



NORTHERN OHIO TRAUMA SYSTEM

2014 Annual Report

right patient. right place. right time.



Northern Ohio Trauma System **2014 Annual Report**

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Welcome



NOTS Staff:

Debra Allen, BSN, RN, CCRN
Program Manager

Cheryl Hawkins, Coordinator
Trauma Program Support

Tod Baker, EMS-I, EMS-P
EMS Coordinator

Jillian Jarosz Cremona, MPH
Regional Trauma Data Specialist

Jack He, MD
Trauma Research Fellow

It remains an honor to serve in the role of Medical Director of NOTS for the past several years. I have pledged at least a 10-year commitment to serve in this role. I continue to be impressed with the collaborations we have established and the outcomes that we are achieving. Mortality for the region is the best it has ever been for our trauma patients. This is in part due to the strong collaboration of MetroHealth and the Cleveland Clinic Systems to work together to improve outcomes and provide a public service to our community. The prehospital personnel in our area are clearly second to none, and are an incredible asset to all of northern Ohio. The nurses and other health care workers are selfless and dedicated to the care of the patient.

As NOTS continues to mature, there are going to be challenges. We are continuing to focus on collaboration and keep our goals on fulfilling our mission:

TO PROVIDE THE HIGHEST QUALITY OF CARE
TO TRAUMA 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.

This means developing protocols that are best for the patient and critically evaluating protocol compliance and outcomes. We must share data, share successes, and build on lessons learned collaboratively. We are continually trying to do better! NOTS has continued to reach out to truly be an inclusive system. In the next several years we are committed to more than just improving survival. We are beginning to work on demonstrating improvement in functional outcomes and quality of life of our patients. We are also working on a robust prevention program.

We are excited to introduce two new members of the NOTS staff. We have created a NOTS EMS Coordinator position and are delighted to have Tod Baker assume this role. We have also hired Jillian Cremona as the new Regional Data Specialist. We are very pleased to announce these positions and look forward to continued success.

In closing, NOTS remains dedicated to the public and getting the *Right Patient to the Right Place at the Right Time*. We will save more lives working together as part of a trauma team and system than we can as individuals.

Sincerely,

A handwritten signature in blue ink, appearing to be 'JAC'.

Jeffrey A. Claridge, MD, MS, FACS

Medical Director, Northern Ohio Trauma System

NOTS Trauma Centers



The MetroHealth System

Level I Adult Trauma Center
Level II Pediatric Trauma Center

2500 MetroHealth Drive
Cleveland, OH 44109

<https://www.metrohealth.org>

Medical Director of Trauma:
Dr. Jeffrey Claridge

Trauma Program Manager:
Patricia Wilczewski, BSN, RN (*retired 5/14*)

Pediatric Trauma Program and
Injury Prevention Coordinator:
Danielle Rossler, BSN, RN



Fairview Hospital

Level II Adult Trauma Center

18101 Lorain Avenue
Cleveland, OH 44111

[http://my.clevelandclinic.org/locations_directions/
regional-locations/fairview-hospital](http://my.clevelandclinic.org/locations_directions/regional-locations/fairview-hospital)

Medical Director of Trauma:
Dr. Timothy Barnett

Trauma Program Manager:
Bernadette Szmigielski, BSN, RN



Hillcrest Hospital

Level II Adult Trauma Center

6780 Mayfield Road
Mayfield Heights, OH 44124

[http://my.clevelandclinic.org/locations_directions/
regional-locations/hillcrest-hospital](http://my.clevelandclinic.org/locations_directions/regional-locations/hillcrest-hospital)

Medical Director of Trauma:
Dr. Michael Samotowka

Trauma Program Manager:
Mary Anne Edwards, RN

NOTS Non-Trauma Centers



Ashtabula County Medical Center

Ashtabula, OH

Brunswick Family Health Center

Brunswick, OH

Euclid Hospital

Euclid, OH

Lutheran Hospital

Cleveland, OH

Lakewood Hospital

Lakewood, OH



CCF Main Campus

Cleveland, OH

Marymount Hospital

Garfield Heights, OH

Marymount Medical Center, Broadview Heights

Broadview Heights, OH

Medina Hospital

Medina, OH



Sagamore Hills Medical Center I & II

Sagamore Hills, OH

South Pointe Hospital

Warrensville Heights, OH

Richard E. Jacobs Health Center

Avon, OH

Twinsburg Family Health and Surgery Center

Twinsburg, OH



What is **Trauma**?

trauma trau·ma (trô'mə, trou'-)
n. pl. **trau·mas** or **trau·ma·ta** (-mə-tə)

A serious bodily injury or shock, as from violence or an accident

trauma. (n.d.). *The American Heritage® Stedman's Medical Dictionary*. Retrieved July 26, 2014, from Dictionary.com website: <http://dictionary.reference.com/browse/trauma>

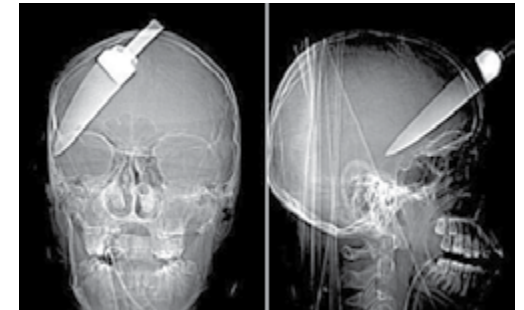


Blunt Trauma is caused by a combination of forces: deceleration, acceleration, shearing, crushing, and compression. Due to the combination of forces, often blunt trauma causes more life-threatening injuries (McQuillen, et al., 2002).



Penetrating Trauma

signifies an injury produced by a foreign object that penetrates tissue. The severity of the injury (ISS score) is related to the structures damaged (McQuillen, et al., 2002).



Are **Traumatic** Injuries Significant?

Trauma is the **leading cause of death** below the age of **44**.

Traumatic injuries lead to **3.6 million hospital admissions** each year.

> 4 million potential years of **productive life are lost annually** — exceeding the loss from heart disease, cancer and stroke combined.



http://www.cdc.gmmwrov//preview/mmwrhtml/su6004a13.htm?s_cid=su6004a13_w

What is a **Trauma** System?

Trauma System: Being able to provide a coordinated and systematic means of delivering trauma patients rapidly to definitive care.

Department of Human Services. *Review of Trauma and Emergency Services*. Acute Health Division: Victorian Government Department of Human Services, 1999.

A Trauma care system represents a continuum of integrated care that is a coordinated effort between out-of-hospital and hospital providers with close cooperation of medical specialists in each phase of care.

American College of Emergency Physicians Policy Statement: Trauma Care Systems Development, Evaluation and Funding. *J. Trauma* 1999; 47 (Suppl.): S110.

Trauma systems help to ensure that the millions of people injured each year get the right care, at the right place, at the right time. The right care can help people continue to live to their full potential, despite having experienced a severe injury.

http://www.cdc.gov/traumacare/access_trauma.html



Evolution of **Trauma** Systems

1985 – *Injury in America, A Continuing Public Health Problem*, Committee on Trauma Research, Institute of Medicine, National Research Council was published stating injuries kill more Americans from 1 to 34 years old than all diseases combined and little is spent on prevention and treatment research.

1990 – Congress addressed the important role of trauma systems responding to injury as a public health threat through passage of the Trauma Care Systems Planning and Development Act.

1992 – The above Act directed the Health and Resources Service Administrations (HRSA) to develop the Model Trauma Care System Plan — a plan to assist statewide development of trauma systems.

2000 – HRSA published a national assessment which revealed regions with trauma systems:

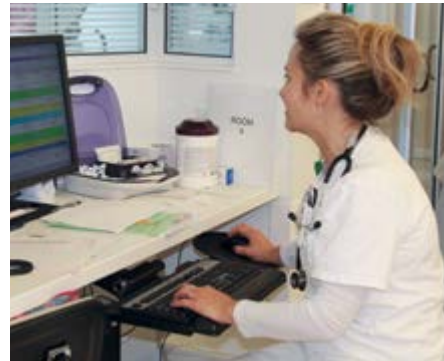
- were the most ready to respond to the day-to-day care of trauma patients.
- had a substantial decrease in morbidity and mortality.

2001 – Congress funded HRSA to update the 1992 Model Trauma Care System Plan.

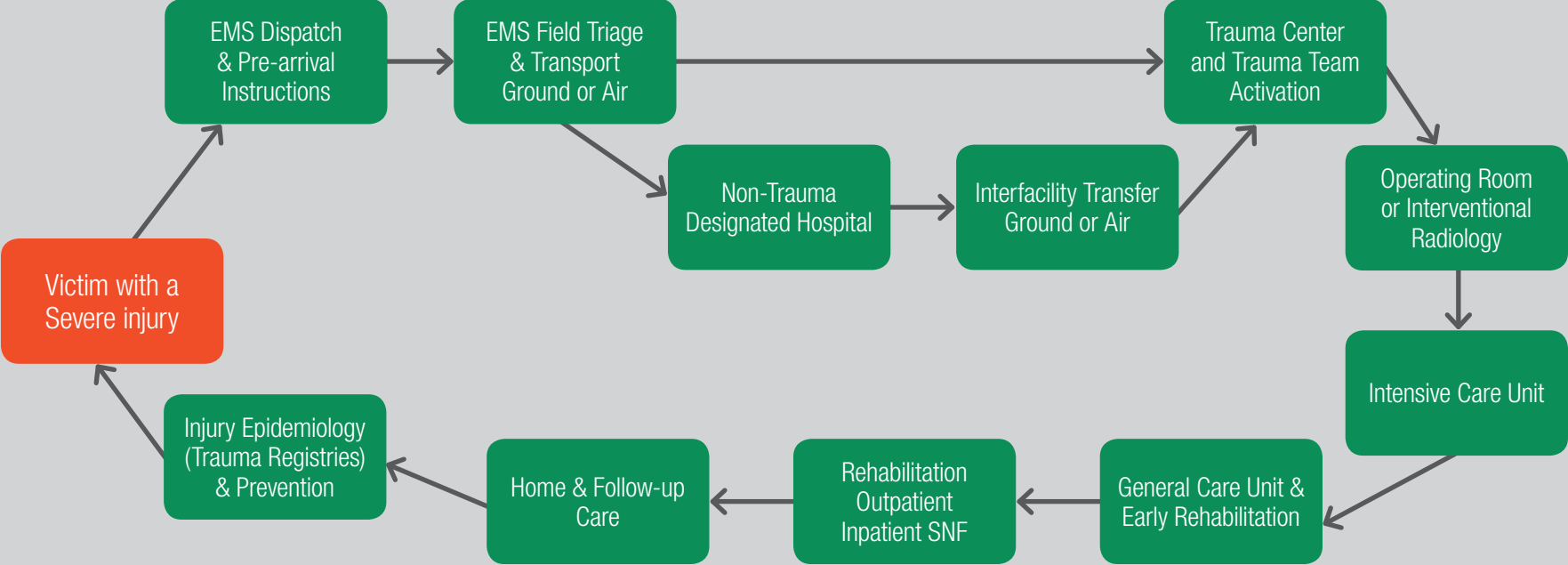
2006 – Publication of HRSA's updated Model Trauma System Planning and Evaluation. The new Model Plan is based on the public health framework and is a guide to modern statewide trauma system development.

