



NORTHERN OHIO TRAUMA SYSTEM

2015 ANNUAL REPORT

right patient • right place • right time

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WELCOME



Now in our fifth year, NOTS has consistently demonstrated that working together collaboratively results in better outcomes for our community.

Trauma is the leading cause of death between the ages of 1-44, and is a disease that results in the loss of more productive years of lives than any other disease.

Through NOTS we have now demonstrated significant improvement in survival. If one evaluates the mortality before and after NOTS, there have been more than 800 lives saved through teamwork and collaboration. Our region's results are being presented nationally and are being published in peer-reviewed journals. We have demonstrated an improvement in patients with traumatic brain injury, which has been published in the *Journal of Trauma*. This year we are presenting our improvement in patients undergoing emergent abdominal surgery at the largest trauma meeting in the nation, the American Association for the Surgery of Trauma.

Furthermore, we are working on evaluating our region's improvement in mortality compared to other areas across the state. We have a lot to be proud of as we are the only large metropolitan area that has shown a significant improvement in mortality in the State of Ohio. We have included this data on page 19.

We are working hard to share our data transparently with the community and are proud to report our work in this year's NOTS annual report. Please take the time to review the information provided in the annual report and give us your feedback. I would personally like to thank everyone in our region who has worked together for the purpose of helping a victim of trauma.

It is an honor to serve as the Medical Director for NOTS, and I urge us all to work together to improve the outcomes for trauma victims.

Sincerely,

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

Jeffrey A. Claridge, MD, MS, FACS
Medical Director, Northern Ohio Trauma System

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

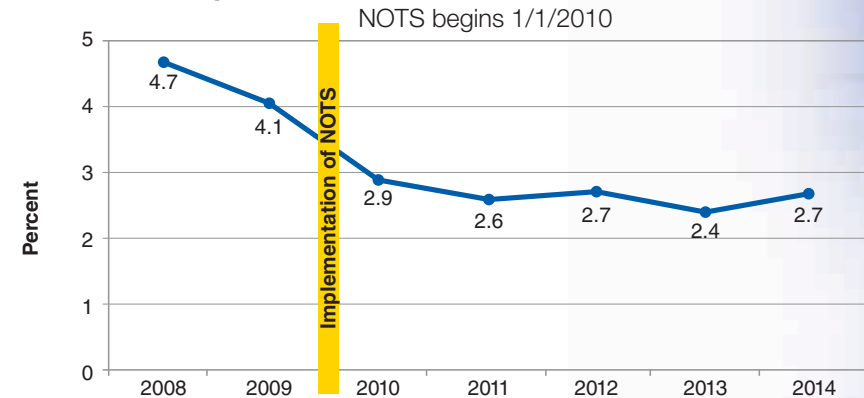
NOTS: **MISSION** STATEMENT

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.

QUALITY OF CARE
OPTIMIZATION

Collaboration = Saving Lives

Mortality



Collaboration includes sharing of planning, making decisions, solving problems, setting goals, assuming responsibility, working together cooperatively, communicating, and coordinating openly (Baggs & Schmitt, 1988).

EDUCATION

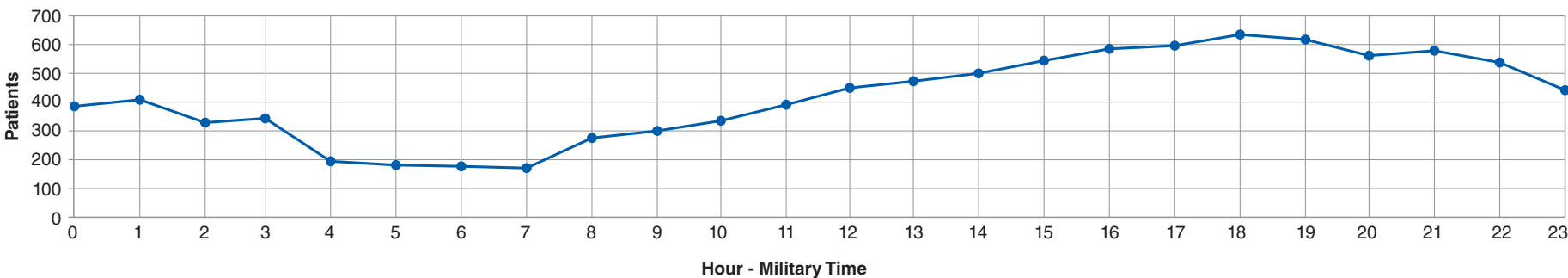
COLLABORATION

EXECUTIVE SUMMARY

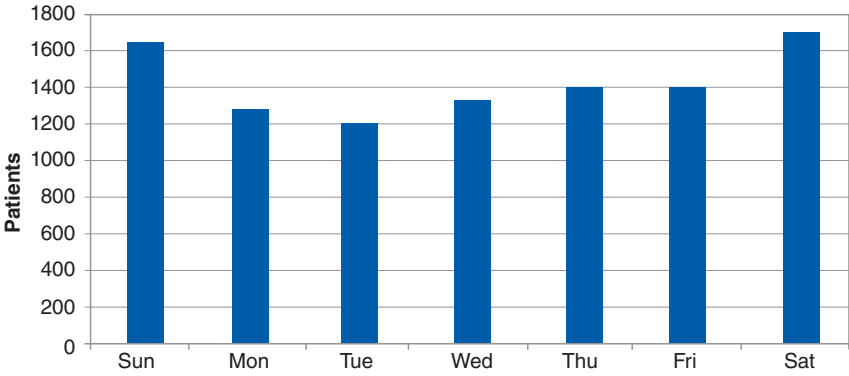
This report is a summary of 2014 data collected from the trauma hospitals within the NOTS system. Individual trauma centers submit their data to the NOTS regional database; the data is aggregated for use in research, injury prevention, protocol development, and quality assurance.

FREQUENCY OF TRAUMA: 2014 DATA

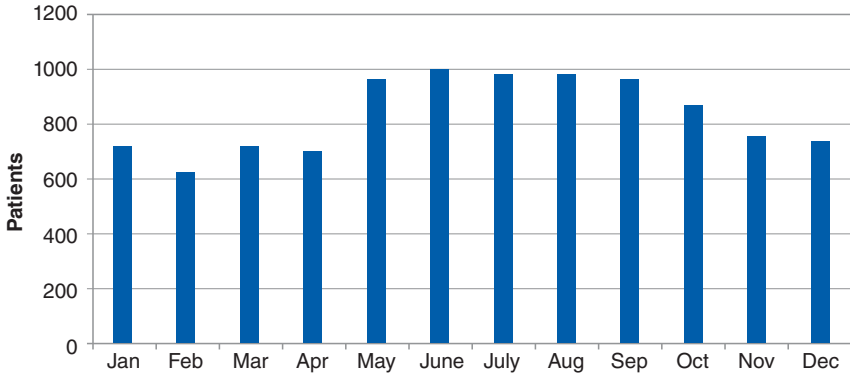
Frequency of Trauma: By Hour of Day



Frequency of Trauma: By Day of Week



Frequency of Trauma: By Month



Note: Southwest General Hospital data included in this page only.



“The Northern Ohio Trauma System has again demonstrated how a partnership between health care institutions (Cleveland Clinic, The MetroHealth System and Southwest General Hospital) can benefit the citizens of Northern Ohio. The survival of patients suffering from major trauma continues to improve, and we

Robert Wyllie, MD

Associate Chief of Staff, Chief Medical Operating Officer Systemwide Medical Operations
Professor, Lerner College of Medicine / Cleveland Clinic / Chairman, NOTS Advisory Board

are expanding our services to treat time sensitive medical conditions such as stroke. The collaboration among health care providers and focusing services has allowed us to gain experience and optimize trauma medical care delivery to Northern Ohio.”

NOTS **TRAUMA** CENTERS

The MetroHealth System

Level I Adult and Level II Pediatric
ACS Verified Trauma Center
Regional Verified Burn Center



Hillcrest Hospital

Level II Adult
ACS Verified Trauma Center

Fairview Hospital

Level II Adult
ACS Verified Trauma Center



Southwest General Hospital

Level III Adult
ACS Verified Trauma Center



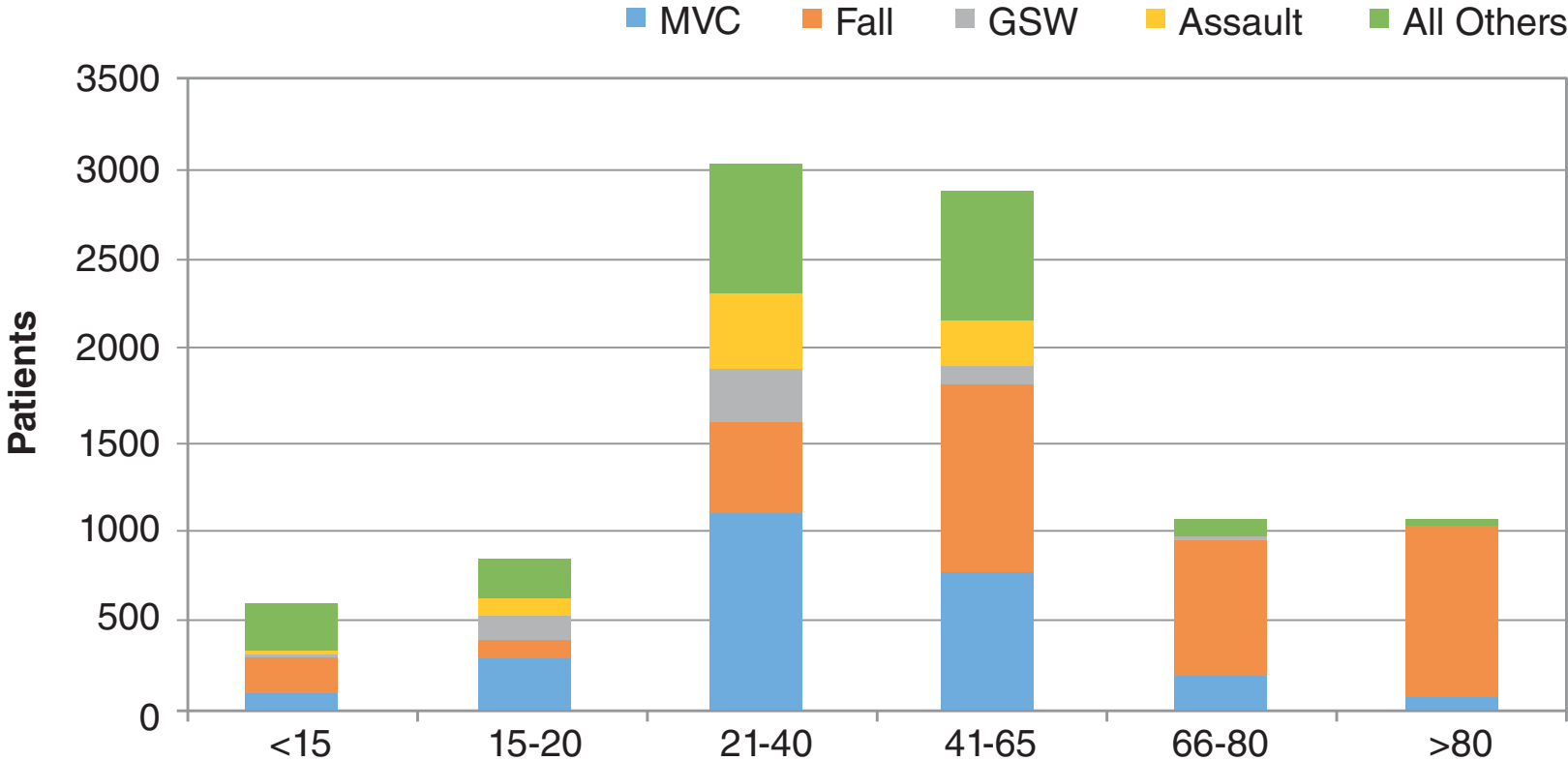
NOTS **NON-TRAUMA** CENTERS

- > Ashtabula County Medical Center
- > Brunswick Family Health Center
- > Cleveland Clinic Main Campus
- > Euclid Hospital
- > Lakewood Hospital
- > Lutheran Hospital
- > Marymount Hospital
- > Marymount Medical Center,
Broadview Heights
- > Medina Hospital
- > Richard E. Jacobs Health Center
- > Sagamore Hills Medical Center I & II
- > South Pointe Hospital
- > Twinsburg Family Health and
Surgery Center



