Cincinnati Children's™
changing the outcome together

Trauma Report 2016

Trauma Report **Dedication: Susan Laurence**

Susan mentored hundreds of injury prevention advocates throughout our region and beyond.

This Trauma Report is in memory of Susan Laurence
July 17, 1952–January 10, 2017

As one of the earliest certified Child Passenger Safety Technicians (CPST) in the nation, Susan Laurence was a true pioneer in her field. In her more than 20 years with Trauma Services at Cincinnati Children's, she mentored hundreds of injury prevention advocates throughout our region and beyond. During her tenure, she served as lead instructor for our local CPST certification courses, as well as lead coordinator on numerous grant-funded child passenger safety projects. Susan worked diligently to build partnerships with emergency service and community agencies, and she helped to created more than forty car seat fitting stations throughout the Tri State area. Most importantly, countless children are alive and safe today because of Susan's passion, and her tireless commitment to keeping kids safe. We are proud to have known Susan as both a colleague and friend, and her legacy lives on.

GIVE TO TRAUMA SERVICES **>**

A Letter to **Our Friends**

Reducing the burden of pediatric injury and eliminating injury as the leading cause of death for children remains our number one priority.

Care of the injured child requires a comprehensive, multi-disciplinary collaborative approach. The “care” begins with injury prevention, and continues until rehabilitation and complete recovery. Trauma Services at Cincinnati Children’s works to change the outcome for children together.

This report highlights some of the many contributions made by the vast array of individuals and divisions that contribute to the care of injured children. Examples include our national Buckle Up for Life program, our on-line education including GlobalCast MD educational events viewed by individuals across the world, our number three ranked orthopaedic division and the care they provide, and the countless research contributions made across all our divisions.

Reducing the burden of pediatric injury and eliminating injury as the leading cause of death for children remains our number one priority. We appreciate your time in reading this report and learning more about our patients and how we strive to continually improve care and more importantly outcomes for these children. Thank you for your commitment toward helping us reach such audacious goals.

Richard A. Falcone, Jr., MD, MPH
Director, Trauma Services

Trauma Care is **Collaborative Care**

At the center of Cincinnati Children's Level I Trauma Center is the multidisciplinary team of specialty-trained healthcare experts, which includes trauma surgery, emergency medicine, orthopedics, neurosurgery, rehabilitation, radiology, anesthesia, nurses, social workers, injury prevention experts, child life specialists and chaplains.

Coordination of Care

The core responsibility of Trauma Services at Cincinnati Children's is to ensure the injured child and their family receive optimal trauma care. This is accomplished through a collaborative model including trauma surgeons, trauma nurse practitioners and a variety of sub-specialists throughout the medical center. In addition, a specialized team of Trauma Core Nurses who have additional training in the care of injured children, works in partnership with the care team throughout the child's stay.

Trauma care is rooted in continuous and ongoing performance improvement as we strive to always learn from and improve care for injured children. This process enables us to reduce injury occurrence as well as enhance prompt and complete recovery.

Trauma Rehabilitation

Returning injured children to their full potential begins at the time of admission. Some children only require a brief assessment future potential needs where other children require more complex rehabilitation. Physical Medicine & Rehabilitation Service at Cincinnati Children's provides both intensive inpatient and outpatient services. The rehabilitation team coordinates an individualized treatment plan to meet the child's medical, behavioral, educational and social needs. The Physical Medicine & Rehabilitation Service works closely with families to help them manage physically disabling conditions or navigate life after an injury.

Family-Centered Care

The family plays an important role on the care team and Trauma Services has a strong belief in family centered care. As a main source of support for the injured child, caregivers are welcomed to stay with their children from the emergency department trauma bay through discharge. Families are encouraged to participate in the child's care.

Advantages to a Pediatric Trauma Center	
Trauma Team	Immediately available, 24 hours-a-day, 7 days a week
Pediatric Trauma Expertise	Full range of pediatric specialists
Hospital Resources	Immediate availability of an operating room
Optimal Care	Evidence based practice
Research	Leads to the adoption of nationwide innovative practice
Rehabilitation	In-hospital rehabilitation team
Outcomes	Risk of death is significantly lower for children treated in a trauma center
Kids are Our Business	Health care professionals who enjoy caring for children
Education	Sharing our knowledge regionally, nationally and internationally

Keeping Children Safe and Healthy Begins with **Injury Prevention**

The core CCIC team is comprised of nearly a dozen injury prevention professionals who promote child passenger safety, home safety, and head injury prevention and management—among other areas of pediatric injury prevention.

The Comprehensive Children's Injury Center (CCIC) was created to address pediatric injury from prevention through complete recovery. The CCIC serves as a conduit for collaborative work among the multiple divisions and services at Cincinnati Children's committed to addressing pediatric injury.

The core CCIC team is comprised of nearly a dozen injury prevention professionals who promote child passenger safety, home safety, and head injury prevention and management—among other areas of pediatric injury prevention. Over the past three years, the CCIC team has committed to improved data collection and analysis, and has further leveraged Cincinnati Children's Trauma Registry to better understand the incidence and trends of injury in the neighborhoods served. This knowledge continuously informs program design and strategic efforts.

