



## NOTS 2012 Annual Report

right patient, right place, right time

# NOTS 2012 Annual Report

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It is with great pleasure to present our **2012** Annual Report which highlights the activities of the Northern Ohio Trauma System in 2010 and 2011. We are very proud and delighted to demonstrate an improvement in mortality across the region.

This success is the result of collaboration between two large, exceptional systems. The MetroHealth System and the Cleveland Clinic have collaborated to provide care to trauma patients across the region.

A key to the success are the numerous EMS personnel who work hard every day to care for injured patients. We are also excited to have our second annual Trauma Symposium on October 12-13, 2012, which we look forward to seeing you all there.

A handwritten signature in blue ink, appearing to read 'JAC', written over a light blue background.

Jeffrey A. Claridge, MD, MS, FACS

#### The mission of NOTS is:

**To provide the highest quality of care to patients across the region by rigorously evaluating and improving outcomes, optimizing resources, and providing education across the region utilizing a collaborative approach with hospitals, emergency medical services, and the public health services.**

#### 2011-2012 GOALS:

- Develop and implement regional trauma **Protocols**.
- Develop a robust regional **Database** for monitoring quality and research initiatives.
- Develop continuing **Education and Training** programs.
- Monitor regional **Outcomes and Protocol Compliance**.
- Review and recommend **Resources** to appropriately treat trauma patients throughout NOTS.
- Improve transfer and storage of **Radiographic** material.
- Develop a **Web Page** for communication and dissemination of NOTS issues.
- Utilize **MetroHealth Flight Control Operations** (FCO) to serve as the regional coordination agency for trauma triage.

# Why It's Important to Have a Trauma System



# Trauma System

A trauma system is a pre-planned, comprehensive, and coordinated network that includes all facilities with the capability to care for the injured. It's the system's inclusiveness, or range of pre-planned trauma center and non-trauma center resource allocation, that offers the public a cost-effective plan for injury treatment.

A primary strategy of the public health approach is to identify a problem based on data, devise and implement an intervention, and evaluate the outcome.

Cities with a comprehensive trauma system have experienced:

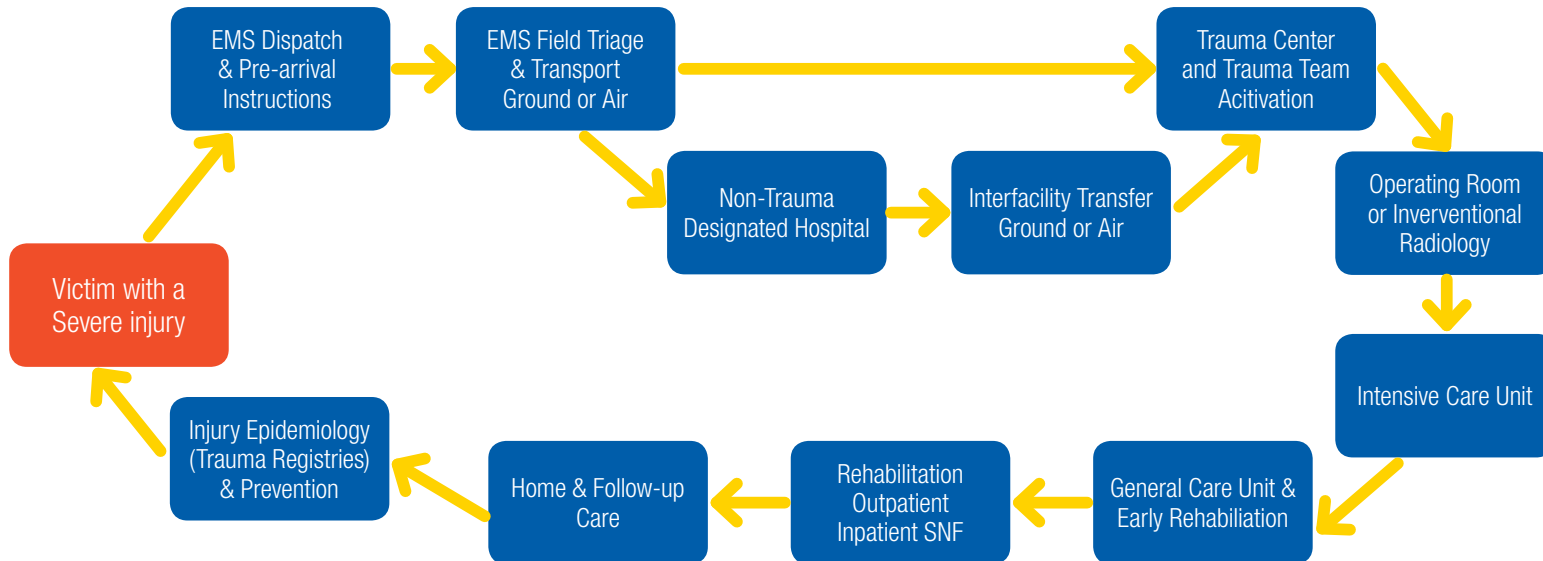
- A 9% decrease in motor vehicle crash deaths.
- A 15-20% increase in the survival rates of seriously injured patients.
- An increase in productive working years.

Facilities within our system consist of hospitals who underwent an extensive review process by the American College of Surgeons to ensure each facility provides an organized and systemic approach to the care of the injured patient.



# Trauma System Model

**Injury** is the leading cause of death during the first four decades of life, and among the top 10 causes in all decades. Trauma systems are essential to combat the injury epidemic across our region.



# Research and Quality

A major goal of NOTS is to practice evidence-based medicine. To accomplish this goal, NOTS is building a comprehensive data repository to serve as the basis for research and quality initiatives. Data is being collected from EMS agencies, hospitals and the Medical Examiner's office. Research has focused on EMS triage and transport, treatment for blunt injuries to the spleen, the implications of repeated diagnostic imaging, medical informatics and trauma recidivism. In addition to research activity, NOTS will monitor all present and future protocols for quality and protocol compliance.

The NOTS team has received two grants from the State of Ohio:

1) *Trauma Bands: The link between EMS and Trauma Repositories* and  
2) *Right Patient, Right Place, Right Time: Prospective Validation of a Revised EMS Triage Protocol*. The first grant focused on the development of the NOTS Trauma Band and its use as a unique identifier in linking EMS data to hospital data. The second grant will focus on the NOTS revised protocol for scene triage.

## **Dr. Michael Nowak**

Northern Ohio Trauma System,  
Regional Data Manager



## Each day of work brings its own unique set of situations; however,

Sometimes it is life altering, lifesaving, and unforgettable.

Sometimes it is praised, appreciated, and respected.

Sometimes it is not understood, remembered or noticed.