TOP MECHANISMS OF INJURY: 2014 DATA

Top Mechanisms of Injury by Age Group



Note: "All Others" include Asphyxiation, Hang, Motorcycle, Motor Vehicle vs. Pedestrian, Bicycle, ATV, Horse & Rider, Stab, Drown, Watercraft, Bite, Sport, Burn, and all otherwise unclassified.

MECHANISMS OF INJURY: 2014 DATA

By Age Group

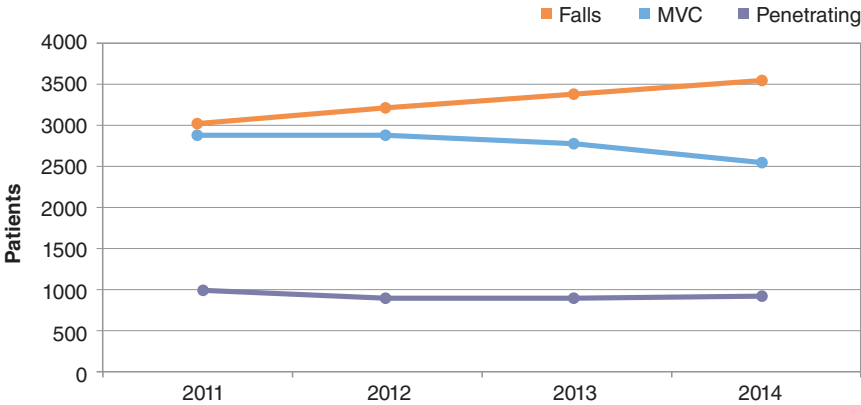
Mechanisms of Injury	<15	15-20	21-40	41-65	66-80	>80
Asphyxiation	2	0	3	0	1	0
Assault	20	102	412	266	15	2
ATV	9	8	23	11	0	0
Bicycle	58	35	61	100	9	0
Bite	8	1	5	6	0	1
Burn	47	8	45	65	20	7
Drown	4	0	1	0	1	0
Fall	198	107	499	1064	757	943
GSW	9	123	305	82	7	2
Hang	1	1	12	2	0	0
Horse & Rider	7	6	13	20	1	1
Motorcycle	7	18	131	186	10	0
MVC	103	299	1100	764	196	84
MVC vs. Pedestrian	29	46	115	90	25	12
Other Blunt	43	22	106	105	20	15
Other Penetrating	8	5	29	26	3	2
Sport	32	28	18	2	0	0
Stab	1	32	153	81	1	1
Watercraft	0	1	4	4	0	0
Total	586	842	3035	2874	1066	1070

MECHANISMS OF INJURY: 2014 DATA

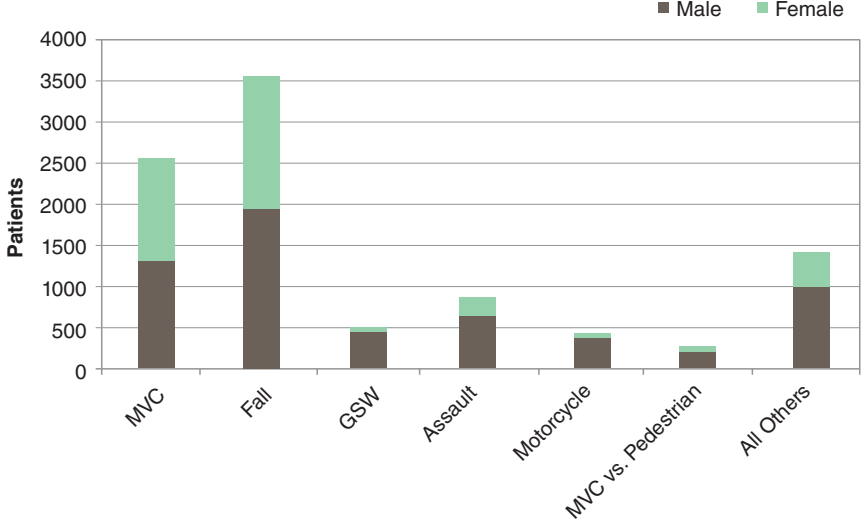
All Patients

Mechanisms of Injury	Patients
Asphyxiation	6
Assault	817
ATV	51
Bicycle	263
Bite	21
Burn	192
Drown	6
Fall	3568
GSW	528
Hang	16
Horse & Rider	48
Motorcycle	352
MVC	2546
MVC vs. Pedestrian	317
Other Blunt	311
Other Penetrating	73
Sport	80
Stab	269
Watercraft	9
Total	9473

Top Mechanisms of Injury: By Year

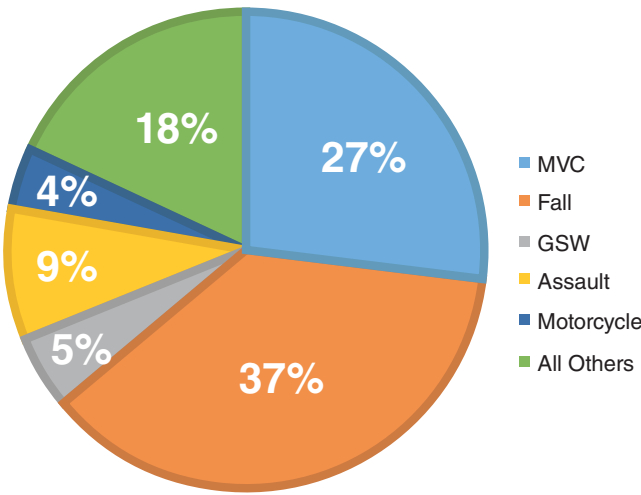


Mechanisms of Injury: By Gender



MECHANISMS OF INJURY: 2014 DATA

All Patients



Note: "All Others" include Asphyxiation, Hang, Motor Vehicle vs. Pedestrian, Bicycle, ATV, Horse & Rider, Stab, Drown, Watercraft, Bite, Sport, Burn, and all otherwise unclassified.

By ISS Group

Mechanisms of Injury	<9	9-14	15-24	25+
Asphyxiation	3	2	0	0
Assault	259	101	26	8
ATV	25	17	1	3
Bicycle	91	50	17	5
Bite	19	0	0	0
Burn	157	14	1	13
Drown	0	3	0	3
Fall	1571	726	236	110
GSW	134	132	48	73
Hang	1	4	0	4
Horse & Rider	36	8	1	0
Motorcycle	127	76	39	18
MVC	970	307	115	71
MVC vs. Pedestrian	105	45	25	10
Other Blunt	165	44	17	7
Other Penetrating	49	5	0	2
Sport	46	9	3	0
Stab	129	36	8	8
Watercraft	1	4	0	1
Total	3888	1583	537	336

Note: Those without a scored ISS are excluded from this chart.

LEADERS IN TRAUMA CARE: **METROHEALTH MEDICAL CENTER**

Level I Adult, Level II Pediatric Trauma Center Regional Burn Center

- > MetroHealth Medical Center is the region's only Level I Adult Trauma Center and Level II Pediatric Trauma Center certified by The American College of Surgeons.
- > As Ohio's only verified Adult and Pediatric Burn Center, MetroHealth provides primary care, teaching, training, and research in burn injuries. The Comprehensive Burn Care Center treats more than 1,700 outpatient and inpatient burn injuries every year.
- > MetroHealth's Trauma Center is one of the busiest in the nation, with over 3,000 admissions related to trauma per year.
- > The 27-bed Surgical Intensive Care Units admit more than 2,000 critically ill surgical patients per year.



Rendering of Critical Care Pavilion 2-Story Expansion

LEADERS IN PEDIATRIC TRAUMA CARE: METROHEALTH MEDICAL CENTER

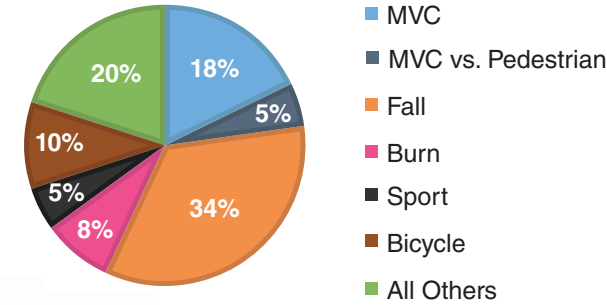
Level II Pediatric Trauma Center

- > More children die of injury than all other causes combined.
- > For injured children who survive, severe disability may become a lifelong problem requiring long-term care and further increasing the financial burden on society.



- > Effective care of injured children requires a comprehensive and inclusive approach that recognizes childhood injury as a major public health problem, identifies effective strategies for prevention, improves systems of emergency medical care for children, and provides the highest quality for pediatric trauma care (American College of Surgeons, 2014).
- > The Northern Ohio Trauma System works diligently to ensure the unique needs of injured children are met.

Pediatric Mechanisms of Injury



Note: This Pediatric chart includes patients 14 years of age and younger.

Note: "All Others" include Asphyxiation, Hang, Motorcycle, ATV, Horse & Rider, GSW, Assault, Stab, Drown, Watercraft, Bite, and all otherwise unclassified.

PICU
Pediatric Intensive
Care Unit



LEADERS IN TRAUMA CARE: **FAIRVIEW HOSPITAL**

Level II Adult Trauma Center

- > The west side's only Level II Adult Trauma Center.
- > Fairview has been an American College of Surgeons' Verified Trauma Center since 1993.
- > The Emergency Department treats more than 75,000 people each year.
- > The recently built state-of-the-art Emergency Department and Intensive Care Units provide care for all levels of injuries.



