



# 2016 ANNUAL REPORT

RIGHT PATIENT.  
RIGHT PLACE.  
RIGHT TIME.



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**Jeffrey A. Claridge, MD, MS, FACS**  
 Medical Director,  
 Northern Ohio Trauma System  
 Division Director,  
 Service Line Administrator,  
 Trauma, Critical Care,  
 Burns & Acute Care Surgery  
 The MetroHealth System

Serving the public as the Medical Director of NOTS for the past 6 years has been an honor. We are continuing to improve the care of trauma patients across the region. Our yearly report

summarizes 2015 trauma activity and some key outcomes. We try to share more every year as we continue to mature. I would personally like to thank everyone who has worked to take care of our traumatically injured patients. We continue to demonstrate that working together is key to improving outcomes. This year we are putting substantial efforts into trauma prevention. We have added a full-time injury prevention position which will work with the hospital systems as well as city and county officials with the goal to reduce traumatic injuries and gun violence.

We hope that you spend some time looking over the yearly report and we look forward to serving the community for years to come.



### **Debra Allen, BSN, RN, CCRN**

Program Manager

*"Coming together is a beginning; keeping together is progress; working together is success." Henry Ford*

NOTS has been together since 2010; we have seen many successes and have had our share of struggles. The bottom line of what I've experienced in the last six years, is everyone wants to do what is best for their patients, their community, and their neighborhoods. Managing and improving the care of severely injured patients is a hallmark of a good trauma system. That is what we strive for, that is what we will continue to work towards.



### **Cheryl Hawkins**

Coordinator, Trauma Program Support

I'm proud to say that I work with a group of dedicated people who hold the NOTS motto of getting "the right patient, to the right place, at the right time" close to their hearts. NOTS continues to strive to make sure that the best interests of the patient come first – period. This

is important to me personally as an employee and as a resident of northern Ohio.



### **Tod Baker, Paramedic, EMSI**

EMS Coordinator

Since joining NOTS, I have realized how effective collaboration in healthcare truly is. As a career firefighter we work as a team, often with other departments. In the fire service it is obvious that in a crisis, this teamwork between departments

accomplishes more than any one department can on its own. The same concept applies with NOTS, the more we work as a team, the better the team performs, and when performance means lives, there is no greater reward.



### **Jillian Jarosz Cremona, MPH**

Regional Data Specialist

Working as the data specialist at NOTS is a worthwhile undertaking because the work we do matters. Whether it provides data for medical research, guidance for the Public Health approach to injury and violence prevention, or transparency to the public in this

Annual Report, NOTS' commitment to quality data works toward everyone's goal of improving patient care and saving lives.



### **Andrea Martemus-Peters, MSSA, LSW**

Injury/Violence Prevention Coordinator

After collaborating with the NOTS team for over a year, I'm excited to join the organization. The importance of collaboration across hospital systems is essential when developing hospital-based intervention programs.

Throughout my career I've always focused on empowering individuals and help remove barriers they may face. We have a unique opportunity to enhance the quality of life for our patients.



### **Jack He, MD**

Research Fellow

Being a part of the NOTS regional group was crucial to our research projects. We were able to utilize data from participating hospitals to assess the performance of the entire NOTS region at a global level as well as analyze

specific aspects of trauma care within the NOTS region, such as transport time.



### **Kaitlin Ritter, MD**

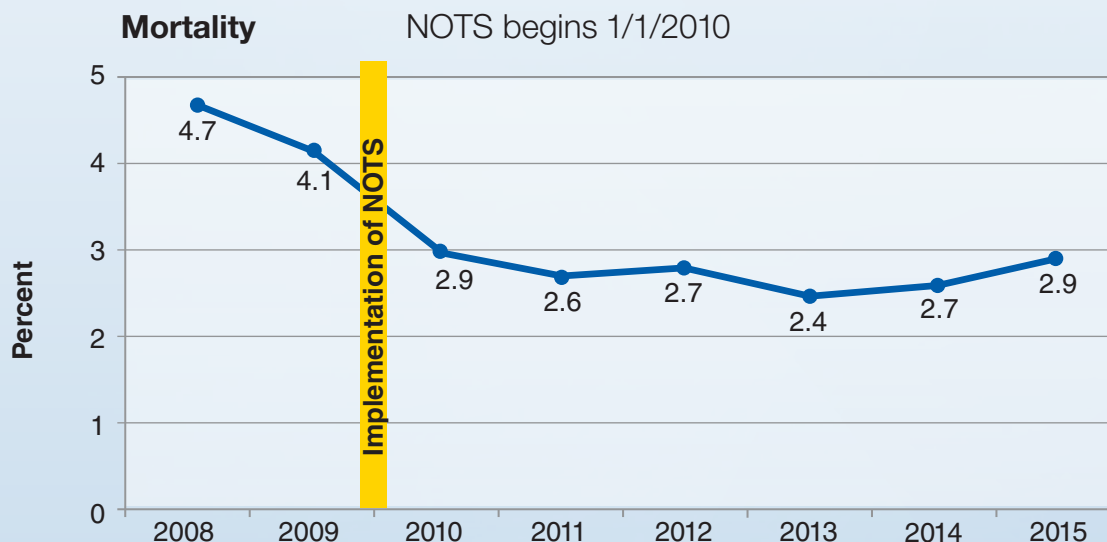
Research Fellow

Cooperation is the key to optimizing everyone's strength and ultimately provide the best care for patients. At the end of the day, that is what matters most. NOTS represents an innovative system that advances the care of patients in their most vulnerable moments and I am proud

to help contribute to that philosophy.

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.

### NOTS: Living the Mission





# One Picture Says It All –

A collaborative team approach to saving lives. This symphony of teamwork comes from years of practice – everyone has a job, everyone knows their role, everyone is in sync with one goal in mind – doing what is best for the patient.

COLLABORATIVE TEAM



*Photo Courtesy of David Efron, MD*

- > The MetroHealth System
  - Level I Adult and Level II Pediatric  
ACS Verified Trauma Center  
ABA & ACS Regional Verified Burn Center
- > Hillcrest Hospital
  - Level II Adult  
ACS Verified Trauma Center
- > Fairview Hospital
  - Level II Adult  
ACS Verified Trauma Center
- > Southwest General Health Center
  - Level III Adult  
ACS Verified Trauma Center





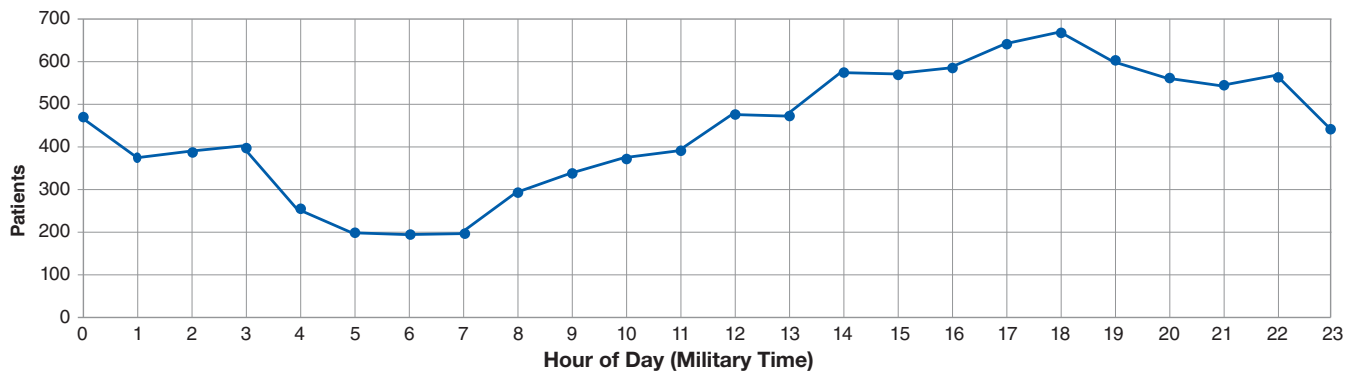


*Photo Courtesy of Regina Schneider, MSN, RN*

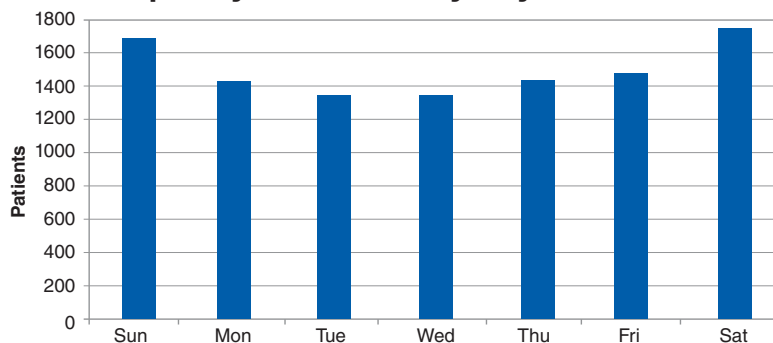
- > Ashtabula County Medical Center
- > Avon Hospital
- > Cleveland Clinic – Brunswick Family Health and Surgery Center
- > Cleveland Clinic – Lakewood
- > Cleveland Clinic – Main Campus
- > Cleveland Clinic – Richard E. Jacobs Health Center
- > Cleveland Clinic – Twinsburg Family Health and Surgery Center
- > Euclid Hospital
- > Lutheran Hospital
- > Marymount Hospital
- > Medina Hospital
- > MetroHealth – Brecksville
- > MetroHealth – Cleveland Heights
- > MetroHealth – Parma
- > South Pointe Hospital
- > Southwest General – Brunswick Medical Center and Emergency Room