The CCIC has two quarterly e-newsletters: *Injury News*, targeting care providers and employees at Cincinnati Children's with updates about injury research and advocacy; as well as *Growing Safer*—targeting community members with injury prevention tips and upcoming safety events. Through the revamped Safety Fair To-Go program, the CCIC continues to offer free, ready-to-use safety curricula for loan to any community organization.

If you are interested in receiving the *Growing Safer* e-newsletter, subscribe **here**.

If you are interested in using our Safety Fair to-Go presentation materials, complete this **online request form**.

In an effort to maintain these programs at no cost to families, we have secured increased extramural grant and corporate funding. The CCIC is honored and thankful to partner with funders like Toyota, Kohl's, Messer Construction, The Greater Cincinnati Automobile Dealers Association, State Farm Insurance, TSJ Media, and many others.

For more information about the CCIC, visit **our website**.

Thanks to our Corporate Partners

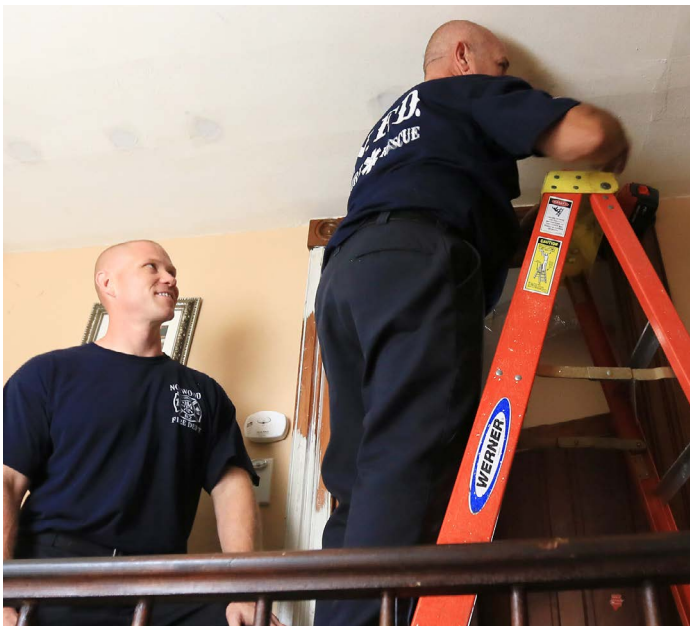
CCIC Programs

Population Health/Safety Days

Each year, injuries kill more children than all other diseases combined, and for kids under the age of five, the home is the most common site of injury. Accordingly, the CCIC has strategically focused on home safety in an effort to improve population health. Since the first "Safety Day" in May 2012, we have concentrated our work in local communities where home injury rates for children under five were among the highest in the region. These communities included, Norwood, Lincoln Heights, Avondale, Price Hill, and Over the Rhine—with recent expansions into Walnut Hills, Evanston, and Camp Washington.

Through 2016, the CCIC has held sixteen volunteer-driven "Safety Days", has engaged more than 500 volunteers, and has reached nearly 1300 unique homes with a home safety bundle (safety education, $100-worth of free home safety equipment, and on-the-spot installation). Data analysis revealed that one cohort of intervention homes saw up to 59% fewer pediatric injuries requiring emergency room treatment than would otherwise be expected for homes in their same zip code. (Falcone RA, Edmunds P, Lee E, et al. Volunteer driven home safety intervention results in significant reduction in pediatric injuries: A model for community based injury reduction. *Journal of Pediatric Surgery*. 51 (2016) 1162-1169)

Please visit **our website** for more information about our Safety Days.



"Volunteering for Preventing Injuries in Norwood (PIN) was an incredible opportunity. The supplies, training and kick-off location were well organized. Families were grateful for their safety equipment. After each home visit, I felt like we made an immediate positive difference in the lives of the children and parents."

Glenna S. Edwards, Community Volunteer

Child Passenger Safety

In the U.S., motor vehicle crashes are the leading cause of serious injury and death among children over the age of one. Since properly used child restraints can greatly decrease these risks, the CCIC's multi-faceted Child Passenger Safety Program aims to increase caregiver knowledge and compliance with best-practices while traveling on our roadways.

Patient Support

- Admitted patients are provided with child passenger safety education, as well as free car seats when financially eligible.
- Replacement car seats are provided to families who visit our Emergency Department because of car crashes.
- Approximately 1,000 car seats are provided to Cincinnati Children's patients annually.
- All patients at CCHMC's Pediatric Primary Care Centers receive a free car seat during a scheduled well visit.

Accommodating Special Health Needs

- Annually, approximately 130 car beds, specialized car seats, and restraint vests are loaned to patients.
- The CCIC assists families in acquiring large medical car seats or adaptive booster seats through their insurance providers.

In the Community

- The CCIC partners with community agencies to offer child passenger safety classes in both English and Spanish, as well car seat check events and free car seats to our neighbors in need.
- Certified Child Passenger Safety Technicians (CPSTs) from the CCIC facilitate educational programs for community parenting groups, pregnancy centers, daycares and preschools.
- The CCIC offers free car seat checks for any member of the community, Monday through Friday, by appointment at Cincinnati Children's, and at over 40 fitting stations throughout the region.