2010 – NOTS Founded

2013 – The State of Ohio underwent a Trauma System Consultation by the American College of Surgeons. The State of Ohio continues to work with Congress to support passing legislation for a Trauma System Program with appropriate funding to serve as the lead trauma agency within the Ohio Department of Health. The complete report can be located at: http://www.publicsafety.ohio.gov/links/ACS%20OH%20Trauma%20System%20Report_final.pdf



Trauma System Model in 2013



What Does a **Trauma** System Mean to the Public?

Engages pre-hospital providers to get severely injured patients to the “**right hospital**, in the **right manner**, in the **right amount of time**.”

These three factors **optimize** chances for trauma patient **survival** with **minimizing** chances for severe disabilities and death.

Ultimately, collaborations result in **improved outcomes** and **maximize resource utilization**.



Pete Soto, Trauma Survivor,
Motorcycle Accident:

“As a police officer and a first responder, I know full well the benefits of a Trauma System. On the day of my accident, it was clear that I needed to be sent to an advanced level of care and quickly. I was lifted to the best hospital for my injuries, and I know I’m alive today because of it.”



Jennifer Scibana, Trauma Survivor, Motor Vehicle vs. Pole,
ejected 60+ft:

“I broke both arms and a leg, among other things in my accident. I’m a hairstylist and a salon owner and not being able to work was simply not an option for me. I can cut hair all day, stand all day, and I’m fully functioning because of the care I received. If I hadn’t gotten the help I needed and the care I needed in the critical time that I needed it, I would not be where I am today.”

NOTS Mission Statement

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 utilizing a collaborative approach with hospitals, emergency medical services, and the public health services.

ABSTRACT

Trauma recidivists: surprisingly better outcomes than initially injured trauma patients.

AUTHORS: Dixon SD, Como JJ, Banerjee A, Claridge JA

BACKGROUND: The purpose of this study was to determine if there was a difference in hospital outcomes between trauma recidivists (RCID) and nonrecidivists (NRCID).

METHODS: Outcomes of RCID and NRCID were compared. A recidivist was defined as a patient with a history of hospital evaluation for injury within the prior 5 years. Patients with good functional status had a Glasgow Outcome Score of 4 to 5.

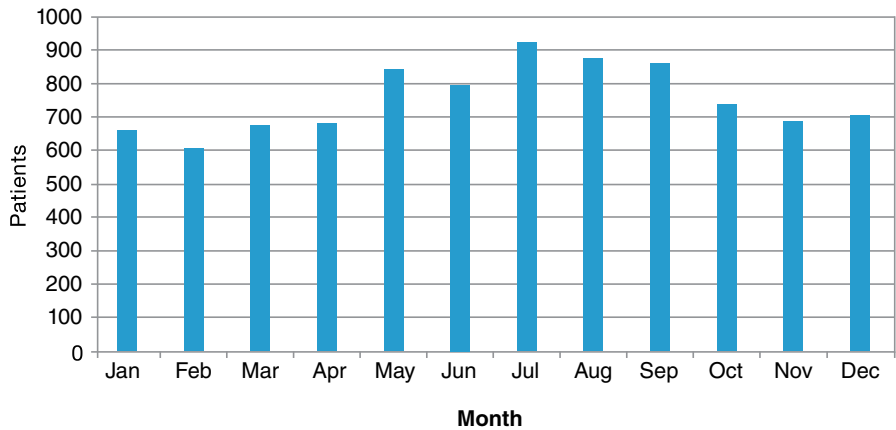
RESULTS: Of the 2,127 patients admitted, 466 (22%) were RCID. NRCID were more likely to have Injury Severity Score >25 (12% vs 8.6%; $P = .04$) than RCID. Eighty-eight percent of RCID were discharged with a good functional status compared with 83% of NRCID ($P = .02$). NRCID were more likely to be admitted to a critical care unit (43% vs 36%; $P = .01$), but there was no significant difference in hospital mortality.

CONCLUSION: RCID were less severely injured and had better hospital outcomes than NRCID.

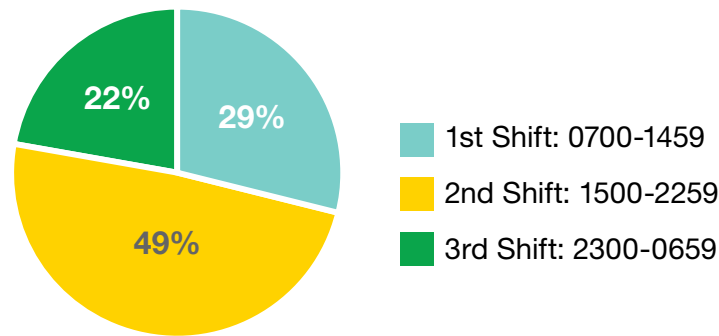
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Frequency of Trauma: 2013 Data

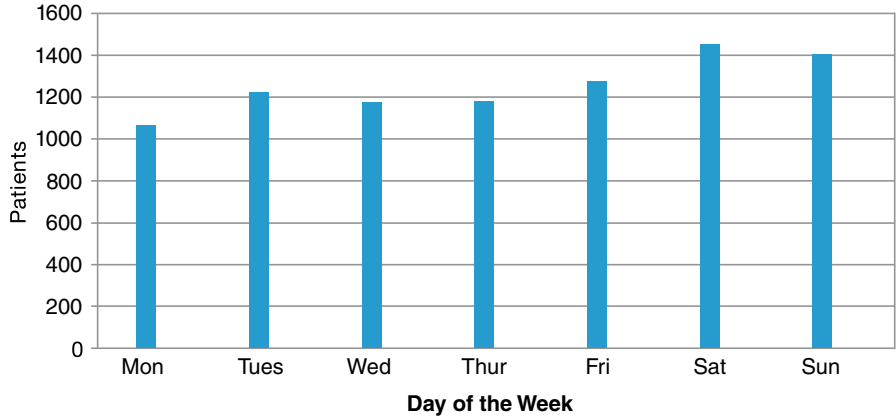
By Month



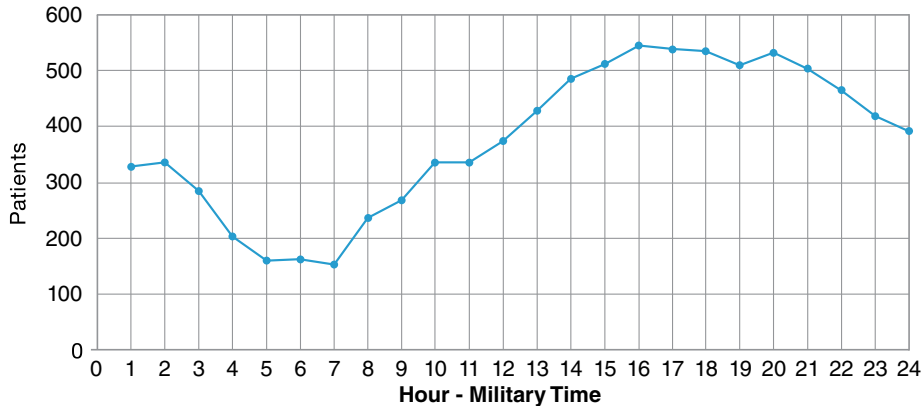
By Shift



By Day of the Week



By Hour



Collaboration is the Name of the Game

According to the U.S. Department of Health and Human Services report on Model Trauma System Planning and Evaluation (2006), in the late 1980s and early 1990s the increase in major trauma led public health professionals to recognize obvious parallels between the epidemiologic behaviors of illnesses and injuries. It also led these professionals to champion a public health approach to injury prevention and control. Injury prevention leaders recognized that public health strategies tested during the years of communicable disease eradication could be successfully applied to the prevention of injury.

Collaboration is essential in all trauma systems and NOTS is honored to have members from the following public agencies represented on the Advisory Board:

- Mr. Terry Allan, Cuyahoga County Board of Health
- Mr. Norberto Colón, Cuyahoga County Public Safety and Justice
- Mr. Edward J. Eckart Jr., City of Cleveland Department of Public Safety

MODEL TRAUMA SYSTEM PLANNING AND EVALUATION

Released February 2006

The Health Resources and Services Administration document Model Trauma System Planning and Evaluation was edited, designed, and coordinated by the U.S. Department of Health and Human Services Program Support Center, Visual Communications Branch.

<http://www.ncdhhs.gov/dhsr/ems/trauma/pdf/hrsatraumamodel.pdf>



Collaboration



Making a difference in our
patients' outcomes.

Making a difference in
our community.

ABSTRACT

Trends in maxillofacial trauma: a comparison of two cohorts of patients at a single institution 20 years apart.

AUTHORS: Martinez AY, Como JJ, Vacca M, Nowak MJ, Thomas CL, Claridge JA

PURPOSE: The purpose of this study was to compare and characterize 2 cohorts of patients with maxillofacial fractures within the same institution over 2 6-year time frames 20 years apart.

MATERIALS AND METHODS: A retrospective review of patients with maxillofacial fractures at the authors' institution from 2004 to 2010 was performed, and a comparison was made with the authors' experience from 1984 to 1990.

RESULTS: The 1990 study showed 458 maxillofacial fractures (152 midface and 306 mandibular fractures). In the 2010 study, there were 1,731 maxillofacial fractures (1,313 midface and 418 mandibular fractures). There were significant differences in the mechanism of injury between the 1990 and 2010 studies: assaults decreased from 48.8% to 29.7%, motor vehicle collisions decreased from 39.1 % to 29.6%, and falls increased from 3.6% to 22.1%. Comparison by age categories showed major changes in the following groups: maxillofacial fractures in patients 21 to 40 years old decreased from 61.7% to 35.3%, those in patients 41 to 65 years old increased from 13.1% to 35.4%, and those in patients at least 66 years old (elderly) increased from 0.2% to 14.5%. All these changes were statistically significant ($P < .0001$).