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

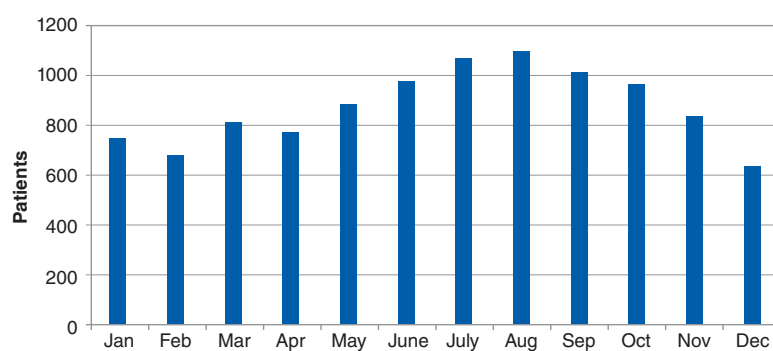
## Frequency of Trauma: By Hour of Day



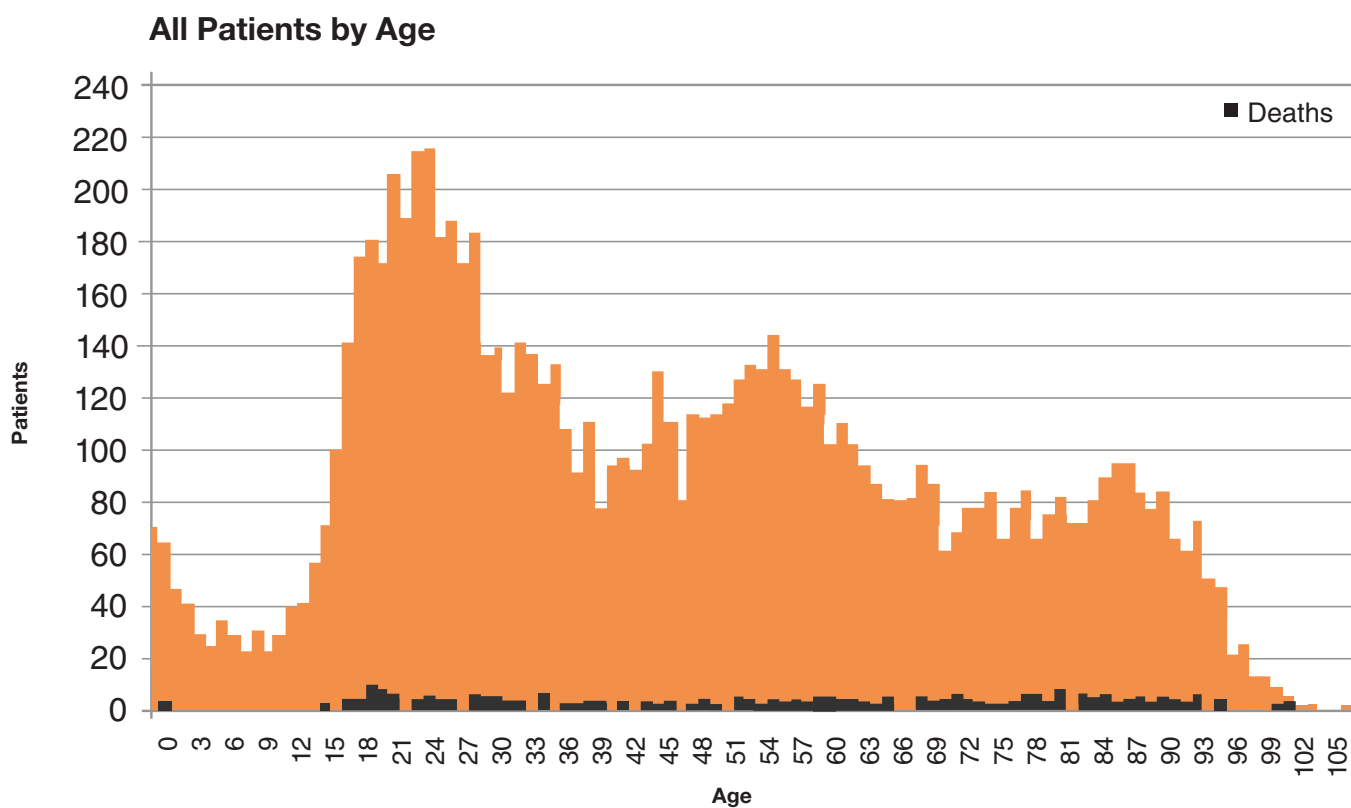
## Frequency of Trauma: By Day of Week



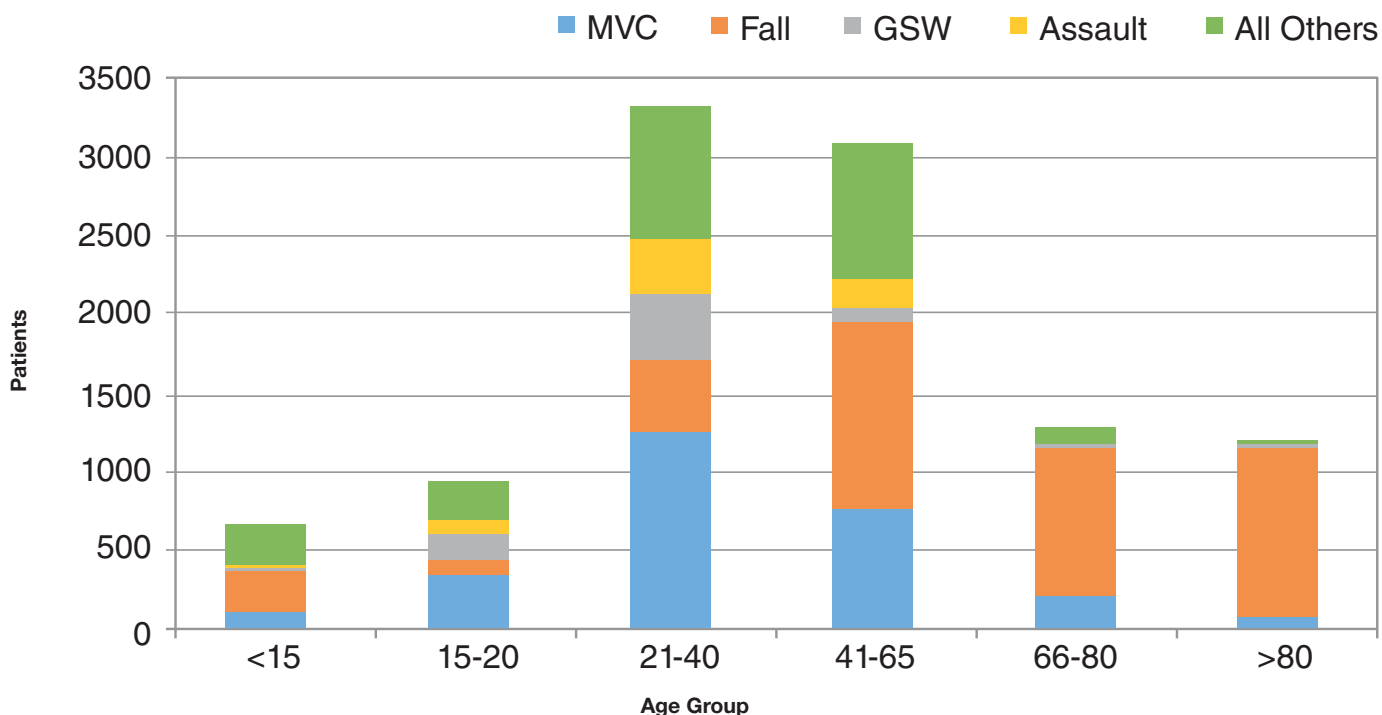
## Frequency of Trauma: By Month







## Top Mechanisms of Injury by Age Group



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

## By Age Group

Mechanism	<15	15-20	21-40	41-65	66-80	>80
<b>MVC</b>	120	352	1259	771	223	89
<b>Fall</b>	261	96	458	1171	927	1072
<b>Assault</b>	14	88	356	192	10	2
<b>Asphyxiation</b>	1	0	2	1	0	0
<b>Hanging</b>	0	5	15	8	0	0
<b>Motorcycle</b>	7	28	161	160	17	0
<b>MVC vs. Pedestrian</b>	50	49	127	142	27	8
<b>Bicycle</b>	47	37	54	87	12	1
<b>ATV</b>	17	12	43	22	4	0
<b>Horse &amp; Rider</b>	10	13	7	23	4	0
<b>Other Blunt</b>	47	36	143	158	23	12
<b>Other Penetrating</b>	4	12	46	49	7	2
<b>Stab</b>	3	22	158	105	5	1
<b>Drown</b>	1	0	1	1	0	0
<b>GSW</b>	13	151	413	89	12	4
<b>Watercraft</b>	0	2	0	0	0	0
<b>Bite</b>	4	3	7	7	2	0
<b>Sport</b>	19	31	14	6	2	0
<b>Burn</b>	37	3	43	65	12	6
<b>Unknown</b>	4	1	9	28	2	2
<b>Totals</b>	<b>659</b>	<b>941</b>	<b>3316</b>	<b>3085</b>	<b>1289</b>	<b>1199</b>



## The MetroHealth Trauma Center:

- One of the first verified trauma centers in the region (1992).
- Takes care of approximately 6,000 patients per year who suffer traumatic injuries.
- Years of experience working as a fine-tuned team to ensure all their patients receive the best care possible.
- Leaders in trauma research.
- Level I Adult and Level II Pediatric Center guarantees injured families stay together.

## State-of-the-Art Critical Care Pavilion

The Critical Care Pavilion (CCP) was designed incorporating an interprofessional approach. From the beginning, all disciplines were at the table to contribute and provide feedback in the design. There were representatives from EVS, IT, respiratory therapy, nursing, physicians, ancillary staff, nutrition services, and more.

The CCP was designed to be patient-centric requiring us to look at a different way of caring for patients. We as healthcare providers are learning to do things differently. We are providing care utilizing new technologies such as Vocera. Incorporating Vocera into our practice will help us save steps, save time, and allow us to spend more time with the patient. Vocera allows care team members to instantly connect with voice, text messaging and critical healthcare data.



One of the first things one notices as they walk onto the floors of the CCP is the natural light flowing in. All 85 rooms have large windows that provide natural light. Natural light and the ability to see the outdoors has therapeutic benefits for patients who are recovering from trauma or illness. In addition to the natural light, the lighting in the CCP adjusts based on the time of day. The lights dim as the day turns into evening and night, and the lights get brighter as the sun rises and the day begins. This is beneficial for time and orientation for our patients. Light impacts health by controlling the body's circadian rhythm as well as affecting mood. Light can be adjusted via switch or blinds for patients with head injuries for example.

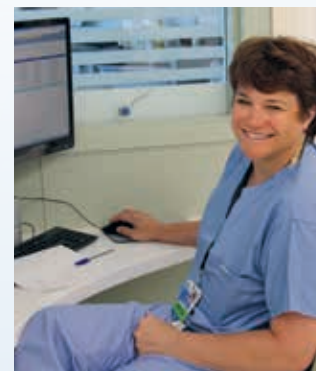
Another attribute of the CCP is the ability to have family presence in the critical care units. Every room has either a sleeper sofa or sleeper chair in the "family" space. This allows for increased family presence which decreases anxiety, agitation, and decreases length of stay. It also increases the trust that families have with the care team as well as provides more opportunity for patient and family teaching. Having families present for our trauma patient population is a positive move as families frequently feel helpless due to the injury's hows and whys. There are family spaces through the unit as well.

In the words of Florence Nightengale, "The symptoms or the sufferings generally considered to be inevitable and incident to the disease are very often not symptoms of the disease at all, but of something quite different-of the want for fresh air, or light, or of warmth, or of quiet, or of cleanliness, or of punctuality of care..." As an interprofessional group, the planning of the CCP hit those points. The space has fresh air, natural light, warmth, quiet, is clean and Vocera offers the ability to be punctual all while keeping the patient at the center.

**Theresa Hannu, MSN, RN, NEA-BC**  
Associate Chief Nursing Officer

"Traumatic injuries happen with little or no warning, and the new Critical Care Pavilion was designed to help patients/families through this extremely stressful period. The new expansion provides our trauma patients with a state-of-the-art Intensive Care Unit. The patient/family is the focus of the unit's design and whole focus of our care."

**Danielle Rossler, MBA, BSN, RN**  
Trauma Program Manager



"The new MetroHealth Intensive Care Units were built with the patient and their family in mind. Every room has ample sunlight, its own bathroom and shower as well as a comfortable place for families to rest and participate in care. Improving the patient and family experience makes caring for critically ill trauma and surgical patients easier."

**Joseph F. Golob Jr., MD, FACS**  
Trauma Surgery and Surgical Critical Care  
Medical Director, Hospital Patient Safety  
Medical Director, Surgical Intensive Care Unit



## Level II Pediatric Trauma Center

"MetroHealth provides extraordinary care to children when they are experiencing a crisis such as a traumatic injury or a devastating illness. When working with pediatric patients who have suffered traumatic injuries, the team at MetroHealth not only provides great physical care which is evidence-based, but they also provide individualized care that meets both the child's and the family's needs. This includes everything from psychological and spiritual needs to psychosocial support. This isn't happenstance but occurs because of the excellent team of doctors, nurses, social workers, child life and support staff that collaborate to ensure that all the needs of the patient and family are met."

**Linda Boseman, MSN, CNP,**

Clinical Nurse Systems Specialist, Department of Pediatrics



**Bridget Gill, BSN, RN, CPN**

Pediatric Trauma Program Manager and Burn Outreach Coordinator

## The John A. Gannon Comprehensive Burn Care Center

- MetroHealth's Burn Center was established in 1970.
- Fourteen-bed unit provides care to both adult and pediatric burn patients.
- The Burn Center evaluates more than 1,000 new patients every year.
- MetroHealth's Burn Center services include the following:
  - Thermal, chemical and electrical injuries
  - Inhalation injuries
  - Frostbite injuries
  - Toxic epidermal necrolysis/Stevens-Johnson Syndrome
  - Reconstructive burn care/scar management
  - Laser scar management
  - Necrotizing soft tissue infection/Necrotizing fasciitis
  - Traumatic soft tissue injuries
  - Complex wound management





## Level I Adult and Level II Pediatric Trauma Center and Regional Burn Center: Meet the Trauma Staff

### Trauma Surgeons



**Jeffrey A. Claridge,**  
MD, MS, FACS  
Trauma Medical Director



**John J. Como, MD,**  
MPH, FACS, FCCM



**Charles J. Yowler,**  
MD, FACS, FCCM



**Amy A. McDonald,**  
MD, FACS



**Joseph F. Golob Jr.,**  
MD, FACS



**Nimitt J. Patel,**  
MD, FACS



**Anjay Khandelwal,**  
MD, FACS, FICS



**Laura Kreiner,**  
MD, FACS



**Kristen Conrad-  
Schnet, DO, FACOS**

### Trauma Program Managers & Coordinators



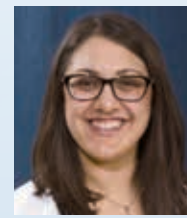
**Danielle Rossler,**  
MBA, BSN, RN,  
Trauma Program Manager