Instruction and Advocacy

- Instructors teach the full, certification course for the Child Passenger Safety Technician training curriculum; as well as refresher and renewal classes for technicians throughout the region.
- Certified instructors facilitate training for Safe Travel for All Children: Transporting Children with Special Health Care Needs—drawing registrants from across the country.
- Child passenger safety experts educate Cincinnati Children's resident physicians on child passenger safety as a critical component of their Advocacy rotation.
- Members of the child passenger safety team represent Cincinnati Children's within some of the preeminent child passenger safety stakeholder and policy groups, including: SafeKids, the Injury Free Coalition for Kids, the Ohio Injury Prevention Partnership, Evenflo's Safety Council, and the National Child Passenger Safety Board.

Please visit **our website** for additional information about our Child Passenger Safety program.

"The partnership that we have developed with the Cincinnati Children's Trauma Team has been magnificent. Working with homeless youth, ages 18-24 years, is a challenge. For many, becoming first time parents presents even more obstacles. We have been grateful for the education provided to our mothers/fathers at our agency by the CCIC Team. Often our clients are obtaining housing on their own for the first time. These classes have been instrumental in teaching them home and car safety. The clients all learn about so much about how to keep their newborns and young children safe. The staff at Lighthouse Youth Services has been elated to have established this ongoing partnership with the CCIC Team. Thank you for all that you do!"

Katrina Hale, RN, Nurse Manager/Pregnancy Care Coordinator, Lighthouse Center for Youth Sheakley Center

Promoting Safe Sleep

In 2016, new efforts to keep patients safe while sleeping at Cincinnati Children's were introduced throughout the institution. The aim was to reduce the number of blankets utilized in patient rooms, and to specifically replace loose blankets with safer sleep sacks for patients under the age of 6 months. Additionally, the hospital's bed policy was updated to incorporate safe sleep guidelines, now including the ABC's of safe sleep: Alone, Back and Crib.

To mirror the hospital's use of sleep sacks, the Family Resource Center (FRC) now offers these items—in addition to other safety equipment—for sale to families at a discounted rate, from their location on the main hospital concourse.

Additionally, a new program was established in 2016 to provide siblings of inpatients with a safe sleeping arrangement while they stay with their family in the hospital. A team of safe sleep advocates, including CCIC staff, worked tirelessly to make free pack-n-plays available to unit staff who identify a need for safe sibling sleep.

GIVE TO ONE OF THESE PROGRAMS **>**

To mirror the hospital's use of sleep sacks, the Family Resource Center (FRC) now offers these items—in addition to other safety equipment—for sale to families at a discounted rate, from their location on the main hospital concourse.

Buckle Up for Life

Buckle Up for Life is a national injury prevention program for families, created by Cincinnati Children's Hospital Medical Center and Toyota in 2004, to help keep child passengers safe. The program teaches parents and children about the proper use of car seats and seat belts and provides free car seats to families in need.

Relying on trusted faith leaders to raise enthusiasm and support among congregants, the initial curriculum introduced safety messages in churches. While Buckle Up for Life continues to have a strong presence in the faith-based community, the program has since evolved and expanded to serve schools, emergency service agencies, and community-based nonprofits assisting any at risk population.

Buckle Up for Life's initial expansion beyond Cincinnati brought three new cities online, per year, and relied on the nation's leading pediatric hospitals as sub-grant recipients to administer the program. In 2016, Buckle Up for Life further evolved to offer grants to any nonprofit or public service agency focused on child passenger safety—and now adds 10–15 new cities to

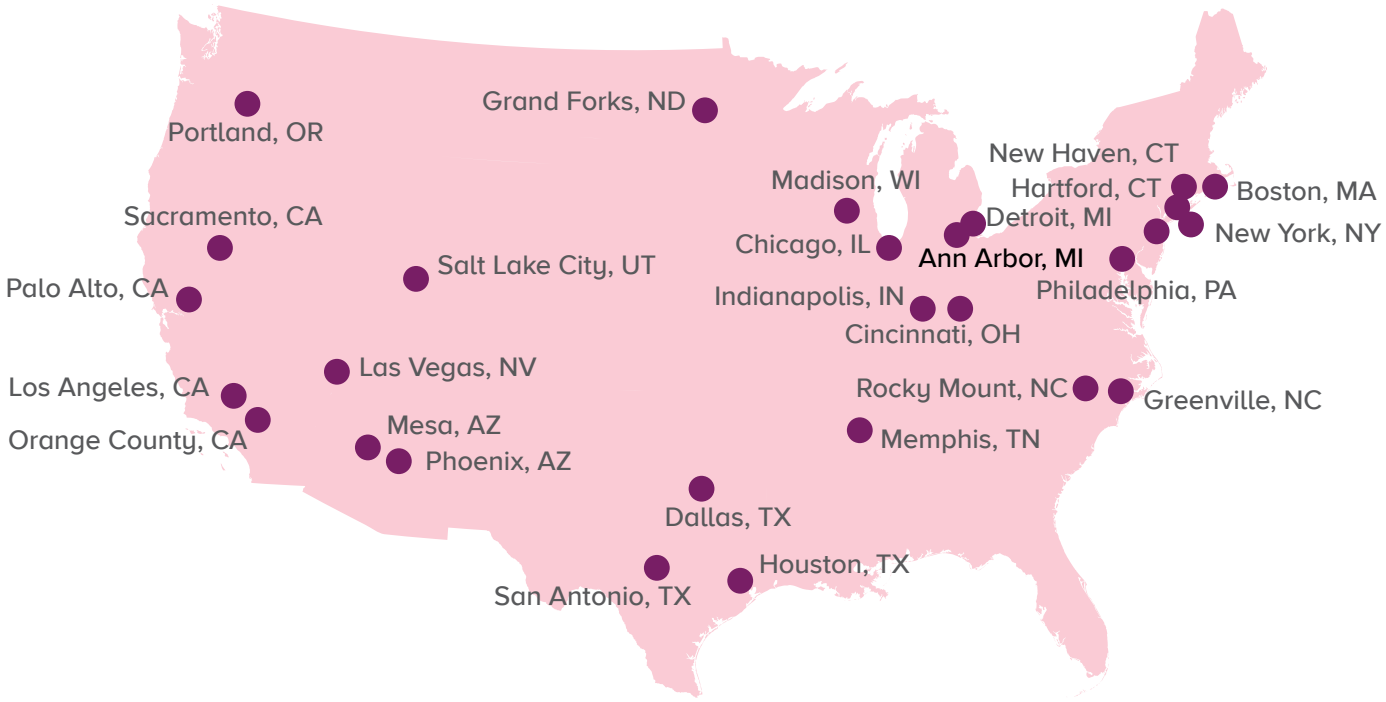
the partnership per year. To date, the full program has been implemented in 26 cities across the country.