CONCLUSION: Maxillofacial trauma has changed significantly over the past 2 decades in the authors' institution. A decrease in assault-related injuries in the younger populations and an increase in the incidence of falls in the elderly were the main differences. There was a significant increase in elderly patients with maxillofacial trauma. This change emphasizes the need for adequate prevention programs and appropriate maxillofacial surgery teams to manage these injuries in the older patient.

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LeFort Midface Fractures

What Does It Mean If a Hospital is an American College of Surgeons Designated Trauma Center?



- > Designated trauma hospitals provide care to patients who experience a traumatic injury and are experts in providing specialized medical services and resources.
- > Accredited trauma hospitals are committed by their institutional governing body to allocate resources to be continuously prepared to treat the most serious, life-threatening and disabling injuries.
- > Trauma hospitals accredited by the ACS provide a team of specialists to be available 24 hours a day/7 days a week.
- > Using a system-wide approach has proven to reduce the likelihood of death or permanent disability to injured patients.
- > The trauma team includes specialists in trauma, orthopedic, neuro, plastic and reconstructive, maxillofacial, and ophthalmologic surgery, along with highly skilled nursing and ancillary staff.

The MetroHealth System

Level I Adult Trauma Center - Level II Pediatric Trauma Center

Why did you choose to work at a Level I Trauma Center?



"I choose to practice in a Level 1 trauma center because it both exposes and enables me to provide the best care to the extremely complex, challenging and high acuity trauma patients in this region."

Nimitt Patel, MD, Trauma Surgeon



"Working at a Level I trauma center allows me to care for both patients and families in the most critical situations. MetroHealth is unique in its ability to keep families together."

Danielle Rossler, BSN, RN
Pediatric Trauma Program Coordinator

The MetroHealth System

Level I Adult Trauma Center - Level II Pediatric Trauma Center

Why did you choose to work at a Level I Trauma Center?



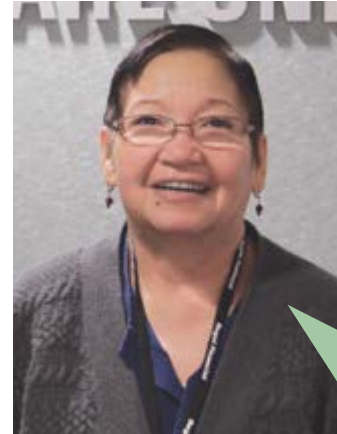
"Working at a Level I trauma center provides me the opportunity to make a difference. What brought me to Metro is its reputation for excellence. Working with these talented people was an experience I couldn't pass up."

Anastasia Gianakis, BSN, RN
Nurse Manager, Trauma ICU



"I chose to work at MetroHealth Medical Center because I have worked in healthcare my entire career. Fifteen years ago I experienced a life threatening situation with my son and thanks to the wonderful physicians and staff at MetroHealth, a Level I Trauma Center, my son is here today!"

Debbie Toth, Patient Support Assistant



"Because of the great experience; people are family here. I've worked here 15 years and wouldn't work anywhere else."

Laura Domingo
Unit Secretary, SICU

Fairview Hospital

Level II Adult Trauma Center

Why is being a trauma center an important asset to the community?



"A trauma center allows for immediate access to specialized resources. Having local access to a trauma center is priceless."

Bernadette Szmigielski, BSN, RN
Trauma Program Manager



"Trauma centers are an important asset to the community because they offer specialized expert care for its citizens. Because of their staffing, training, and certification, they are able to provide immediate high level care any time of the day or night, which has been shown numerous times to result in decreased injury, morbidity and mortality."

Timothy Barnett, MD, Trauma Medical Director, Chairman, Dept. of Surgery

Fairview Hospital

Level II Adult Trauma Center

Why is being a trauma center an important asset to the community?

“Fairview covers a large area, but we are a community hospital. Our community members want to go to their community hospital.”

Elaine Pagan, ANM, Emergency Department



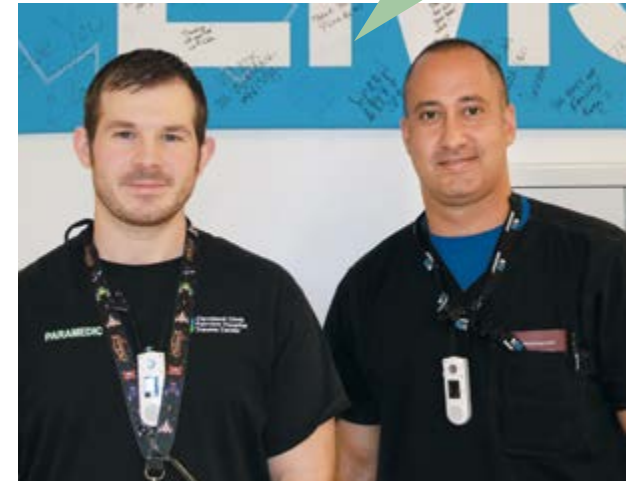
“We are very conveniently located for our family and friends. Cleveland is lucky to have so many good, close trauma centers. We are privileged to have this level of care in our community.”

Aaron Alexander & Rafael Muniz
ED Paramedics



“I feel it is the accessibility of care within our community that is important for the survival of injured patients.”

Julie Callahan, Surgical Resident Coordinator



How does Hillcrest Hospital excel in the care of the patient with traumatic injuries?



"Hillcrest Hospital maintains a state of readiness to accept any kind of trauma that comes through our door."

Mary Anne Edwards, RN
Trauma Program Manager



"Hillcrest Hospital has taken great strides in the last year to improve our trauma program. We have hired five full-time midlevel providers that now staff the front line of our trauma team with one being in house 24/7. We have rebuilt our trauma bays and purchased a new EXPORT ultrasound machine for the trauma service to help provide rapid evaluation of our trauma patients."

Dr. Michael Samotowka, Medical Director of Trauma

Hillcrest Hospital

Level II Adult Trauma Center

How does Hillcrest Hospital excel in the care of the patient with traumatic injuries?

"We have a great interdisciplinary approach to our trauma patients. We cover all our bases with an environment that supports all members of the trauma team."

Matthew Nagar, PharmD, BCPS



"I am very proud we have the highest percentage of nurses who have completed TNCC (Trauma Nursing Core Course). We support our staff with good education."

Tess Young, ANM, Emergency Department



"I feel we excel at Hillcrest due to our continuity of care and team approach in caring for both trauma and critical care patients."

Jeannine Marong PA-C, MPAS
Trauma Services

"The people at Hillcrest, especially the folks in the ER and ICU, have been very willing to learn and try a new way of doing things, with respect to trauma. This has allowed our program to grow and become even more successful."

Dr. Aisha Violette
Trauma Surgeon



Metro Life Flight

“Outstanding trauma care demands the highest level of teamwork from the point of injury to the trauma center to optimize patient outcomes. NOTS provides the mechanism for MetroHealth, Cleveland Clinic, and pre-hospital providers to work closely together to provide the people of Northeast Ohio with the best possible trauma care. Metro Life Flight is proud to be an integral part of not only coordinating but also performing the transportation of these patients by helicopter and ground units throughout the region and helping achieve the NOTS goal of “right patient, right place, right time.” — Dr. Craig Bates



Metro Life Flight utilizes cutting edge therapies to optimize trauma patient survival in the critical early time period after injury. Air and ground crews carry two units of O negative blood for emergency transfusions, tranexamic acid to optimize blood clotting after traumatic injury, and portable ultrasound to aid early diagnosis of injuries. Metro Life Flight is also one of a handful of transport programs in the country participating in a DOD funded study investigating the field use of fresh frozen plasma for patients in hemorrhagic shock.

Cleveland Clinic Critical Care Transport



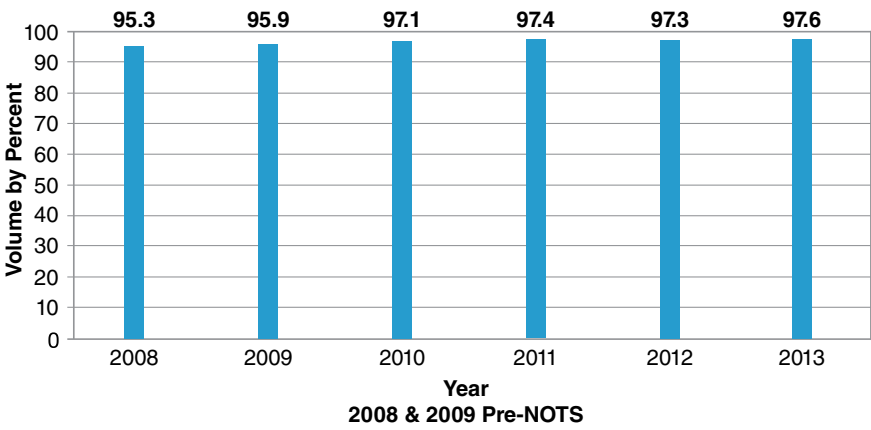
Cleveland Clinic's Critical Care Transport team is ready around the clock. No patient is too ill for transport. Our specially trained critical care staff is prepared for the highest acuity of patients — ranging from neonates to adult. The team is available by ground, rotor wing and fixed wing. By initiating tertiary care during transfer, outcomes are improved for many critical care conditions.

All Cleveland Clinic Critical Care team members are experienced in critical care and/or emergency services and have received additional training in the specialized care of the transport equipment — all aimed at providing safe and quality care to our patients. Globally, our team transports more than 4,500 patients each year.

