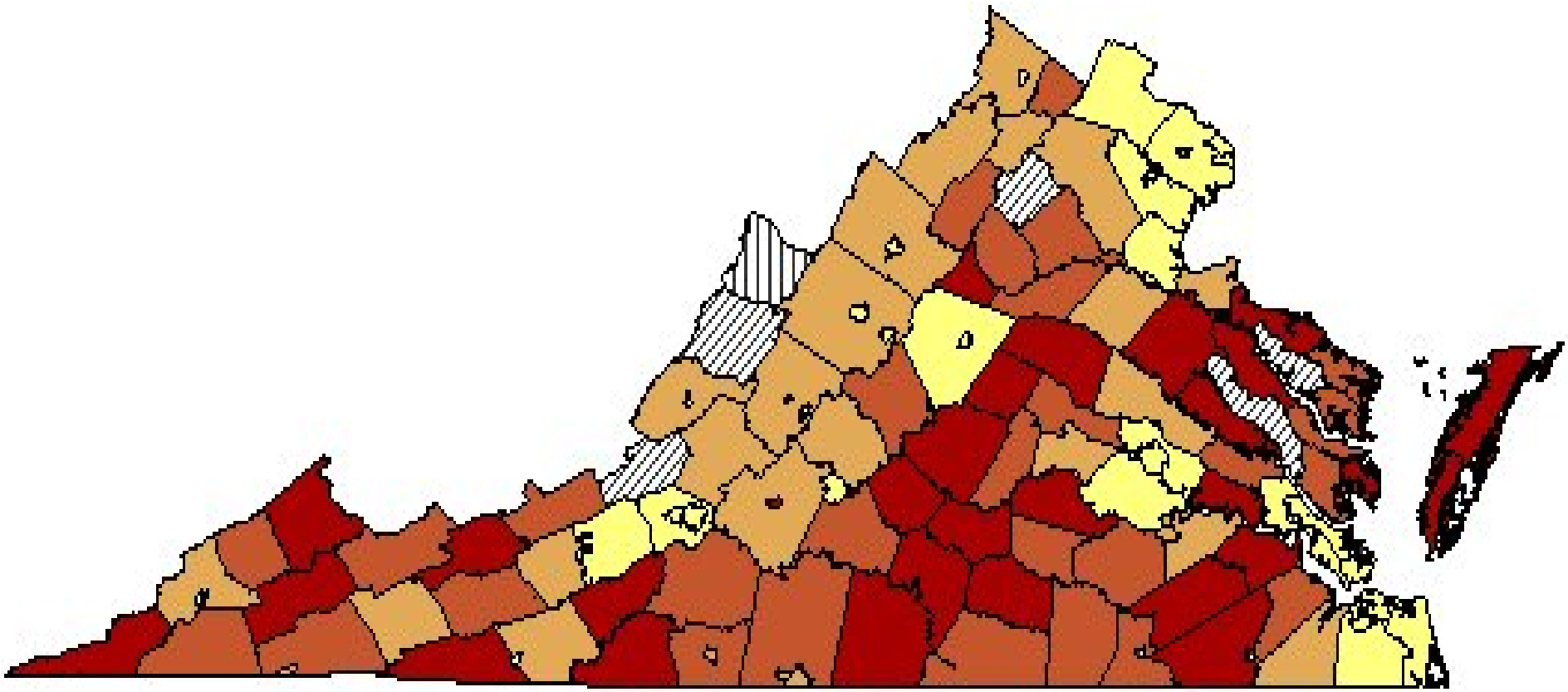
Absolute reduction of 2% (7.6%-9.5%)

0.8 times more likely to die (0.6-0.95)