During the fall of 2016, Buckle Up for Life also launched the Gift of Safety program, which provides an additional 5000 car seats annually to families in need, nationwide. Each year, each of 50 non-profit organizations or public service agencies receives 100 free car seats to distribute to families in their communities. Each parent or caregiver who receives a seat will also benefit from safety education and assistance from a certified child passenger safety technician.

For more information about Buckle Up for Life, please visit www.buckleupforlife.org.

National Partnerships

Buckle Up for Life's 2016 network of partners across the nation is proud to educate parents and families on child passenger safety



Clayton Frink

On July 30, 2012, 16 year old Clayton Frink was hit by a car while crossing the street. Due to the severity of his injuries, he was initially transported to the closest hospital in order to stabilize his condition. Clay was then transferred to Cincinnati Children's Hospital Medical Center where the multidisciplinary Trauma Team had been activated and prepared for his arrival. The Trauma Team not only includes a specialized team of doctors and nurses it also includes support staff for the family. The Frink family was grateful for the chaplain that met them in the trauma bay and remained with them "like an angel standing at their side."

Clay's head CT confirmed what was feared. The impact to his head caused multiple facial fractures, skull fractures, and a severe traumatic brain injury. He also suffered a knee injury. The family was told Clay would have "a long bumpy road ahead of him." Someone with his degree of injury requires multiple medical specialties to aid in recovery. Clay's team included: PICU (Pediatric Intensive Care Unit), Neurosurgery, Trauma, Plastic Surgery, Orthopedics and Physical Medicine & Rehabilitation. He was kept sedated on a ventilator while a pressure monitor inserted into his brain monitored the swelling in his head. After two long weeks the swelling in his head stabilized and Clay's breathing tube was removed.

Clay's own determination to get well contributed to his success.

But that was just the beginning of Clay's journey to recovery. He underwent two and a half months of intensive physical rehabilitation to regain the skills he had prior to his injury. Clay also had surgery to repair the broken bones in his face and damage that was done to his skull. The team working with Clay during his inpatient rehabilitation included: Physical Medicine & Rehabilitation, Physical Therapy, Occupational Therapy, Speech Therapy, Music Therapy, Recreational Therapy, and Behavioral Medicine.

Clay has made incredible progress since his injury. In addition to the medical team that cared for him, his family, and a strong community support system, Clay's own determination to get well contributed to his success. Clayton is currently a junior at Northern Kentucky University where he is a mathematics major.