LEADERS IN TRAUMA CARE: **HILLCREST HOSPITAL**

Level II Adult Trauma Center

- > Hillcrest is the only Level II Adult Trauma Center on Cleveland's east side.
- > Hillcrest first became an American College of Surgeons' verified Level II Adult Trauma Center in 1993.
- > Trauma Surgeons are on call 24/7 to rapidly respond, assess, and provide prompt care for traumatic or life threatening injuries.
- > The Emergency Department is capable of taking care of everything ranging from minor injuries to critical and resuscitative care.



LEADERS IN TRAUMA CARE: **SOUTHWEST GENERAL HOSPITAL**

Level III Trauma Center

- > NOTS is pleased and honored to have Southwest General Hospital become part of our Trauma System.
- > Southwest is verified by the American College of Surgeons (ACS) Committee on Trauma as a Level III trauma center.
- > This verification recognizes that trauma service has 24-hour, in-house coverage by highly specialized physicians and nurses prepared for the immediate treatment of the critically injured patient.
- > Southwest's Mission Statement:
Health is our Passion, Quality is our Focus, Compassion is our Way.



Meet our new partners



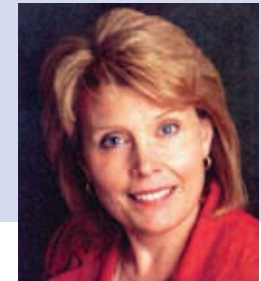
**Craig M. Eyman,
DO, FACOS, FACS**
Trauma Medical
Director



Susan Tout, MD
System Medical Director
Emergency Services



**Noreen Molek,
RN, BA, CNP**
Trauma Program
Manager



**Jackie Haumschild,
MSN, RN, BA, EMT**
Nurse Manager/
EMS Coordinator

OHIO DEPARTMENT OF PUBLIC SAFETY: AN OVERVIEW OF TRAUMA MORTALITY

In 2015 the Ohio Department of Public Safety (ODPS), Division of EMS published *An Overview of Trauma Mortality Trends in Select Urban Counties in Ohio* (http://www.publicsafety.ohio.gov/links/ems_Select_mortality.pdf). The State data was evaluated to determine if there have been changes in mortality after a traumatic injury within the major urban counties in Ohio. We compared the data before and after the inception of NOTS in 2010.

- > This is a preliminary look at data from across the state to evaluate hospital mortality as recorded in the state trauma database.
- > The comparison was done between patients seen from 2006 through 2009 vs. 2010 through 2012. This is their most recent data.
- > This first look was done to evaluate mortality of patients injured in the most populated areas.
- > This initial analysis includes the 5 major metropolitan areas and their respective counties. Overall statewide mortalities are also reported.
- > The areas included are:
 - Cleveland – Cuyahoga County
 - Cincinnati – Hamilton County
 - Columbus – Franklin County
 - Akron/Canton – Summit and Stark Counties
 - Dayton – Montgomery County
 - Toledo – Lucas County

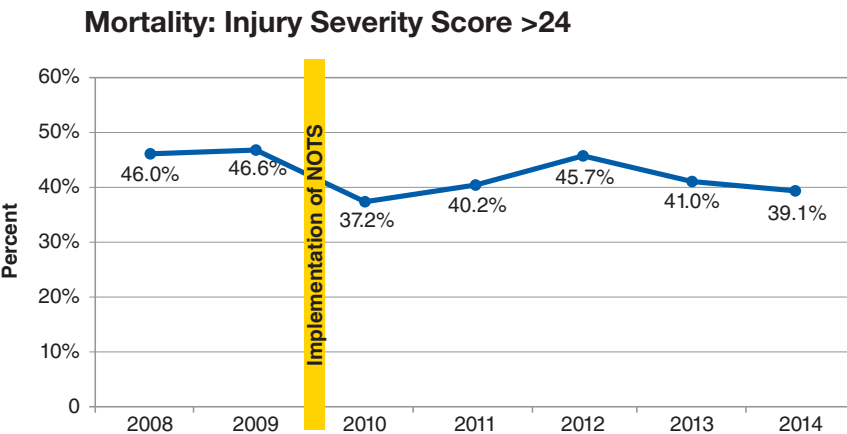
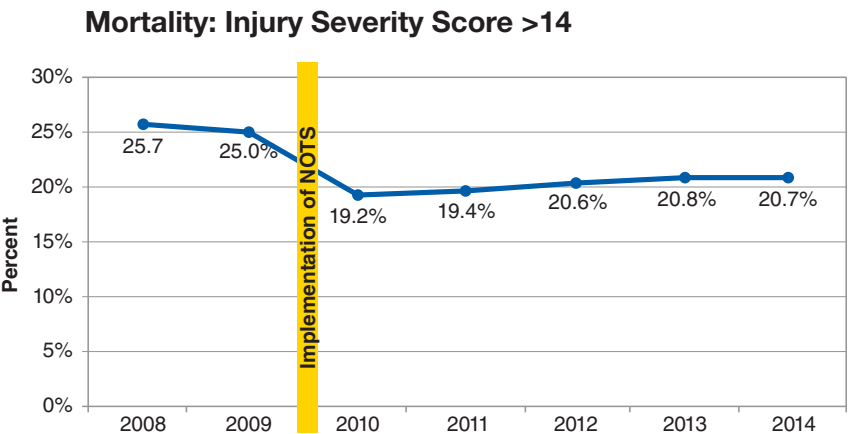
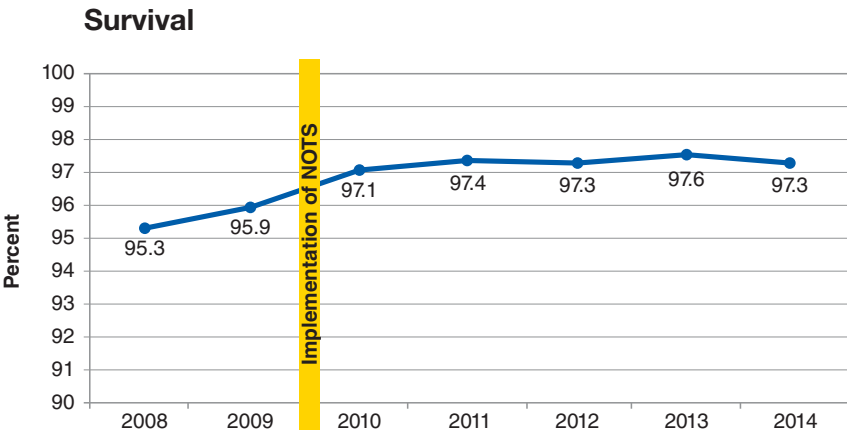
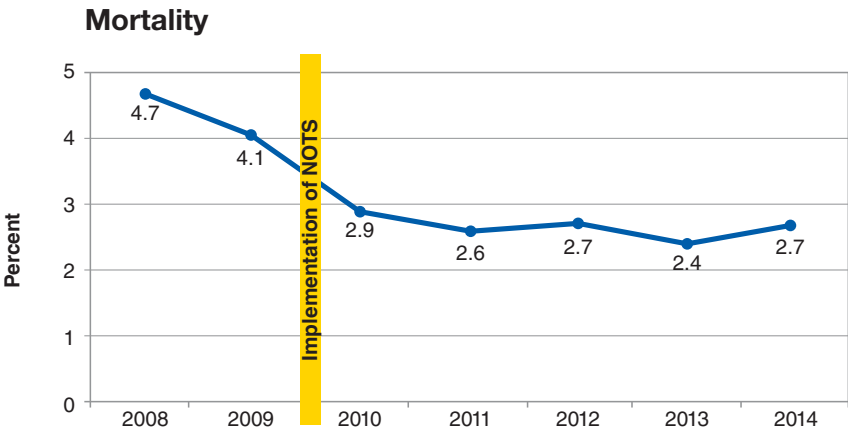
County	Relative % Change in Hospital Mortality
Statewide (N=220,468)	No Significant Change
Cuyahoga (N=22,255)	(↓↓↓) 26.6% reduction in deaths
Franklin (N=23,370)	No Significant Change
Hamilton (N=11,419)	No Significant Change
Summit (N=8,751)	No Significant Change
Montgomery (N=11,945)	No Significant Change
Lucas (N=11,387)	(↑↑↑) 57.1% increase in deaths
Stark (N=6,174)	(↑↑↑) 42.3% increase in deaths

LEADERS IN COLLABORATION: **NORTHERN OHIO TRAUMA SYSTEM**



When Experience, Expertise, and Care Matters – **We Are Here For You**

OUTCOMES: 2008-2014 DATA



NOTS begins 1/1/2010

EACH STORY IS UNIQUE

A cold winter night
A home invasion
A sawed off-shotgun
A family changed
forever



“I remember thinking, I have to protect my family.”

Within the next couple of minutes, Mr. Smith's family was terrorized and he was shot in the chest and abdomen at point-blank range...



Mr. Smith and his family survived. This is their story.

On a cold wintery night in March, Mr. Smith arrived home exhausted from a long trip. He immediately went upstairs to his bedroom to take a nap. In the living room, downstairs from where Mr. Smith was sleeping, Mrs. Smith, her sister, and six children were in the living room.

There was a knock at the door; Mrs. Smith opened the door to a home invasion. Multiple men entered the house and demanded money.

Mr. Smith heard the noise and came to protect his family – he was shot in the chest and abdomen by a sawed-off shotgun at close range – greater than 300 pellets were shot into his body.

- Mr. Smith arrived in the Emergency Department at MetroHealth Medical Center, hypotensive from massive blood loss. Not only had Mr. Smith been shot, but the invaders also slashed him across his upper chest.
- Within 8 minutes, Mr. Smith was in the operating room with three trauma surgeons and a team of highly experienced nurses and OR staff.
- Mr. Smith was hospitalized for 3 months and endured multiple surgeries.

Within 8 minutes after arrival to the trauma bay, Mr. Smith was in the operating room.





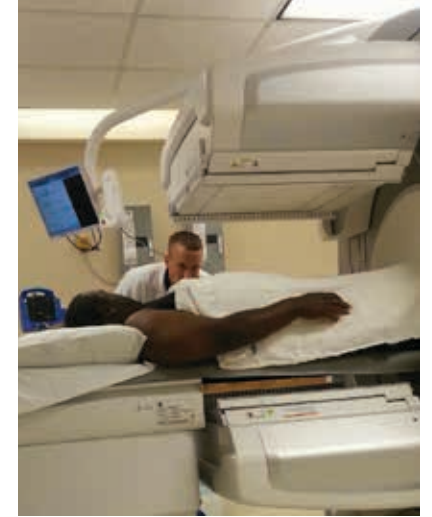
An excellent trauma center expects the unexpected and prepares for it...