**Bridget Gill,**  
BSN, RN, CPN, Pediatric  
Trauma Program Manager



**Andrea Rinker, BSN,**  
RN, CMSRN, TCRN



**Cristina Aldridge,**  
MPH, BSN, CCRN

### Trauma Support Staff



**Cheryl Hawkins**



**Deborah Toth**

### Trauma Registrars



*Left to Right*

**Rose Harshman,**  
E.M.T.P.

**Cathy Wolanin,**  
R.H.I.T.

**Pamela Owen,**  
C.C.S., C.S.T.R.  
Lead Trauma Registrar

**Sara Arida,**  
R.H.I.T.

**Terri White,**  
C.P.C.

**Laura Sims,**  
R.H.I.T.

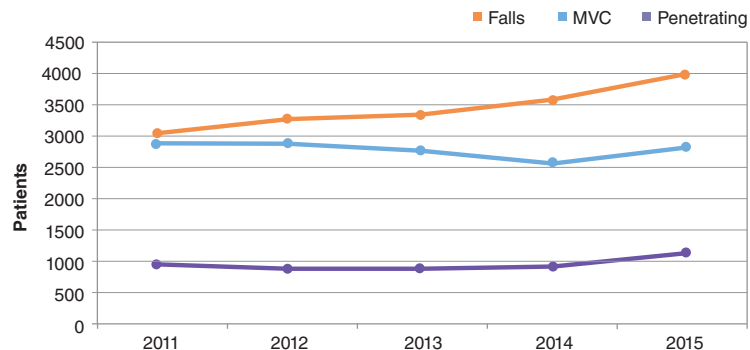
**Wendy Ragone,**  
R.H.I.T.  
*Not pictured*

**Becky Volin-Patton,**  
R.H.I.T.  
*Not pictured*

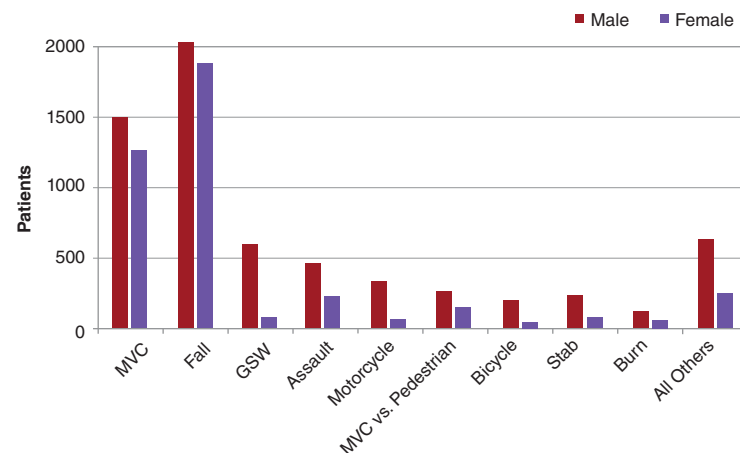
## All Patients

Mechanism of Injury	Patients
MVC	2814
Fall	3985
Assault	662
Asphyxiation	4
Hanging	28
Motorcycle	373
MVC vs. Pedestrian	403
Bicycle	238
ATV	98
Horse & Rider	57
Other Blunt	419
Other Penetrating	120
Stab	294
Drown	3
GSW	682
Watercraft	2
Bite	23
Sport	72
Burn	166
Unknown	46
<b>Total</b>	<b>10489</b>

## Top Mechanisms of Injury: By Year



## Mechanisms of Injury: By Gender



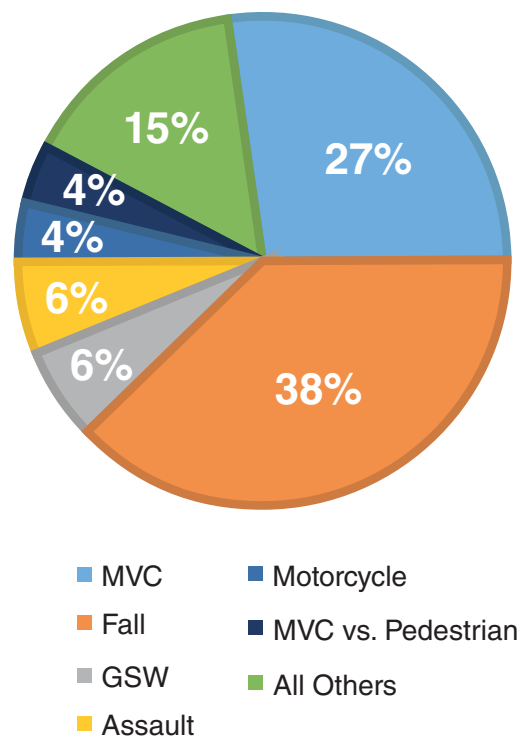
Note: "All Others" include Asphyxiation, Hanging, Motorcycle, Motor Vehicle vs. Pedestrian, Bicycle, ATV, Horse & Rider, Stab, Drown, Watercraft, Bite, Sport, Burn, and all otherwise unclassified.

## By ISS Group

Mechanism	<9	9 -14	15 - 24	25+
<b>MVC</b>	1041	302	109	69
<b>Fall</b>	1652	893	249	115
<b>Assault</b>	231	69	18	8
<b>Asphyxiation</b>	0	1	0	2
<b>Hanging</b>	7	4	0	5
<b>Motorcycle</b>	128	82	43	22
<b>MVC vs. Pedestrian</b>	120	51	35	18
<b>Bicycle</b>	105	48	15	5
<b>ATV</b>	46	36	6	4
<b>Horse &amp; Rider</b>	45	7	1	0
<b>Other Blunt</b>	159	69	23	10
<b>Other Penetrating</b>	83	1	0	0
<b>Stab</b>	117	32	12	9
<b>Drown</b>	0	1	0	0
<b>GSW</b>	179	137	55	79
<b>Watercraft</b>	2	0	0	0
<b>Bite</b>	20	0	0	0
<b>Sport</b>	40	10	2	0
<b>Burn</b>	117	11	3	13
<b>Unknown</b>	8	14	5	2
<b>Total</b>	<b>4100</b>	<b>1768</b>	<b>576</b>	<b>361</b>

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

## All Patients



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



## Level II Adult Trauma Center:

- American College of Surgeons verified Level II Trauma Center since 1992.
- The only Level II Trauma Center on Cleveland's west side.
- Fairview is one of only 91 American College of Surgeons' verified Level II Trauma Centers in the country!
- Nearly 75,000 people from Cleveland's west side visit the Emergency Department and Trauma Center at Fairview Hospital each year.
- Fairview's mission is to provide care for ill or injured patients in a competent and caring manner.



## Critical Care, Making a Critical Difference

Many trauma patients require monitoring and treatment in an intensive care unit (ICU). The trauma surgeon will then collaborate with a synoptic ICU team that includes physicians and nurses who are experts in caring for the critically injured, as well as respiratory therapists, pharmacists, dietitians, case managers, and physical, occupational, and speech therapists.

Daily multidisciplinary rounds guide a comprehensive team effort to consider the entire spectrum of the patient's medical, psychological, and social needs. While the trauma surgeon directs the overall plan of care, the ICU team provides around-the-clock support and coordination of the various medical and surgical subspecialties, creating a healing environment to facilitate recovery from injury and begin the rehabilitation process.

Unfortunately, some injuries are so severe as to be non-survivable, and the ICU team is prepared to engage in open discussions about end-of-life preferences and support the patient and family through this difficult transition. Management of pain and other distressing symptoms is paramount. When the patient chooses to give the gift of organ donation, the ICU team will coordinate with Lifebanc.

The people who make up the ICU team take great pride in their responsibilities within the trauma program. Trauma-specific education is a routine part of ongoing professional development. ICU personnel participate in case reviews, monthly lectures, and performance improvement initiatives. Many attend additional activities such as the Trauma Nursing Core Course of the Emergency Nurses Association, the Trauma Care After Resuscitation course, and the NOTS Annual Trauma Symposium. As individuals and as a group, the ICU plays a key role in the hospital's disaster management plan. The team strives for continuous quality improvement.

A variety of technologies to enhance many aspects of patient care are utilized in the critical care setting, including:

- Overhead lifts to facilitate early mobilization
- Continuous Bedside Pressure Mapping System for prevention of bedsores
- Invasive and noninvasive cardiac output monitoring
- Vocera communication badges
- Enteral access system for feeding tube placement
- Ultrasound
- Continuous EEG monitoring
- Intracranial pressure monitoring



**Michael D. Taylor, MD, FACS**

Director, Surgical Critical Care—Fairview Hospital

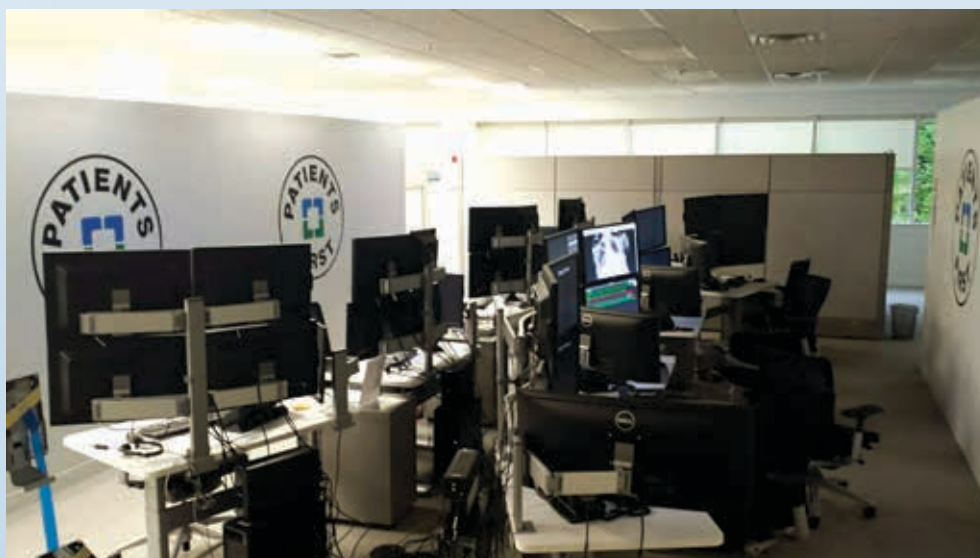
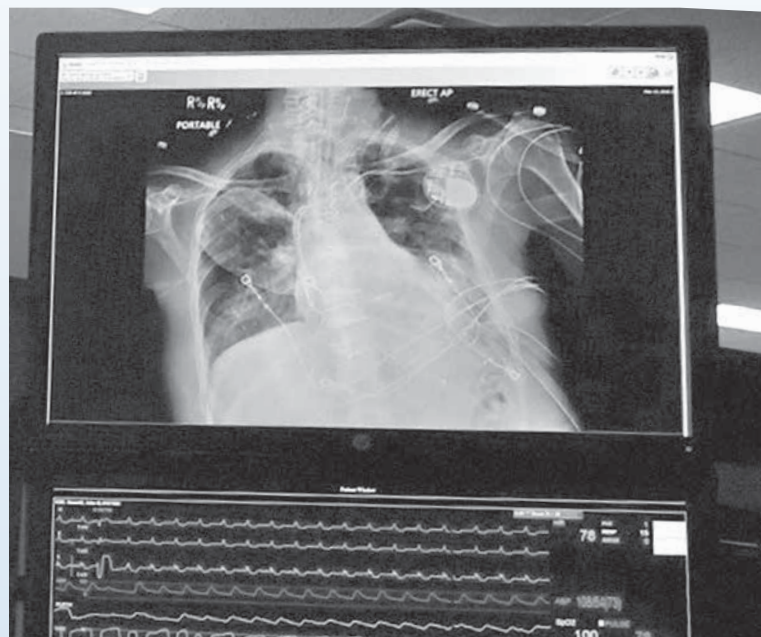
Director, Critical Care—Avon Hospital

Vice Chief of Staff—Avon Hospital

## Level II Adult Trauma Center:

### eHospital

- Critical care nurses, nurse practitioners, and physicians continuously monitor patients from the Cleveland Clinic's eHospital in Beachwood through real-time access to the bedside monitor, electronic health record, radiology images, and even a camera in the patient's room that can be activated for direct viewing. Sophisticated algorithms constantly comb the electronic health record to look for trends that suggest a change in patient condition and notify the eHospital staff. If the eHospital identifies a concern, then they immediately call the bedside nurse. The ICU team also can turn to the eHospital with questions or concerns and get an immediate "second opinion."
- Fortunately, most injured patients do not require the ICU. But for those who do, there is a team of highly trained caregivers using advanced technology to deliver individualized, compassionate care.