**Regardless, it is always challenging.**





Welcome to the Northern Ohio Trauma System  
**Open for Business – 24/7**

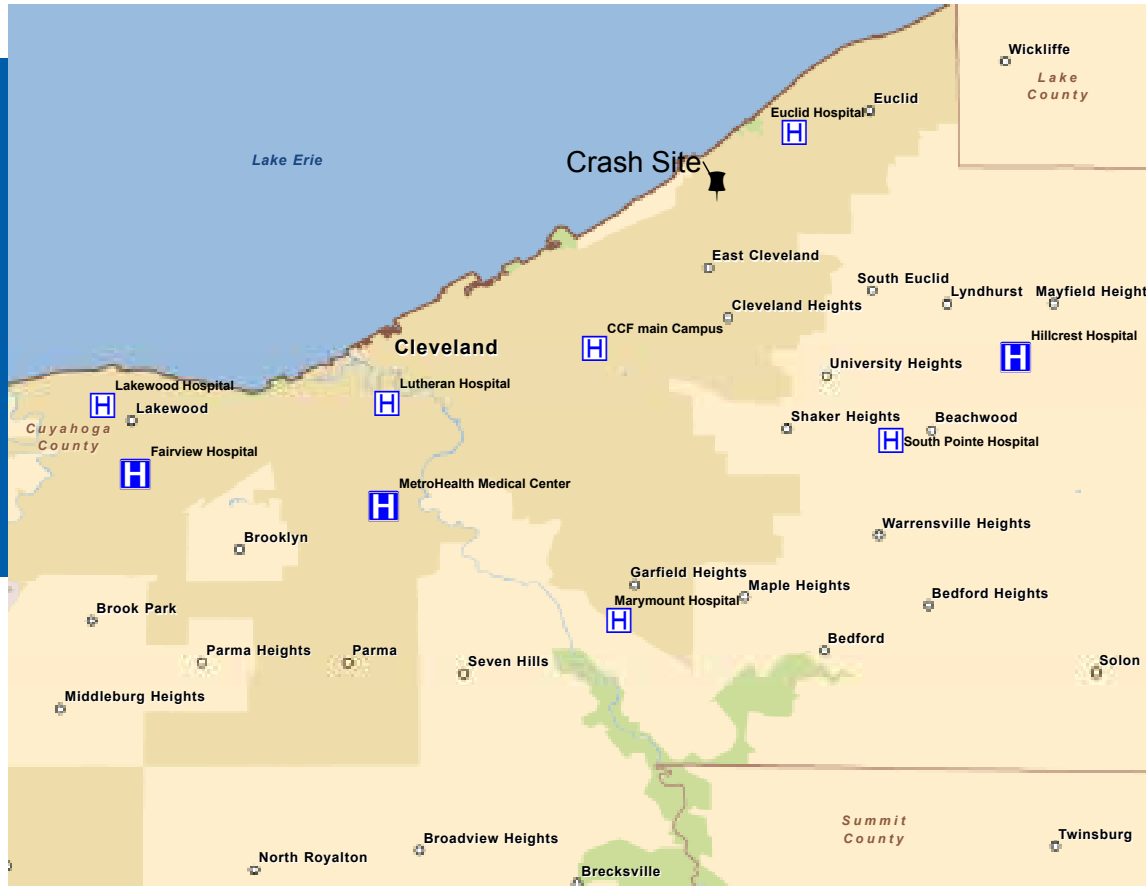


6:03 AM

On a cold, rainy Saturday morning, EMS receives a 911 call; a car ran a red light on the east side of Cleveland, hit a pole and flipped over. There are three victims in the car.

# Mapping the Crash Site

NOTS is working to map every crash site across the region, and link it to the hospital record.





6:09 AM

EMS arrives on the scene. A 27-year-old female is walking around the car crying and holding her left arm. In the front seat, on the passenger side, a 24-year-old male holds his abdomen in pain; awake, but dazed. The driver of the car was not as lucky. He was not wearing his seatbelt; he is unconscious with serious head and facial injuries.



# Motor Vehicles Crashes

Motor vehicle crashes continue to be the leading cause of death in ages 5-34 and carry a huge economic impact. In Ohio, total crash-related death costs in one year equal \$1.23 billion dollars.

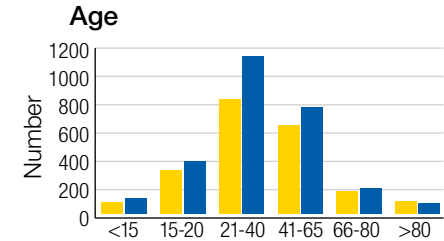
In the NOTS geographic area, 42.7% of motor vehicle crashes are in the age group of 21-40, with males 52.8% vs. females at 47.2%. Statistically, you are more likely to be involved in a motor vehicle crash on a Friday at 1700, than any other day/time of the week.

The United Nations General Assembly has proclaimed 2011 to 2020 as the Decade of Action for Road Safety.

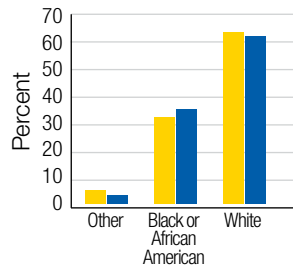
Ohio has taken action by following evidence-based strategies that are proven to save lives and money:

- Primary enforcement seat belt law that covers all seating positions.
- Comprehensive graduated drivers licensing (GDL).
- Universal motorcycle helmet law that requires all riders to wear helmets under 18 years of age and for novice riders.
- Banning of texting while driving — effective August 31, 2012.

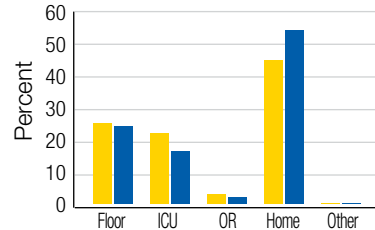
2010  
2011



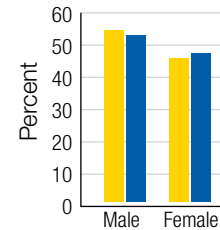
## Race



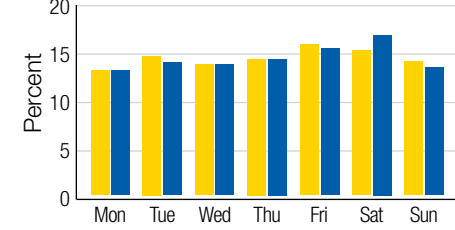
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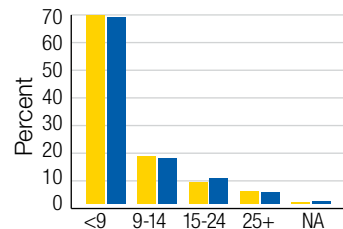
## Sex



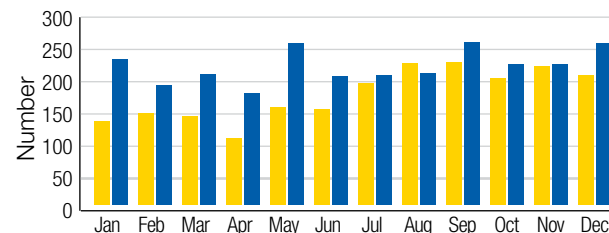
## Day



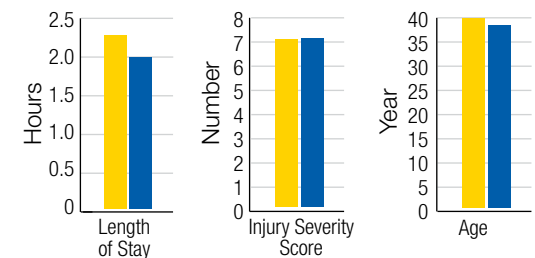
## ISS Group



## Month



## Averages/Means



Inclusion Criteria: Includes all patients treated for an MVC at NOTS Trauma Centers in 2010 & 2011.



6:12 AM

Using the NOTS Triage Protocol, EMS personnel determined the first victim should be transported to the closest Emergency Department. The patient is transported to Cleveland Clinic — Euclid Hospital's Emergency Department.

# NOTS Scene Triage Protocol

The NOTS Protocol Subcommittee, in conjunction with the NOTS EMS Subcommittee, developed a trauma scene triage protocol.

The protocol was adapted from CDC Field Triage guidelines, State of Ohio EMS Field Triage guidelines and with input from NOTS committees and members.

Thomas E. Collins, MD, FACEP, MetroHealth, and Donald Spaner, MD, Cleveland Clinic, are co-chairmen of the NOTS EMS Committee.



## Adult (> 16 years old) Field Triage Decision Trauma Triage Protocol

### Step 1. Measure vital signs and level of consciousness of patient with a traumatic mechanism

- Glasgow Coma Scale < 12 with a traumatic mechanism
- Systolic blood pressure < 90 mmHg or
- Respiratory rate < 10 or > 29 breaths/minute or requiring airway/ventilatory support

YES

Take to a trauma center. These patients should be transported preferentially to the highest level of care within the trauma system. If transport to Level I will add greater than 15 minutes, transport to nearest trauma facility.

