



# The Trauma Activation Review Committee: Response to undertriage during a period of rapid growth at a Level II trauma center

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## Purpose

The objective of this study was to evaluate the rapid growth over eight years at our level 2 trauma center. Specific attention was paid to under and overtriage rates during the same time.

## Background

- The American College of Surgeons Committee on Trauma (ACS COT) created national guidelines of physiologic and mechanistic triage criteria to mobilize a full trauma team for the sickest patients
- Undertriage: where a patient can potentially decompensate worse outcomes due to delays in care, rate should be no more than 5%
- Overtriage: patient was misidentified, fully activated and is not sick, adding cost and wastes resources. Acceptable rate 25-35%
- Our region underwent a period of rapid expansion and growth especially in the elderly population

## Trauma Activation Criteria Changes

### 2011: Trauma 1

- GCS <8, potential for multiple injuries
- Airway compromise

### 2019 Trauma 1

- GCS <9 + trauma mechanism or deterioration by 2 in pts <15YO
- Intubated pre-hospital
- Age 65YO or older (<110 systolic)

### 2019 Trauma 2:

- Added - Consider activation for pts 65YO > w/ trauma mechanism (other than ground level falls – including falls from chair, bed wheelchair/toilet)

## Methods

### Patient Population

- Two time periods (Jan 1, 2011 - Dec 30, 2011 and Jan 1, 2019 - Dec 30, 2019) of trauma registry data at a single rural Level 2 trauma center were reviewed.
- Two-tier approach to trauma team activations, changes in activation criteria were made between the periods to respond to rapid growth and minimize potential undertriage

### Triage Criteria

- Overtriage = number of activations with injury severity score (ISS) <15 divided by total activations. (ISS/# activations)
- Undertriage: # of pts with an ISS >15 with no activation divided by total number of non-activated patients, minus direct admits.
- TARC (Trauma Activation Review Committee) reviewed the process between study period with improvement and ED staff to review all trauma activations for adherence.

Table 1. Trauma I and II comparison across years.

| Year                    | 2011                    |                         |        | 2019                    |                         |        |
|-------------------------|-------------------------|-------------------------|--------|-------------------------|-------------------------|--------|
| Trauma Level            | I (N = 183)             | II (N = 117)            | P      | I (N = 450)             | II (N = 585)            | P      |
| Age                     | 35.63 (17.76)           | 41.71 (17.60)           | 0.004  | 45.86 (23.01)           | 53.55 (23.92)           | <0.001 |
| ISS                     | 13.00 [5.00, 22.00]     | 9.00 [5.00, 14.00]      | 0.011  | 10.00 [5.00, 22.00]     | 5.00 [1.00, 10.00]      | <0.001 |
| Hospital Days           | 5.00 [1.00, 12.00]      | 4.50 [2.00, 9.00]       | 0.658  | 3.00 [1.00, 10.00]      | 1.00 [1.00, 4.00]       | <0.001 |
| Ventilator Days         | 1.00 [0.00, 3.00]       | 0.00 [0.00, 0.00]       | <0.001 | 3.00 [2.00, 7.00]       | 1.00 [0.00, 2.50]       | <0.001 |
| ICU Days                | 1.00 [0.00, 5.00]       | 0.00 [0.00, 2.00]       | <0.001 | 3.00 [2.00, 8.00]       | 2.00 [1.00, 4.00]       | <0.001 |
| Injury Type (%)         |                         |                         |        |                         |                         |        |
| Blunt                   | 118 (65.6)              | 97 (85.1)               |        | 338 (75.1)              | 467 (79.8)              |        |
| Burn                    | 0 (0.0)                 | 6 (5.3)                 |        | 4 (0.9)                 | 15 (2.6)                |        |
| Penetrating             | 62 (34.4)               | 11 (9.6)                | <0.001 | 103 (22.9)              | 103 (17.6)              | 0.005  |
| Probability of Survival | 0.94 [0.48, 0.99]       | 0.99 [0.97, 0.99]       | <0.001 | 0.97 [0.70, 0.99]       | 0.98 [0.97, 0.99]       | <0.001 |
| ED GCS                  | 11.00 [3.00, 15.00]     | 15.00 [15.00, 15.00]    | <0.001 | 14.00 [3.00, 15.00]     | 15.00 [15.00, 15.00]    | <0.001 |
| ED Systolic BP          | 120.00 [100.00, 147.50] | 130.00 [116.00, 148.00] | 0.008  | 120.00 [100.00, 140.00] | 138.00 [122.00, 152.00] | <0.001 |
| Discharge Home (%)      | 72 (40.0)               | 60 (52.6)               | 0.045  | 227 (50.4)              | 397 (67.9)              | <0.001 |
| Discharge Rehab (%)     | 33 (18.3)               | 18 (15.8)               | 0.687  | 57 (12.7)               | 33 (5.6)                | <0.001 |
| Mortality (%)           | 40 (22.2)               | 3 (2.6)                 | <0.001 | 82 (18.2)               | 8 (1.4)                 | <0.001 |

## Results

### 2011

- 300 activated trauma pts --> 183 (61%) Trauma 1
- Overtriage: 23%
- Undertriage 3.7%

### 2019

- 1035 activated trauma pts --> 450 (43%) Trauma 1
- Overtriage 20.5%
- Undertriage 2.2%

- Trauma I patients both years were younger, more injured, and stayed in the hospital and ICU longer  
 - Blunt trauma predominated for both years  
 - Mortality decreased over time  
 - Comparisons except hospital days and discharge to rehab for the 2011 cohort were statistically significant.

## Conclusions

Using evaluations and a committee to review overtriage and undertriage for feedback to the providers and staff making pre-hospital or ER triage decisions can improve patient outcomes even while a trauma center is experiencing a period of rapid growth.

## Limitations

This was a single institution study. A larger multicenter investigation would allow for elimination of locoregional factors. Different trauma triage criteria could also exist for other centers and states, this could also affect overtriage and undertriage rates.

Disclosures: None

