



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**

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Objectives

- Review the importance of accurate Field Triage in Trauma Care
- Review the history of the American College of Surgeons Field Triage Decision Scheme
- Discuss the changes in the 2006 Field Triage Decision Scheme
- Review CDC educational initiatives for the 2006 Field Triage Decision Scheme



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Recommendations and Reports

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Guidelines for Field Triage of Injured Patients Recommendations of the National Expert Panel on Field Triage



INSIDE: Continuing Education Examination

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION

10 Leading Causes of Death by Age Group, United States—2004

Rank	Age Groups										All Ages
	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	
1	Congenital Anomalies 5,622	Unintentional Injury 1,641	Unintentional Injury 1,126	Unintentional Injury 1,540	Unintentional Injury 15,449	Unintentional Injury 13,032	Unintentional Injury 16,471	Malignant Neoplasms 49,520	Malignant Neoplasms 96,956	Heart Disease 533,302	Heart Disease 652,486
2	Short Gestation 4,642	Congenital Anomalies 569	Malignant Neoplasms 526	Malignant Neoplasms 493	Homicide 5,085	Suicide 5,074	Malignant Neoplasms 14,723	Heart Disease 37,556	Heart Disease 63,613	Malignant Neoplasms 385,847	Malignant Neoplasms 553,888
3	SIDS 2,246	Malignant Neoplasms 399	Congenital Anomalies 205	Suicide 283	Suicide 4,316	Homicide 4,495	Heart Disease 12,925	Unintentional Injury 16,942	Chronic Low. Respiratory Disease 11,754	Cerebro-vascular 130,538	Cerebro-vascular 150,074
4	Maternal Pregnancy Comp. 1,715	Homicide 377	Homicide 122	Homicide 207	Malignant Neoplasms 1,709	Malignant Neoplasms 3,633	Suicide 6,638	Liver Disease 7,496	Diabetes Mellitus 10,780	Chronic Low. Respiratory Disease 105,197	Chronic Low. Respiratory Disease 121,987
5	Unintentional Injury 1,052	Heart Disease 187	Heart Disease 83	Congenital Anomalies 184	Heart Disease 1,038	Heart Disease 3,163	HIV 4,826	Suicide 6,906	Cerebro-vascular 9,966	Alzheimer's Disease 65,313	Unintentional Injury 112,012
6	Placenta Cord Membranes 1,042	Influenza & Pneumonia 119	Chronic Low. Respiratory Disease 46	Heart Disease 162	Congenital Anomalies 483	HIV 1,468	Homicide 2,984	Cerebro-vascular 6,181	Unintentional Injury 9,651	Diabetes Mellitus 53,956	Diabetes Mellitus 73,138
7	Respiratory Distress 875	Septicemia 84	Benign Neoplasms 41	Chronic Low. Respiratory Disease 74	Cerebro-vascular 211	Diabetes Mellitus 599	Liver Disease 2,799	Diabetes Mellitus 5,567	Liver Disease 6,569	Influenza & Pneumonia 52,760	Alzheimer's Disease 65,965
8	Bacterial Sepsis 827	Perinatal Period 61	Septicemia 38	Influenza & Pneumonia 49	HIV 191	Cerebro-vascular 567	Cerebro-vascular 2,361	HIV 4,422	Suicide 4,011	Nephritis 35,105	Influenza & Pneumonia 59,664
9	Neonatal Hemorrhage 616	Benign Neoplasms 53	Cerebro-vascular 34	Benign Neoplasms 43	Influenza & Pneumonia 185	Congenital Anomalies 420	Diabetes Mellitus 2,026	Chronic Low. Respiratory Disease 3,511	Nephritis 3,963	Unintentional Injury 35,020	Nephritis 42,480
10	Circulatory System Disease 593	Chronic Low. Respiratory Disease 48	Influenza & Pneumonia 33	Cerebro-vascular 43	Chronic Low. Respiratory Disease 179	Septicemia 328	Influenza & Pneumonia 891	Septicemia 2,251	Septicemia 3,745	Septicemia 25,644	Septicemia 33,373

WISQARS™ Produced By: Office of Statistics and Programming, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention

Data Source: National Center for Health Statistics (NCHS), National Vital Statistics System

Source: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System. Ten Leading Causes of Death, 1999-2004.

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.,
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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.



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 four times (1990, 1993, 1999, 2006)
- 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