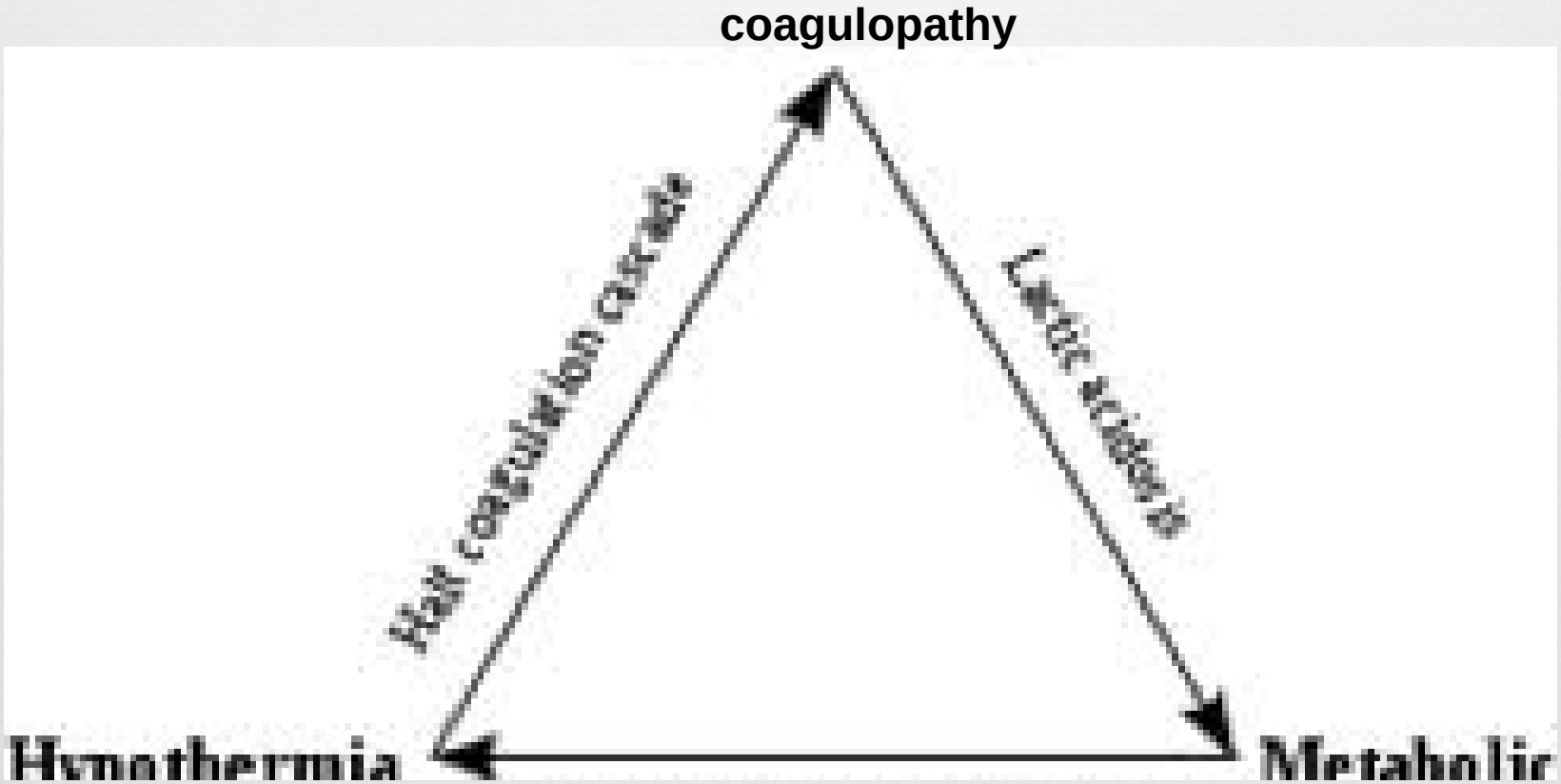
Application to rural areas

- What are some differences between Suburban vs. Rural areas
- A Major determinant of survival is proximity to trauma center
- Death maps by county





Vicious triad



Click to edit Master title style

Know Your Hospitals

Some hospitals have helpful services above their designation

MANDATORY SERVICES BASED ON DESIGNATION

Surgical specialty	Level I	Level II	Level III
Cardiac	X		
Thoracic	X	X	
Ortho	X	X	X
Pediatric	X		
Hand	X		
Replant	X		
Plastic	X	X	

MANDATORY SERVICES BASED ON DESIGNATION

Surgical Specialty	LEVEL 1	LEVEL II	LEVEL III
Maxilofacial	X	X	
Oral	X		
Optho	X	X	
OB/Gyn	X	X	
Int Rads	X	X	
Research	X		
Surgeon/ER			X

Click to edit Master title style

History of trauma triage

History of the Decision Scheme

- The American College of Surgeons-Committee on Trauma (ACS-COT) developed guidelines to designate "trauma centers" in 1976
  - Set standards for personnel, facilities, and processes necessary for the best care of injured persons

- Studies showed mortality reduction in regions with trauma centers

History of the Decision Scheme

- National consensus conference in 1987 resulted in first ACS field triage protocol, the “Triage Decision Scheme”

- The Decision Scheme serves as the basis for field triage of trauma patients in most EMS systems in the U.S.