## Level II Adult Trauma Center: Meet the Trauma Staff



**Cathleen Khandelwal,**  
MD, FACS  
Trauma Medical Director



**Bernadette Szmigielski,**  
BSN, RN  
Trauma Program Manager



**Diya Alaedeen,**  
MD, FACS



**Toms Augustin,**  
MD, MPH



**Timothy R. Barnett,**  
MD, FACS



**Bradley J. Champagne,**  
MD, FACS, FASCRS



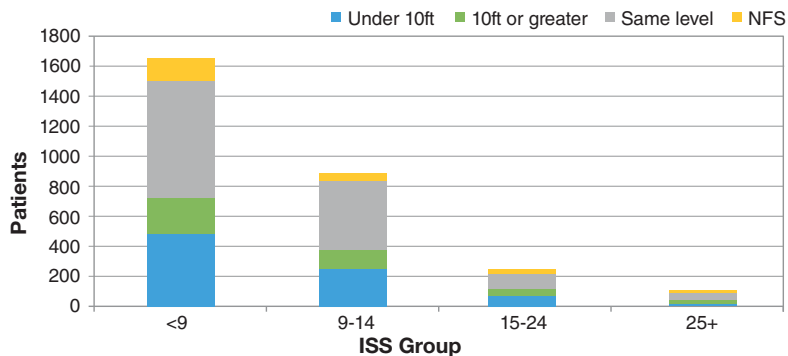
**Andrew W. Smith,**  
MD, FACS



**Joyce Hudak,**  
Trauma Registrar

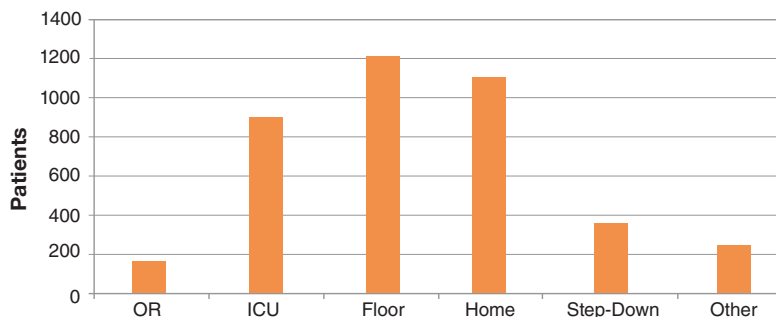
**Julie A. Callahan,**  
Trauma Abstractor

## Falls: By Injury Severity Score (ISS) and Fall Type



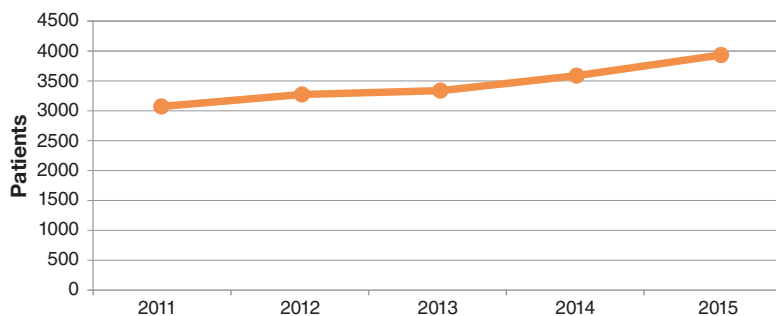
Note: Those without a scored ISS are excluded from this chart.

## Falls: ED Disposition



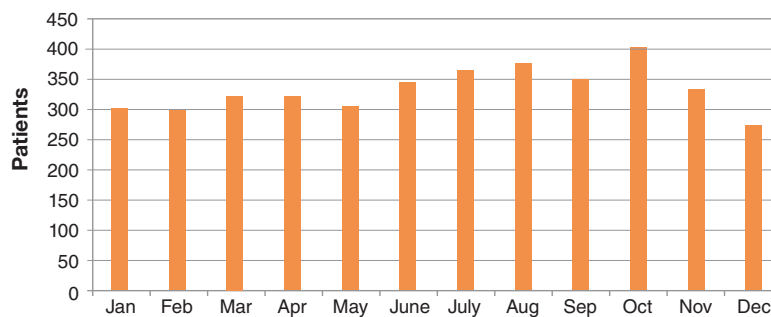
Notes: "Step-Down" includes Step-Down Unit, Telemetry and Burn Unit. "Other" includes Observation, Special Procedures, AMA, Correctional Facility, Morgue, Acute Care Facility, Mental Health Facility, or another inpatient facility.

## Falls: By Year

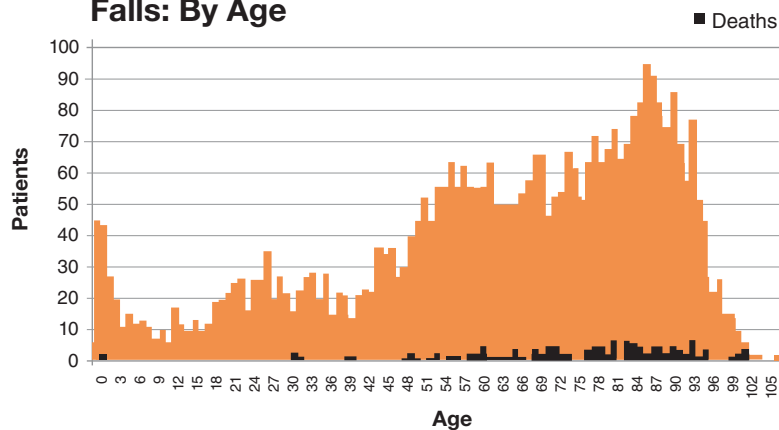




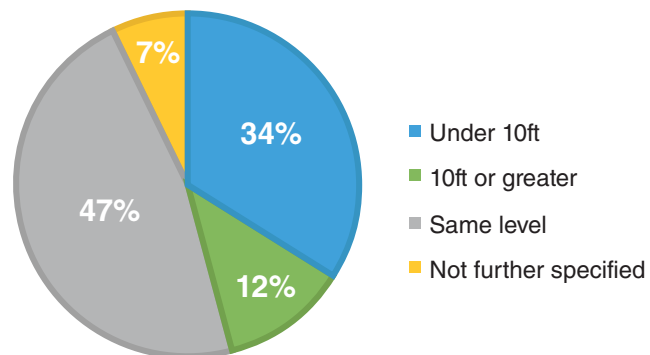
## Falls: By Month



## Falls: By Age



## Falls: By Fall Type



## Level II Adult Trauma Center:

- Only Level II Trauma Center on Cleveland's east side.
- Verified by the American College of Surgeons.
- Surgeons on-call 24/7 to respond, assess and provide prompt care for traumatic or life threatening injuries.
- Treating conditions ranging from minor injuries to critical and resuscitative care.
- Highly skilled nurses trained in trauma care and Advanced Cardiac Life Support.



## Level II Adult Trauma Center

Level II Trauma Centers provide comprehensive trauma care. The American Trauma Society defines Level II Trauma Centers as having the following elements:

- 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.
- Provides trauma prevention and continuing education programs for staff.
- Incorporates a comprehensive quality assessment program.
- Level II and Level I Trauma Centers work closely together to optimize resources for all injured patients in their area.



Across the spectrum, all employees at Hillcrest Hospital have a great sense of pride in being a Level II Trauma Center. Hillcrest is continuously developing and improving its care to ensure the best outcomes for our patients. What makes Hillcrest great is we excel in education. All our surgeons either have a fellowship in critical care and/or trauma and over the years we have increased our specialists' expertise – we now have an orthopedic traumatologist as well as interventional radiologists to name a few. Our ED nurses do continuing education through the Emergency Nurses Association's Trauma Nursing Core Course (TNCC), and our ICU nurses are provided continuing education through the Trauma Care After Resuscitation course. Here at Hillcrest we are very dedicated to providing the best possible care to our patients.

Mary Anne Edwards, RN  
Trauma Program Manager



## What Does Innovative Look Like at Hillcrest Hospital?

Changing the way EMS calls come into Hillcrest Hospital's Emergency Department was the brainchild of Karen Shelby, EMI-I, EMS Manager, CCF Emergency Services, and Dr. Christopher Gaskins. Under the guidance of Marty Whitacre, MSN, RN, Director of Nursing, Emergency/Trauma Services, Karen hired registered nurses who are intently educated to understand the criteria needed to prevent under/overtriaging. It started as a trauma initiative which was so successful it is now used to initiate a "code crimson" or a "brain attack." The fallout from the program is not only a substantial decrease in undertriage, but utilizing this model increased staff satisfaction, promoted better relationships between EMS and emergency department staff, and provided a best practice for the system.

As the position is evolving and being fine-tuned, they are moving toward a paramedic-based communication specialist.



## Level II Adult Trauma Center: Meet the Trauma Staff



**Tony R. Capizzani,**  
MD, FACS  
Trauma Medical Director



**Mary Anne Edwards,**  
RN, Trauma Program Manager



**Molly Flannagan,**  
MD



**Sonfya Asfaw, MD**



**Walter Cha, MD**



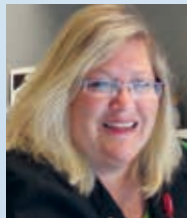
**William O'Brien,**  
MD



**Christian Massier,**  
MD



**Catherine Smith,**  
BSN, RN, Trauma  
Clinical Documentation  
Specialist



**Kimberly A.  
Dalessandro,**  
Trauma Registrar



**Pat Baskin,**  
Trauma Registrar

## Level III Trauma Center

Southwest General participated in multiple NOTS initiatives in 2015 to improve the quality of care for patients and to educate EMS personnel who provide high quality pre-hospital services in their communities. The following bullet points highlight multiple initiatives Southwest General personnel were engaged in to improve quality care for patients in the community.

- Evaluation of evidence-based information regarding EMS protocols for Spine Motion Restriction (SMR), and the subsequent development of education and training strategies for EMS providers in the community.
- Review of current EMS/hospital hemorrhage and burn protocols.

- Evaluating all EMS/hospital patient pass off procedures among care providers for patient safety and information accuracy.
- Participation in discussions about countywide EMS/hospital EMS protocol standardization.

Southwest General is proud to provide emergency medical control to the following communities and governmental organizations: Berea, Brook Park, Brunswick, Brunswick Hills, Cleveland Hopkins International Airport, Columbia Station, Middleburg Heights, NASA Glenn Research, Olmsted Falls, and Strongsville.





## Level III Trauma Center

Level III Trauma Centers are an important part of the trauma system. The American Trauma Society defines Level III Trauma Centers as having the following elements:

- 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 continued education of 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.





## Level III Trauma Center Medical Direction Departments



## Level III Trauma Center: Meet the Trauma Staff



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



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



**Leonard L. Brzozowski,**  
MD, FACS



**Vladimir Dubchuck,**  
MD



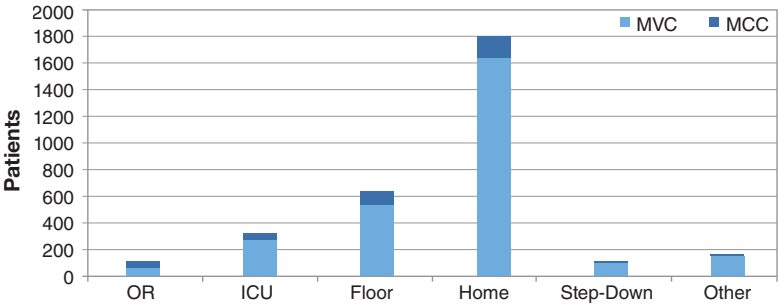
**Dilip Narichania,**  
MD, FACS



**Donna Vecchione,**  
MD

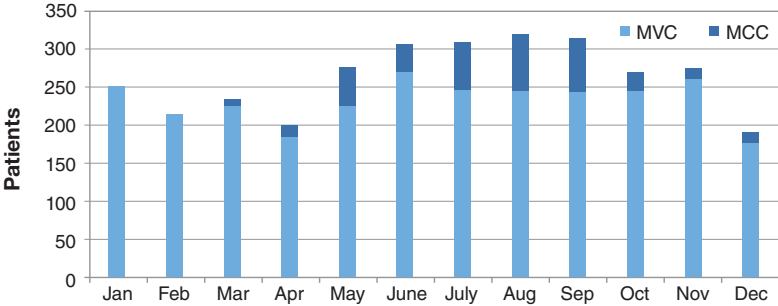


MVC and MCC: By ED Disposition

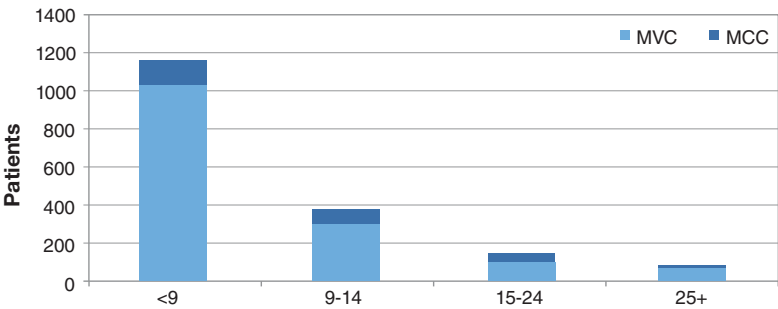


Note: "Other" includes Observation, Special Procedures, AMA, Correctional Facility, Morgue, Acute Care Facility, Mental Health Facility, or another inpatient facility.