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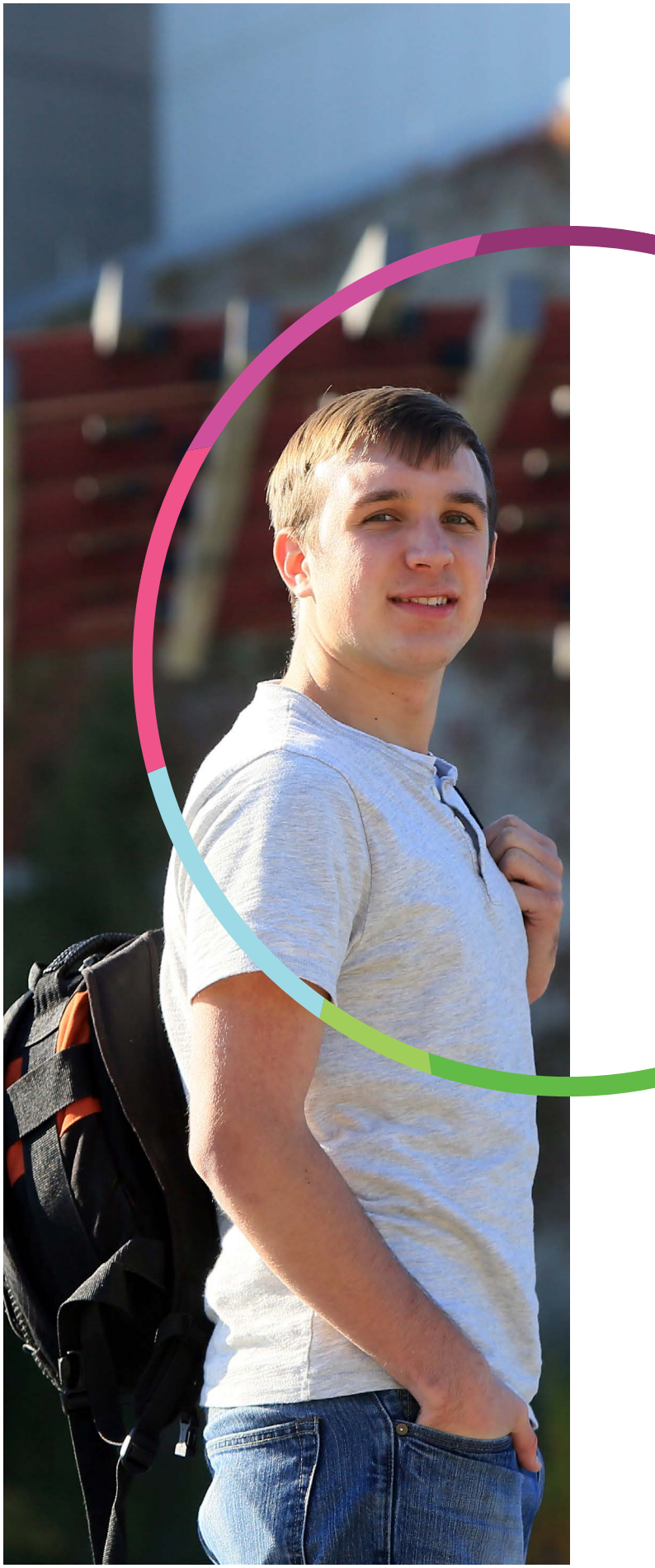

It is Our Duty to Share our Knowledge and **Learn from Others**

Pediatric Trauma Transformation Collaborative

The Pediatric Trauma Transformation Collaboration (PTTC) was developed to partner with other hospitals to ensure injured children receive the best care possible, not just in the Cincinnati region but across the nation and the globe. This outreach program provides education and essential training to hospitals interested in pursuing or maintaining Level II pediatric trauma status. This innovative program supports efforts to improve quality and safety for pediatric trauma patients by collaborating with hospitals and assisting each hospital to achieve their maximum potential.

The program, which can be customized to meet the need of the partnering institution, blends diverse training methods and components. Participants gain broad clinical and academic experience through training that incorporates Continuing Medical Education (CME), monthly case reviews, real-time consultations, hands-on training and simulation experience.

Program Benefits

- Customizable components for collaborative partners
- Evidence-based guidelines and protocols
- Pediatric trauma focused CME/CEU
- Multidisciplinary trauma team simulation training
- Peer-to-peer support
- Expert guidance and support throughout ACS review process

PTTC Outcomes

Collaborative partners have successfully implemented a range of improvement initiatives, including:

- Image/radiation reduction
- Cervical spine clearance
- Non-accidental trauma evaluation process
- Safe transport checklists for children
- Trauma team notification system to include pediatric critical care physician
- Pediatric trauma outreach/follow-up, and solid organ management

PTTC Expansion to Poland

In October 2016, Dr. Rich Falcone and Margot Daugherty, Trauma Education Specialist, traveled to Poland to meet with leaders from Copernicus Hospital and members of the Polish Ministry of Health. The goal was to discuss pediatric trauma care in the Polish health system and determine how the PTTC model could help support efforts to improve their overall pediatric trauma readiness.

The Polish Ministry of Health was presented with an overview of the foundations of pediatric trauma readiness, staffing, and infrastructure best practices as well as potential collaborative options to address challenges faced by the trauma system in Poland. As a result of this trip, Cincinnati Children's and Copernicus Hospital are working to formalize a collaboration between institutions. If the initial collaboration with Copernicus Hospital proves successful, additional hospitals in Poland could be added within the collaborative.

GlobalCast MD

Cincinnati Children's hosted two GlobalCast MD events in the past two years. Experts from around the country were joined together to discuss pediatric trauma topics. These four hour symposia are broadcast live and include presentations and faculty panel discussions. It is an interactive and engaging seminar with audience polling, questions and debate.

- **December 2015—Pediatric Trauma—Are you Ready?**
- **September 2016—Pediatric Trauma—It Takes a Multidisciplinary Village**

Visit the **PTTC website** >

Corey Thompson

As the parent of a healthy, spirited three year old boy, Corey Thompson's mother never expected getting the worst phone call she can imagine. On August 7, 2016, her son was involved in a severe car accident and had been taken to the Cincinnati Children's to be assessed and treated by the Trauma Team. Corey was in critical condition and would require multiple medical procedures to save his life. In the Trauma Bay, Corey's heart stopped beating but the trauma team worked diligently to revive him. Once he was stabilized he was transferred to the Pediatric Intensive Care Unit (PICU). He required multiple blood transfusions and underwent 5 surgeries during his PICU stay.