History of the Decision Scheme

- The Decision Scheme has been revised sixtimes (1990, 1993, 1999, 2006, 2009 and 2011)

- In 2005-2006 the Centers for Disease Control and Prevention (CDC), with support from the National Highway Traffic Safety Administration (NHTSA), convened the National Expert Panel on Field Triage

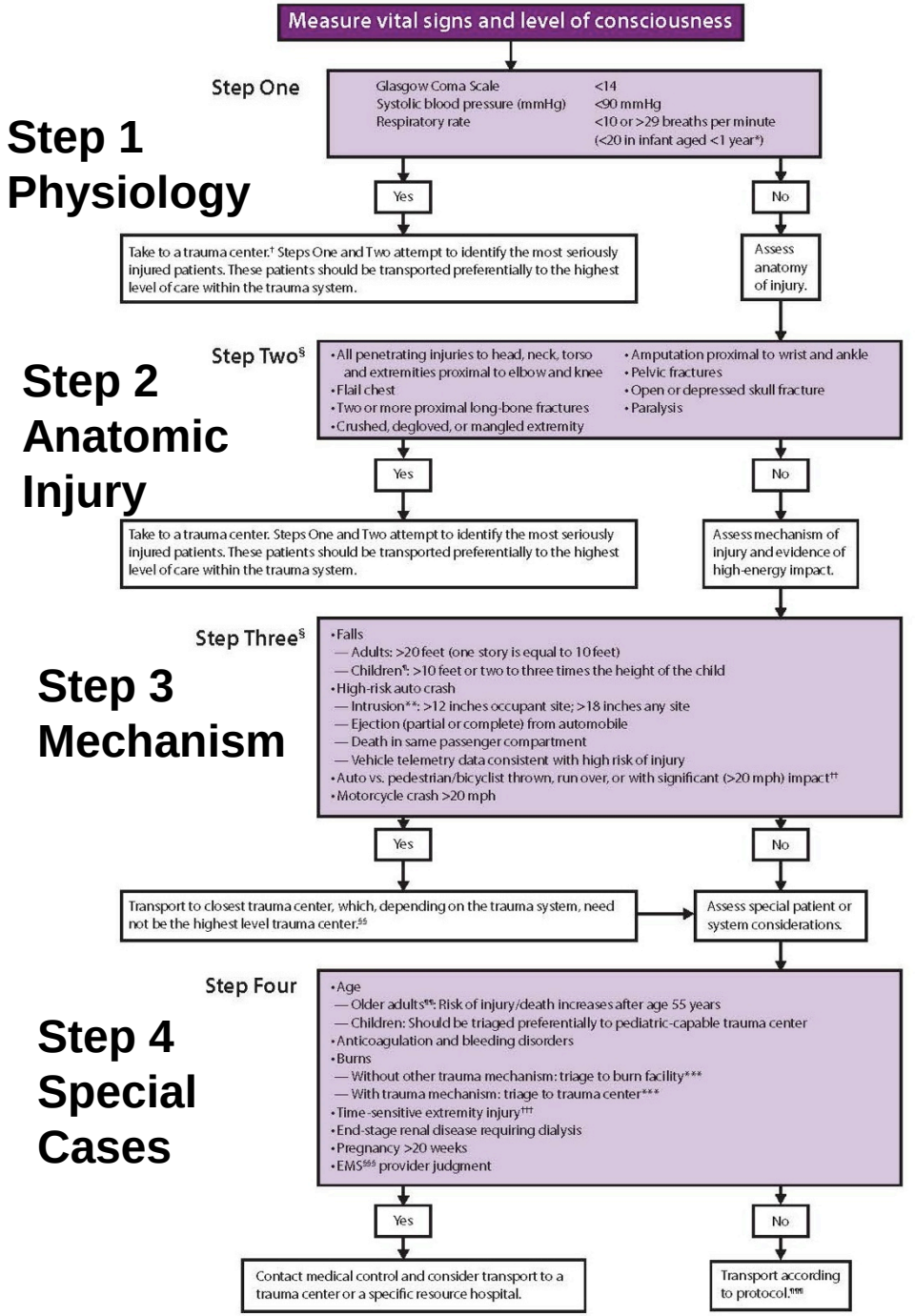
National Expert Panel on Field Triage

- Membership
  - National leadership, expertise, and contributions in the realm of injury prevention and control
- Members
  - EMS Providers and Medical Directors
  - Emergency Medicine Physicians and Nurses
  - Trauma Surgeons
  - Public Health
  - Federal Agencies
  - Automotive Industry