MVC and MCC: By Month



MVC and MCC: By Injury Severity Score (ISS)

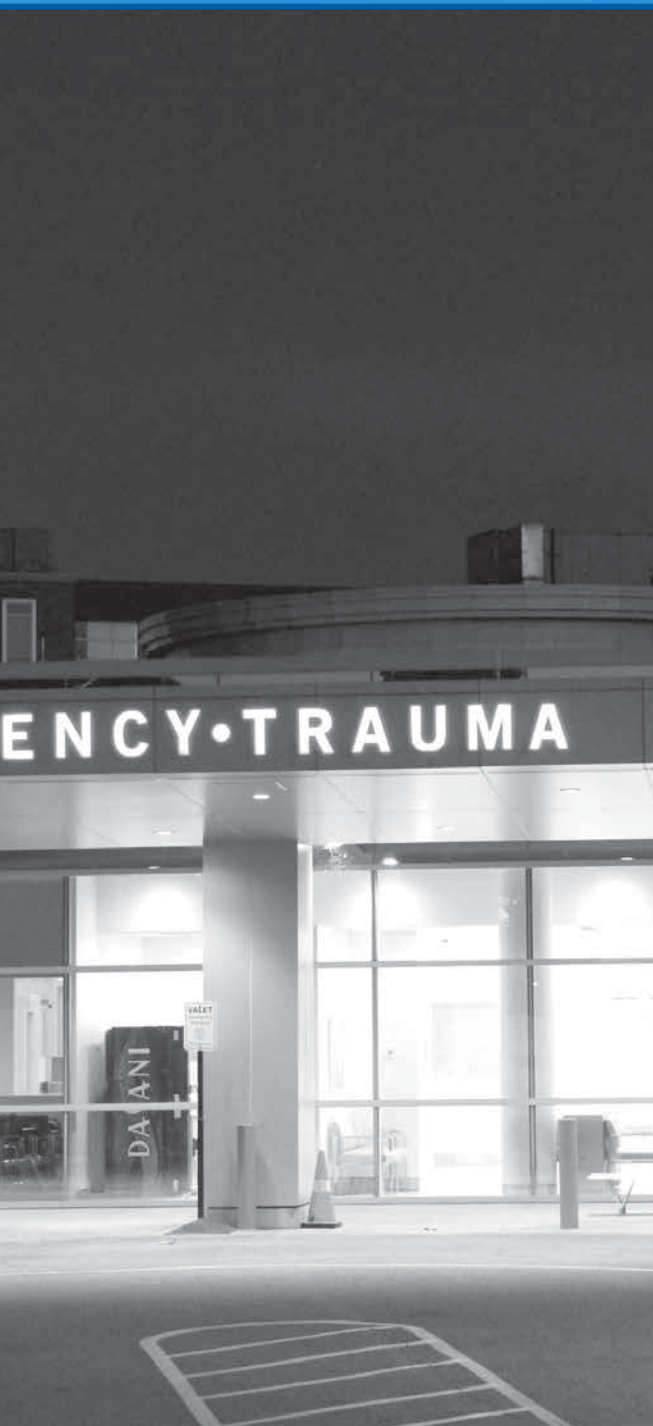


Note: Those without a scored ISS are excluded from this graph.

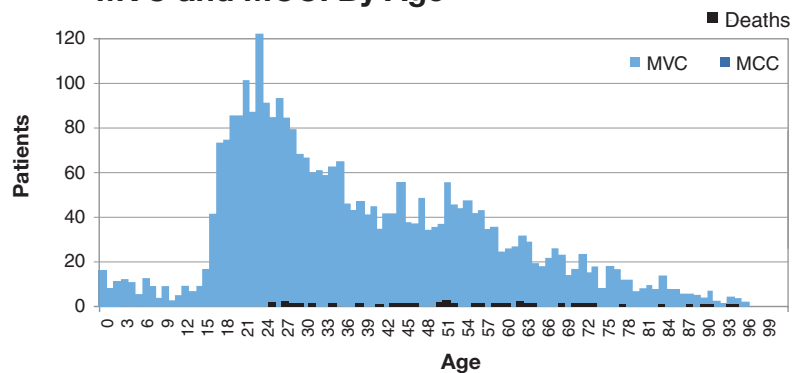




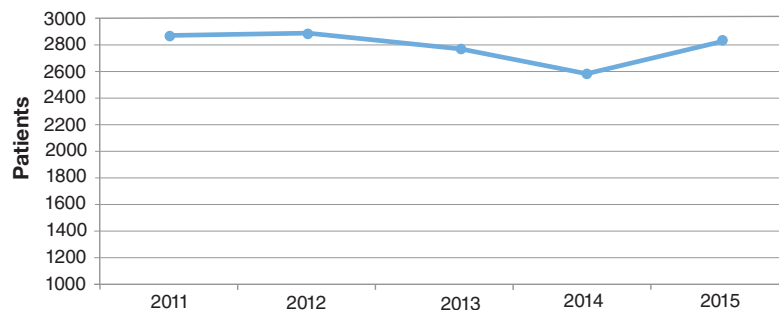
# MOTOR VEHICLE AND MOTORCYCLE CRASH: 2015 DATA



**MVC and MCC: By Age**



**MVC: By Year**







**Laura Gaertner,**  
BSN, RN  
Clinical Coordinator  
Forensic & SANE Nursing  
Fairview Hospital

## Fairview Hospital:

- Fairview Hospital's Forensic/Sexual Assault Nurse Examiner program has staff available to assess, medically evaluate and assist adults and children afflicted by violence 24 hours a day, 7 days a week. The Forensic Nurses are specially trained RNs who see patients affected by sexual assault, domestic/interpersonal violence, child abuse, elder abuse and human trafficking. The Forensic Nurses perform a detailed history and physical examination; forensic photography; and assist with the establishment of safety planning with a focus on compassionate care.
- For questions regarding Fairview Hospital's Forensic/Sexual Assault Nurse Examiner Program, please contact: Laura Gaertner, RN, BSN, SANE Coordinator.



## Hillcrest Hospital:

### Top 10 Facts for Forensic Nursing Services & SANE (Sexual Assault Nurse Examiners)

1. Thirteenth year for the SANE program at Hillcrest Hospital celebrating officially the week of Nov. 7-11th during Forensic Nursing week. Program initiated by Diane Daiber, BSN, SANE-A/P.
2. Two full-time staff; Christi LaPrairie, BSN, RN, SANE-A/P, CEN, PH-C Clinical Coordinator and Angelita Olowu RN, SANE-A, PSANE, FNE. In addition, Deb Casey, BSN, A/A SANE trained RN provides call-backs and community resources to our patients post care.
3. Injury Prevention: Angelita teaches in the community and campus settings, as well as how to access FNS to other facilities / providers.
4. Eighteen on-call, prn (as needed) nurses on our staff with more hires expected after SANE training in September; most of our nurses work separate full-time positions yet provide on-call time up to 48 hours a month.
5. SAAM (sexual assault awareness month) is in April (wear teal ribbons); Domestic Violence awareness month is October (wear lavender/purple).
6. Monthly 65% of all cases we see are for sexual assault; others include Domestic violence (or IPV-interpersonal violence); Trauma and Child Maltreatment concerns.
  - 20% of all sexual assault cases are for children 12 and under;
  - 20% are between the ages of 13 and 17. We will see approximately 420 patients this year (2015).
7. Five of our nurses hold board certification through the International Association of Forensic Nurses; SANE-A (adult/adolescent) and/or SANE-P (pediatrics); 3 SANEs hold both certifications.
8. Our nurses are available by pager or cell phone 24/7 for adult and adolescents; and on average 20 hours a day for Pediatric care (call ahead for availability to Peds ED); access through the CCF on-call directory from the intranet home page.
9. We utilize Child Life Specialists to assist with care of children affected by sexual abuse.
10. Donations are always appreciated; plain solid color Hanes-type t-shirts, unisex athletic shorts, new bras with tags (larger sizes), journals; mandala coloring books, colored pencils, new toys or books for children to take home, children's pajama sets (boys and girls), small quilts or Snuggles.



**Christi L. LaPrairie,**  
BSN, RN, CEN, SANE-A/P, PH-C  
Coordinator Forensic Nursing Services, S.A.N.E. Program

#### Forensic Nurses Week: November 7 – 11, 2016

This special week has been set aside to recognize the extraordinary work of nurses who practice in this unique nursing specialty. Forensic nurses specialize in caring for patients who have experienced violence and trauma. As the fastest growing nursing specialty, forensic nursing serves to ensure that patients who are affected by violence receive expert, compassionate, and comprehensive care.

Please take a moment to learn more about forensic nursing by visiting [www.ForensicNurses.org](http://www.ForensicNurses.org).



**Elizabeth Booth,**  
BSN, RN, SANE-A  
Forensic Nurse  
Coordinator

## The MetroHealth System:

The Sexual Assault Nurse Examiner (SANE) program at The MetroHealth System provides timely, non-judgmental, compassionate care to the sexual assault victim. This includes a forensic exam, prophylaxis for pregnancy and sexually transmitted diseases, forensic photography, referrals for appropriate medical and psychological follow-up, and support and participation in legal proceedings as either a fact or expert witness. We provide this care to victims of all ages and gender, to include LGTB, regardless of ability to pay. We also perform a suspect exam, if requested by police/court order. We are also one out of five programs in the United States that are endorsed by the International Association of Forensic Nurses (IAFN) to provide SANE clinical training through our Simulation Center, utilizing Gynecological Teaching Assistants (GTAs). We have trained nurses all over the country, to include participants from the Department of Defense.





**Tina Pendley,**  
BSN, RN  
SANE Coordinator

## Southwest General Health Center:

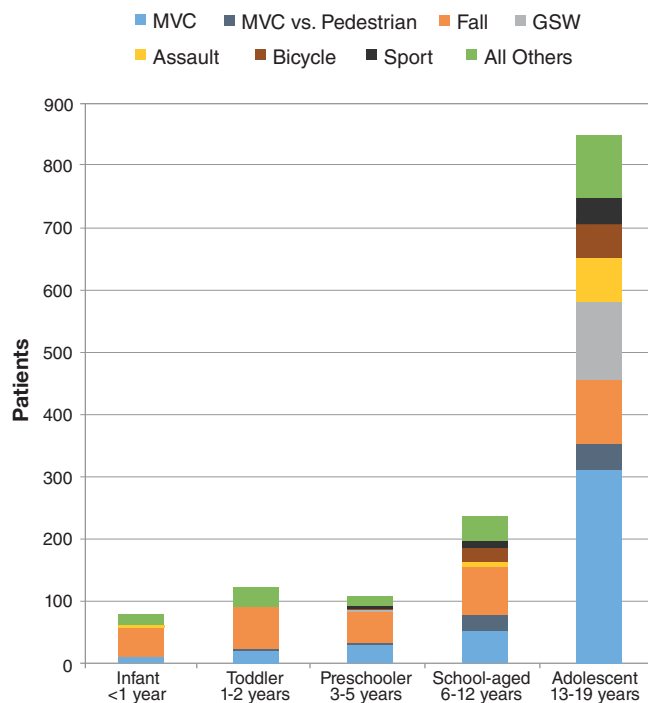
As the SANE Coordinator at Southwest General Health Center, my goal is to provide compassionate care to victims of sexual assault and other violent emergencies. My experience includes working as a staff nurse for over 16 years in emergency services and 6 years as a SANE nurse. My professional affiliations include a member of the Cuyahoga County Sexual Assault Response Team (SART) and the International Association of Forensic Nursing (IAFN). The SANE program uses an interdisciplinary approach by collaborating with other members of the community. Specially trained SANE nurses strive to provide victims of violent crimes quality care through a confidential, comprehensive medical-forensic exam.