Surgeons had to surgically remove his damaged kidney, repair a hole in his diaphragm, remove a portion of his liver to stop bleeding, and place multiple chest tubes to treat his severe right chest/lung injury. His Attending Surgeon, Dr. Victor Garcia, described his injuries and surgeries as "so severe, he was literally bleeding to death. Unless we intervened immediately, skillfully, and collaboratively, he would have died in the operating room. What took place was the ultimate formation of a team of teams—anesthetists, nurses, surgical technicians, and surgeons each working together. There certainly was no way we could have rehearsed what we needed to do to save Corey's life at that moment. What the Trauma Team did was adapt. The result was Corey lived." Corey remained in the PICU for three weeks, his mother in constant vigil, at the bedside.

While on the trauma floor his hospital course continued to be difficult at times and his care required the help of multiple hospital services. These services coordinated their efforts to ensure the best outcome for Corey. Consulting services included Dietary, Occupational, Physical and Speech Therapy, Gastro-enterology Team, Child Life Team, Pain Team, Nephrology and Radiology Services. Corey was eventually transferred to the Rehabilitation Unit and spent two weeks completing intensive therapy to restore the strength he lost while being in a critical state for so long.

Corey and his mother continued to be fighters during his entire hospital course. Because of his witty personality and playful spirit he left a big impression on everyone that cared for him. Corey was finally discharged home nearly 7 weeks after his accident as the playful happy boy he was prior to the accident. Corey was followed in multiple outpatient clinics and is now thriving with few remaining health problems—a true testament of how teamwork and collaboration can save a child's precious life.

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The Child Abuse Team at **The Mayerson Center**

Trauma Services and Child Abuse Team Collaborate to Keep Children Safe

The Child Abuse Team at the Mayerson Center for Safe and Healthy Children at Cincinnati Children's treats children for whom abuse is suspected. The Center conducts diagnostic, treatment, prevention, training and research programs in the fields of child sexual abuse, child physical abuse and child neglect and parenting. This multidisciplinary team includes physicians, nurses, social workers, Cincinnati police and sheriff's officers, Department of Job and Family Services workers and staff from the Hamilton County prosecutor's office.

When a child is admitted for suspected child abuse, the Mayerson Center and Trauma Services work collaboratively to treat and diagnose the patient's injuries. According to the Center's Director, Robert A. Shapiro, MD, the two services complement each other. "We have different roles and functions; many children who have injuries from physical abuse are admitted to Trauma Services. Since the Mayerson Center does not admit patients under their service the two teams have established an effective working relationship."

The Trauma Team often identifies safety issues and will contact the Mayerson Center if the patient needs to be evaluated by the Child Abuse Team. According to Dr. Shapiro, "the teams work synergistically to care for children, e.g. assisting with discharge planning and standardized reporting." The vision of the Mayerson Center is to assure safe, healthy and nurturing families and communities where all children can achieve their full potential. In conjunction with the Mayerson Center, Trauma Services helps them accomplish that goal.

The Trauma Nurse Practitioners are considered a part of the Child Abuse Team. They attend the weekly Child Abuse Team case review that also includes law enforcement and children's services. Their involvement allows all care providers to align impressions of the case and work-up. As a result of their presence at these meetings there is better communication between providers. Every patient that is suspected to be abused is reviewed to ensure that responses provided by the child's caregivers have been consistent. This prevents decision making based on unintentional biases. Reviewing each case in a multidisciplinary meeting allows for a comprehensive work-up and findings.

Visit the **Mayerson Center for Safe and Healthy Children website** for additional information.

Social Worker Helps Patients Cope with Traumatic Injuries

April Barker-Casey, MSW, LISW-S, a Social Worker with the Mayerson Center works with the Trauma Service to provide short-term mental health therapy for children who have experienced any type of traumatic injury such as a car crash or assault. April attends trauma clinic each week where she meets children to identify those who are having difficulty coping with their injury.

April schedules specialized therapy sessions to assess the symptoms of stress; helps families identify and articulate the symptoms; and teaches copings skills that significantly reduce or eliminate those symptoms of stress.

"I love what I do because I get to watch people feel better within weeks of starting therapy. I am thrilled to partner with the Trauma Clinic for this service!"

The Center for **Simulation and Research**

The Center for Simulation and Research at Cincinnati Children's Hospital Medical Center utilizes patient simulation and innovative teaching techniques to deliver high quality, customized, state-of-the-art education and training. The Center provides opportunities for healthcare providers to improve multi-disciplinary team performance and to practice communication and clinical skills in a safe environment.

The high-fidelity human patient simulators (HPS) continue to be a crucial part of trauma education at Cincinnati Children's and has expanded to the Pediatric Trauma Transformation Collaborative. Scenarios based on real trauma patients are run with a formal debriefing after each simulation.

Since the incorporation of HPS into trauma education in 2005, over 900 providers have been trained, including surgeons, emergency medicine physicians, residents, trauma core nurses, staff nurses, respiratory therapists and other ancillary personnel.

Learn more about the **Center for Simulation and Research**.

Since the incorporation of HPS into trauma education in 2005, over 900 providers have been trained, including surgeons, emergency medicine physicians, residents, trauma core nurses, staff nurses, respiratory therapists and other ancillary personnel.

Pediatric Trauma Quality Improvement Program

ACS tqip® TRAUMA QUALITY IMPROVEMENT PROGRAM pediatric

Beginning in 2014, Cincinnati Children's joined the Pediatric Trauma Quality Improvement Program. This initiative of the American College of Surgeons aims to provide risk-adjusted benchmarking for pediatric trauma centers that care for injured children. The program allows centers to track outcomes and improve patient care. Centers can also benchmark their data against other comparable centers nationally.