Click to edit Master title style

2011 Revision

Triage Scheme



Purpose

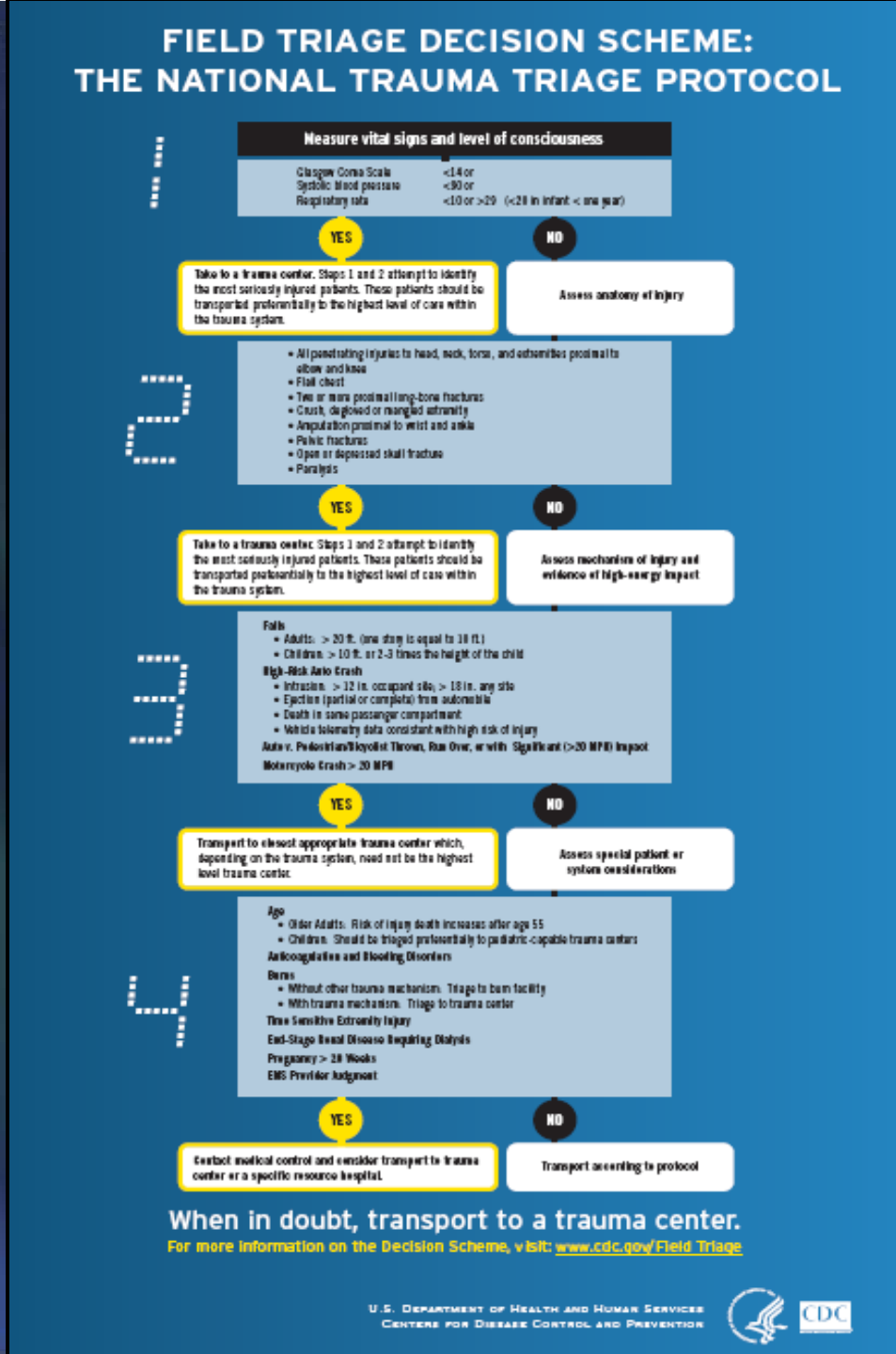
- Get the patient to the right place at the right time