NO

### Step 2. Assess anatomy of injury

- Significant penetrating injuries to head, neck, torso, & extremities proximal to elbow or knee
- Two or more proximal long-bone fractures
- Crushed, degloved, threatened, pulseless or mangled extremity
- Amputation proximal to wrist or ankle
- Pelvic fractures
- Open or depressed skull fracture
- Paralysis

YES

Red = Priority 1

NO

### Step 3. Assess mechanism of injury and evidence of high-energy impact

- Falls
  - Adults: > 10 ft. (one story is equal to 10 ft.)
- High-Risk Auto Crash
  - Intrusion: Including roof: > 12 in. occupant site; > 18 in. any site
  - Extrication time over 20 minutes
  - Ejection (partial or complete) from automobile
  - Death in same passenger compartment
  - Vehicle telemetry data consistent with high risk of injury
- Auto vs. Pedestrian/Bicyclist Thrown, Run Over, or with Significant (> 20 mph) Impact
- Motorcycle Crash > 20 mph

YES

Yellow = Priority 2

NO

### Step 4. Assess special patient or system considerations of trauma patients

- GCS: 12-14 and evidence of traumatic injury
- Age
  - > 70 years to Trauma Center
- Anticoagulation and Bleeding Disorders: On Prescription Blood Thinners
- Significant Burns (+/- trauma mechanism): Triage to MetroHealth
- Open Fractures
- Pregnancy > 20 Weeks
- EMS Provider Judgment – When in doubt transfer to a trauma center

YES

Transport patient to nearest trauma center within trauma system, need not be the highest level of trauma center.

NO

Step 5. Patients not meeting above criteria – transport to closest Emergency Department

Green = Priority 3



6:13 AM

The second patient is sitting in the car holding his abdomen and complaining of significant pain. He is pale and his heart rate is elevated, but his blood pressure is normal. Following the NOTS protocol, EMS elect to take him to Hillcrest Hospital, Cleveland Clinic facility — a Level II Trauma Center. Within precious minutes, the patient is diagnosed with an injury to his spleen.



# Blunt Splenic Injury Within the Northern Ohio Trauma System: Where Are We Now?

*Aman Banerjee, MD*

*Jeffrey A. Claridge, MD, MS, FACS*

**Background:** Non-operative management of hemodynamically stable patients with blunt splenic injury (BSI) has become the standard of care. However, practice patterns can vary by institution and occasionally by provider. Regionalization of trauma systems and implementation of evidence-based protocols can be used to reduce this variability and improve rates of success of non-operative management. The purpose of this multi-institutional study was to characterize patients with BSI within the system, determine regional practice patterns and outcomes, specifically, the spleen salvage rate within the trauma system prior to implementation of a system wide protocol.

**Methods:** The trauma registry for the Northern Ohio Trauma System, a regional trauma system made up of 2 healthcare systems was queried for patients older than 14 years diagnosed with BSI from 2008 through 2010. The primary outcome measure was spleen salvage rate, defined as a patient being discharged from the hospital with the spleen in situ. Secondary outcomes included mortality, ICU length of stay (LOS), overall LOS, ventilator days and rate of splenic artery embolization (SAE). The Level I center was compared to regional trauma centers, additionally, individual hospital analysis was also performed.

**Results:** 328 patients were identified. The Level I center treated more BSI patients during the study period 261 vs. 67. Patients treated at the Level I center were more severely injured with ISS  $21.7 \pm 0.8$  vs.  $15.6 \pm 1.4$ ,  $p < 0.001$ . The Level I center patients tended to treat a higher percentage of patients with AIS head, chest, abdomen and lower extremity scores of 3 or greater  $p = 0.031$ ,  $0.001$ ,  $0.035$  and  $0.001$ , respectively. The Level I center treated a higher percentage of grade 3 and 4 spleen injuries 46% vs. 28.3,  $p = 0.003$ . SAE rates were higher at the Level I center 19.5% vs. 7.5%,  $p = 0.01$ .

This was most pronounced for grade 3 and 4 spleen injuries 39.2 % vs. 15.8%,  $p = 0.05$ . Splenectomy rates and spleen salvage rates were identical at 14.9% (NS) and 85.1% (NS), respectively. Total LOS and ICU LOS was longer at the Level I center 8.8 vs. 5.3 (0.006) and 5.3 vs. 3.1 (0.05), respectively. Across the system splenectomy rates ranged from 8.7% to 100% (0.01). SAE rates ranged from 0% to 19.5% (NS).

**Conclusion:** The study established the splenectomy rate across the trauma system at 14.9% with a spleen salvage rate of 85.1%. There exists significant regional practice variability as seen in utilization of SAE, specifically, in grade 3 and 4 injured spleens. Use of SAE may account for the observation that although the Level I center treated a significantly higher proportion of grade 3 and 4 injuries the rate of splenectomy was similar to that of the regional hospitals. Centers that incorporated splenic artery embolization into their practice had higher rates of spleen salvage across the system; however this did not reach statistical significance. The data generated will serve as a point of reference with which comparison can be made with future studies within the trauma system.



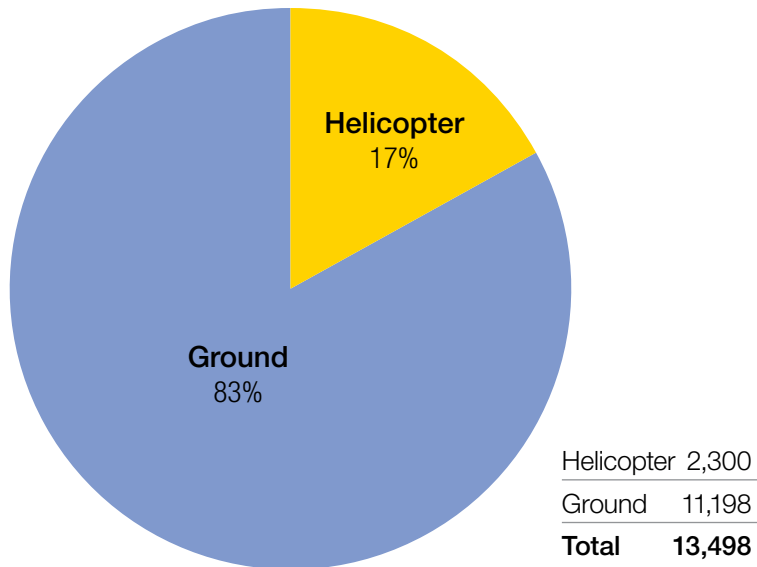
6:20 AM

Simultaneously, EMS assesses the driver; he is unconscious and bleeding from his head and face. Extrication from the vehicle takes several minutes. EMS puts in a call for a helicopter to transport the third victim to MetroHealth Medical Center, Level I Trauma Center.

# Critical Care Flight Programs

An important part of a Trauma System is the rapid transfer of patients via highly skilled, efficient, and expert critical care flight programs.

## Mode of Arrival



*Inclusion Criteria: Includes all patients treated at NOTS Trauma Centers in 2011*

## MetroHealth Life Flight



## Cleveland Clinic Critical Care Transport



The 24-year-old woman was treated at Euclid Hospital and is on her way home. Hillcrest Hospital is admitting the second patient so he can be carefully watched with the hope the splenic injury can be managed non-operatively. At 12:45 he was comfortably resting in his hospital room. He will be watched for two days and if everything stays stable, he will be discharged to home with follow-up in trauma clinic. The driver has a significant head injury and remains intubated in the Intensive Care Unit at MetroHealth Medical Center. He is being cared for by the trauma, neurosurgical, ENT and plastic surgeons. His outcome is unknown at this point; however, because of the rapid decision making process, all the patients have been given the greatest opportunity for the best outcome possible.