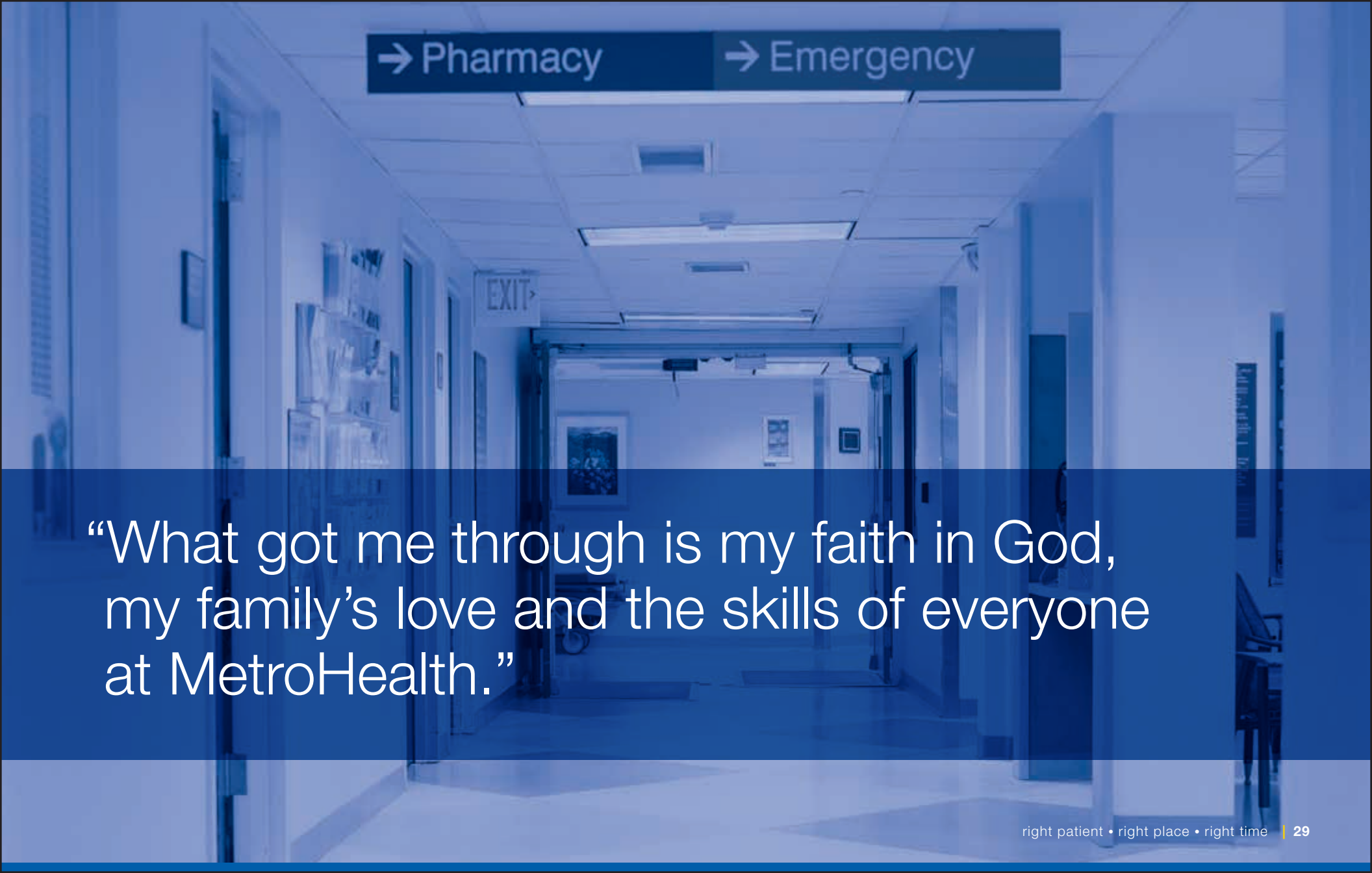
“Mr. Smith sustained a complex abdominal wound. Although the treatment of his injury has been very difficult, we have extensive experience with situations like his. A combination of time, patience, and appropriate surgical therapy has led to an excellent outcome for what otherwise might have been a fatal injury.”

John J. Como, MD, MPH, FACS, FCCM, Associate Trauma Director

More than 150 health care workers with years of experience in the field of trauma were involved in saving Mr. Smith's life.





A photograph of a hospital hallway with a blue tint. At the top, a dark sign with white text points right to 'Pharmacy' and right to 'Emergency'. Further down the hallway, an 'EXIT' sign is visible above a doorway. The hallway has white walls, a tiled floor, and several doors on the left side.

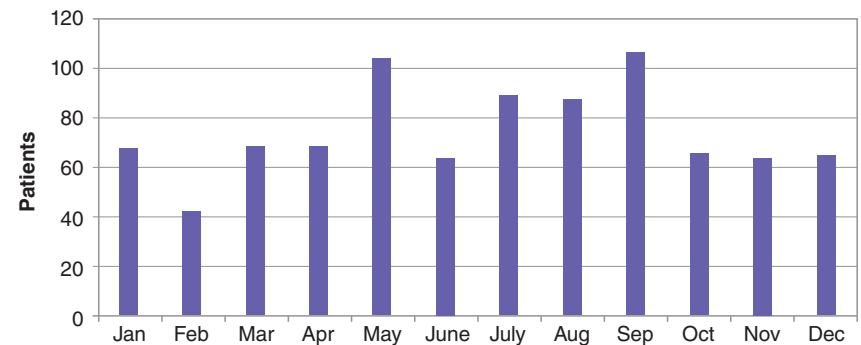
→ Pharmacy

→ Emergency

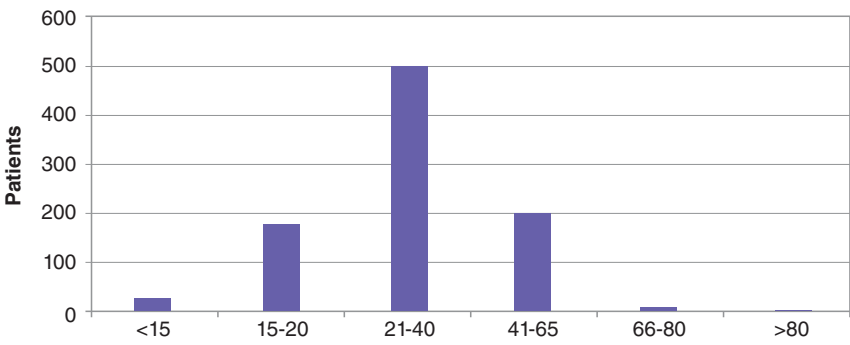
“What got me through is my faith in God,
my family’s love and the skills of everyone
at MetroHealth.”

PENETRATING TRAUMA: 2014 DATA

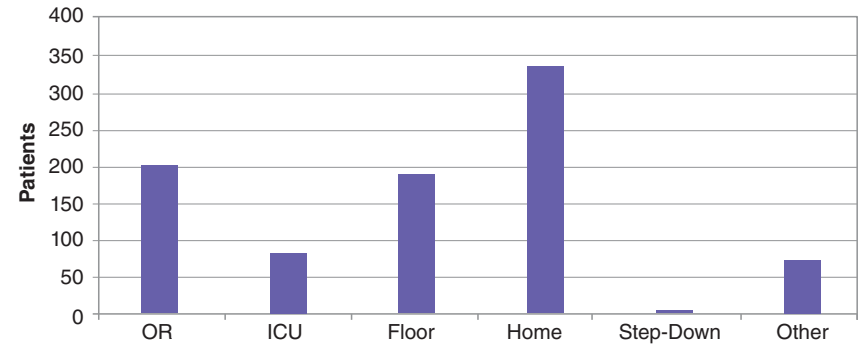
Penetrating Trauma: By Month



Penetrating Trauma: By Age

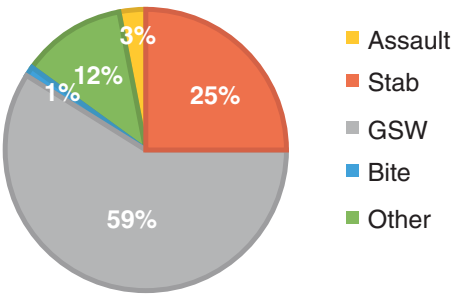


Penetrating Trauma: ED Disposition



Notes: "Step-Down" includes Step-Down Unit, Telemetry and Burn Unit. "Other" includes Observation, Special Procedures, AMA, Correctional Facility, Morgue, Acute Care Facility, Mental Health Facility, or another inpatient facility.

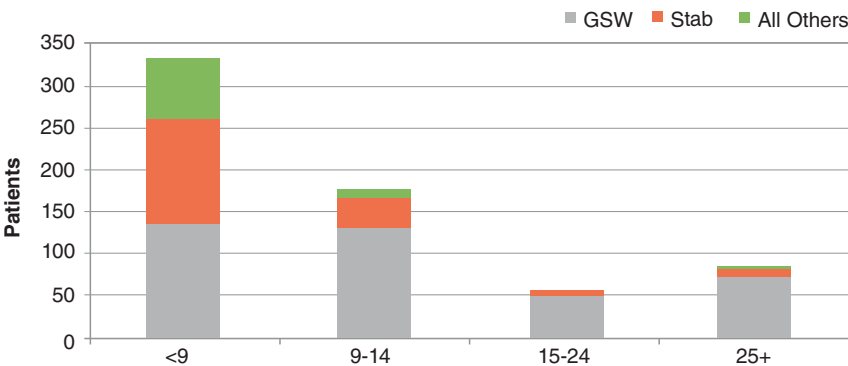
Penetrating Trauma: By Type



Note: Examples of "Other" include injuries by Glass, Machining, or other uncategorized penetrating injuries.

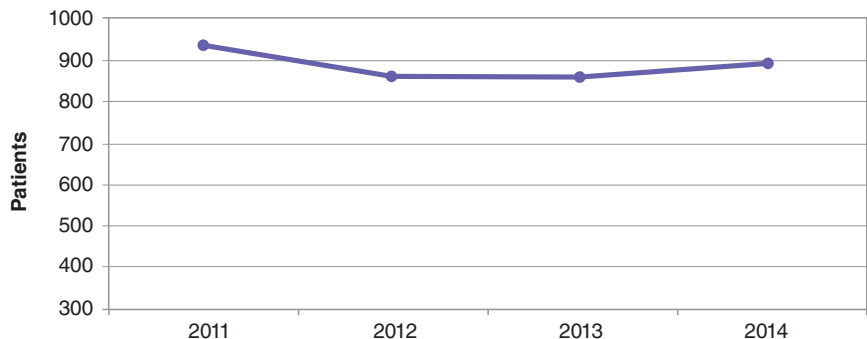
PENETRATING TRAUMA: 2014 DATA

Penetrating: By Injury Severity Score and Type

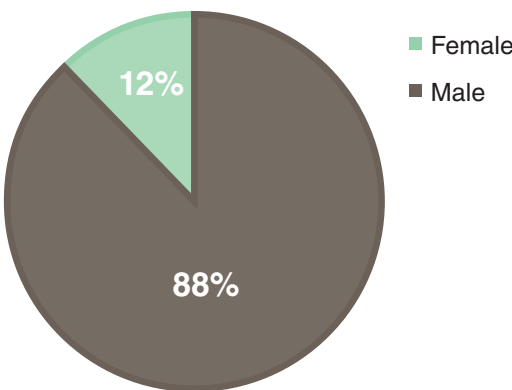


Note: Those without a scored ISS are excluded from this graph.