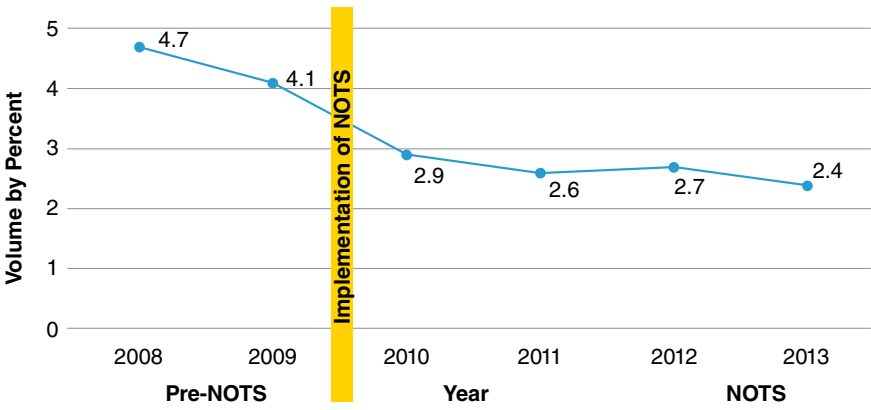


Outcomes: 2013 Data

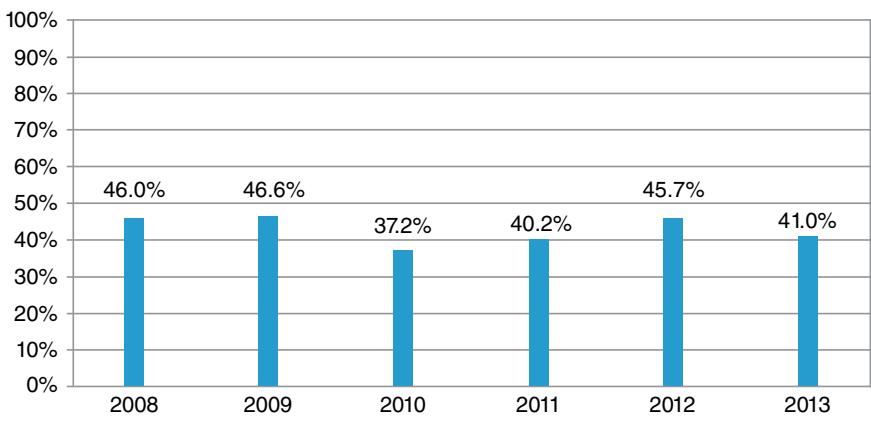
Survival



Mortality



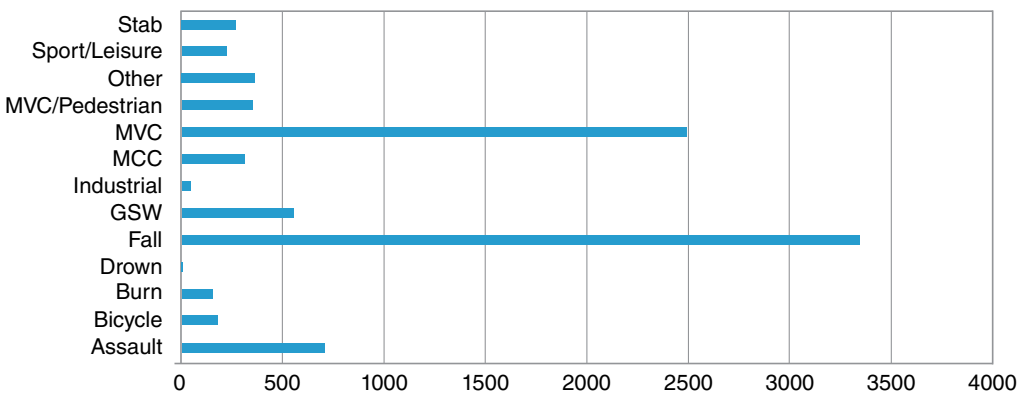
Mortality Outcome: Injury Severity Score >24



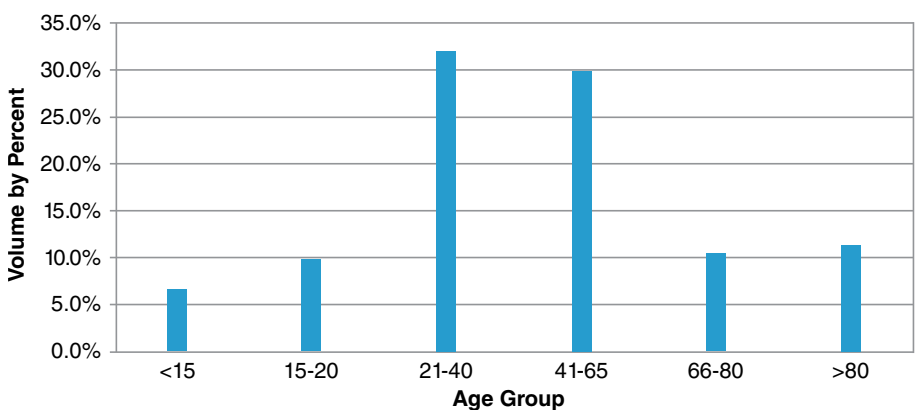
ISS: Patients with an Injury Severity Score of >24 are the most seriously injured patients. This group of patients have the highest risk of dying. Historically, a rough estimate is that patients with an ISS of >24 have almost a 50% chance of not surviving their injury.

Mechanism of Injury: 2013 Data

Mechanism of Injury by Volume



Percent of Injury by Age



Mechanism of Injury: 2013 Data

2013

Mechanism of Injury	Patients	Percent
FALL	3315	37.00%
MVC	2503	27.80%
ASSAULT	708	7.86%
GSW	556	6.17%
MVC-PEDESTRIAN	356	4.00%
MCC	336	3.70%
OTHER	280	3.10%
STAB	274	3.04%
BICYCLE	185	2.10%
BURN	151	1.68%
SPORT	120	1.30%
ATV	70	0.78%
INDUS	51	0.57%
HORSE & RIDER	27	0.30%
HANGING	19	0.21%
BITE	18	0.20%
DROWN	14	0.16%
ABUSE	7	0.07%
DIVING	5	0.06%
SMOKE	5	0.06%
BOAT	3	0.03%
ASPHYXIATION	2	0.02%

By Gender

Mechanism of Injury	Female		Male	
	Number	Percent	Number	Percent
ABUSE	4	0.11%	3	0.05%
ASPHYXIATION	1	0.03%	1	0.02%
ASSAULT	187	5.36%	522	9.40%
ATV	23	0.66%	47	0.85%
BICYCLE	33	0.95%	152	2.74%
BITE	12	0.34%	6	0.11%
BOAT	0	0%	3	0.05%
BURN	49	1.40%	102	1.84%
DIVING	1	0.03%	4	0.07%
DROWN	5	0.14%	9	0.16%
FALL	1569	44.97%	1776	31.98%
GSW	51	1.46%	505	9.09%
HANGING	5	0.14%	14	0.25%
INDUS	4	0.11%	47	0.85%
MCC	39	1.12%	275	4.95%
MVC	1197	34.31%	1309	23.57%
MVC-PEDESTRIAN	131	3.75%	225	4.05%
OTHER	94	2.69%	210	3.78%
HORSE & RIDER	22	0.63%	5	0.09%
SMOKE	2	0.06%	3	0.05%
SPORT	14	0.40%	107	1.93%
STAB	46	1.32%	228	4.11%

Mechanism of Injury: 2013 Data

By Mortality Outcome

Mechanism of Injury	Percent	Number of Deaths
ABUSE	0%	0
ASPHYXIATION	0%	0
ASSAULT	0.28%	2
ATV	1.43%	1
BICYCLE	1.08%	2
BITE	0%	0
BOAT	0%	0
BURN	3.31%	5
DIVING	0%	0
DROWN	28.57%	4
FALL	2.14%	71
GSW	14.03%	78
HANGING	5.26%	1
INDUS	3.92%	2
MCC	1.49%	5
MVC	1.36%	34
MVC-PEDESTRIAN	1.97%	7
OTHER	1.43%	4
HORSE & RIDER	0%	0
SMOKE	0%	0
SPORT	0%	0
STAB	1.46%	4

By ISS

Mechanism of Injury	0-8	9-14	15-24	25+
ABUSE	7	0	0	0
ASPHYXIATION	1	1	0	1
ASSAULT	232	75	25	7
ATV	42	18	3	2
BICYCLE	112	31	8	4
BITE	13	0	0	0
BOAT	1	1	1	0
BURN	133	11	2	4
DIVING	2	1	0	0
DROWN	0	2	4	4
FALL	1558	690	218	101
GSW	145	122	51	96
HANGING	2	2	2	2
INDUS	26	6	3	2
MCC	112	77	41	31
MVC	1052	262	119	78
MVC-PEDESTRIAN	137	37	26	13
OTHER	161	37	11	6
HORSE & RIDER	25	0	2	0
SMOKE	3	0	1	0
SPORT	126	12	2	0
STAB	120	28	16	3

ABSTRACT

Where's the difference? Presentation of nosocomial infection in critically ill trauma versus general surgery patients.

AUTHORS: Kelly KB, Banerjee A, Golob JF, Fadlaila AA, Claridge JA

BACKGROUND: Diagnosing infection efficiently is integral to managing critically ill patients. Knowing if and how trauma and general surgery patients differ in their presentation of new infectious complications could be useful. We hypothesized these populations would differ in presentation in the intensive care unit (ICU).

METHODS: We analyzed data collected prospectively from all 1,657 trauma and general surgery patients admitted to the surgical and trauma ICU (STICU) over a 21-month period. Clinical data from the first day of a newly diagnosed infection were compared for trauma (82% of the series) and general surgery (18%) patients.

RESULTS: A total of 10,424 STICU days were included, and 267 nosocomial infections were diagnosed. Trauma patients were younger (50 vs. 62 years; $p<0.001$) and more likely to be male (78% vs. 46%; $p<0.001$) than were general surgery patients. Similar percentages of the two groups were infected (11% and 13%, respectively), and infections occurred after a similar number of days in the STICU. The mean maximum temperature on the day prior to diagnosis was higher in trauma patients (38.4°C vs. 37.7°C; $p<0.001$), and the mean leukocyte count was lower (13,500 vs. 15,800 10⁶/L; $p=0.013$). General surgery patients were more likely to be hypotensive (13% vs. 2%; $p=0.002$) and to have a positive fluid balance >2 L on the first day of infection (27% vs. 13%; $p=0.02$). Respiratory infections were more common in trauma patients (40% vs. 7%; $p<0.001$), and urinary tract infections were less common (19% vs. 36%; $p=0.011$).

CONCLUSION: Differences exist in how new infections manifest in trauma and general surgery patients in the ICU. General surgery patients appeared sicker on their first day of infection, as evidenced by a higher leukocyte count, lower blood pressure, and substantial positive fluid balance. Intensivists may need differing thresholds for triggering infection workups when employed in a mixed unit.

NOTS Committees

Collaboration is the name of the game.

- Quality Committee
- Protocol Development Committee
- Research Committee
- EMS Committee
- Trauma Program Manager Committee
- Injury Prevention Committee
- Education/Symposium Committee



NOTS Committees

NOTS Committees: Mission Statement

The first goal for all the NOTS Committees is to achieve true collaboration. There is a huge difference between working together and collaborating. We sincerely believe the old adage — the whole is definitely more than the mere sum of the individual parts.

Within the NOTS Committee framework, we continue to adjust our teams to ensure we are effective, dynamic, and working continuously toward achieving the best possible outcome for our patients.

As we move forward, our Committees will grow and change. We are excited to see what research, quality improvement, and protocols will develop out of dedicated teamwork.