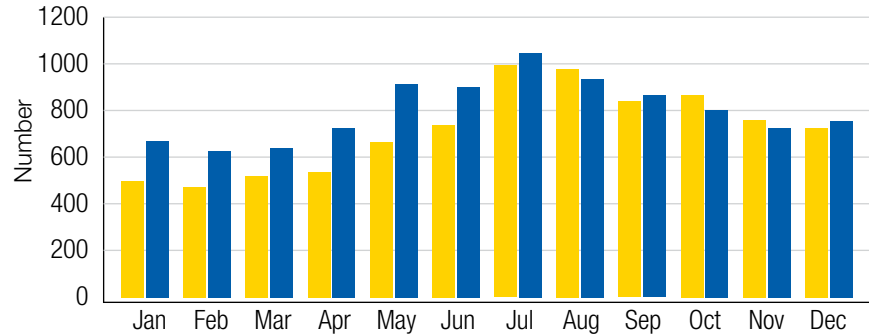
10:14 AM



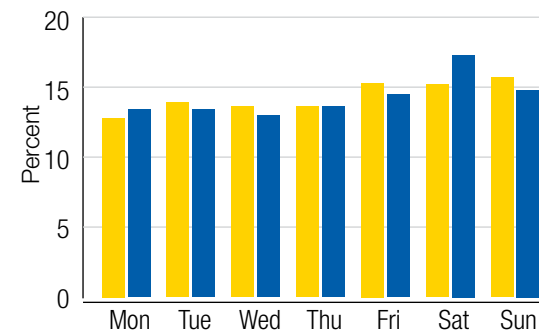
# Time / Day / Month — Does it Make a Difference?

Collecting and examining data that shows the months, days, shifts, and even the exact hour is very important in the management and utilization of resources. By knowing our peak times, it allows us to arrange staffing patterns, OR room availability, trauma clinics and even non-direct patient care events such as meetings and conferences.

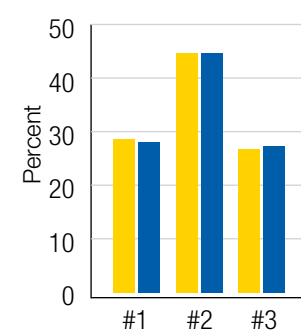
**Month**



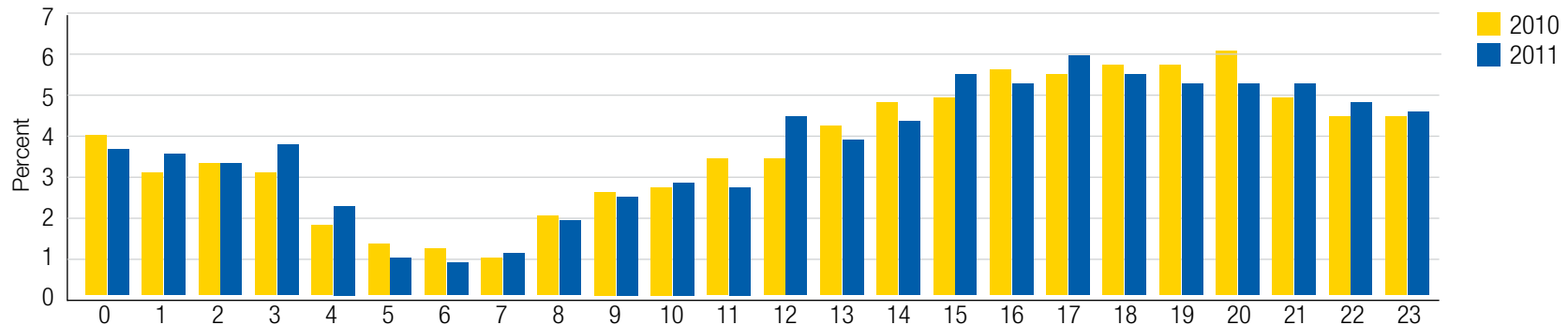
**Day**



**Shift**

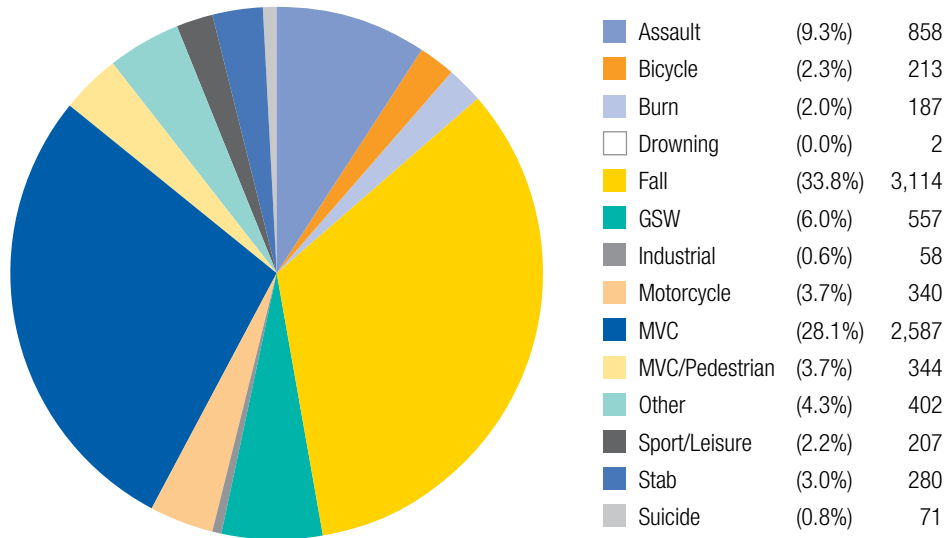


**Hour**



*Inclusion Criteria: Includes all patients treated at NOTS Trauma Centers in 2010 & 2011*

# Mechanism of Injury: 2011



## Injuries by Gender

Cause	Male	Female
Assault	669	189
Bicycle	176	37
Burn	135	52
Drown	1	1
Fall	1725	1389
GSW	486	71
Industrial	55	3
Motorcycle	286	54
MVA	1366	1221
MVA/Pedestrian	213	131
Other	289	113
Sport/Leisure	153	54
Stab	230	50
Suicide	55	16

Inclusion Criteria: Includes all patients treated at NOTS Trauma Centers

# Injuries by Outcome / Age / ISS Group: 2011

## Injuries by Outcome

Cause	Alive	Dead
Assault	854	4
Bicycle	212	1
Burn	179	8
Drown	0	2
Fall	3013	101
GSW	507	50
Industrial	58	0
Motorcycle	327	13
MVA	2561	26
MVA/Pedestrian	335	9
Other	396	6
Sport/Leisure	206	1
Stab	277	3
Suicide	59	12

## Injuries by Age Group

< 15	15-20	21-40	41-65	66-80	> 80
18	132	400	292	14	2
50	31	55	73	4	0
45	20	42	58	17	5
1	0	1	0	0	0
215	94	442	996	594	773
12	123	326	89	4	2
0	6	21	31	0	0
3	19	151	159	8	0
110	371	1105	749	176	76
58	52	114	97	13	10
64	35	132	145	18	8
52	59	60	33	3	0
1	40	171	67	1	0
4	12	35	18	2	0

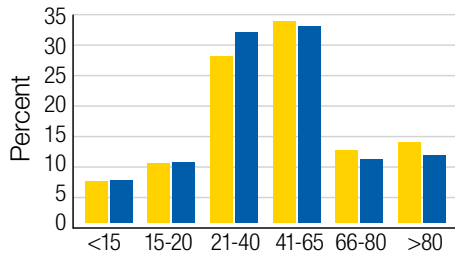
## Injuries by ISS Group

< 9	9 - 14	15 - 24	25 +	NA
302	88	42	9	2
113	31	14	3	1
149	20	7	5	0
0	0	0	2	0
1349	716	213	128	11
180	125	40	62	0
26	11	2	1	1
127	75	38	22	0
1136	275	158	71	16
103	48	19	10	2
195	41	22	13	5
126	36	10	3	1
141	37	5	6	0
27	12	6	16	0