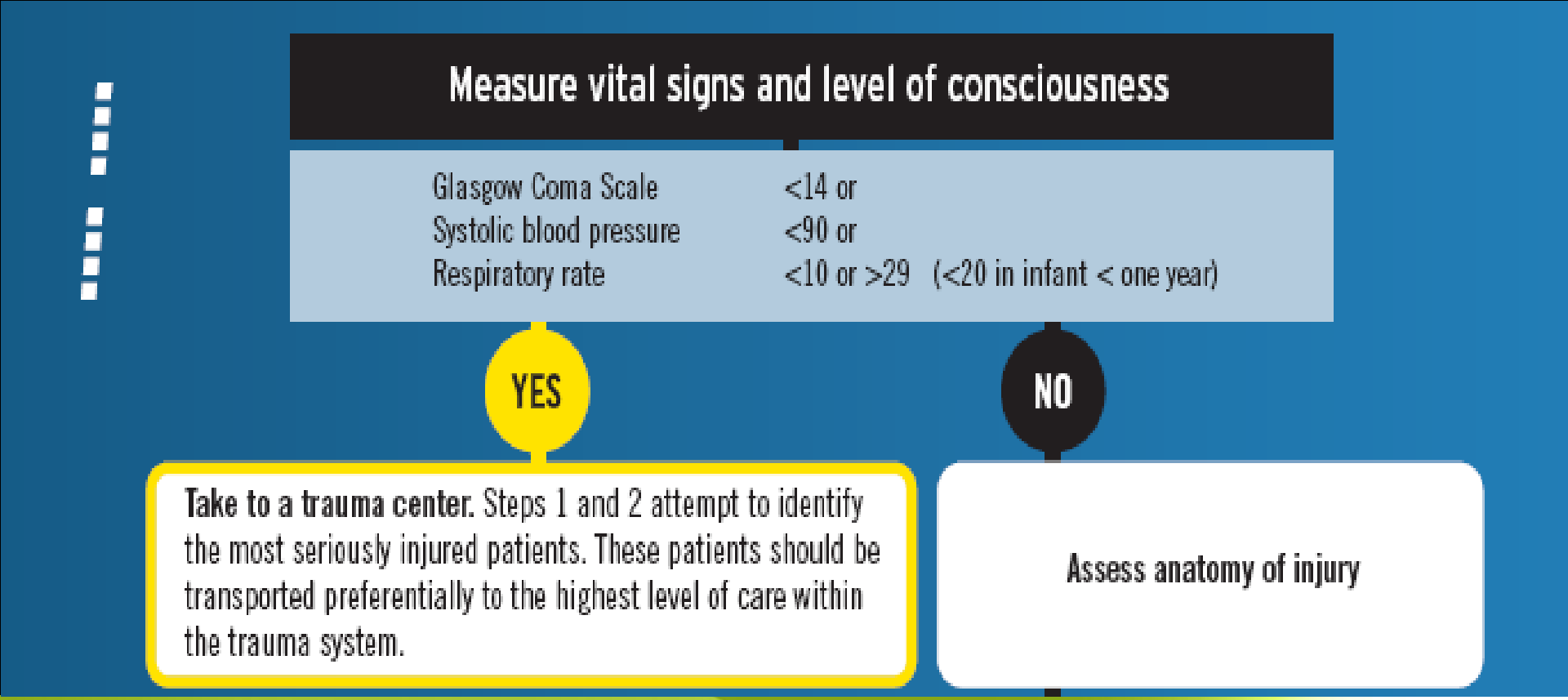
Why this Decision Scheme is Unique

- Takes into account recent changes in assessment and care of the injured patient in the U.S.