Thank you to all our Committee members for your hard work and commitment.



2013 Trauma Symposium

Trauma Education at its Highest Level

Our 2013 Symposium was held at the brand new Cleveland Convention Center on October 28-29. We were honored to have Dr. L.D. Britt as our keynote speaker, along with many other nationally-recognized speakers. Our attendance set a new record with over 500 people attending.

Symposium Dates

September 30-October 1, 2011
Intercontinental Hotel
Cleveland, OH

October 12-13, 2012
Intercontinental Hotel
Cleveland, OH

October 28-29, 2013
Cleveland Convention Center
Cleveland, OH

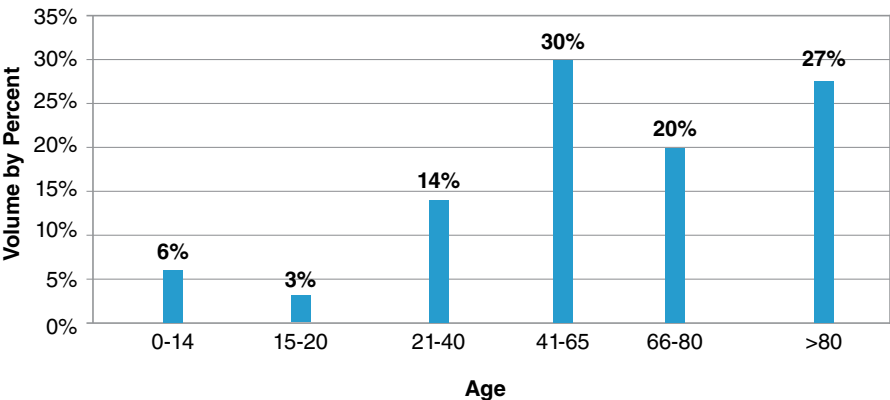
October 13-14, 2014
Cleveland Convention Center
Cleveland, OH

November 2-3, 2015
Cleveland Convention Center
Cleveland, OH

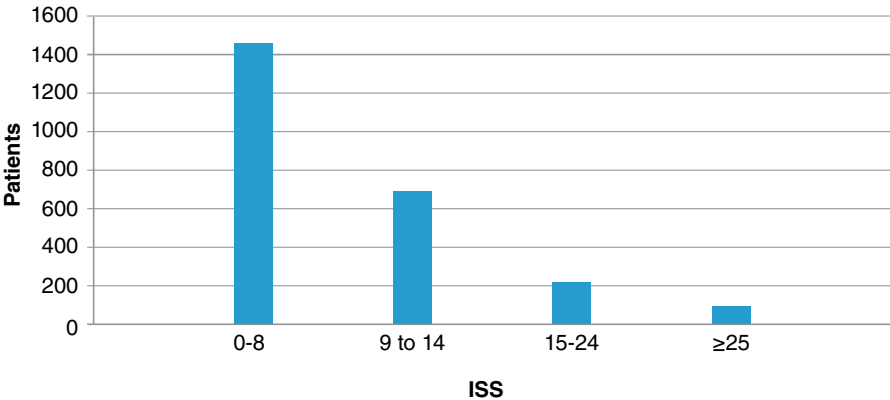


Falls: 2013 Data

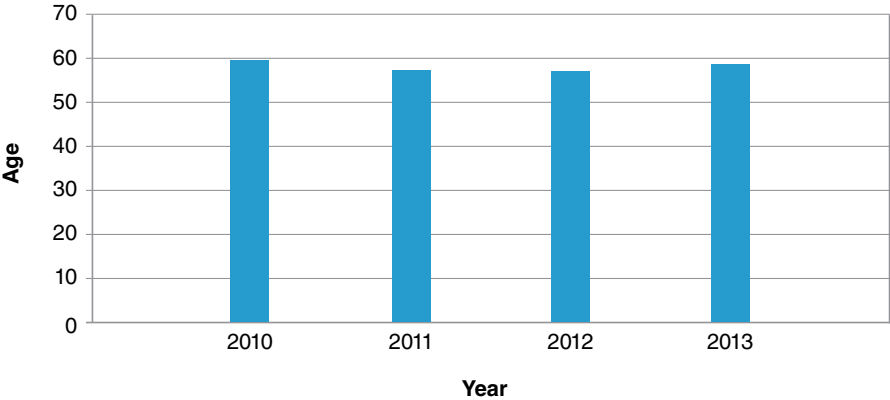
Falls: By Age



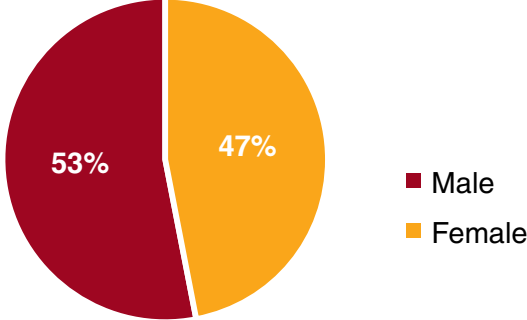
Falls: Injury Severity Score (ISS)



Falls: Mean Age

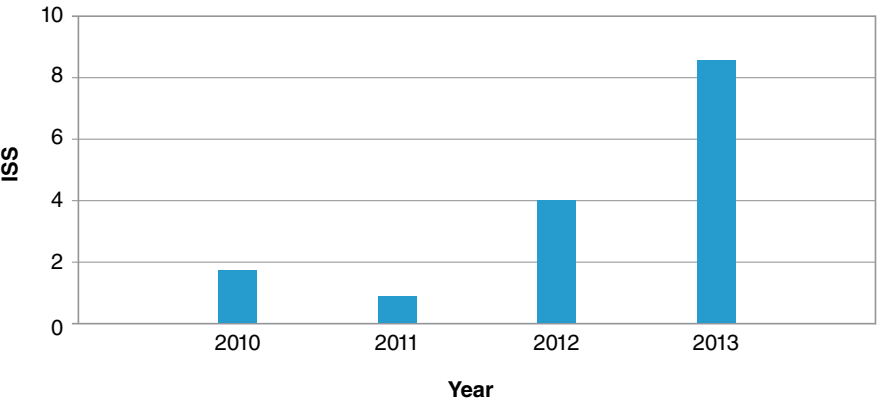


Falls: By Gender

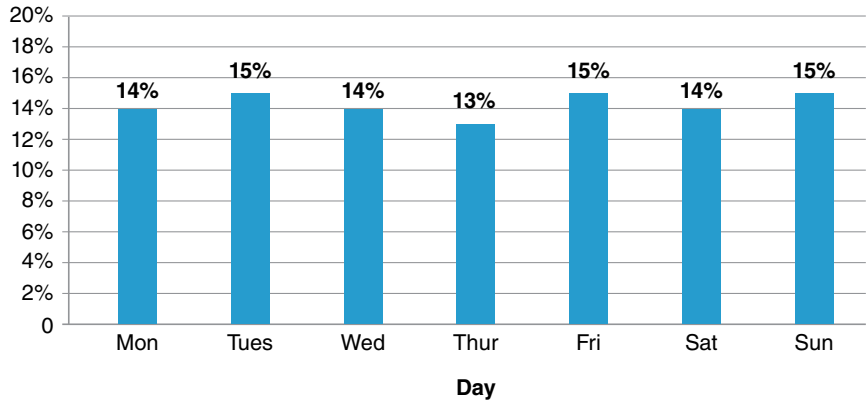


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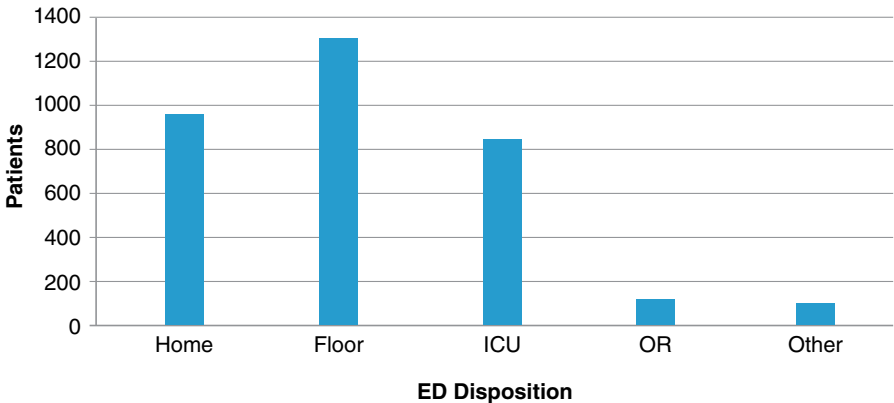
Falls: By ISS – Mean