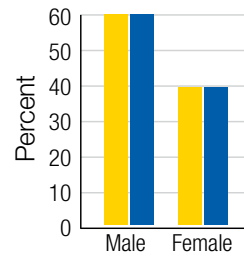
*Inclusion Criteria: Includes all patients treated at NOTS Trauma Centers*

# Penetrating Trauma Data: 2010-2011

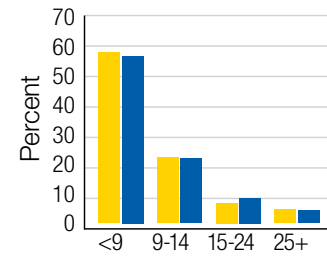
**Age**



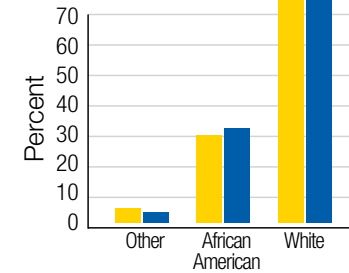
**Sex**



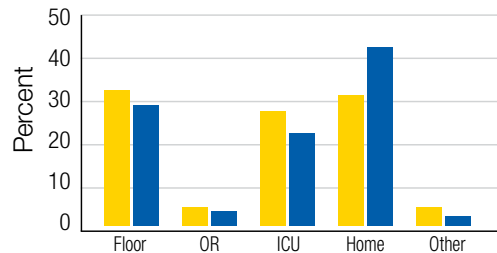
**ISS Group**



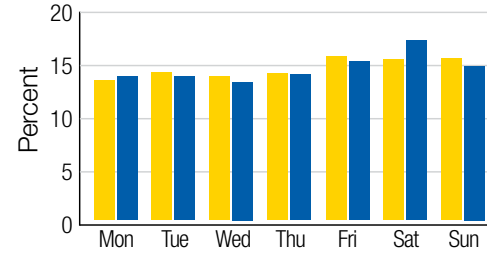
**Race**



**ED Disposition**



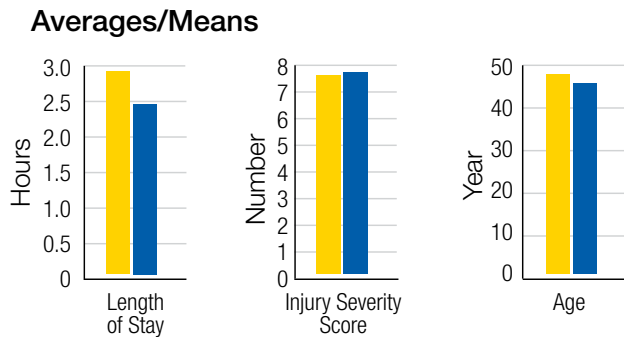
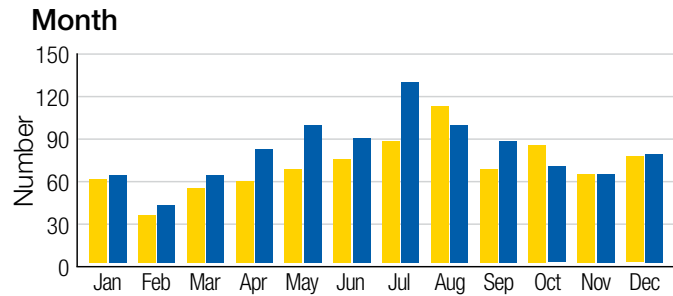
**Day**



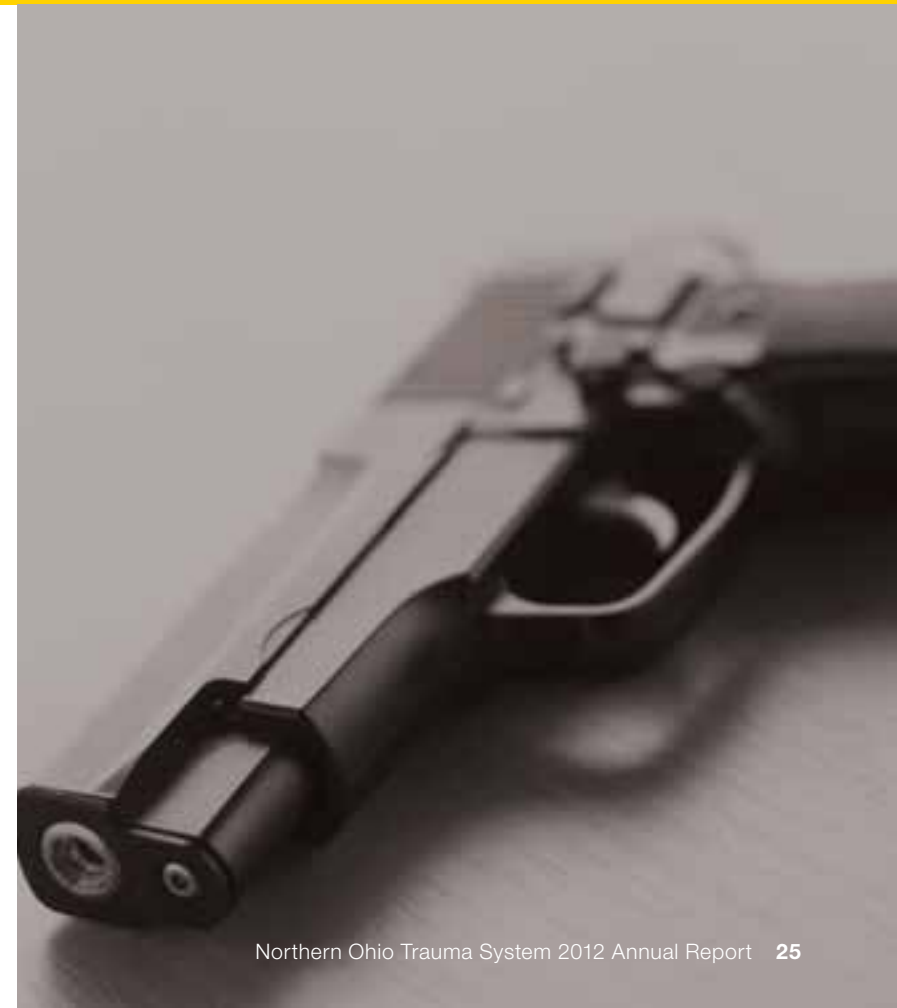
■ 2010  
■ 2011



# Penetrating Trauma Data Cont'd: 2010-2011



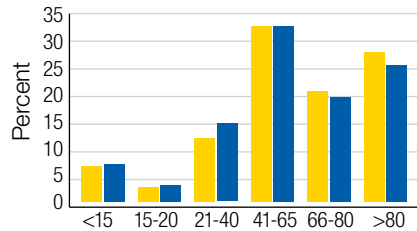
*Inclusion Criteria: Includes all patients treated at NOTS Trauma Centers for GSWs and stabbings in 2010 & 2011*