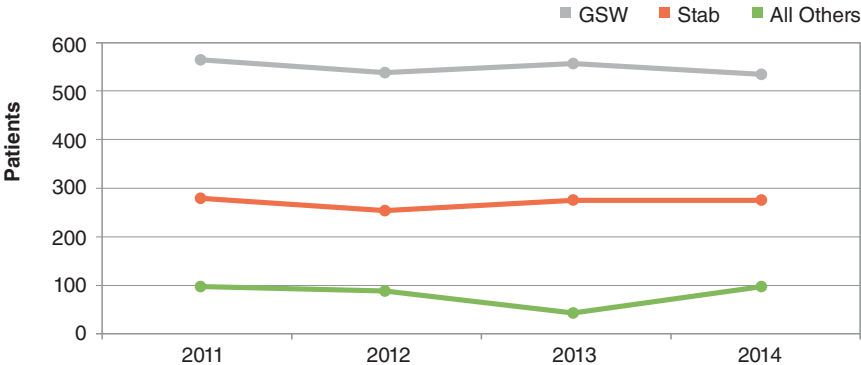
Penetrating Trauma: Total by Year



Penetrating Trauma: By Gender



Top Penetrating: By Type and Year



LEADERS IN TRAUMA **EDUCATION**

NOTS 4th Annual Trauma Symposium



Another successful Symposium! Thank you to everyone who participated.

LEADERS IN TRAUMA EDUCATION

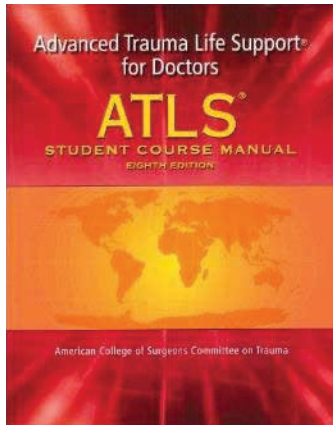
Physician/Nursing/EMS/Healthcare Providers

NOTS strives to provide state-of-the-art education using the most advanced teaching techniques available.

Beginning in 2015, NOTS began working in collaboration with MetroHealth's Simulation (SIM) Center to bring innovative education to ATLS. Utilizing the SIM's mannequins provides the student with an more enhanced active learning situation beyond the traditional modalities.

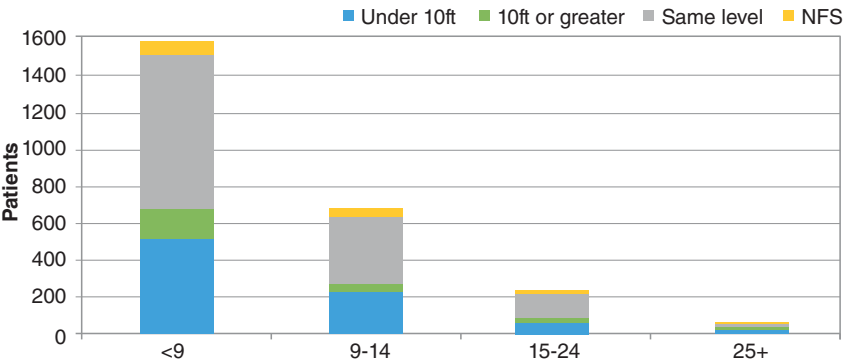
Tod Baker, NOTS EMS Coordinator, has developed education specific to pre-hospital providers and would love to come to your department and teach. The education is free and provides continuing education credit hours. If you are interested in learning more, please contact Tod Baker at tbaker4@metrohealth.org.

If you are interested in education for nursing or physician staff, please contact Deb Allen at dallen@metrohealth.org.



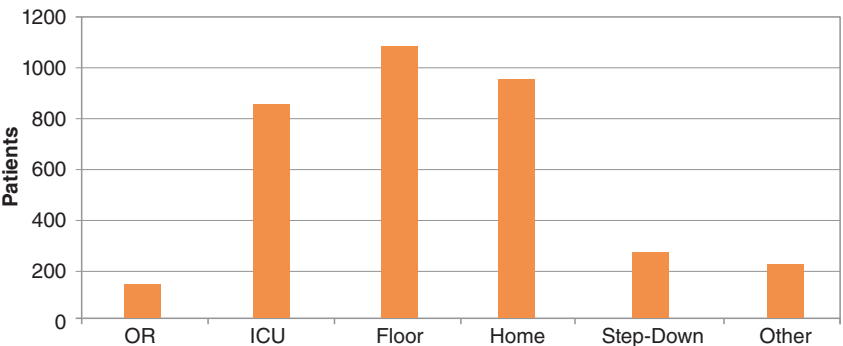
FALLS: 2014 DATA

Falls: Injury Severity Score (ISS) and Fall Type



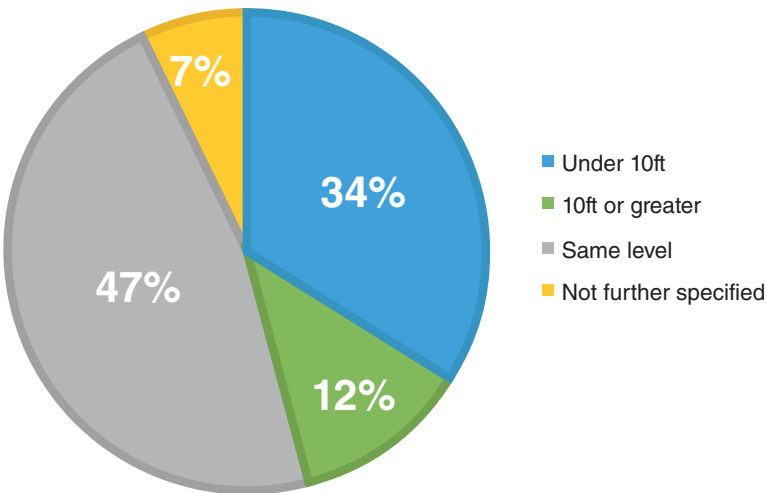
Note: Those without a scored ISS are excluded from this graph.

Falls: ED Disposition



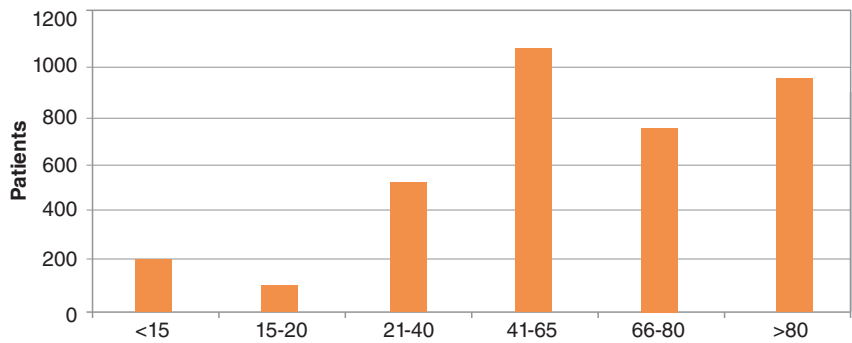
Notes: "Step-Down" includes Step-Down Unit, Telemetry and Burn Unit. "Other" includes Observation, Special Procedures, AMA, Correctional Facility, Morgue, Acute Care Facility, Mental Health Facility, or another inpatient facility.

Falls: Fall Type

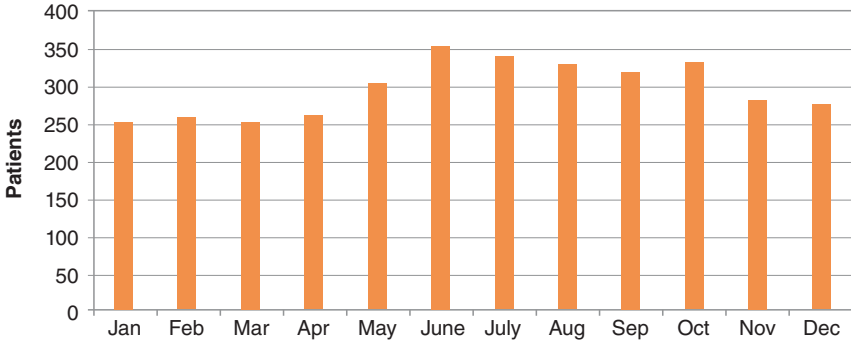


FALLS: 2014 DATA

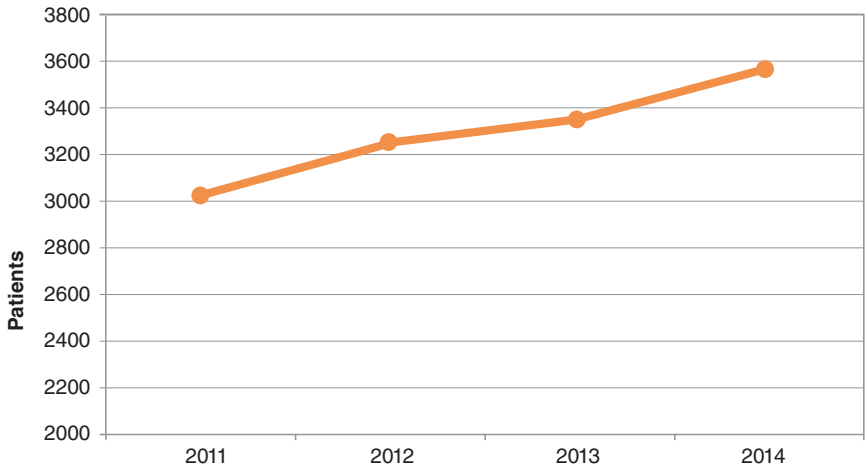
Falls: By Age Group



Falls: By Month



Falls: By Year



LEADERS IN TRAUMA RESEARCH: REGIONAL AND NATIONAL PRESENTATIONS

- Jack C. He, MD; Kate Clancy, BS; David Schechtman, BS; Jeffrey A. Claridge, MD, MS. **The Burden of Vascular Injuries on a Trauma Center Still Requires a Multi-specialty Approach.** Presented at Ohio Committee on Trauma, Trauma Paper Competition, October 13, 2014.
- David Schechtman, BS; Jack C. He, MD; Debra Allen, BSN, CCRN; Jeffrey A. Claridge, MD, MS. **Trauma System Regionalization Improves Mortality in Patients Requiring Trauma Laparotomy.** Cleveland Surgical Society Presentation, May 12, 2015. Awarded first place in presentation.
- David Schechtman, BS; Jack C. He, MD; Debra Allen, BSN, CCRN; Jeffrey A. Claridge, MD, MS. **Trauma System Regionalization Improves Mortality in Patients Requiring Trauma Laparotomy.** Scheduled to present at the 74th American Association for the Surgery of Trauma Annual Meeting, September 10, 2015.