## 19 years of age and younger

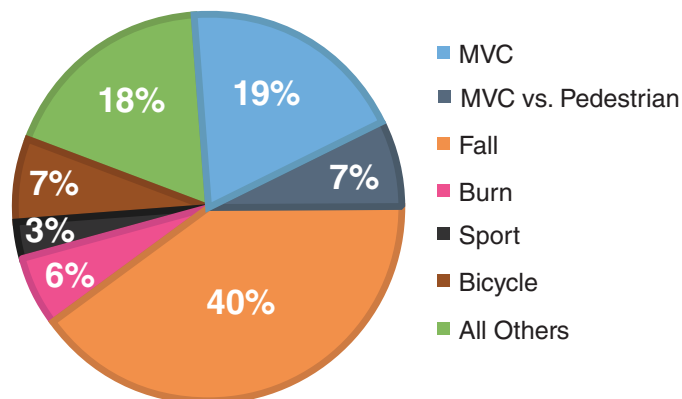
### Pediatric Mechanism of Injury: By Age Group



Mechanism of Injury	Infant <1 year	Toddler 1-2 years	Preschooler 3-5 years	School-aged 6-12 years	Adolescent 13-19 years
<b>MVC and MCC</b>	13	17	29	52	310
<b>MVC vs. Pedestrian</b>	0	4	7	27	52
<b>Fall</b>	45	71	47	76	96
<b>GSW</b>	0	2	2	1	122
<b>Assault</b>	2	0	0	7	74
<b>Bicycle</b>	0	0	4	25	53
<b>Sport</b>	0	0	1	9	39
<b>All Others</b>	19	30	18	41	111
<b>Total</b>	<b>79</b>	<b>124</b>	<b>108</b>	<b>238</b>	<b>857</b>

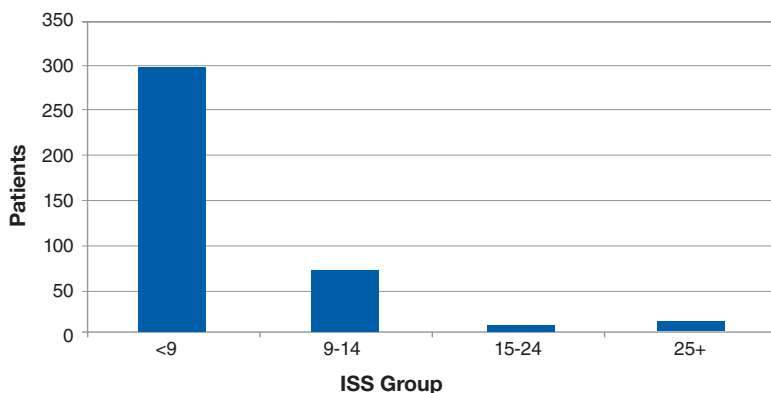
## 14 years of age and younger

### Pediatric Mechanism of Injury



Note: "All Others" include Assault, Asphyxiation, Hanging, Motorcycle, ATV, Horse & Rider, Other Blunt, Other Penetrating, Stab, Drown, Gunshot Wounds, Watercraft, Bite, and all otherwise unclassified.

### Pediatric Trauma: By Injury Severity Score



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

Mechanism of Injury	Patients
MVC	120
Fall	261
Assault	14
Asphyxiation	1
Hanging	0
Motorcycle	7
MVC vs. Pedestrian	50
Bicycle	47
ATV	17
Horse & Rider	10
Other Blunt	47
Other Penetrating	4
Stab	3
Drown	1
GSW	13
Watercraft	0
Bite	4
Sport	19
Burn	37
Unknown	4
<b>Total</b>	<b>659</b>

When you think of prevention, you normally think of activities that stop an action or behavior. The U.S. Department of Health & Human Services state research has found that successful interventions must both reduce risk factors and promote protective factors to ensure the well-being of children and families. Our Trauma Centers within the NOTS System work diligently to do just that. Working collaboratively and developing prevention initiatives that are unique to each hospital, but can be expanded to all facilities is our goal.

**Andrea Martemus-Peters, MSSA, LSW**  
Injury/Violence Prevention Coordinator  
Northern Ohio Trauma System

**Cristina Aldridge, MPH, BSN, RN, CCRN**  
Injury Prevention Coordinator  
Trauma Program Coordinator  
MetroHealth Medical Center

**Cheryl Behm, BSN, RN, EMS-I**  
Trauma Injury Prevention  
EMS Coordinator  
Fairview Hospital

**Angelita Olowu, RN, SANE-A/P**  
Forensic Nurse Examiner  
Injury Prevention Educator  
Hillcrest Hospital

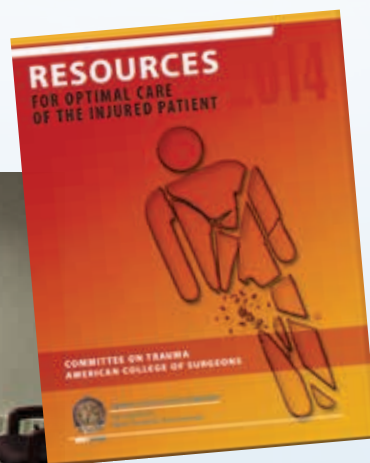
**Noreen Molek, BA, RN, CNP**  
Trauma Program Manager  
Injury Prevention Coordinator  
Southwest General Health Center

**Christi LaPrairie, BSN, RN, CEN, SANE-A/P, PH-C**  
Clinical Coordinator Forensic Nursing Services  
Injury Prevention Coordinator  
Hillcrest Hospital



## Trauma Program Manager Committee

Coming together to share best practices, ideas, suggestions and support is a key function of the Trauma Program Manager Committee.



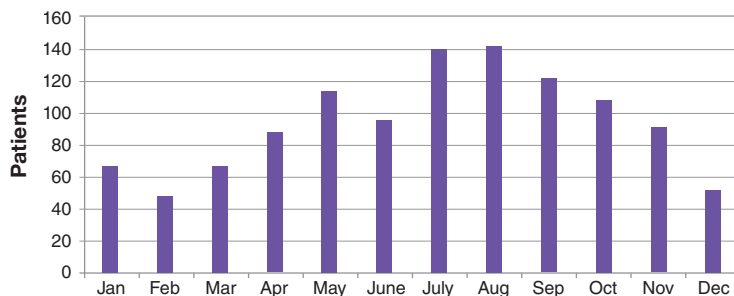
## Symposium Committee

The goal of this Committee is to produce a trauma symposium that is both educational & entertaining – worthy of you taking the time from your busy schedule to attend.

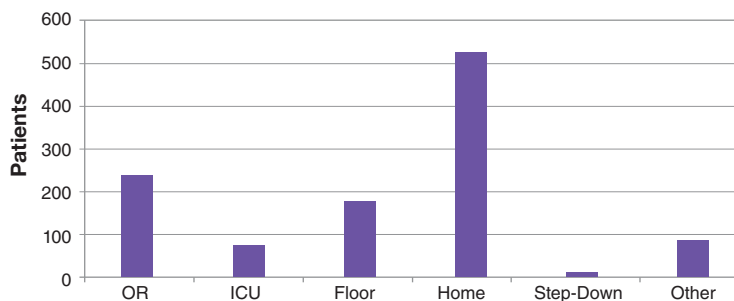




Penetrating Trauma: By Month

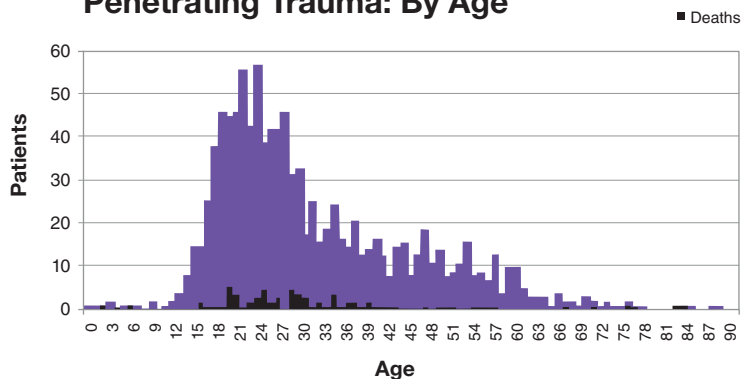


Penetrating Trauma: ED Disposition

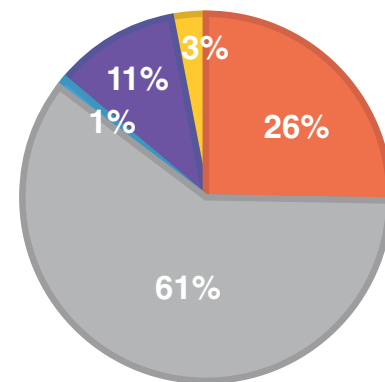


Note: "Other" includes Observation, Special Procedures, AMA, Correctional Facility, Morgue, Acute Care Facility, Mental Health Facility, or another inpatient facility.

Penetrating Trauma: By Age

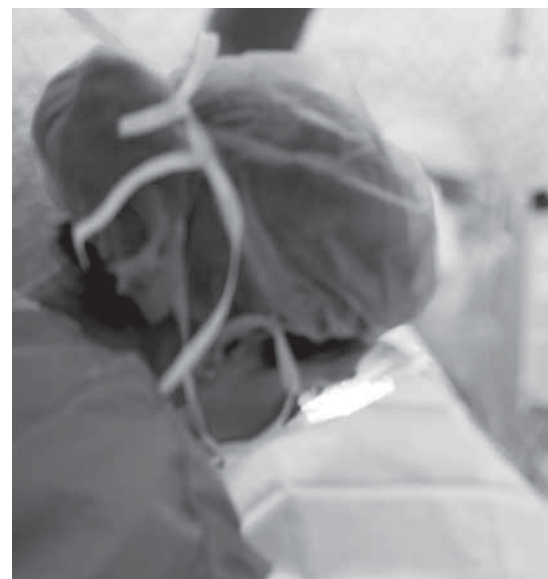


Penetrating Trauma: By Type

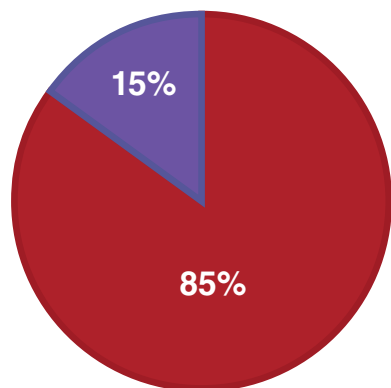


- Assault
- Bite
- Stab
- Other
- GSW

Note: Examples of "other" include injuries by glass, machining, or other uncategorized injuries.

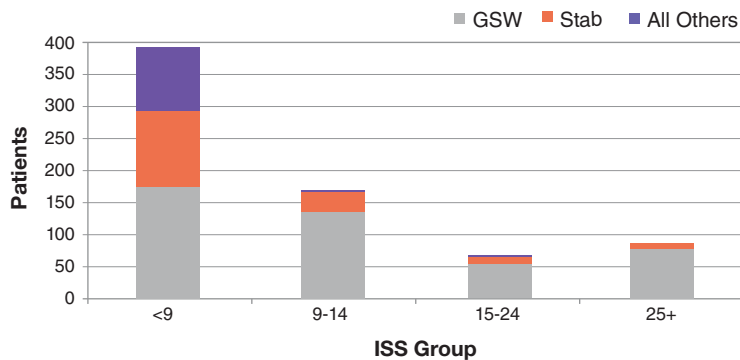


## Penetrating Trauma: By Gender



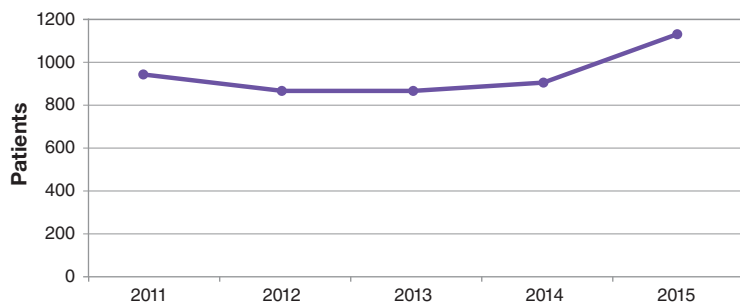
■ Female  
■ Male

## Penetrating: By Injury Severity Score and Type

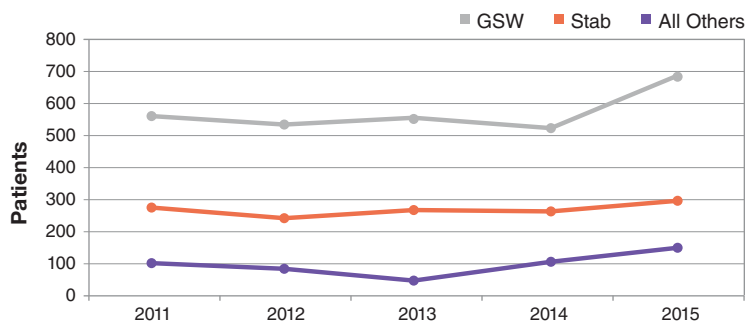


Note: Those without a scored ISS are excluded from this graph.