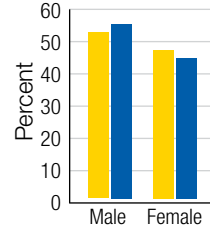
# Fall Data: 2010-2011



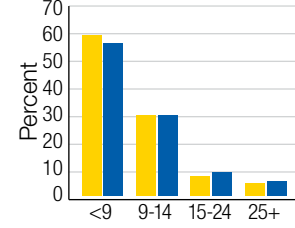
**Age**



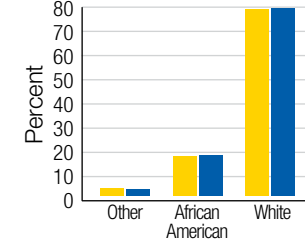
**Sex**



**ISS Group**

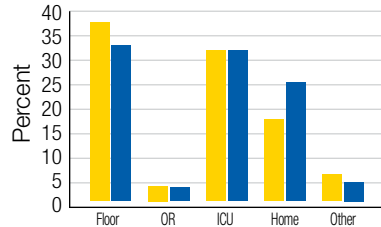


**Race**

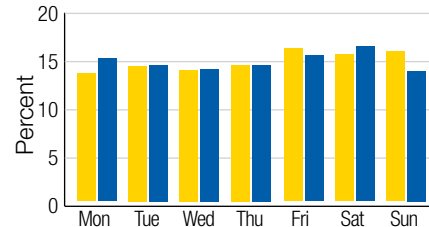


■ 2010  
■ 2011

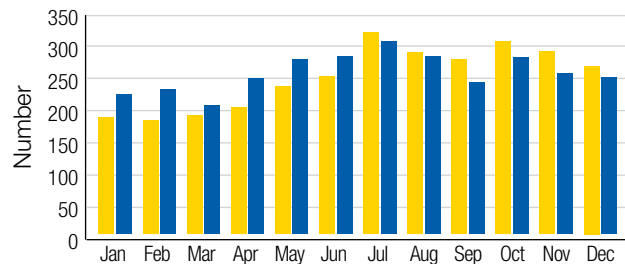
**ED Disposition**



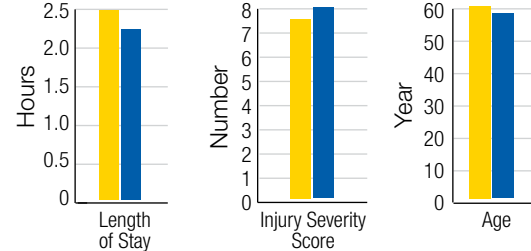
**Day**



**Month**

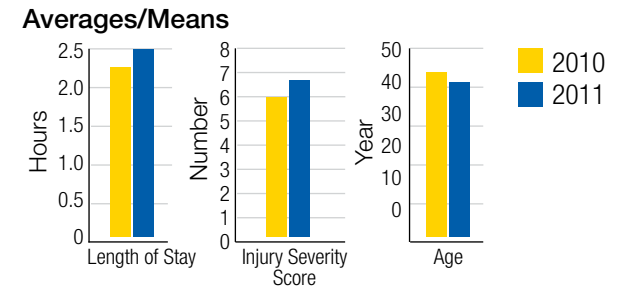
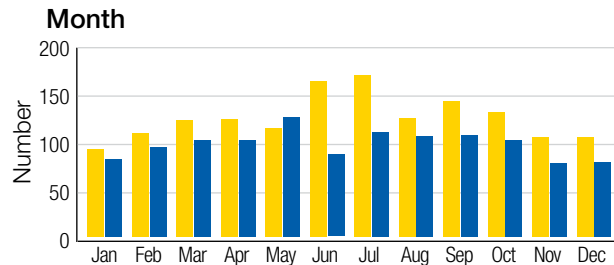
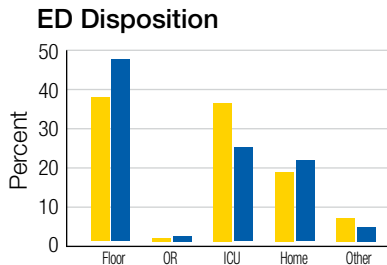
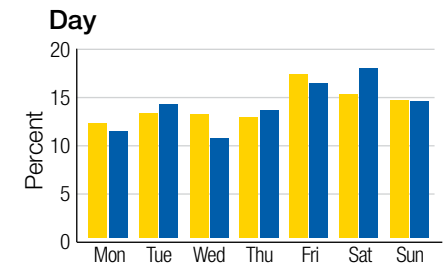
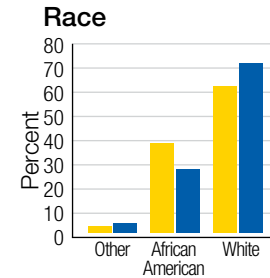
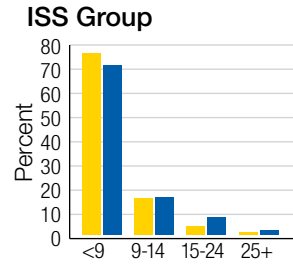
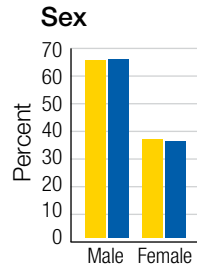
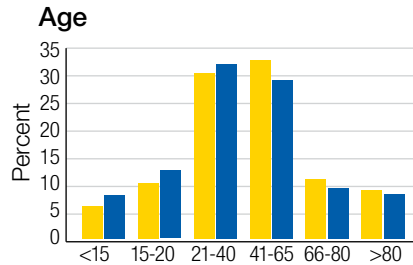


**Averages/Means**





# Traumatic Brain Injury 2010-2011



## Fall and TBI

Age Group	2010		2011	
	Male	Female	Male	Female
< 15	19	13	23	11
15 - 20	12	9	15	4
21 - 40	41	22	41	17
41 - 65	116	55	93	35
66 - 80	63	49	32	39
> 80	39	67	24	50

## MVC and TBI

Age Group	2010		2011	
	Male	Female	Male	Female
< 15	7	4	5	6
15 - 20	29	27	38	20
21 - 40	110	67	101	66
41 - 65	75	47	66	40
66 - 80	12	13	12	9
> 80	6	6	5	6

## Assault and TBI

Age Group	2010		2011	
	Male	Female	Male	Female
< 15	2	0	3	0
15 - 20	24	3	17	4
21 - 40	77	22	41	14
41 - 65	50	11	30	4
66 - 80	2	1	0	0
> 80	0	0	0	0

# Mortality Data: 2010-2011

Injury Severity Score (ISS) was developed initially to quantify blunt trauma. However, it is also used for penetrating injuries. Simply put, the higher the ISS, the more injured the patient. It is well accepted an ISS of <9 is considered to be minimal trauma, an ISS of 9-14 is considered minor trauma, an ISS of 15-24 is considered moderate trauma, and 25 and greater is considered to be major trauma. ISS is also highly associated with mortality.

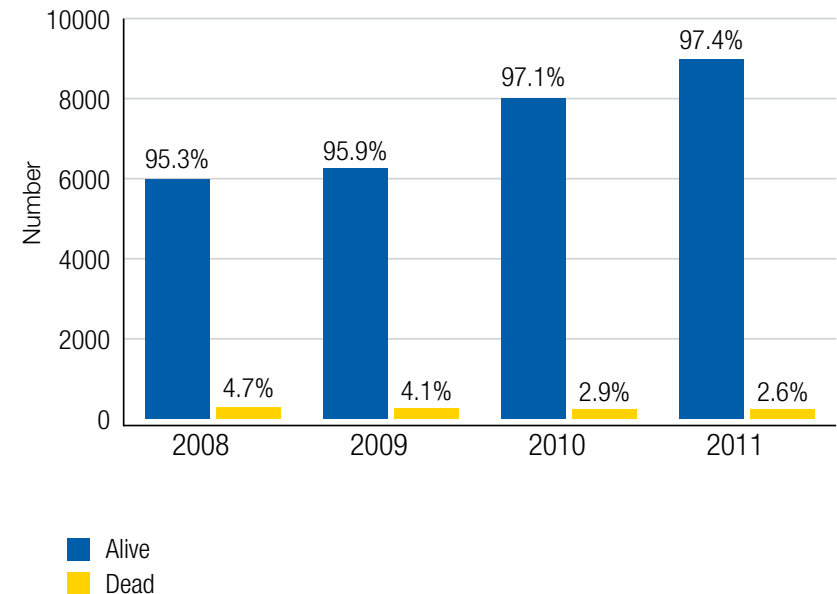
One of the overall goals of the Northern Ohio Trauma System was, and is, to continue to improve trauma outcomes. In this report, we demonstrate the last four years of mortality from traumatic injuries. NOTS began operations in the beginning of 2010. We are delighted to demonstrate a significant reduction in mortality starting, most pronounced, after 2010. Mortality rates have improved as much as 40%.