- Jack C. He, MD; Joseph F. Golob, MD; Kate Clancy, BS; David Schechtman, BS; Jeffrey A. Claridge, MD, MS. **Benefit of TeamSTEPPS Rounding Improvement Project on Infection-Related Monitoring.** Presented at the 35th Surgical Infection Society Annual Meeting, April 18, 2015. Awarded third place in poster presentation.
- Jack C. He, MD; Kate Clancy, BS; David Schechtman, BS; Kristen J. Conrad-Schnetzer, DO; Jeffrey A. Claridge, MD, MS. **Traumatic Vascular Injuries: Who Are Repairing Them and What Are the Outcomes?** Presented at the Midwest Surgical Association 2015 Annual Meeting, July 28, 2015.
- Jack C. He, MD; David Schechtman, BS; Michael A. Samotowka, MD; Jeffrey A. Claridge, MD, MS. **Despite Trauma Center Closures, Trauma System Regionalization Reduces Time to Definitive Care and Mortality.** Scheduled to present at the 2015 American College of Surgeons Clinical Congress, October 6, 2015.



LEADERS IN TRAUMA RESEARCH: **WINNING AWARDS**

First Place, Presentation:

David Schechtman, BS; Jack C. He, MD; Debra Allen, BSN, CCRN; Jeffrey A. Claridge, MD, MS. **Trauma System Regionalization Improves Mortality in Patients Requiring Trauma Laparotomy**. Cleveland Surgical Society Presentation, May 12, 2015.

Third Place, Poster Presentation:

Jack C. He, MD; Joseph F. Golob, MD; Kate Clancy, BS; David Schechtman, BS; Jeffrey A. Claridge, MD, MS. **Benefit of TeamSTEPPS Rounding Improvement Project on Infection-Related Monitoring**. Presented at the 35th Surgical Infection Society Annual Meeting, April 18, 2015.

First Place, Trauma Paper Competition:

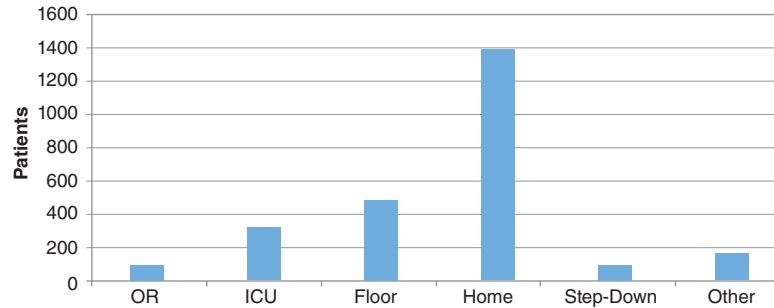
Michael L. Kelly, MD; Mary Jo Roach, PhD; Aman Banerjee, MD; Michael Steinmetz, MD; Jeffrey Claridge, MD, MS. **Functional and Long-Term Outcomes in Severe Traumatic Brain Injury Following Regionalization of a Trauma System**. Ohio Committee On Trauma, Trauma Paper Competition, October 13, 2014. Also presented as one of the top 10 Resident papers at the 28th annual Eastern Association for the Surgery of Trauma meeting, January 14, 2015.



Left to Right: Jeffrey Claridge, MD; David Schechtman, BS; Jack He, MD

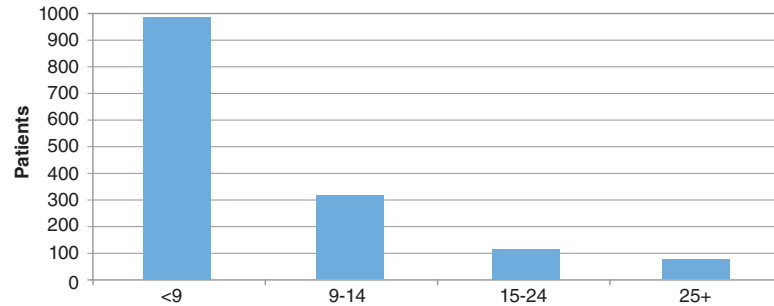
MOTOR VEHICLE COLLISION: 2014 DATA

MVC: ED Disposition



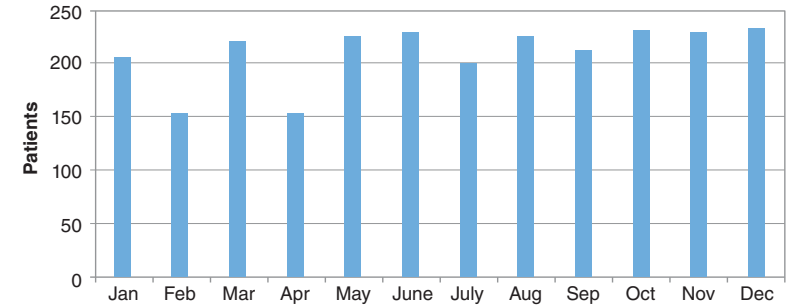
Notes: "Step-Down" includes Step-Down Unit, Telemetry and Burn Unit.
 "Other" includes Observation, Special Procedures, AMA, Correctional Facility, Morgue, Acute Care Facility, Mental Health Facility, or another inpatient facility.

MVC: By Injury Severity Score (ISS)

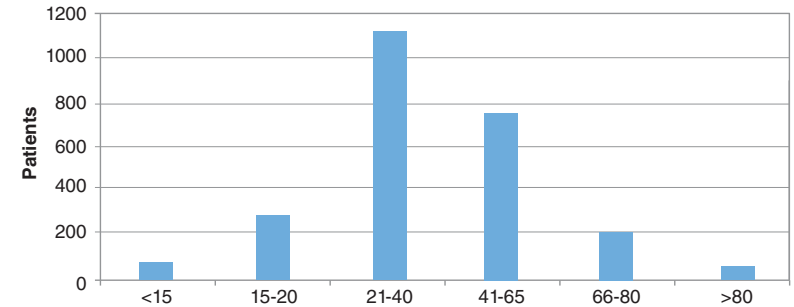


Note: Those without a scored ISS are excluded from this graph.

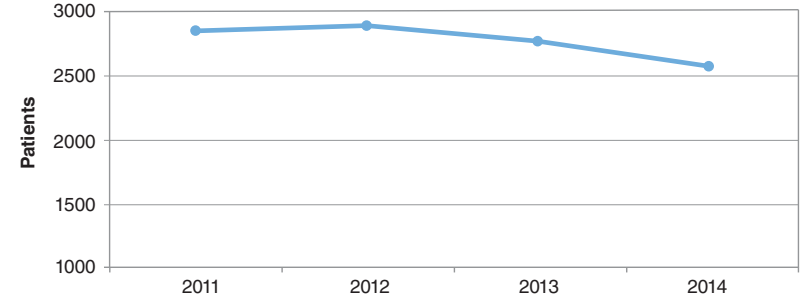
MVC: By Month



MVC: By Age



MVC: By Year



WHAT IS AN **INCLUSIVE TRAUMA SYSTEM**?

Things we know to be true:

- Collaboration works to improve outcomes.
- Collaboration is better for our community.
- Cuyahoga County has seen a decrease in mortality since the inception of NOTS.
- NOTS encourages and welcomes all hospitals to join.

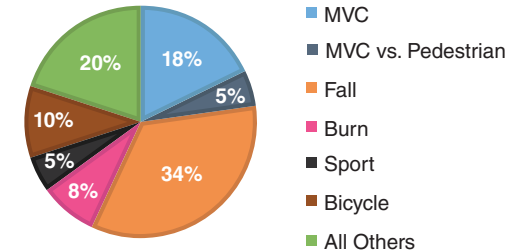


PEDIATRIC MECHANISMS OF INJURY: 2014 DATA

14 YEARS OF AGE AND YOUNGER

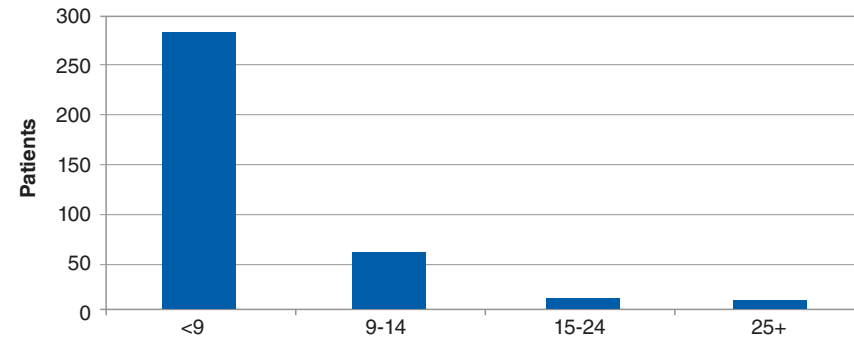
Mechanisms of Injury	Patients
Assault	20
Asphyxiation	2
ATV	9
Bicycle	58
Bite	8
Burn	47
Drown	4
Fall	198
GSW	9
Hang	1
Horse & Rider	7
Motorcycle/Dirtbike	7
MVC	103
MVC vs. Pedestrian	29
Other Blunt	43
Other Penetrating	8
Sport	32
Stab	1
Watercraft	0
Total	586

Pediatric Mechanisms of Injury



Note: "All Others" include Asphyxiation, Hang, Motorcycle, ATV, Horse & Rider, GSW, Assault, Stab, Drown, Watercraft, Bite, and all otherwise unclassified.

Pediatric Volume: By Injury Severity Score (ISS)



Note: Those without a scored ISS are excluded from this chart.

Note: Inclusion criteria for this page of the Pediatric section is 14 years of age and younger.