Garrett Blackwell

On June 7, 2015, 15 year old Donnie “Garrett” Blackwell ran out onto the baseball field as he had done so many times before. He had no idea that this game would change his life in such a significant way. During the game, Garrett collided with another player while going for a fly ball and suffered blunt abdominal trauma. He was taken to an outside hospital with a complaint of abdominal pain and a CT scan revealed a pancreatic transection. He was then transferred to Cincinnati Children’s for ongoing care where his journey to recovery would begin.

Garrett was initially evaluated by the trauma team at Cincinnati Children’s and then quickly admitted to the Pediatric ICU for ongoing care, and close monitoring. Since he suffered a relatively rare injury, there was no set standard of treatment in the pediatric population. His parents, Kelley and Michael, and extended family members remained by his side and worked closely with the medical team to determine the best course of treatment for him. In addition to the Trauma Team, many other services were involved in order to manage his complex condition, including Dieticians, the Pain Team, Occupational and Physical Therapy, Interventional Radiology, Gastroenterology, and Pediatric General Surgery.

Garrett was discharged home exactly one month after his initial injury but with significant medical limitations. Garrett would eventually need to return to Cincinnati Children’s to remove part of his injured pancreas but needed additional time to heal. During this waiting period he had multiple visits in follow-up clinics to maintain his continued recovery and optimal nutrition prior to surgery.

Two weeks after his first discharge, he was readmitted for his planned partial pancreatectomy. He underwent another nearly two week admission that involved multiple tests and procedures that was complicated by pain, nutrition needs and therapy. After his discharge, he continued to have multiple follow up appointments but all the hard work and persistence of Garrett and his family had proven successful as he made a full recovery.

Garrett is now a junior at Mason High School where he continues to compete on the school’s football team. He and his family give back to Cincinnati Children’s as part of the Champion’s Program after this life changing trauma that had a happy ending.

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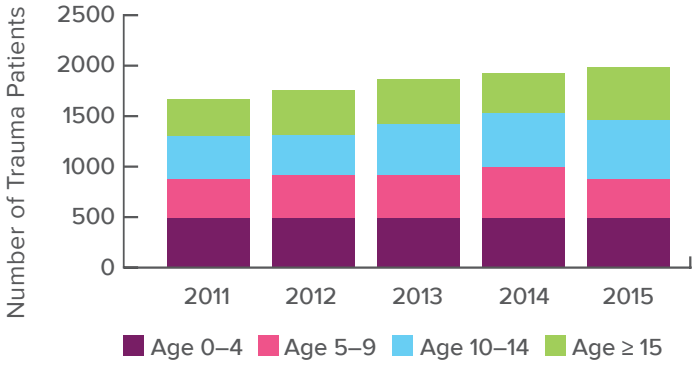
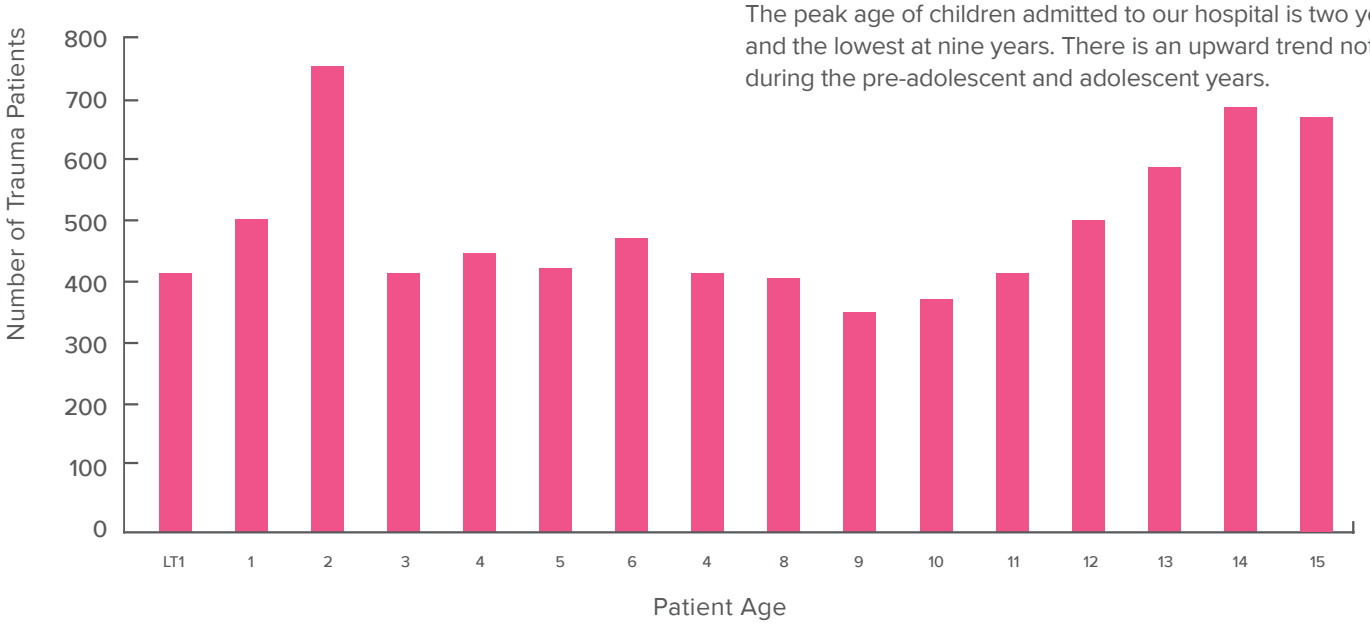
Data is the **Foundation** of Improving Care