The following three figures show the outcomes of all cases, patients with ISS greater than 14, and patients with ISS scores greater than 25.:

- Patients who have moderate injuries with an ISS score of greater than 14. We also demonstrate an improvement in mortality.
- Patients who are the most severely injured with an ISS score of 25 or greater.
- Showing this reduction in mortality within two years is an accomplishment that the region should be very proud of. It is also worth noting that we are just beginning.

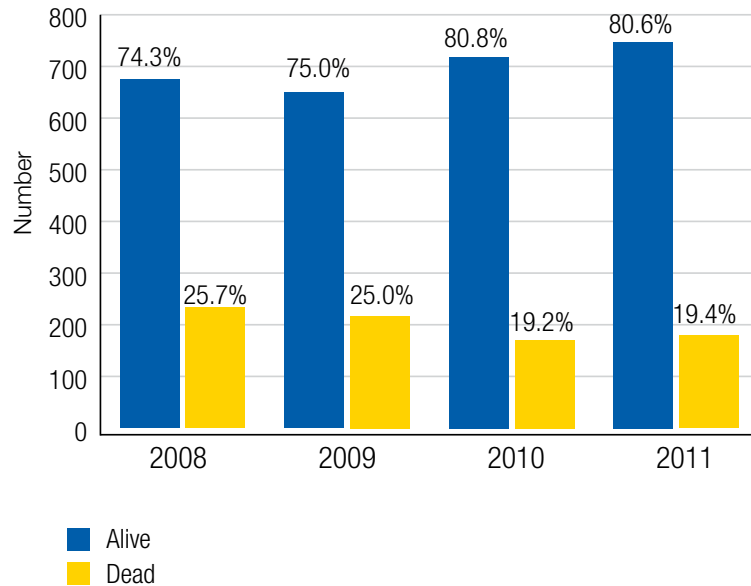
Jeffrey A. Claridge, MD, MS, FACS

### Mortality by Year (Volume) - All Cases

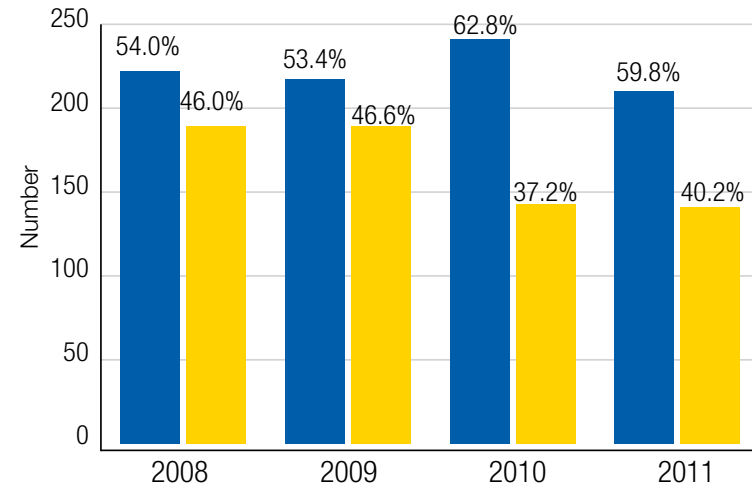


# Mortality Data Cont'd: 2010-2011

### Mortality by Year (Volume) - ISS > 14



### Mortality by Year (Volume) - ISS ≥ 25



# Northern Ohio Trauma System's 1st Annual Trauma Symposium

Our first annual Symposium was a huge success. We had over 250 participants, nationally recognized speakers, and multiple exhibitors all within a fabulous venue.



September 30 and October 1, 2011 | InterContinental Hotel, Cleveland, OH



# Participating Hospitals/Trauma Centers

## Trauma Centers



### **MetroHealth Medical Center**

Level I Adult Trauma Center,  
Level II Pediatric Trauma Center

2500 MetroHealth Drive  
Cleveland, OH 44109  
<http://www.metrohealth.org>

Medical Director:  
Dr. Jeffrey Claridge

Trauma Program Manager:  
Patricia Wilczewski, BSN, RN

Trauma Program Coordinator, Pediatrics:  
Danielle Baksai, BSN, RN



### **Fairview Hospital**

Level II Adult Trauma Center

18101 Lorain Avenue  
Cleveland, OH 44111  
<http://www.fairviewhospital.org>

Medical Director of Trauma:  
Dr. Timothy Barnett

Trauma Program Manager:  
Bernadette Szmigielski, RN



### **Hillcrest Hospital**

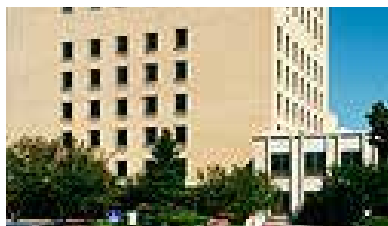
Level II Adult Trauma Center

6780 Mayfield Road  
Mayfield Heights, OH 44124  
<http://www.hillcresthospital.org>

Medical Director of Trauma:  
Dr. Michael Samotowka

Trauma Program Manager:  
Mary Anne Edwards, RN





**Euclid Hospital**

1890 Lake Shore Blvd.  
Euclid, OH 44119  
<http://www.euclidhospital.org>



**Lutheran Hospital**

1730 West 25th Street  
Cleveland, OH 44113  
<http://www.lutheranhospital.org>



**Marymount Hospital**

12300 McCracken Road  
Garfield Heights, OH 44125  
<http://www.marymount.org>



**South Pointe Hospital**

20000 Harvard Avenue  
Cleveland, OH 44122  
<http://www.southpointehospital.org>



**Lakewood Hospital**

14519 Detroit Road  
Lakewood, OH 44107  
<http://www.lakewoodhospital.org>



**Cleveland Clinic Main Campus**

9500 Euclid Avenue  
Cleveland, OH 44106  
<http://my.clevelandclinic.org>



**Medina General Hospital**

1000 East Washington Street  
Medina, OH 44256  
<http://medinahospital.org>



**Ashtabula County Medical Center**

2420 Lake Road  
Ashtabula, OH 44004  
<http://www.acmchealth.org>

# Pre-Hospital Trauma Triage Protocol

## A Revised Pre-Hospital Trauma Triage Protocol: Saving Patients and Resources

*Abstract Submission Type: Accepted for presentation at the Eastern Association for the Surgery of Trauma.*

*Authors: Katherine Kelly, Jeffrey Claridge, Aman Banerjee, Michael Nowak, Patricia Wilczewski, Debra Allen*

**Objectives:** To create a revised pre-hospital trauma triage protocol that could identify a subset of trauma victims that can be safely treated at a local Emergency Department (ED).