PEDIATRIC AND ADOLESCENT MECHANISMS OF INJURY: 2014 DATA

19 YEARS OF AGE AND YOUNGER

Definition of exactly what age constitutes a “pediatric patient” varies:

American College of Surgeons

- Pediatric Trauma Centers
 - <15 years of age
- Epidemiologic Considerations
 - Infants
 - Birth - 12 months
 - Toddlers
 - 1-3 years
 - Preschoolers
 - 3-5 years
 - School-aged children
 - 6-12 years
 - Adolescents
 - 13-19 years

Ohio Department of Public Safety – Division of EMS

- “Pediatric” means involving a patient who is <16 years of age
 - Ohio Revised Code: 4765.01

Centers for Disease Control and Prevention – Morbidity and Mortality Report

- Guidelines for Field Triage of Injured Patients
 - Pediatric patient: <15 years old

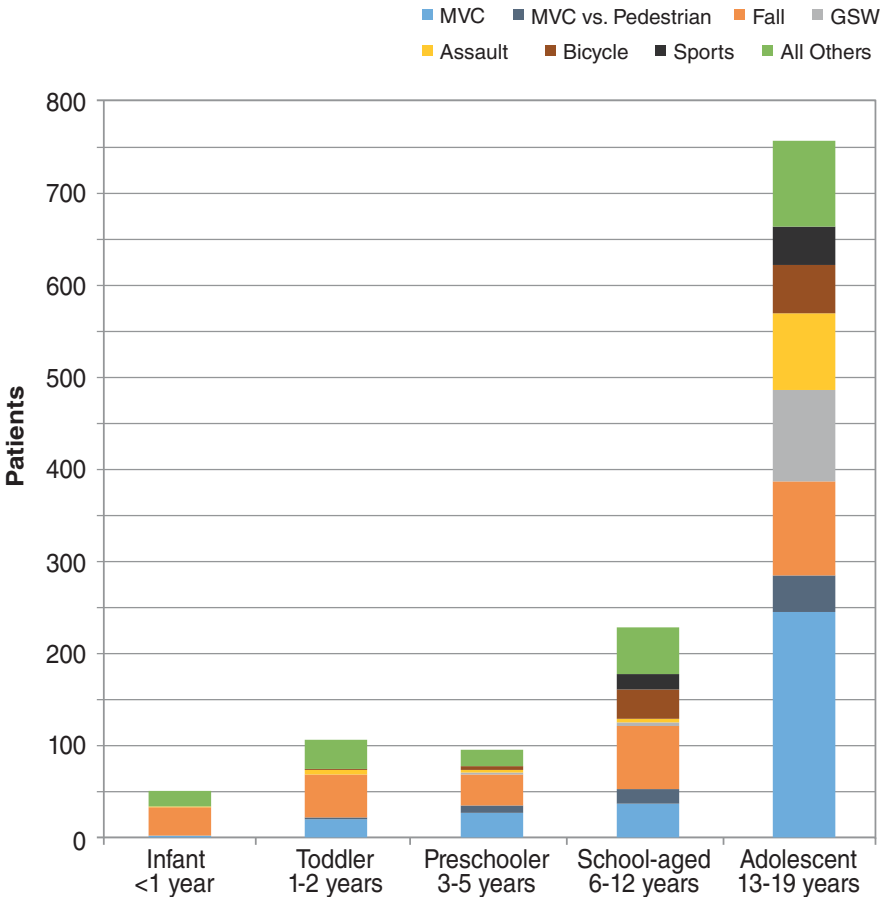
NOTS: Trauma Triage

- Pediatric: <16 years of age

Mechanism of Injury	Infant <1 year	Toddler 1-2 years	Preschooler 3-5 years	School-aged 6-12 years	Adolescent 13-19 years
Assault	1	5	3	4	84
Bicycle	0	1	4	32	53
Fall	31	47	34	69	103
GSW	0	0	2	4	100
MVC	2	20	27	37	247
MVC vs. Pedestrian	0	2	8	16	40
Sport	0	0	0	17	42
All Others	17	32	18	51	94
Total	51	107	96	230	763

Note: “All Others” include Asphyxiation, Hang, Motorcycle, ATV, Horse & Rider, Stab, Drown, Watercraft, Bite, Sport, Burn, and all otherwise unclassified.

Pediatric Mechanism of Injury: By Age Group



Note: Inclusion criteria for this page of the Pediatric section is 19 years of age and younger.

CLEVELAND CLINIC CRITICAL CARE TRANSPORT

Cleveland Clinic Critical Care Transport prides itself on bringing the most advanced critical care medicine to critically ill and injured patients across the globe. With over 5,400 high-acuity patient transports performed annually, our critical care teams are among the most experienced in the world. Utilizing a fleet of fixed wing jets, Sikorsky S-76 C+ helicopters and Mobile Intensive Care Units, our teams are able to deliver Cleveland Clinic care to patients anywhere and at any time.

Our medical teams have extensive experience in critical care medicine and include physicians, acute care nurse practitioners, critical care paramedics, and critical care nurses. Team members undergo rigorous training in the management of highly complex and critically ill and injured patients in the transport environment. We are proud to be partnered with NOTS as well as Akron General's Level 1 Trauma Program, providing rapid access to the most advanced level of trauma care in the region. We are also one of the few programs with extensive experience in transporting critically ill patients with a variety of cardiac assist devices, including LVADs, intra-aortic balloon pumps and ECMO.

Our broad range of clinicians and transport modalities allows Cleveland Clinic to best meet the needs of every patient, from neonatal to geriatric. Via Mobile ICU, helicopter, regional jet, or internationally, we work in collaboration with sending and receiving physicians to ensure each transport request is given individualized care, and personalized so that we always place Patients First.



Our pilots are among the best in the industry, with comprehensive training including night vision goggle use, instrument flight regulation certification, and use of instrument approach procedures (IAP). These certifications and others ensure that we are among the safest and most efficient programs in the industry.

Cleveland Clinic Critical Care Transport Teams are strategically located throughout Cuyahoga and Summit counties. Each location is equipped with one of our Sikorsky S-76 C+ helicopters and/or ground ambulance. The Sikorsky S-76 C+ helicopter is among the largest and fastest in civilian use, with cruising speeds of up to 180 mph. The larger interior allows for full access to the patient, and provides the capability to take additional personnel if needed.

Fixed wing operations are based out of Burke Lake Front Airport in Cleveland and provide national as well as international capabilities.

The Cleveland Clinic Critical Care Transport Team is committed to providing the highest level of critical care medicine anywhere in the world. No patient too sick, no patient too far. Learn more about our team at, <http://my.clevelandclinic.org/departments/criticalcare/default.aspx> or visit our Facebook page at, <https://www.facebook.com/clevelandclinic.cct>.

METRO LIFE FLIGHT

When minutes matter, physicians and emergency crews around the region rely on Metro Life Flight. Metro Life Flight has three state-of-the-art EC145 helicopters with the latest in aviation safety features. The program is proud of its more than 32 years of experience with an outstanding safety record. Regional base locations allow for rapid response to patients in critical condition. In addition, the Metro Life Flight Ground Unit, based at MetroHealth Medical Center, is a Mobile Intensive Care Unit for transfers between hospitals. The team consists of an outstanding group of nurses, physicians, medics, flight communication specialists, pilots, mechanics and support personnel. Metro Life Flight flies with a dual-pilot team with IFR (instrument flight rules) and NVG (night vision goggles) capabilities to maximize safety.

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.



Metro Life Flight's aircraft are operated by Metro Aviation Incorporated, which holds an FAA Part 135 certificate for aviation operations.

To learn more about Metro Life Flight visit <http://www.metrohealth.org/lifeflight> or stay connected on Facebook at <http://www.facebook.com/metrolifeflight>.

"Metro Life Flight is honored to be a cornerstone of the successful Northern Ohio Trauma System and it is our pleasure to provide critical care transport and coordination throughout the System. We realize that life-saving trauma care can't be done alone. The care and coordination between MetroHealth, Cleveland Clinic, and pre-hospital providers offers the people of Northern Ohio with the best possible trauma care and is the reason why NOTS is a national model. Most recently, we feel excited to work with Southwest General Hospital as they become a part of NOTS and share our commitment to collaboration as the foundation of outstanding regional trauma care."

— Craig Bates, MD, MS, FACEP

Medical Director, Metro Life Flight

Attending Physician, MetroHealth Department of Emergency Medicine

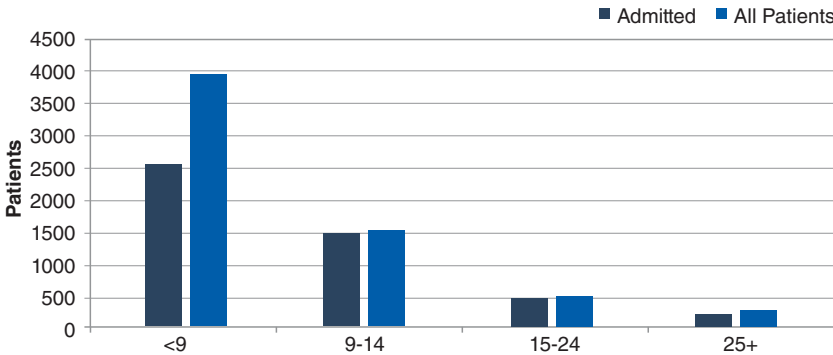
Clinical Assistant Professor of Emergency Medicine, Case Western Reserve University School of Medicine

ADMITTED PATIENTS: 2014 DATA

Percent of Patients Admitted

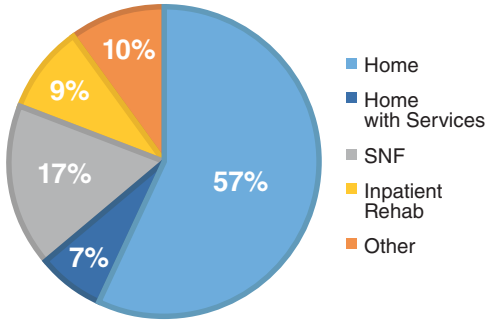
Mechanisms of Injury	Percent
MVC	41.83%
Fall	69.73%
Assault	36.84%
Asphyxiation	66.67%
Hang	56.25%
Motorcycle	57.67%
MVC vs. Pedestrian	42.90%
Bicycle	41.06%
ATV	64.71%
Horse & Rider	45.83%
Other Blunt	57.56%
Other Penetrating	58.90%
Stab	51.30%
Drown	50.00%
GSW	57.01%
Watercraft	55.56%
Bite	76.19%
Sport	38.75%
Burn	86.46%

Admitted vs. All Patients: By Injury Severity Score



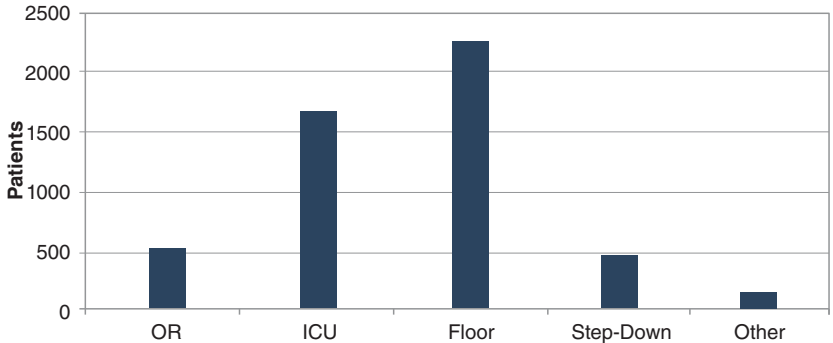
Note: Those without a scored ISS are excluded from this graph.

Admitted Patients: By Hospital Disposition



Note: "Other" includes AMA, Correctional Facility, Morgue, Child Protective Services, Acute Care Facility, Long-term Care, Hospice, and Inpatient Mental Health services.