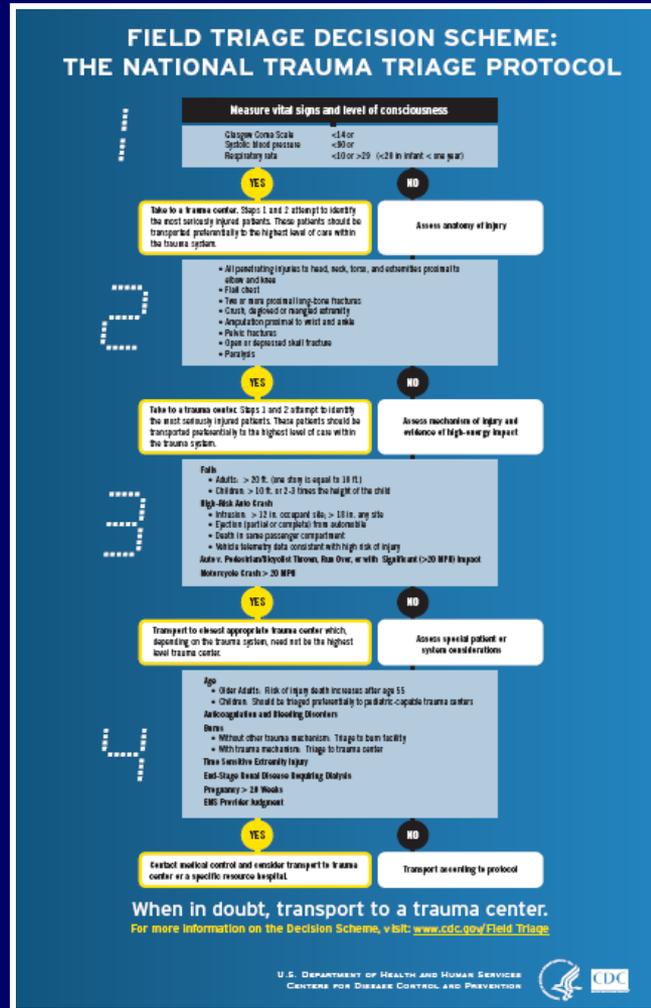
- EMS Providers and Medical Directors
- Emergency Medicine Physicians and Nurses
- Trauma Surgeons
- Public Health
- Federal Agencies
- Automotive Industry



National Expert Panel on Field Triage

- The role of the Expert Panel is to:
 - Periodically review the Decision Scheme
 - Ensure criteria are consistent with existing evidence
 - Ensure criteria are compatible with advances in technology
 - Make necessary recommendations for revision

2006 Decision Scheme





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



Purpose

- This Decision Scheme was revised to facilitate more effective triage and better match trauma patients' conditions with the medical facility best equipped to treat them



Specific Changes to the Field Triage Decision Scheme



Step 1: Physiologic Criteria

Measure vital signs and level of consciousness

Glasgow Coma Scale	<14 or
Systolic blood pressure	<90 or
Respiratory rate	<10 or >29 (<20 in infant < one year)

YES

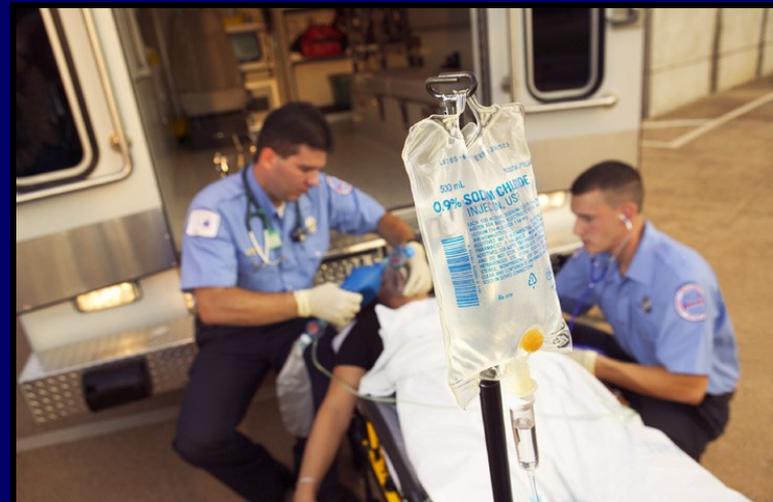
Take to a trauma center. Steps 1 and 2 attempt to identify the most seriously injured patients. These patients should be transported preferentially to the highest level of care within the trauma system.

NO

Assess anatomy of injury

Step 1: 2006 Changes

- Added
 - A threshold for respiratory rate (<20 bpm) in infants
- Removed
 - Revised Trauma Score



Step 2: Anatomic Criteria



- 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: 2006 Changes

- Added
 - Crushed, degloved, or mangled extremity
- Modified
 - “Open and depressed” changed to “open or depressed” skull fracture
- Removed
 - Burns moved to Step Four



Step 3: Mechanism of Injury Criteria



Falls

- Adults: > 20 ft. (one story is equal to 10 ft.)
- Children: > 10 ft. or 2-3 times the height of the child

High-Risk Auto Crash

- Intrusion: > 12 in. occupant site; > 18 in. any site
- Ejection (partial or complete) from automobile
- Death in same passenger compartment
- Vehicle telemetry data consistent with high risk of injury

Auto v. Pedestrian/Bicyclist Thrown, Run Over, or with Significant (>20 MPH) Impact
Motorcycle Crash > 20 MPH

YES

Transport to closest appropriate trauma center which, depending on the trauma system, need not be the highest level trauma center.