- Adds views of a broader range of disciplines and expertise into the process

Lets go through the steps: Step 1





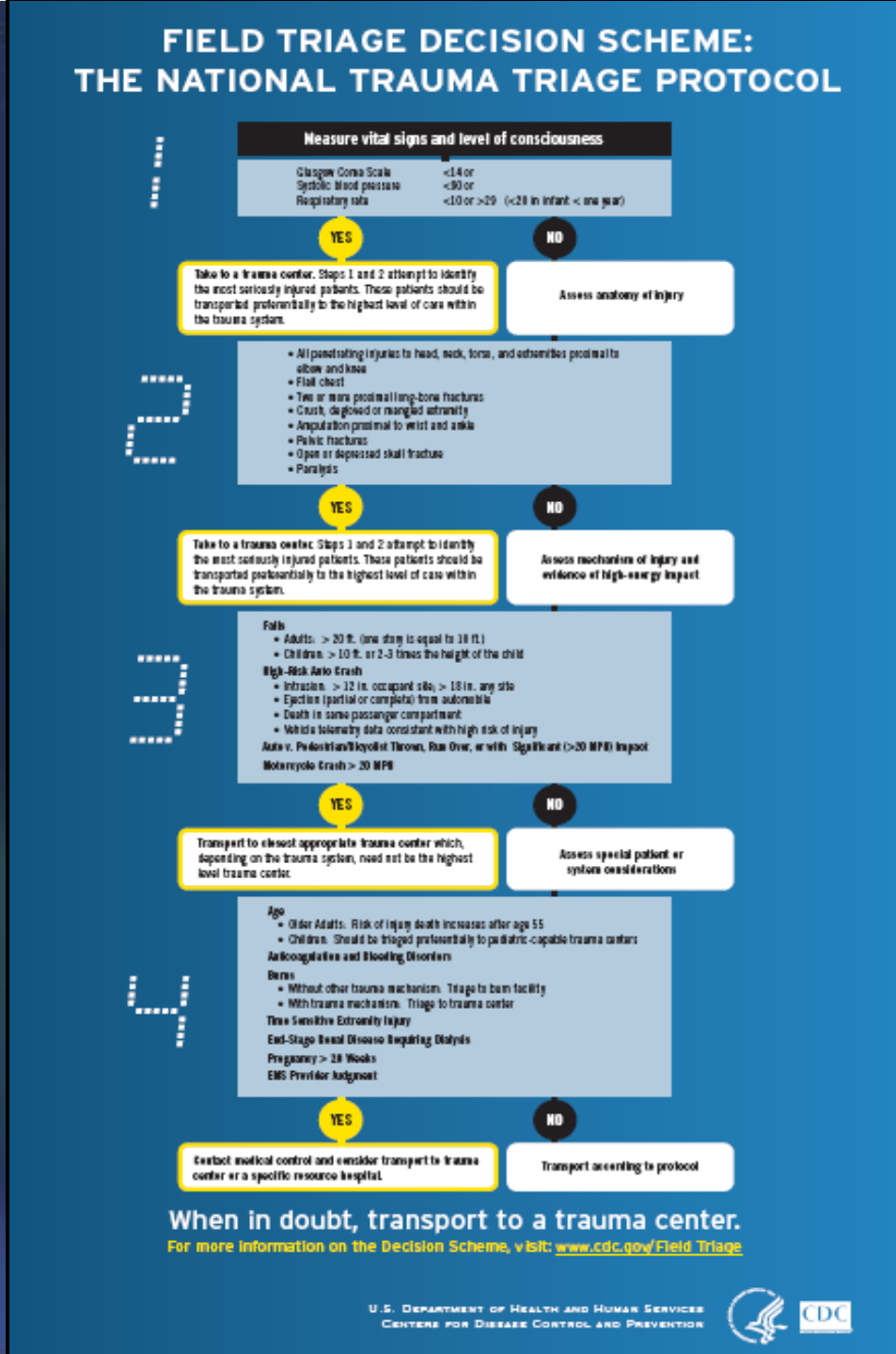
Step 1: Physiologic Criteria

Thoughts??

- What do you think about a GCS of >14?
- What do you think about blood pressure and respiratory rates?
- Respiratory Rate < 20 in infants

Step 2:

Anatomy



- All penetrating injuries to head, neck, torso, and extremities proximal to elbow and knee
- Flail chest
- Two or more proximal long-bone fractures
- Crush, degloved or mangled extremity
- Amputation proximal to wrist and ankle
- Pelvic fractures
- Open or depressed skull fracture
- Paralysis

YES

Take to a trauma center. Steps 1 and 2 attempt to identify the most seriously injured patients. These patients should be transported preferentially to the highest level of care within the trauma system.

NO

Assess mechanism of injury and evidence of high-energy impact

Step 2: Anatomic Criteria

Anatomic Injuries:

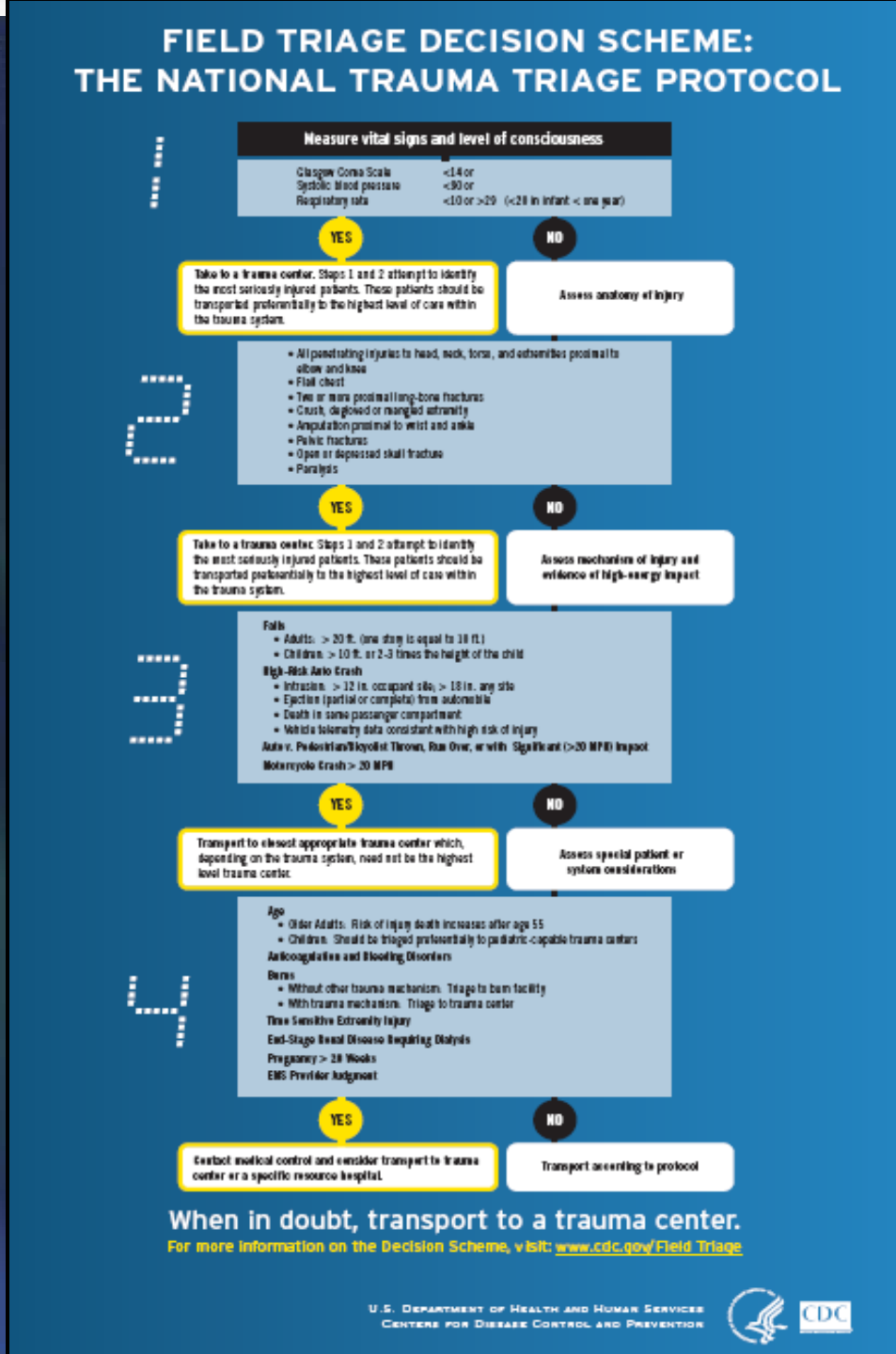
- Proximal penetrating injuries
- Penetrating neck injuries
- Flail chest (anyone ever diagnose that one?)
- Severe extremity injury (might need a specialty team)