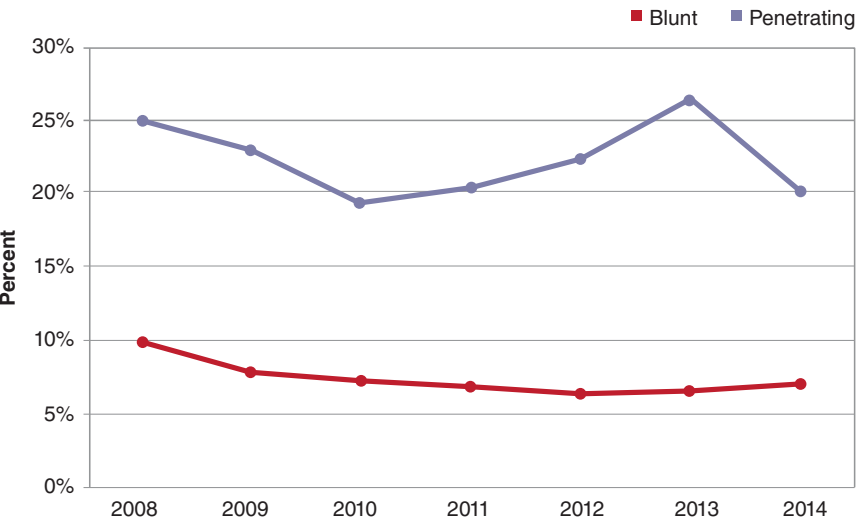
Admitted Patients: By ED Disposition



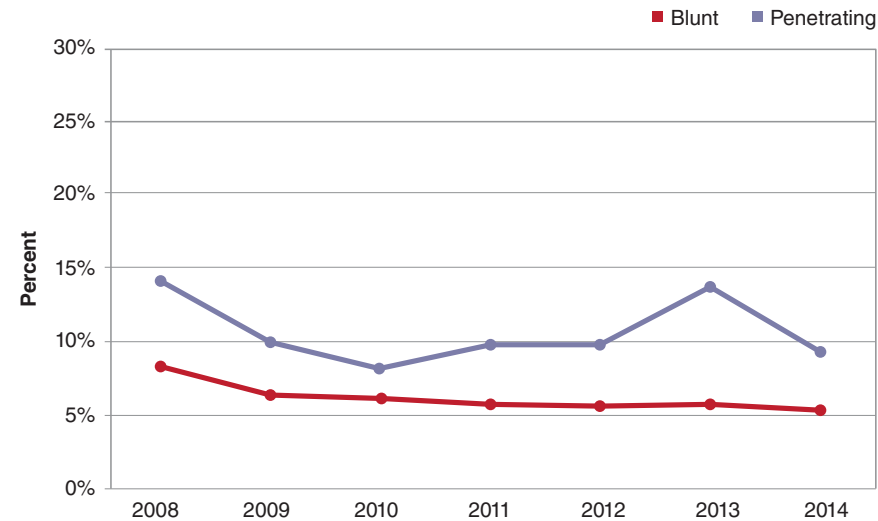
Notes: "Step-Down" includes Step-Down Unit, Telemetry, and Burn Unit. "Other" includes Observation, Special Procedures, and Labor and Delivery.

ADMITTED PATIENTS OUTCOMES: 2008-2014 DATA

Mortality Rate of Admitted Patients with an ISS of ≥ 9 , Plus All ED Deaths and DOAs: By Injury, Type and Year



Mortality Rate of Admitted Patients with an ISS of ≥ 9 : By Injury, Type and Year



In these figures we are showing the mortality of patients who have an ISS of 9 and greater. An ISS, or Injury Severity Score, of 9 or greater allows us to look at patients who have significant enough injuries that usually warrant admission. This is the first time we are showing this information in this format. The first graph shows the mortality of admitted patients with an ISS > 9 along with DOAs and patients who died in the Emergency Department. Thus, the first graph includes patients who either are declared dead on arrival or die in the Emergency Department. Almost all deaths that occur in the Emergency Department are either dead on arrival or occur within the first 15 – 30 minutes of arrival. The second graph shows the mortality results of all patients with an ISS > 9 who are admitted to the hospital. Unfortunately, some injuries are non-survivable; however, we continue to diligently work toward improving the care of our trauma patients.

TRAUMA SYSTEM REGIONALIZATION

IMPROVES MORTALITY IN PATIENTS REQUIRING TRAUMA LAPAROTOMY

The following information was sent as part of an abstract to the American Association for the Surgery of Trauma (AAST). This is the largest trauma organization in the world. It has been accepted for presentation at the 2015 meeting this fall.

Purpose of Study:

A regional trauma network (RTN) consisting of multiple hospital systems and collaboration with local EMS was established in 2010 to improve trauma outcomes. This study evaluates the impact of the trauma network on patient survival, total ICU days, and length of stay in patients who require trauma laparotomy.

Results:

- > 570 patients were analyzed.
- > 231 patients were pre-RTN and 338 were in the RTN group.
- > Overall there was a 33% relative reduction in mortality from the pre-RTN to RTN groups ($p=0.035$).
- > Logistic regression showed that being in the RTN group was an independent predictor for survival ($p=0.026$) with odds ratio of 0.53 (95% CI 0.30-0.93).

TRAUMA SYSTEM REGIONALIZATION

IMPROVES MORTALITY IN PATIENTS REQUIRING TRAUMA LAPAROTOMY

All Patients	Pre-RTN (n=231)	RTN (n=338)	p - value
Age (mean ± SD)	36.3 ± 18.0	35.4 ± 16.4	ns
ISS (median, IQR)	16 (9-26)	16 (9-25)	ns
Male	85.7%	82.0%	ns
Blunt	35.1%	34.0%	ns
Triaged to a Level 1 Trauma Center	66.7%	96.4%	<0.001
ICU Days (median, IQR)	2 (0-6)	1.5 (0-6)	0.047
Mortality	19.9%	13.3%	0.035
Table 1 (SD, Standard deviation; IQR, interquartile range)			

Conclusions:

- > Implementation of a Regional Trauma Network was associated with a significant reduction of hospital mortality.
- > There was an increase in the number of patients requiring trauma laparotomy being triaged to MetroHealth and these patients spent fewer days in the ICU.
- > This study strengthens the argument for the positive effects of regionalization, and is unique in that it demonstrated a large benefit to patients undergoing trauma laparotomy.

Simple Translation:

If you are in a trauma and need a laparotomy, you are about 50% more likely to survive a trauma after regionalization and the creation of NOTS!

NOTS **ADVISORY BOARD**

The significant decrease in trauma-related mortality seen since NOTS was instituted demonstrates the power of thoughtful, deliberate, and quality-driven collaboration across institutions and regions, leading to better care for individuals and for our community.

Christopher P. Brandt, MD

Richard B. Fratianna Professor of Surgery
Case Western Reserve University
Chair, Department of Surgery
MetroHealth Medical Center



Robert Wyllie, MD
Chairman



Terry Allan



Bradley Borden, MD



Christopher Brandt, MD



Alfred F. Connors, Jr., MD



Edward J. Eckart, Jr.



Brendan M. Patterson, MD



Matthew Walsh, MD

DEDICATION

We dedicate this report to the incredible men and women who serve northern Ohio and are committed to improving their state, their region, and their community, one patient at a time.

- Hospitals participating in the Northern Ohio Trauma System
- NOTS Advisory Board
- Ohio Department of Health
- Ohio Department of Public Safety – Division of EMS
- Cuyahoga Board of Health
- Fire and EMS providers for Cuyahoga, Ashtabula, Geauga, Portage, Summit, Medina, Lake, Lorain, and all surrounding communities.

THANK YOU!



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.

Burn: Burn mechanism of injury includes all burn injuries including chemical, thermal, electrical, inhalation and others.

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 less than 24-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).

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.

Mechanism of Injury: The manner in which a physical injury occurred (e.g., fall from a height, ground-level fall, high- or low-speed motor vehicle accident, ejection from a vehicle, vehicle rollover). The mechanism of injury (MOI) is used to estimate the forces involved in trauma and, thus, the potential severity for bodily damages, fractures, and internal organ destruction that a patient may suffer as a result of the injury.

Trauma Centers – Designation vs. Verification:

Trauma center levels across the United States are identified in two fashions – A designation process and a verification process. The different levels (ie. Level I, II, III, IV or V) refer to the kinds of resources available in a trauma center and the number of patients admitted yearly. These are categories that define national standards for trauma care in hospitals. Categorization is unique to both Adult and Pediatric facilities. Trauma Center designation is a process outlined and developed at a state or local level. The state or local municipality identifies unique criteria in which to categorize Trauma Centers. These categories may vary from state to state and are typically outlined through legislative or regulatory authority.

Trauma Center Verification is an evaluation process done by the American College of Surgeons (ACS) to evaluate and improve trauma care. The ACS does not designate trauma centers; instead, it verifies the presence of the resources listed in Resources for

Optimal Care of the Injured Patient. These include commitment, readiness, resources, policies, patient care, and performance improvement.

Trauma Center Levels (American Trauma Society):

Trauma categories vary from state to state. Outlined below are common criteria for Trauma Centers verified by the ACS and also designated by states and municipalities. Facilities are designated/verified as Adult and/or Pediatric Trauma Centers. It is not uncommon for facilities to have different designations for each group (ie. a Trauma Center may be a Level I Adult facility and also a Level II Pediatric Facility).

- **Level I:** A Level I Trauma Center is a comprehensive regional resource that is a tertiary care facility central to the trauma system. A Level I Trauma Center is capable of providing total care for every aspect of injury – from prevention through rehabilitation. Elements of Level I Trauma Centers include:
 - 24-hour in-house coverage by general surgeons, and prompt availability of care in specialties such as orthopedic surgery, neurosurgery, anesthesiology, emergency medicine, radiology, internal medicine, plastic surgery, oral and maxillofacial, pediatric and critical care.
 - Referral resource for communities in nearby regions.
 - Provides leadership in prevention, public education to surrounding communities.
 - Provides continuing education of the trauma team members.
 - Incorporates a comprehensive quality assessment program.

- Operates an organized teaching and research effort to help direct new innovations in trauma care.
 - Program for substance abuse screening and patient intervention.
 - Meets minimum requirement for annual volume of severely injured patients.
- **Level II:** A Level II Trauma Center is able to initiate definitive care for all injured patients. Elements of Level II Trauma Centers include:
 - 24-hour immediate coverage by general surgeons, as well as coverage by the specialties of orthopedic surgery, neurosurgery, anesthesiology, emergency medicine, radiology and critical care.
 - Tertiary care needs such as cardiac surgery, hemodialysis and microvascular surgery may be referred to a Level I Trauma Center.
 - Provides trauma prevention and continuing education programs for staff.
 - Incorporates a comprehensive quality assessment program.
 - **Level III:** A Level III Trauma Center has demonstrated an ability to provide prompt assessment, resuscitation, surgery, intensive care and stabilization of injured patients and emergency operations. Elements of Level III Trauma Centers include:
 - 24-hour immediate coverage by emergency medicine physicians and the prompt availability of general surgeons and anesthesiologists.

- Incorporates a comprehensive quality assessment program.
- Has developed transfer agreements for patients requiring more comprehensive care at a Level I or Level II Trauma Center.
- Provides back-up care for rural and community hospitals.
- Offers continuing education for the nursing and allied health personnel or the trauma team.
- Involved with prevention efforts and must have an active outreach program for its referring communities.



right patient • right place • right time

NOTS Transfer Center:
216-778-7850

NOTS 2015 Annual Report

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

Data by: **Jillian Jarosz Cremona,**
MPH, Regional Trauma Data Specialist

Edited by: **Cheryl Hawkins,**
Trauma Support Coordinator

northernohiotraumasystem.org



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