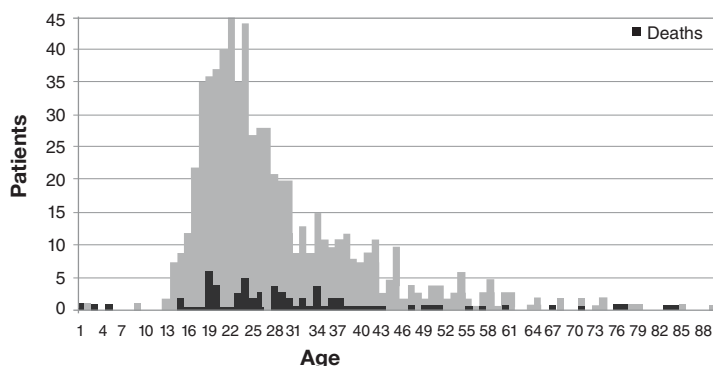
## Penetrating Trauma: Total by Year



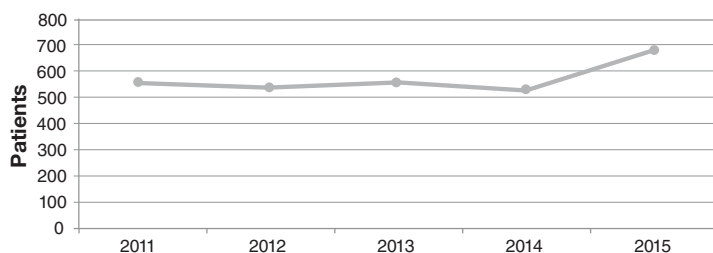
## Top Penetrating: By Type and Year



## GSWs: By Age



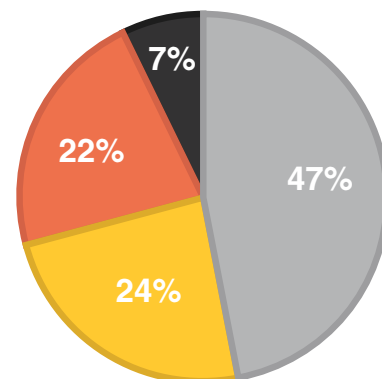
## GSWs: By Year



## Spotlight on Gunshot Wounds

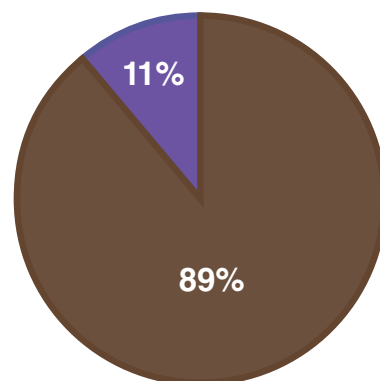
- There were 682 GSWs seen in 2015
- 89% of GSW patients were male
- 47% were discharged from the ED
- 22% were taken directly to the OR from the ED
- Of those who were admitted, 48% went directly to the OR
- Of those who were admitted, 18.8% had a stay in the ICU with an average ICU stay of 5.5 days
- Mortality Rate of those who were admitted: 8.5%

## GSW: By ED Disposition



- Discharged from ED
- Admitted to Hospital
- Admitted to OR
- ED Deaths

## GSW: By Gender



- Female
- Male

## Performance of a regional trauma network: A state-wide analysis

He JC, Kreiner LA, Sajankila N, Allen DL, Claridge JA

### BACKGROUND:

The Northern Ohio Trauma System (NOTS), established in 2010, is a collaborative regional trauma system composed of one level I and several lower-level trauma centers (TCs) across multiple hospital systems. Mortalities between counties in NOTS and other Ohio counties were compared to assess NOTS performance.

### METHODS:

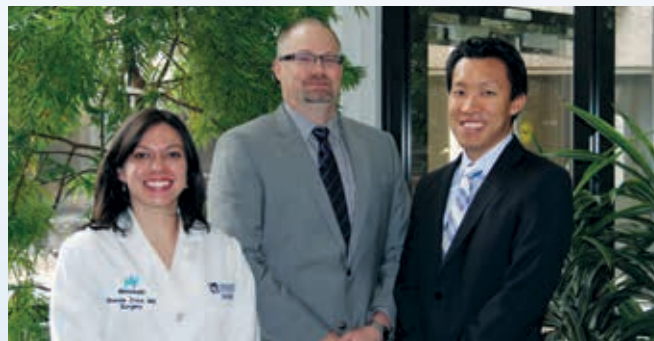
State trauma registry was analyzed for patients 15 years or older from 2006 to 2012. Mortality change over time was assessed by comparing all counties before and after NOTS establishment. Two analyses were done in the post-NOTS period: (1) a county analysis, comparing Cuyahoga County, the county containing NOTS level I TC (L1TC), with other counties containing L1TCs and (2) a regional analysis, comparing Cuyahoga and its adjacent counties (i.e., the NOTS region) with other L1TC containing regions. The following subgroups were included a priori: Injury Severity Score 15 or greater, age 65 years or older, and trauma mechanism.

### RESULTS:

A total of 178,143 patients were analyzed. Cuyahoga was the only county that had a decrease in mortality for both the overall group and all subgroups over time (all  $p < 0.05$ ). Both the county and regional analyses showed that the overall NOTS patients were 1 to 4 years older ( $p < 0.05$ ), had similar or higher Injury Severity Score ( $p < 0.05$ ), and were treated more often at lower-level TCs ( $p < 0.001$ ). County analysis demonstrated that Cuyahoga County had approximately 1% lower mortality in geriatrics patients compared with non-NOTS counties. Regional analysis showed lower mortality in the NOTS region for the overall patient group, as well as geriatric and blunt injuries subgroups.

### CONCLUSIONS:

Cuyahoga was the only county in Ohio that had significant mortality reduction for all patient groups over time. Trauma system regionalization was associated with greater utilization



of lower-level TCs and lower patient mortality. These findings suggest that a collaborative regional trauma system may be more important than the number of L1TC in an area.

### LEVEL OF EVIDENCE:

Therapeutic/care management study, level IV.

*J Trauma Acute Care Surg.* 2016 Jul;81(1):190-5. doi: 10.1097/TA.0000000000001067.



## EMS Committee

The NOTS EMS Committee is a group chaired by Dr. Tom Collins and Dr. Jim Sauto. The group is comprised of emergency physician leadership, hospital coordinators, fire chiefs and EMS providers representing our region's emergency departments and fire/EMS organizations. The committee meets regularly to discuss needs for the community ranging from issues on current legislation, to recommended educational programs and provider guidelines. This group provides direction and insight to NOTS and is a valuable component in merging NOTS with EMS.



## Quality Committee

The NOTS Quality Committee is unique in that we openly and corroboratively discuss opportunities for improvement in the care of the trauma patient. We review cases, protocols, transport concerns, and system issues. If we identify opportunities for improvement, changes are then implemented through protocol/guideline development, education, and implementing process changes. This can only be accomplished through mutual respect, complete transparency, and committee members dedicated to improving patient outcomes. We are proud of the Quality Committee's accomplishments and value its members.



### **Mission Statement:**

The Northern Ohio Trauma System Quality Committee's mission is to emphasize a continuous, multidisciplinary effort to measure, evaluate, and improve the process of care and its outcome. The patient safety program evaluates the overall care process to minimize risk of harm related to the care process itself. Our mission is to reduce inappropriate variation in care and to improve patient safety.

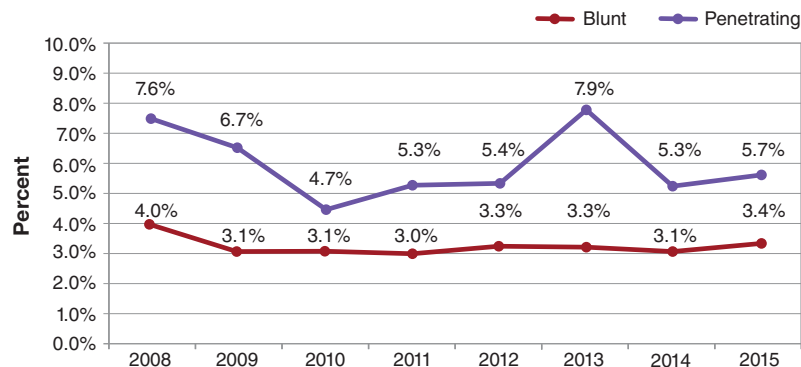


Another successful Symposium! Thank you to everyone who attended.

## MORTALITY: ALL ADMITTED PATIENTS

In these next figures, we are showing the trends of mortality of the NOTS region over time. The data is based on admitted patients and separated based on blunt and penetrating injuries. Blunt injuries are mechanisms of injury such as falls or motor vehicle crashes. Penetrating injuries mainly include gunshot wounds or stabbings. Attached are the number of patients by each category for each year. This number is very important to determine our impact on mortality.

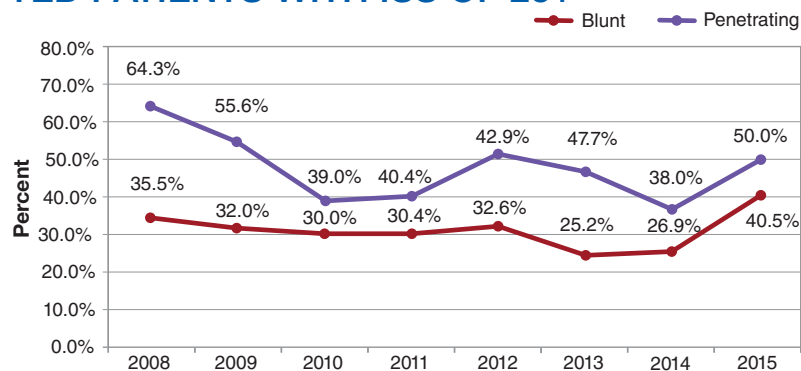
The first figure shows all patients' mortality over time. 2015 was a busy year for NOTS with 4,804 patients having blunt injuries and 508 patients having penetrating injuries. The mortality percentages are not adjusted for severity or any other factors. Overall, there is still a significant reduction in mortality from years prior to NOTS (2008 and 2009). The mortality for blunt injury patients was 3.4% and relatively unchanged for the past 4 years. Penetrating mortality did increase to 5.7% from 5.3% last year, but is still significantly better than before NOTS began.



Blunt (n)	4481	4557	4928	4420	4425	4257	4638	4804
Penetrating (n)	642	670	613	551	464	454	493	508

## MORTALITY: ADMITTED PATIENTS WITH ISS OF 25+

This figure represents the smallest subset of injured patients - patients with the highest severity of injury. The ISS for these patients is 25 and higher. A significant percentage of these patients have fatal injuries and are not expected to survive. A historical estimate (or rule of thumb) is that roughly 50% of patients with an ISS > 25 don't survive. Severity scores can go as high as 75; thus the range of ISS for those patients is from 25-75. This figure does not break it down further than ISS > 25. Last year there was an increase in mortality in this group of patients. Although the number of patients and the number of deaths in this group of patients is small, we will be working hard to collaboratively improve the care of these most injured patients.

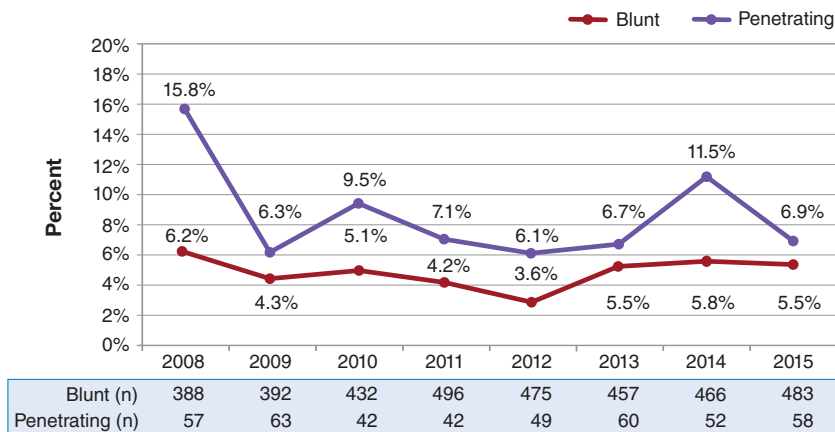


Blunt (n)	229	266	277	237	227	230	208	220
Penetrating (n)	56	72	59	57	49	65	50	46

Likewise, part of the trauma surgeon's job is to respect family and patient wishes and recognize that it is our responsibility to allow people to die comfortably. At this time, we do not monitor how often we honor patient and family wishes to provide just comfort care and withhold life sustaining therapy.