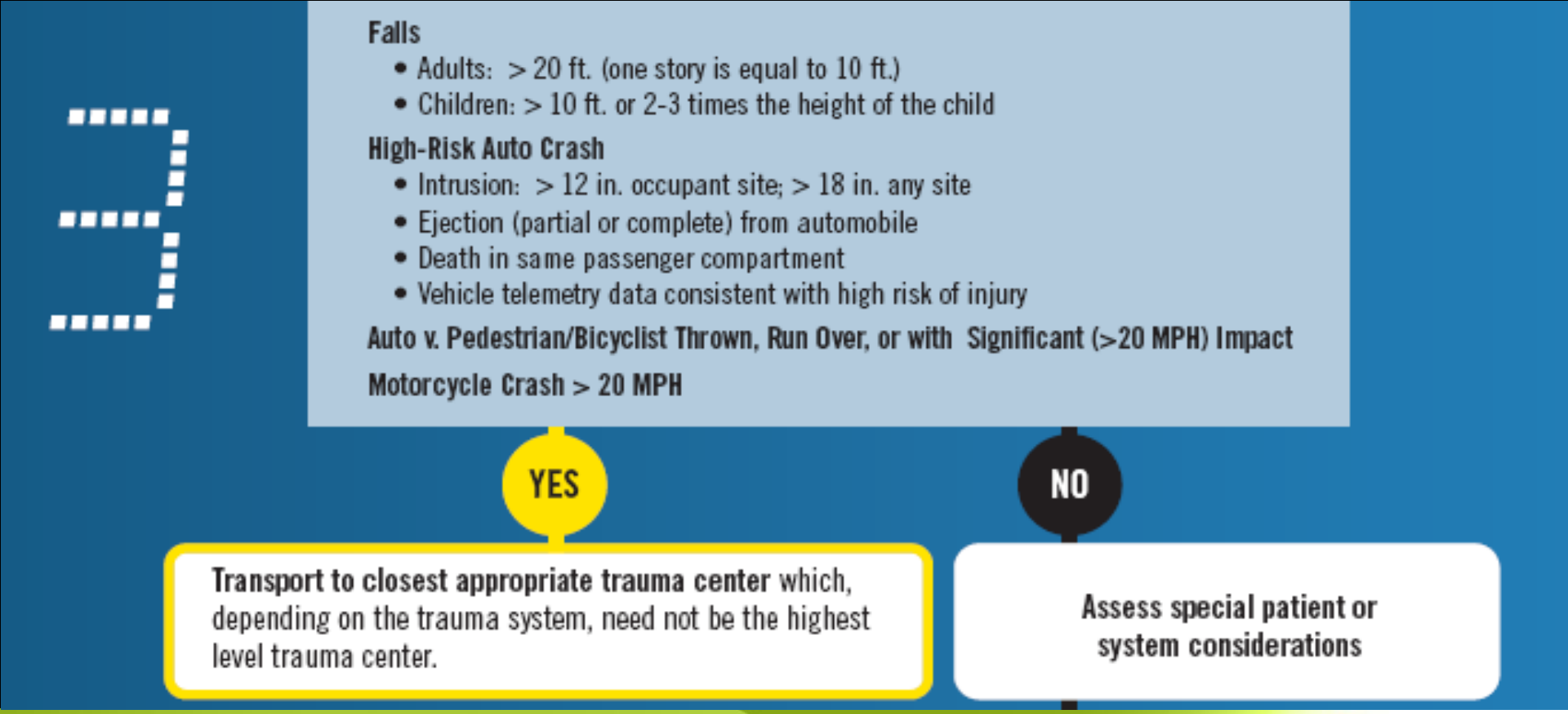
Step 2: 2006 Changes

- Added
  - Crushed, degloveding injuries, or mangled extremity

- Modified
  - "Open and depressed" changed to "open or depressed" skull fracture
- Removed
  - Burns moved to Step Four

Step 3 Mechanism





Step 3: Mechanism of Injury Criteria

Mechanism of Injury

Does not require transport to Level I or Level II center.