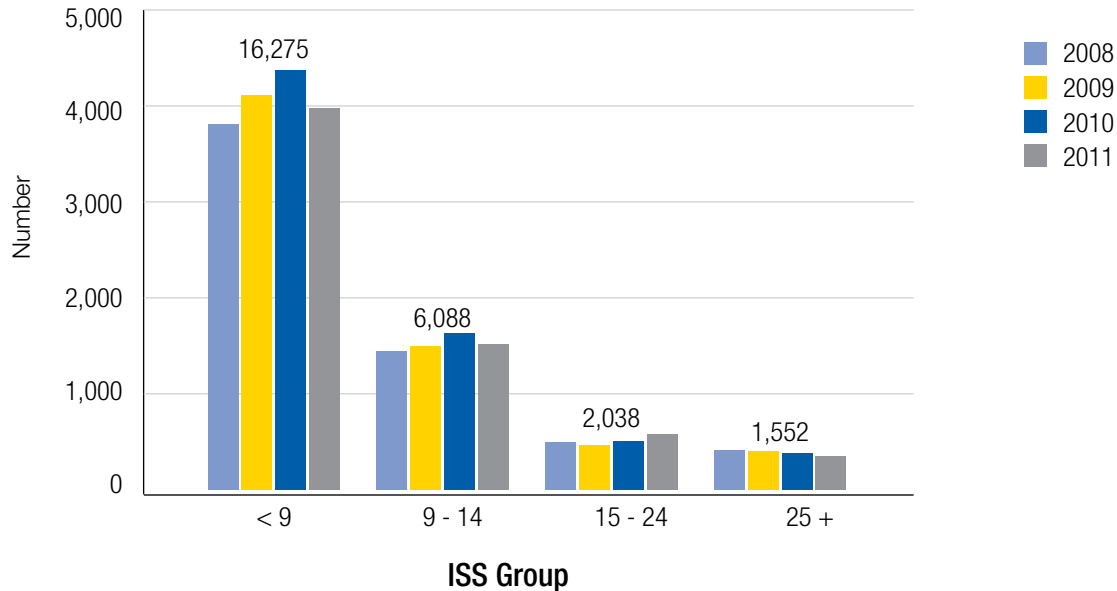
**Methods:** A revised Emergency Medical Services (EMS) trauma triage protocol checklist was devised which divided patients into Red, Yellow, or Green groups. Red included those most likely to be severely injured while Green had those unlikely to be seriously injured. Changes included decreasing Glasgow Coma Scale score from less than or equal to 13 to <12. The presence of abdominal tenderness, distension, or seat belt sign and speed of a motor vehicle crash were removed. Age requiring a trauma center was increased from 55 to 70. For 3 months in 2011, EMS completed a revised triage checklist for each trauma while continuing to use current triage rules. Revised over- and under-triage rates were calculated. Green patients requiring ICU or OR admission had their charts reviewed to determine protocol failure or coding error.

**Results:** There were 614 patients transported by EMS to 3 trauma centers. EMS designated 143 (23%) Red, 299 (49%) Yellow, and 172 (28%) Green patients. 510 (83%) of the patients were transported to the Level I center. Level II West received 37 (6%) patients and Level II East received 67 (11%) patients. Of these, 28% of all EMS transports were Green and could be taken to the nearest ED under the revised protocol. There was no mortality in the Green group. There were 7 Green patients who required admission to the ICU or OR. Of these, 2 patients had injuries from falls between 10 and 20 feet. Coding errors were found in 4 of the cases. Correcting for coding errors resulted in an under-triage rate of 1%.

**Conclusion:** Current trauma triage rules result in inefficient use of trauma center resources by patients with minor injuries. Use of a revised triage protocol could potentially transport patients with minor injuries to a non-trauma hospital ED.

# Trauma Center Data: 2008, 2009, 2010, 2011

## All Patients



*Inclusion Criteria: Includes all patients treated at NOTS Trauma Centers in 2011.*

# Northern Ohio Trauma System Board Members



Dr. Brendan M. Patterson  
*Chairman*



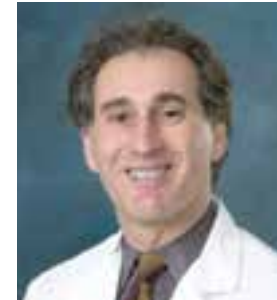
Dr. David L. Bronson



Dr. Alfred F. Connors, Jr.



Mr. Fred M. DeGrandis



Dr. Charles L. Emerman



Dr. Robert Wyllie



Mr. Edward J. Eckart

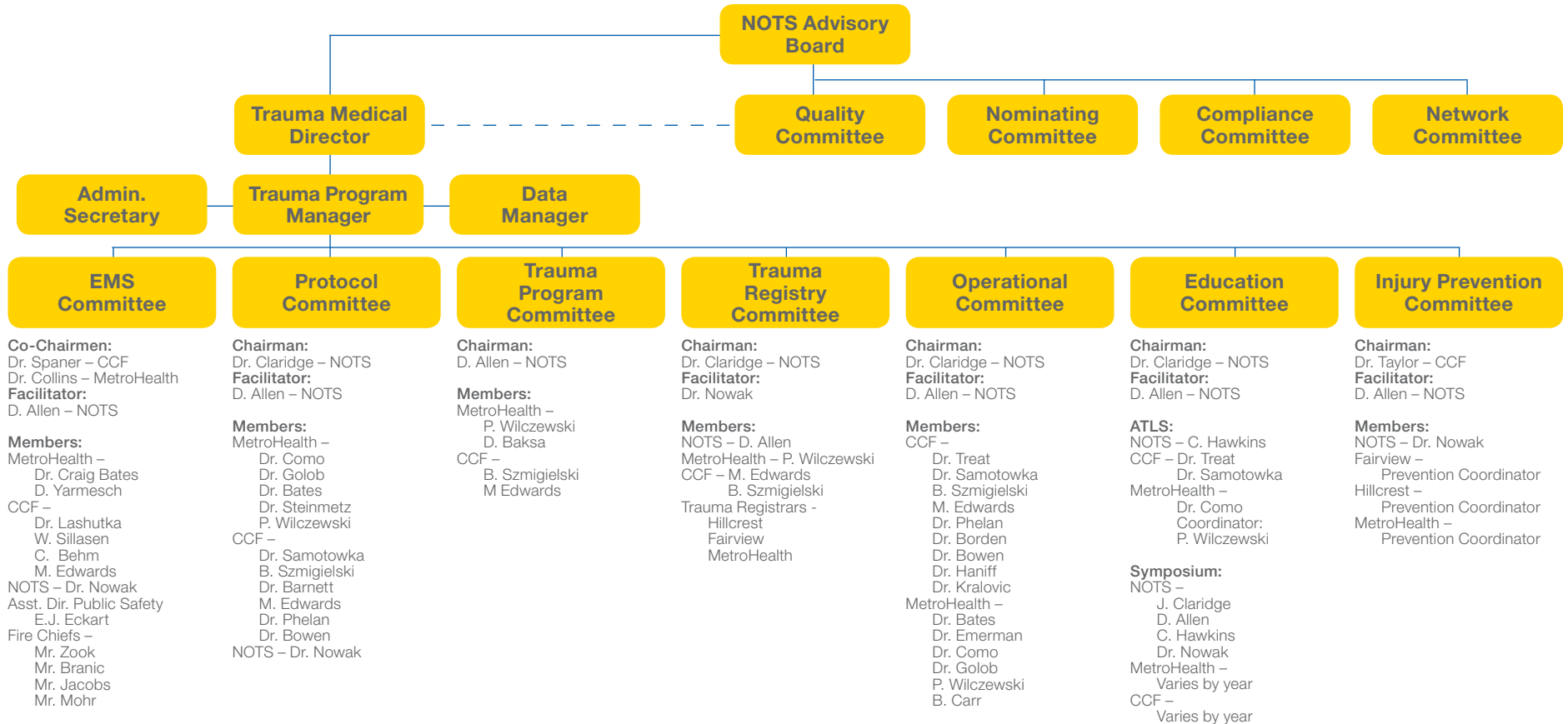


Mr. Terry Allan



Mr. Norberto Colón

# Organizational Chart



# Northern Ohio Trauma System Staff

For more information regarding NOTS,  
please contact:

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Administrative Secretary  
Northern Ohio Trauma System  
216-778-2266



Visit our website at [www.northernohiotraumasystem.org](http://www.northernohiotraumasystem.org)

# Conclusion

On behalf of all the members of the Northern Ohio Trauma System, we thank you for your support and collaboration to provide the people of our community with the highest level of trauma care possible.

## **NOTS 2012 Annual Report**

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Written by Jeffrey Claridge, MD, MS, FACS, Medical Director  
and Debra Allen, BSN, RN, Trauma Program Manger

Edited by Cheryl Hawkins, Administrative Secretary

Data by Michael Nowak, PhD





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