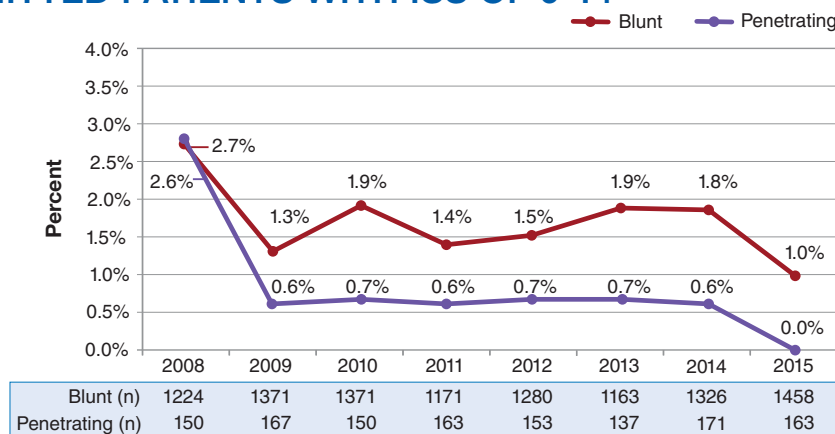
## MORTALITY: ADMITTED PATIENTS WITH ISS OF 15-24

This group represents patients with a moderate severity of injury. There are significantly more patients in this group, and although some patients will still not survive, it is our goal to have every patient with these injuries survive. We will never get this number to zero, but when NOTS started, our goal was to specifically improve the outcomes of this patient group. The mortality for blunt injuries has been relatively the same the past three years. Patients with penetrating injuries and an ISS of 15-24 improved significantly from last year from 11.5% to 6.9%



## MORTALITY: ADMITTED PATIENTS WITH ISS OF 9-14

Patients with a minor ISS of 9-14 are numerous. We have been very successful at reducing the mortality of these patients over the past eight years.



*We would like to stress that we are sharing data in order to be transparent and highlight our successes as well as identify further opportunities for improvement. The most important thing to recognize is that while we talk about this as data, one must remember that we are talking about patients' lives. Every life matters and we would like to take a moment to humbly express our sympathy to all the families who have been affected by the loss of a loved one as a result of a traumatic injury.*



The Trauma Survivor Network (TSN) is a community of patients and families who are looking to connect with one another and rebuild their lives after a serious injury. (<http://www.traumasurvivorsnetwork.org/pages/about-us>)

- The TSN was established at MetroHealth in March 2013.
- Since its inception, Sarah Hendrickson and her staff have provided:
  - Direct service, support and education to 602 patients and families,
  - Five hundred and twenty-five peer support visits,
  - Coordinated 485 hours of volunteer work from former patients (peer visitors),
  - Participated in the 3rd Annual Fox 8 Fox Trot in honor of those that could not walk the one-mile course,
  - Collected over 1100 items for the "We've Got You Covered" campaign – an initiative created by a former patient that provided comfort items to families and patients during their stay.



# Implementation of an image sharing system significantly reduced repeat computed tomographic imaging in a regional trauma system

Banerjee A, Zosa BM, Allen D, Wilczewski PA, Ferguson R, Claridge JA

## BACKGROUND:

The practice of repeating computed tomography (re-CT) is common among trauma patients transferred between hospitals incurring additional cost and radiation exposure. This study sought to evaluate the effectiveness of implementing modern cloud-based technology (lifelIMAGE) across a regional trauma system to reduce the incidence of re-CT imaging.

## METHODS:

This is a prospective interventional study to evaluate outcomes after implementation of lifelIMAGE in January 2012. Key outcomes were rates of CT imaging, including the rates and costs of re-CT from January 2009 through December 2012.

## RESULTS:

There were 1,081 trauma patients transferred from participating hospitals during the study period (657 patients before and 425 patients after implementation), with the overall re-CT rate of 20.5%. Rates of any CT imaging at referring hospitals decreased (62% vs. 55%,  $p < 0.05$ ) and also decreased at the accepting regional Level I center (58% vs. 52%,  $p < 0.05$ ) following system implementation. There were 639 patients (59%) who had CT imaging performed before transfer (404 patients before and 235 patients after implementation). Of these patients, the overall re-CT rate decreased from 38.4% to 28.1% ( $p = 0.01$ ). Rates of re-CT of the head (21% vs. 11%,  $p = 0.002$ ), chest (7% vs. 3%,  $p = 0.05$ ), as well as abdomen and pelvis (12% vs. 5%,  $p = 0.007$ ) were significantly reduced following system implementation. The cost of repeat imaging per patient was significantly lower following system implementation (mean charges, \$1,046 vs. \$589;  $p < 0.001$ ). These results were more pronounced in a subgroup of patients with an Injury Severity Score (ISS) of greater than 14, with a reduction in overall re-CT rate from 51% to 30% ( $p = 0.03$ ).



## CONCLUSIONS:

The implementation of modern cloud-based technology across the regional trauma system resulted in significant reductions in re-CT imaging and cost.

## LEVEL OF EVIDENCE:

Therapeutic/care management study, level IV; economic analysis, level IV.

**Table 1. Patient Demographics**

	Repeat CT	No Repeat CT	p value
n	222	859	
Age (median)	51	39	<0.001
Male	67%	71%	0.248
Non-Trauma Hospital Referral	62%	73%	0.002
Blunt Injury	96%	81%	<0.001
ISS (median)	10	5	<0.001

*J Trauma Acute Care Surg.* 2015 Sept;79(3):372-7. doi: 10.1097/TA.0000000000000762.

- 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 ground ambulances, 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 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 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/services/criticalcare> or visit our Facebook page.





- For over 33 years, physicians and emergency crews around the region have relied on Metro Life Flight during the heat of the moment. Never afraid to roll up their flight suit sleeves, Metro Life Flight has a mission devoted to caring for the most critical of patients. They do this by strategically basing their three state-of-the-art EC145 helicopters, all equipped with the latest in aviation safety features. The program is proud of its three decades of experience with an outstanding safety record. Rotary crews based in Ravenna, Elyria and Wooster locations allow for rapid response to patients in critical condition. In addition, the Metro Life Flight Ground Unit, based at MetroHealth Medical Center in Cleveland around the clock, 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. Additionally, as a department within The MetroHealth System, Metro Life Flight has the same financial assistance programs and insurance contracts as MetroHealth which minimizes the out-of-pocket costs to patients.
- 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 - more so than any other type of healthcare, trauma care is all about outstanding teamwork. The care and coordination between hospital systems 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 and Northern Ohio has experienced decreasing trauma mortality over the past few years. Patients win when organizations partner to optimize the quality of care and that is what NOTS does best. We look forward to the possibility of bringing additional hospital systems into NOTS so we can further improve regional trauma care in Northern Ohio because the best team needs the best players working together."*

**Craig Bates, MD, MS, FACEP**

Medical Director, Metro Life Flight  
Attending Physician,  
MetroHealth Department of Emergency Medicine



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

Kelly ML, Roach MJ, Banerjee A, Steinmetz MP, Claridge JA

### BACKGROUND:

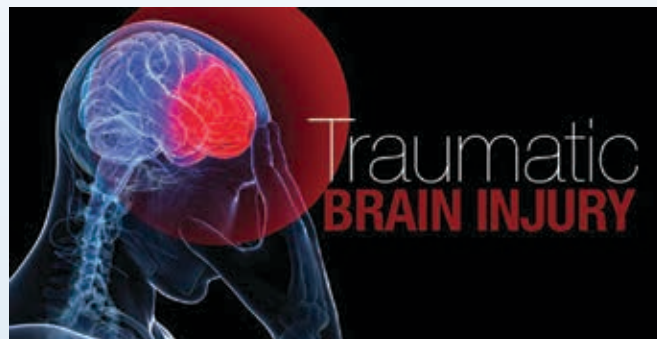
We previously demonstrated that regionalization of trauma (RT) significantly reduced in-hospital mortality from 19% to 14% in patients with severe traumatic brain injury (sTBI). However, functional and long-term outcomes had not been assessed. We hypothesized that RT would be associated with improved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

### METHODS:

All TBI patients older than 14 years with a head Abbreviated Injury Scale (AIS) score of 3 or greater 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 before and after RT.

### RESULTS:

A total of 3,496 patients with sTBI were identified in the RT database, 1,359 in the pre-RT and 2,137 in the post-RT period. The mortality rate after discharge decreased significantly after RT from 21% to 16% ( $p < 0.0001$ ) at 30 days and from 24% to 20% ( $p = 0.004$ ) at 6 months. Multivariable logistic regression demonstrated RT to be an independent predictor against mortality at 30 days (odds ratio, 0.74; 95% confidence interval, 0.60-0.91; C statistic, 0.84) and 6 months (odds ratio, 0.82; 95% confidence interval, 0.67-0.99; C statistic, 0.82). Discharges to the TBIr unit increased from 117 (9%) in the pre-RT to 297 (14%) in the post-RT period ( $p < 0.0001$ ), while discharges to home and non-TBIr units remained similar. Injury Severity Score (ISS) and Glasgow Coma Scale (GCS) score for all discharged patients remained similar. FIM admission scores were similar in the pre-RT (median, 54; interquartile range [IQR],



30-65) and post-RT period (median, 48; IQR, 31-61) ( $p = 0.2$ ) and remained similar at discharge in the pre-RT (median, 92; IQR, 75-102) and post-RT period (median, 89; IQR, 73-100) ( $p = 0.1$ ). TBIr patients showed similar FIM score gains in the pre-RT (median, 37; IQR, 26-46) and post-RT period (median, 36; IQR, 24-49) ( $p = 0.6$ ).

### CONCLUSIONS:

RT was associated with reduced long-term mortality, increased TBIr admissions, and similar FIM score improvements for patients with sTBI.

### LEVEL OF EVIDENCE:

Therapeutic/care management study, level IV.

*J Trauma Acute Care Surg.* 2015 Sep;79(3):372-7. doi: 10.1097/TA.0000000000000762.



**Michael Kelly, MD, MA**  
Department of Neurosurgery  
MetroHealth Medical Center

## The NOTS Advisory Board

*Although northern Ohio is extremely blessed to have several world renowned health systems, none of these systems standing alone has the potential that this collaborative relationship brings. Only with everyone working together, can this community truly realize our potential. The NOTS program is a living testament to what can be accomplished through collaboration, transparency, and the commitment to place the community above self.*

*Collaboration catalyzed a series of cross system partnerships with public health and safety to effectively address the Ebola community response, the elimination of EMS Diversion, common EMS protocol discussions, health coverage at the RNC, and the development of evidence-based injury/violence prevention program.*



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Cleveland, Ohio



**Terry Allan, MPH**  
Health Commissioner  
Cuyahoga County  
Board of Health

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, and Lorain counties, and all surrounding communities.



## THANK YOU!



**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 healthcare 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:** This includes patients who died, were transferred, or admitted for 23-hour observation.

**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.

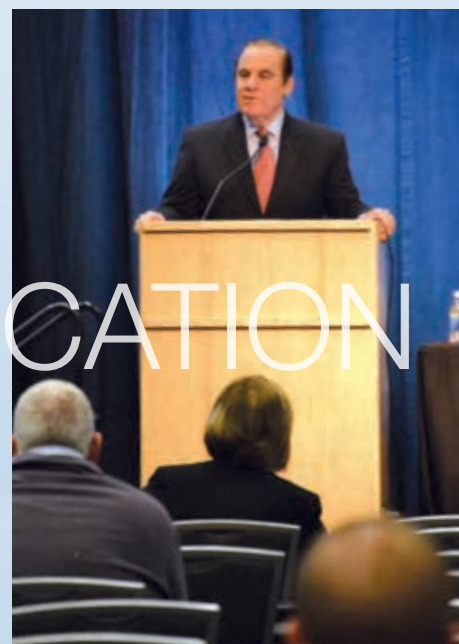
**Mechanism of Injury:** The manner in which a physical injury occurred (e.g., fall from a height, ground-level fall, high- or low-speed motor vehicle accident, ejection from a vehicle, vehicle rollover). The mechanism of injury (MOI) is used to estimate the forces involved in trauma and, thus, the potential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

**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.









# PROTOCOLS EMERGENCY DEPARTMENTS

# EDUCATION TEAMWORK





NORTHERN OHIO TRAUMA SYSTEM

right patient • right place • right time

NOTS Transfer Center:  
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### NOTS 2016 Annual Report

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