Step 3: 2006 Changes

- Modified
  - Falls:
    - Adults: >20 feet (one story = 10 feet)
    - Children: >10 feet, or 2–3 times the child's height
  - "High speed auto crash" was changed to "high-risk auto crash"

Step 3: 2006 Changes

- Modified
  - Intrusion modified to >12 inches at occupant site or >18 inches at any site into the passenger compartment
  - Auto-pedestrian/struck/auto-bicycle injury changed to "Auto v. pedestrian/bicyclist thrown, run over, or with significant (>20mph) impact"

- Motorcycle crash shortened to "Motorcycle crash >20mph"

Step 3: 2006 Changes

- Removed
  - Rollover crash
  - Extrication time >20 minutes
  - Crush depth
  - Vehicle deformity >20 inches and vehicle speed >40 mph

Step 3: 2006 Changes

- Added
  - Vehicle telemetry data consistent with high risk of injury

Age

- Older Adults: Risk of injury death increases after age 55
- Children: Should be triaged preferentially to pediatric-capable trauma centers

Anticoagulation and Bleeding Disorders

Burns

- Without other trauma mechanism: Triage to burn facility
- With trauma mechanism: Triage to trauma center

Time Sensitive Extremity Injury

End-Stage Renal Disease Requiring Dialysis

Pregnancy > 20 Weeks

EMS Provider Judgment

YES

Contact medical control and consider transport to trauma center or a specific resource hospital.

NO

Transport according to protocol

Step 4: Special Considerations

Step 4: 2006 Changes

- Added
  - Time-sensitive extremity injuries
  - End stage renal disease requiring hemodialysis
  - EMS Provider judgment

Step 4: 2006 Changes

- Burns
  - Moved to Step 4 (from step 2)
  - Traumatic injuries got to trauma centers
  - Burn center care is secondary to trauma center care

Step 4: 2006 Changes

- Modified
  - Age
    - Older adults: Risk of injury/death increases after age 55
    - Children: Should be triaged preferentially to pediatric capable trauma centers (age 15)

- Pregnancy changed to read “Pregnancy greater than 20 weeks”

Click to edit Master title style

Case 1

Fall

Fall – you are a BLS crew

- 3 year old falls from the top of the slide at the play ground (9 ft)
- On arrival pt is quiet, looking about, clinging to mother.
- RR 36, SBP = 94, HR = 140

Fall – you are a BLS crew

- 15 min from a low volume ER
- 25 min from a Level II center
- 45 min from a Level I center

Click to edit Master title style

Case 2

Isolated Head Injury

Head Injury

- 26 yo man
- Struck in head with baseball (didn't move fast enough).
- Bystanders report + LOC
- Normal vitals

Head Injury

- You are 5 min from a small ER (with CAT Scan)
- You are 15 min from a Level II (no neurosurgery)
- You are 90 min from a Level I
- What do you think?
- ALS? BLS?

Click to edit Master title style

Case 3

Motor Vehicle Crash

Motor Vehicle Crash

- 65 yo man
- T-bone
- Trapped
- P=90, R=8 (sonorus), Palpable Brachials
- No purposeful movements

Motor Vehicle Crash

- You are 15 min from Small ER
- You are 50 min from Level II
- You are 30 min from Level II without neurosurgical services
- Sorry, it is raining hard
- BLS approach?
- ALS approach?

Click to edit Master title style

Case 4

Gunshot Wound

GSW

- 17 year old shot in the chest
- 85/60, P=140, GCS=15
- Symmetric breath sounds, wound is in left chest at the inferior costal margin (near the spleen)

GSW

- You are in a city
- 20 minutes to Level I
- 5 minutes to Level II

GSW

- Same patient
- Now you are:
  - Now you are in the woods
  - Level one is 40 min by air which is 10 minutes out
  - Small ER is 10 minutes away
  - Level III is 20 min away

Burn

- 40 year old working and McDonald's
- Spills grease on herself
- Full thickness burns on both legs and lower abdomen ≈ 30% BSA
- 160/90, R=28, P=120

BURN

- 20 min to Level I without a burn center
- 90 min by air to Burn Center that is a Level III in another city

Click to edit Master title style

Discussion