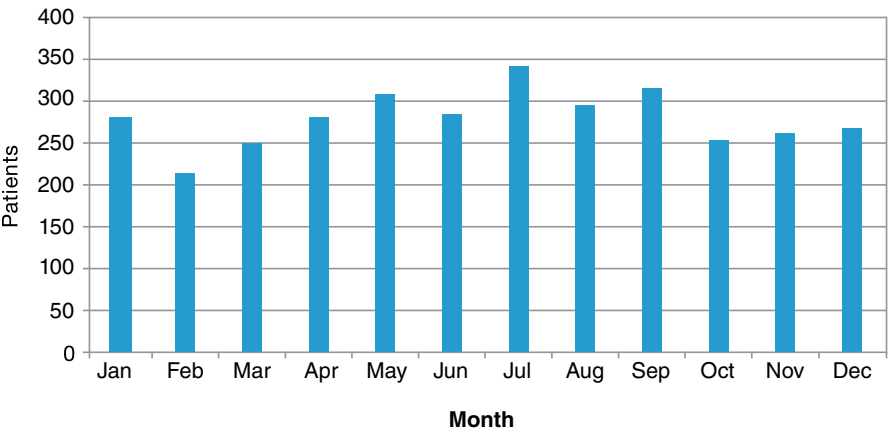
Falls: Day of the Week



Falls: Emergency Department Disposition

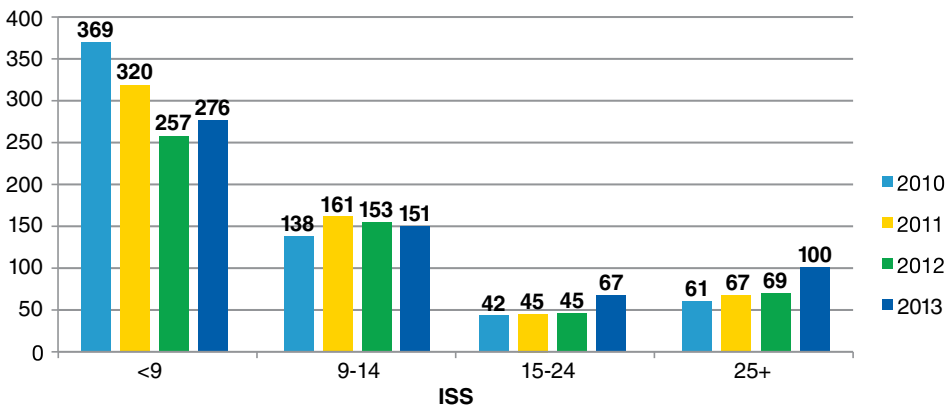


Falls: By Month

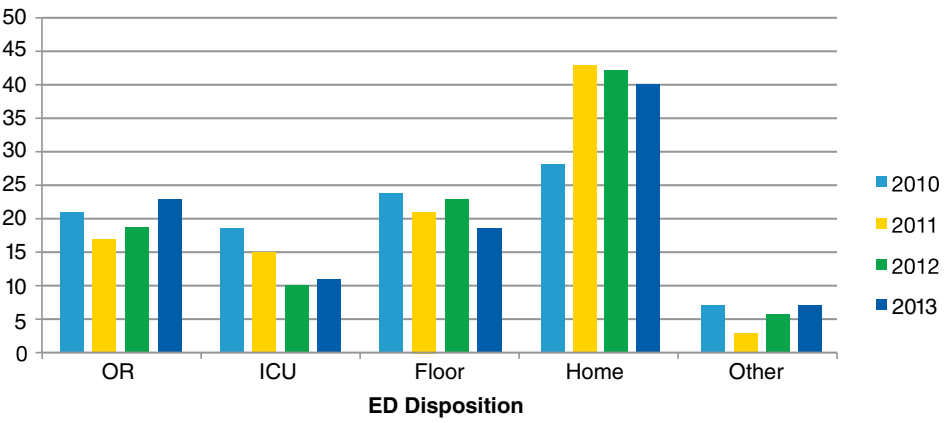


Penetrating Trauma: 2013 Data

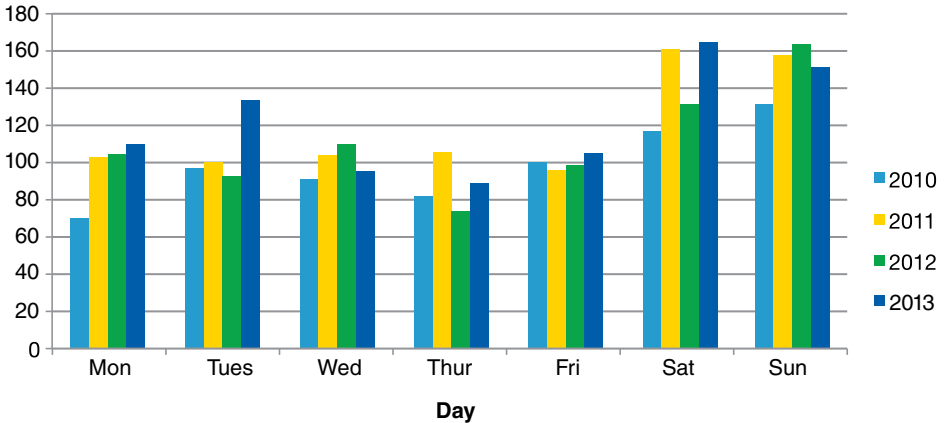
Penetrating Trauma: Injury Severity Score (ISS)



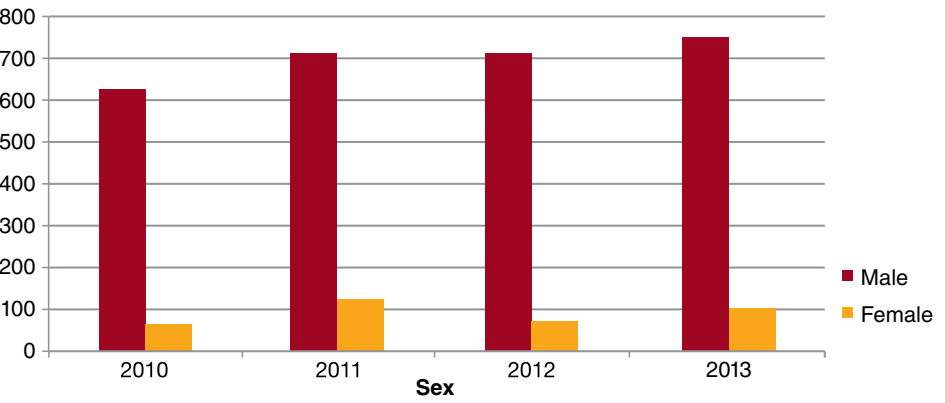
Penetrating Trauma: Emergency Department Disposition