NO

Assess special patient or system considerations



Step 3: 2006 Changes

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

Time Out

- What is vehicle telemetry?
 - Combination of telematics and computing
 - Integration of vehicle's electrical architecture, cellular communication, GPS systems, and voice recognition
 - Can notify of exact location of crash
 - Can enable communication with occupants
 - Can provide key injury information to providers regarding force, mechanics, and energy of a crash that may help predict severity of injury



Step 3: 2006 Changes

■ Modified

- Intrusion modified to >18 inches at any site
- 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 4: Special Considerations

4

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 Four: 2006 Changes

■ Added

- Burns (moved from Step Two)
- Time-sensitive extremity injuries
- End stage renal disease requiring hemodialysis
- EMS Provider judgment



Step Four: 2006 Changes

- Modified

- Age

- Older adults: Risk of injury/death increases after age 55

- Children: Should be triaged preferentially to pediatric capable trauma centers

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



Step Four: 2006 Changes

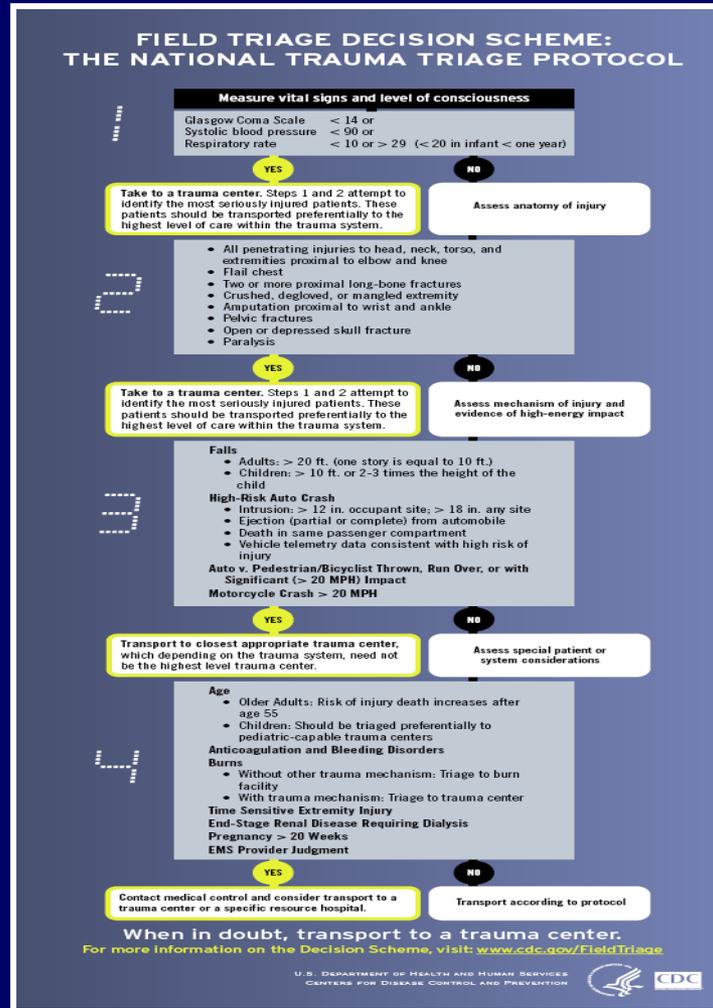
- Removed
 - Cardiac and respiratory disease
 - Diabetes Mellitus
 - Morbid obesity
 - Immunosuppression
 - Cirrhosis





Resources for EMS Providers

Tool Kit for Implementation



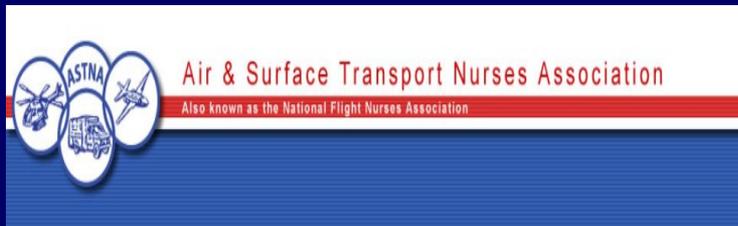


CDC Educational Initiative

- CDC, in collaboration with partners and experts, has developed:
 - EMS leader's guide to the revised Decision Scheme
 - Decision Scheme poster and pocket-sized reference card
 - *Morbidity and Mortality Weekly Report (MMWR)* article, "Guidelines for Field Triage of Injured Patients, Recommendations of the National Expert Panel on Field Triage"
 - Contains continuing education credits



Endorsing Organizations





With concurrence from the National Highway Traffic Safety Administration



References

1. National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System. Ten Leading Causes of Death, 1999-2004.
2. MacKenzie EJ, Rivara FP, Jurkovich GJ, Nahens AB, Frey KP, Egleston BL, Salkever DS, Scharfstein DO. A national evaluation of the effect of trauma-center care on mortality. *N Engl J Med*. 2006 Jan 26; 354(4):366-78.
3. Centers for Disease Control and Prevention. Guidelines for Field Triage of Injured Patients, Recommendations of the National Expert Panel on Field Triage. *MMWR* 2009; 58 (1): 1-35.



**For more information or to order or
download materials, visit:**

www.cdc.gov/FieldTriage

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