Trauma: Day of the Week

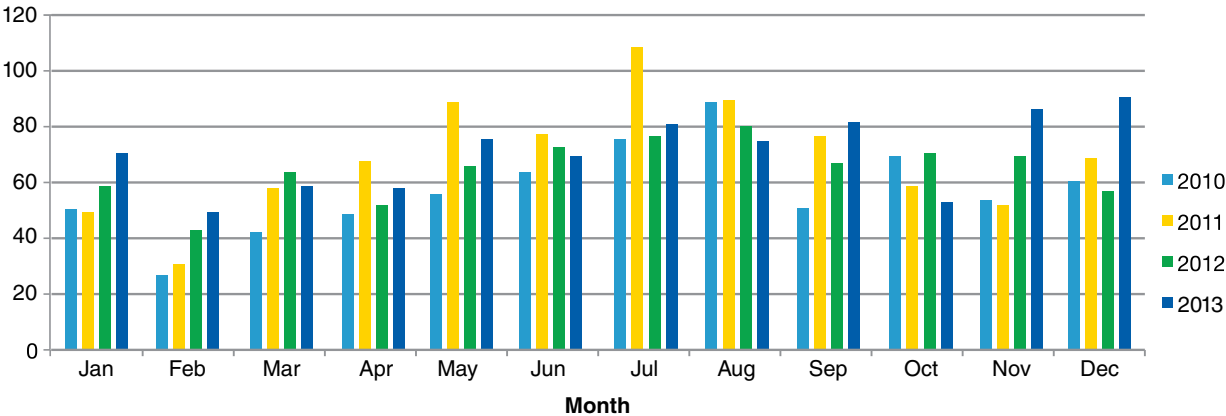


Penetrating Trauma: Gender

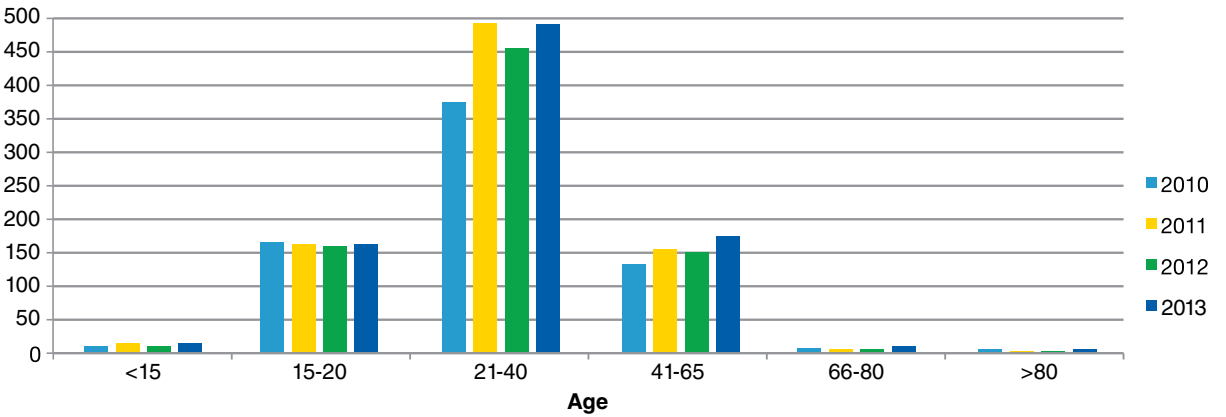


Penetrating Trauma: 2013 Data

Penetrating Trauma: Month

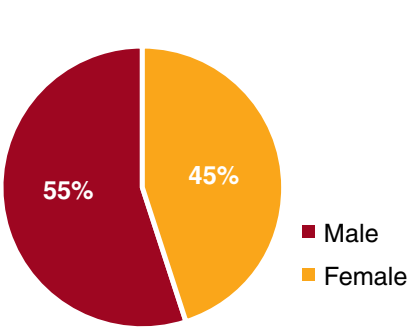


Penetrating Trauma: Age

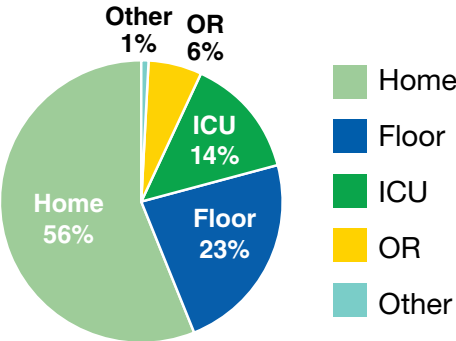


Motor Vehicle Crash: 2013 Data

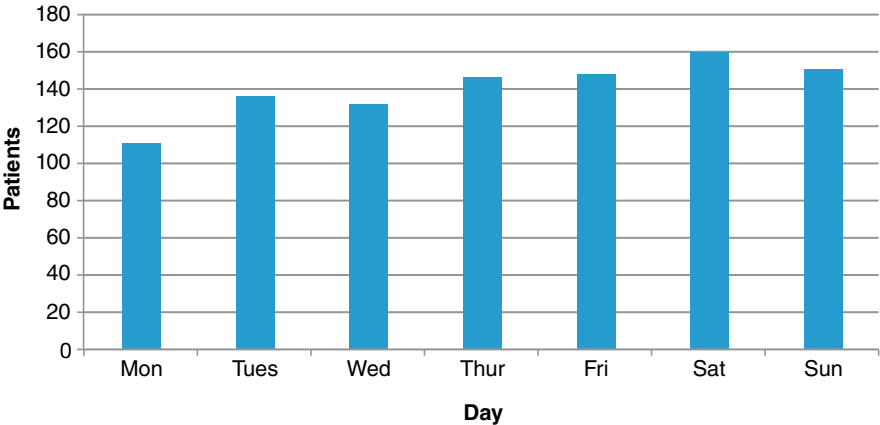
Gender



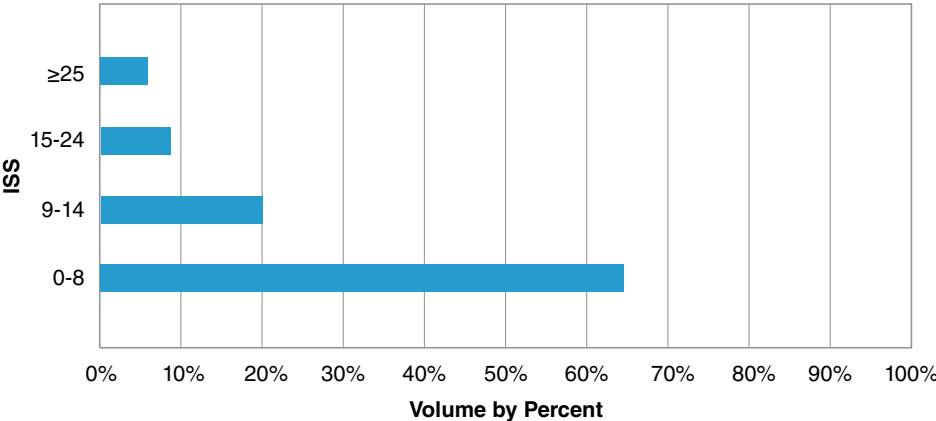
Emergency Department Disposition



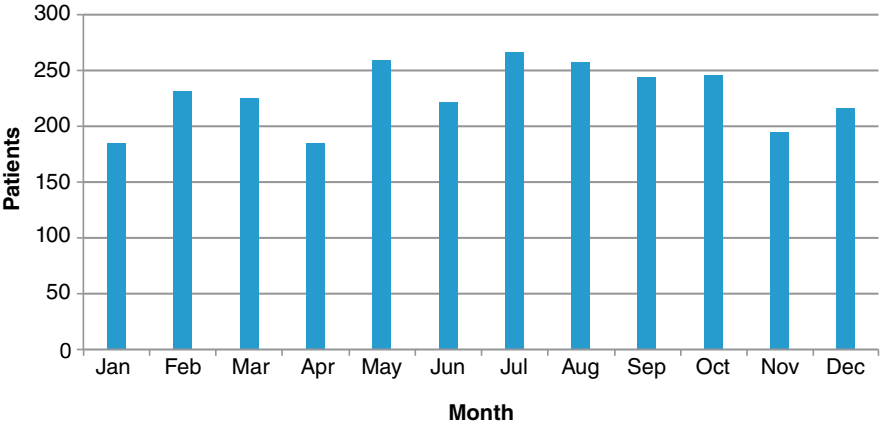
Day of the Week



Injury Severity Score (ISS)



Month



ABSTRACT

Diagnosis of infection after splenectomy for trauma should be based on lack of platelets rather than white blood cell count.

AUTHORS: Banerjee A, Kelly KB, Zhou HY, Dixon SD, Papana Dagiasis A, Quinn LM, Claridge JA

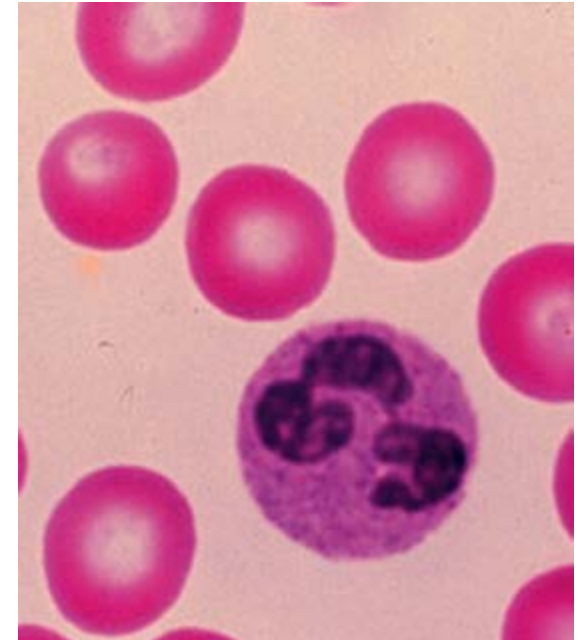
BACKGROUND: There is a lack of evidence-based criteria to assist the diagnosis of infection following trauma splenectomy (TS). However, the literature suggests that white blood cell count (WBC) is associated with infection in patients who undergo TS. We sought to find whether there exist key differences in laboratory and clinical parameters that can assist the diagnosis of infection after TS.

METHODS: We evaluated all consecutive trauma patients who had undergone TS at a Level 1 trauma center from 2005 to 2011 for the development of infection. To do this, we compared the values of demographic, laboratory, and clinical variables of infected and non-infected patients on odd post-operative days (POD) in the period from 1-15 days after TS.

RESULTS: Of 127 patients who underwent TS, 25 died within 48 h after the procedure and were excluded from our analysis, leaving, 102 patients for investigation. In the 41 (40%) patients who developed an infection, the

mean day for the first infectious episode was POD 7 (range, POD 4-14). The three most common infections were pneumonia (51%), urinary tract infection (24%), and bacteremia (20%). An evaluation of laboratory and clinical parameters showed no differences in the WBC of the patients who did and did not develop infections at any time in the 15 d after TS. However, the platelet count was statistically significantly higher in non-infected patients on POD 3-9 and on POD 13, and maximal body temperature was statistically significantly higher in the infected group of patients during the first week after TS. Differences in laboratory and clinical values of the infected and non-infected patients were greatest on POD 5.

CONCLUSIONS: Patients who undergo TS have high rates of infectious complications. The WBC is not a reliable predictor of infection in these patients in the 2 wks following TS. However, patients who do not develop infection after TS have statistically significantly higher absolute platelet counts and rates of change in their daily platelet counts than those who develop infection.



Cuyahoga County Board of Health

Mission, Vision & Core Values

Mission: To prevent disease and injury, promote positive health outcomes, and to provide critical services to improve the health status of the community.

Vision: To optimize the public health status of the community through transformational programming that creates a clear line of sight between what we do every day and how the organization performs.

Core Values: Accountability, Community Service, Integrity, Leadership and Partnership

Epidemiology, Surveillance, & Informatics (ESI)

Epidemiology, Surveillance, and Informatics Services (ESI) leads the Cuyahoga County Board of Health's efforts to collect and monitor the amount of infectious and chronic diseases in the community. Additionally, ESI also leads the agency's emergency preparedness planning efforts as well as provide technical support for agency programs such as data analysis and public health informatics (computer support) activities.

ESI Services include:

- Conducting disease / outbreak investigations.
- Monitoring the amount of disease in the community.
- Planning for county-wide emergencies.
- Evaluating the effectiveness of agency programs.
- Helping agency programs with computer related activities.



Mr. Terry Allan

Health Commissioner

NOTS Advisory Board
member since 2010



Cuyahoga County Board of Health

Environmental Public Health:

The Environmental Public Health Service area collaborates closely with local, county, regional, state, and national officials to address the needs and concerns of our residents and community partners. We are the branch of public health that is concerned with all aspects of our natural and manmade environment that may affect our health and the ways in which we impact the environment.

A dedicated and highly-educated staff, which includes registered sanitarians, registered nurses, a watershed coordinator, and a health educator, work daily to prevent environmental health hazards and to protect and promote public health.

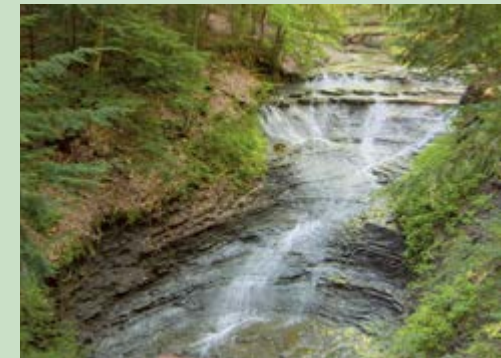
Core activities include, but are not limited to: consultation, coordination, data collection and management, education, emergency preparedness and response, enforcement, integration of related public health disciplines to attack the burdens of chronic disease, investigation, monitoring and prevention.

Education Emergency Preparedness



Pictures courtesy of:
<http://www.sciencekids.co.nz/pictures/disasters.html>

Cuyahoga County Watershed



Cuyahoga County Public Safety & Justice Services



Mr. Norberto Colón

Deputy Chief of Staff
Justice for Cuyahoga County

NOTS Advisory Board
member since 2010

On September 13, 2011, the Cuyahoga County Department of Public Safety and Justice Services was established. The Department of Public Safety and Justice Services houses all of the divisions that previously were part of the former Cuyahoga County Department of Justice Affairs.

5 Divisions:

- Administration
- Emergency Management
- Office of Mediation
- Regional Enterprise Data Sharing System (REDSS)
- Witness/Victim Service Center

Cuyahoga County Public Safety & Justice Services

Divisions

Administration

The Administration Division manages the day-to-day operations of the Department of Public Safety and Justice Services. The Division includes the Office of the Director and all PSJS Fiscal Staff. The Administration Division works closely with all divisions within the Department to make sure it is functioning at the highest level possible and supporting the mission of the Executive. The Director, Mr. Ken Mills, sets goals and objectives for the Department and works with each Manager to ensure all performance expectations are met. The Administration Division is also the conduit between the Department of Public Safety and Justice Services and the Office of the Deputy Chief of Staff, Justice.

Emergency Management

The mission of the Office of Emergency Management is to protect lives, property and the economy of Cuyahoga County through preparedness, planning, and effective response to natural disasters, man-made catastrophes, and emergencies. To accomplish our mission we work closely with county departments, municipal public safety forces, government agencies, non-governmental organizations, businesses, and the public.



Witness/Victim Service Center

Since 1974, the Cuyahoga County Witness/Victim Service Center has protected crime victims' rights to receive advocacy, information, and access to community services. Ohio law provides victims with specific rights. The Witness/Victim Service Center promotes and preserves the rights of crime victims.

Office of Mediation

What is Mediation? Mediation is a voluntary process in which the parties develop their own parenting plan with the help of the mediator. The mediator is a neutral third party who encourages parents to discuss the issues concerning their children and to help them reach an agreement. The parties control the outcome and they can communicate their feelings with each other directly, in a safe environment. This reduces hostility and helps foster a rational discussion. The outcome of the mediation is limited only by the nature of the problem and the ability of the parents to work together for their child's best interest.

Regional Enterprise Data Sharing System (REDSS)

REDSS's mission is to offer robust, redundant, and high availability architecture to all public safety clients, while embracing current and new technologies in the public safety field, and maintaining an exceptional level of customer service and availability to all clients.

City of Cleveland Department of Public Safety



The Cleveland Department of Public Safety strives to meet its objectives by providing efficient and effective service, establishing public trust through the development of strong partnerships within the community, and by focusing on public safety and improving the quality of life in Cleveland neighborhoods.



Edward J. Eckart, Jr.

Assistant Safety Director

NOTS Advisory Board
member since 2010

Terrorism Prevention and Awareness

The assistance of every Clevelander is critical to keeping neighborhoods safe. Knowing what to look for and being aware of what is going on forms the basis of an effective terrorism prevention program. Residents and those who work in Cleveland should take note of the following to ensure safety:

- > **Awareness of surroundings:** the nature of terrorism suggests there may be little or no warning.
 - > **Travel precautions:** no luggage should be left unattended, nor should packages be accepted from strangers.
 - > **Unusual activity:** conspicuous behavior, unusual activity, suspicious packages, and strange devices should be reported to police or other security personnel.
 - > **Intuition:** feeling strange or unusual could warrant exiting an area or situation.
- > **Exit planning:** all should be aware of the emergency exit locations within buildings they frequent. It is also important to note stairway locations, and heavy or breakable objects that could cause harm if falling or breaking in an explosion. Those who frequent the downtown area should be aware of the City's Evacuation Plan.
 - > **Be prepared:** additional information here at http://portal.cleveland-oh.gov/CityofCleveland/Home/Government/CityAgencies/PublicSafety/Homeland_Security/Terrorism
 - > **Safety equipment:** fire extinguisher use and locations are important, as well as the location and availability of hard hats in often-frequented buildings.



ABSTRACT

Functional and long-term outcomes in severe traumatic brain injury following regionalization of a trauma system

AUTHORS: Kelly ML, MD¹; Roach MJ, PhD²; Banerjee A, MD³; Steinmetz M, MD⁴; Claridge JA, MD³

Affiliations: ¹Department of Neurosurgery, Neurological Institute, Cleveland Clinic, Cleveland, OH; ²MetroHealth Medical Center, Center for Healthcare Research and Policy, Case Western Reserve University School of Medicine, Cleveland, OH; ³MetroHealth Medical Center, Northern Ohio Trauma System, Department of Surgery, Case Western Reserve University School of Medicine, Cleveland, OH ⁴Department of Neurosurgery, MetroHealth Medical Center, Case Western Reserve University School of Medicine, Cleveland, OH.

OBJECTIVES: We previously demonstrated that regionalization of trauma (RT) significantly reduced in-hospital mortality from 19% to 14% in patients with severe traumatic brain injury (sTBI). However, functional and long-term outcomes had not been assessed. We hypothesized that RT would be associated with improved functional and long-term outcomes in sTBI patients.

METHODS: All TBI patients >14 years with a Head Abbreviated Injury Scale ≥ 3 were identified from the RT database and matched to the state death index and the regional TBI rehabilitation (TBIr) database. Data from 2008 through 2012 were analyzed before and after RT in 2010. For patients discharged to the TBIr unit, overall Functional Independence Measure (FIM) scores and FIM score gains were compared pre- and post-RT.

RESULTS: 3,496 patients with sTBI were identified in the RT database; 1,359 pre-RT and 2,137 post-RT. Table 1 shows decreased post-RT mortality at 30-days and 6-months. Multivariable logistic regression demonstrated RT to be an independent predictor against mortality at 30-days (OR: 0.74; 95% CI: 0.60-0.91, C-stat=0.84) and 6-months (OR: 0.82; 95% CI: 0.67-0.99, C-stat=0.82). Discharges to the TBIr unit increased from 117 (9%) pre- to 297 (14%) post-RT ($p<0.0001$), while discharges to home and non-TBIr units remained similar. Injury Severity Scale (ISS) and Glasgow Coma Scale (GCS) scores for all discharged patients remained similar. FIM admission scores were similar pre- (median: 54; interquartile range: 30,65) and post-RT (48;31,61) ($p=0.2$) and remained similar at discharge pre- (92;75,102) and post-RT (89;73,100) ($p=0.1$). TBIr patients showed similar FIM score gains pre- (37;26,46) and post-RT (36;24,49) ($p=0.6$).

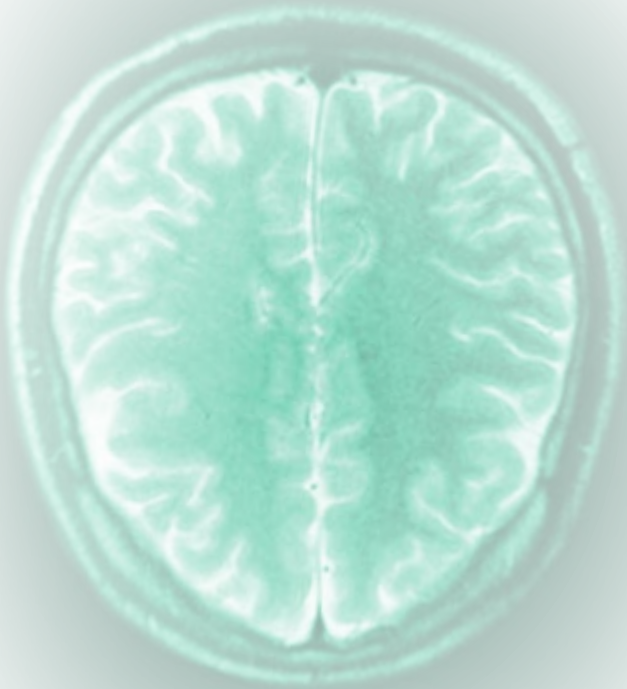
CONCLUSION: Regionalization of trauma was associated with reduced long-term mortality, increased TBIr admissions, and similar FIM score improvements for patients with sTBI.

Table 1. Mortality for sTBI patients pre- and post-RT (n=3496)

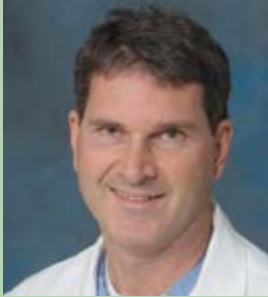
	Pre-RT (n=1359)	Post-RT (n=2137)	P value
In-hospital	262 (19%)	302 (14%)	<0.0001*
30-day	285 (21%)	343 (16%)	<0.0001*
6-month	320 (24%)	417 (20%)	0.004*

RT = Regionalized trauma system; TBI = Traumatic Brain Injury

*Statistically significant



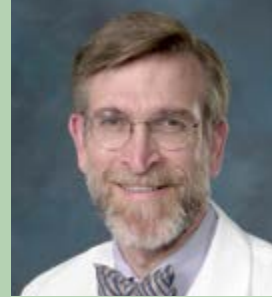
Northern Ohio Trauma System 2013 **Advisory Board** Members



Dr. Brendan M. Patterson
Chairman



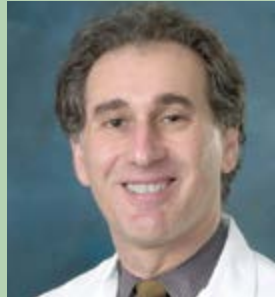
Dr. David L. Bronson



Dr. Alfred F. Connors, Jr.



Mr. Fred M. DeGrandis



Dr. Charles L. Emerman



Dr. Robert Wyllie



Mr. Edward J. Eckart, Jr.



Mr. Terry Allan



Mr. Norberto Colón

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Jack He, MD

Trauma Research Fellow

CONCLUSION

This is NOTS' Fourth Annual Report. We are continuously learning, growing and changing.

It has not always been easy, but it has always been worth the effort. During difficult times we always brought it back to — *what is best for the patient*. As long as we keep our sights set on the patient, we can never go wrong.

Thank you to everyone who has taken care of a patient who sustained traumatic injuries. It is your incredible skill, hard work and caring that makes our community a better place for us all to live.

— Deb Allen

NOTS 2014 Annual Report

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

Edited by: Cheryl Hawkins, Coordinator

Glossary of Terms

AIS: The Abbreviated Injury Scale (AIS) was developed by the Association for the Advancement of Automotive Medicine. The goal of the scale was to quantify the impact of automobile crashes on the human body. The AIS scale is based on a set of codes which correspond to specific locations on the body. The scale also provides a rating scale from 1 to 6 which describes the severity of injury. The AIS codes are the basis for the calculation of the ISS score.

ED Disposition: ED disposition designates where the patient went after treatment in the Emergency Department. The patient may have been discharged to home, home with home health or left the hospital AMA. The patient may have been admitted to a hospital floor, the ICU, went directly to surgery or kept for 23-hour observation. The patient may have been transferred to another facility or died. The patient floor can be any regular inpatient unit. The ICU would include any critical care unit including Telemetry, Intensive Care Unit (ICU) and Coronary Care Unit (CCU).

ED Disposition Other: includes patients who died, were transferred, or admitted for 23-hour observation.

Head Injury: Head injury was determined by the following ICD-9 codes. The codes are 804.1-804.4, 804.6-804.9, 804.00-804.06, 850.0-850.5, 804.5-804.53, 804.50-804.53, 804.55 - 804.56, 851-854, 950.0-950.3, 800, 801, 803, 804.9, 850.9, 850.59, 995.55, 959.01.

ISS: The 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 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.

Mean: Is the result of dividing the sum of the numbers by the number of numbers. It is something referred to as average. For example, you take a sample of 100 patients and sum their age and divide by 100. The result would be the mean age of patients in the sample.

Mechanism of Injury Other: This category includes bicycle injuries, drownings, burns, industrial, motorcycle, pedestrian, sport/leisure, stabbing, suicide and ones that do not fit a category.

Hospital Shifts: 1st Shift = 0700-1459,
2nd Shift = 1500-2259, 3rd Shift = 2300-0659

ICD-9: Classification systems are important for the diagnosis and treatment of disease. A major classification system is the ICD-9 or International Classification of Diseases version 9. This system was developed in conjunction with the World Health Organization.





right patient. right place. right time.

NOTS Transfer Center: **216-778-7850**

THANK YOU!

The Annual Report would not have been possible without the help of the following dedicated Cleveland Clinic and MetroHealth personnel:

(In Alphabetical Order)

Mary Anne Edwards

Palma Filighera

Joyce Hudak

Pamela Owen

Bernadette Szmigielski



NORTHERN OHIO TRAUMA SYSTEM

Northern Ohio Trauma System
2500 MetroHealth Drive, Room H947
Cleveland, Ohio 44109

Deaths per 1000 Trauma Events, 2008 to 2013 Northern Ohio Trauma System Hospitals