Number of Trauma Patients

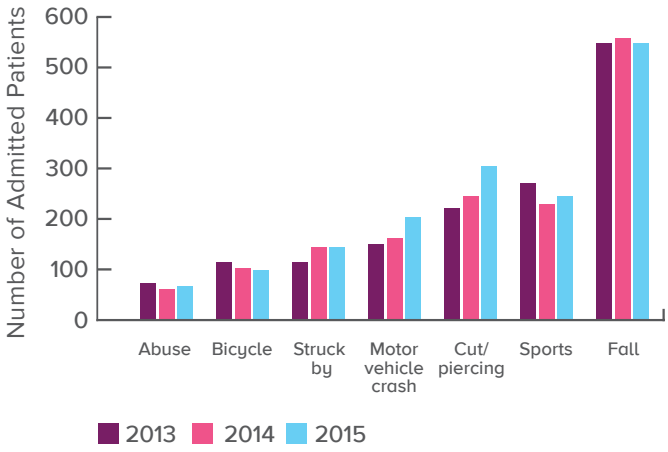
There has been a slight increase in the number of trauma patients admitted to Cincinnati Children's since 2011.



Admitted Injured Patient's Age

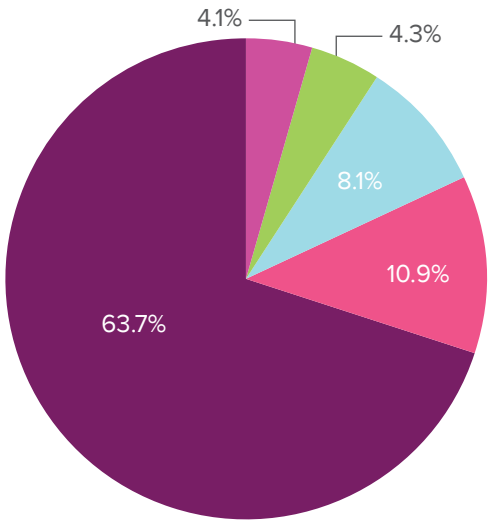
The peak age of children admitted to our hospital is two years and the lowest at nine years. There is an upward trend noted during the pre-adolescent and adolescent years.

All data shown above reflect the period 2011–2015



Leading Cause of Injury—Admitted Patients

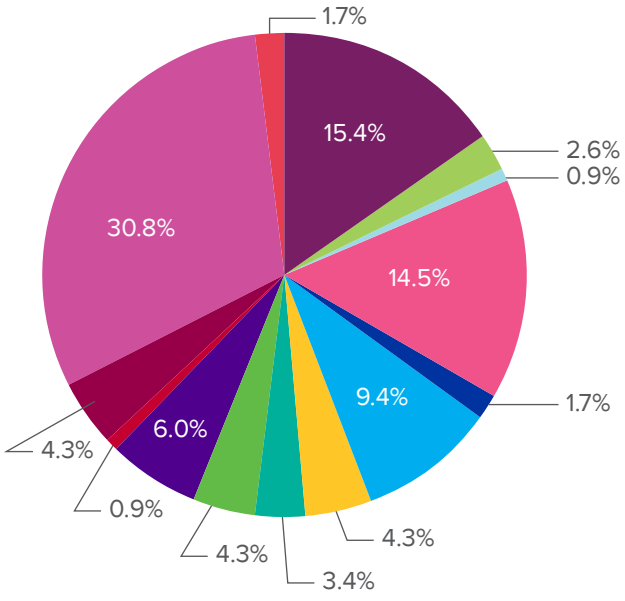
Falls remain the leading cause of childhood injury for admitted patients and those treated and released from the Emergency Department. Injuries from motor vehicle crashes and cut/ piercings have been on the rise the past three years.



Top Services for Operative Cases

Orthopedics is the leading admitting service for operative cases.

- ENT
- Plastic Surgery
- Ophthalmology
- Trauma Surgery
- Orthopaedics

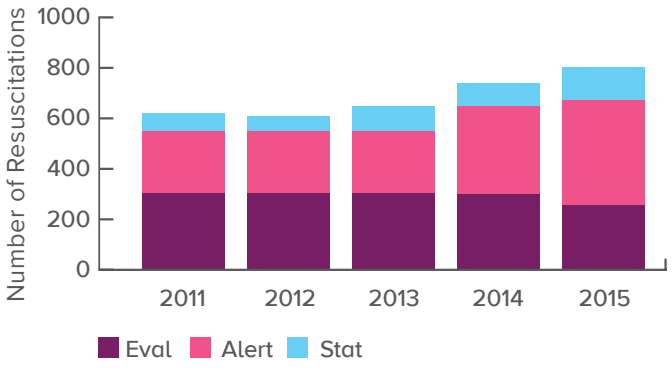


Causes of Death Due to Injury: 117 Total Deaths

The overall mortality rate has remained constant at 1% over the past five years. Suffocations, abuse, and drowning are the leading causes of death.

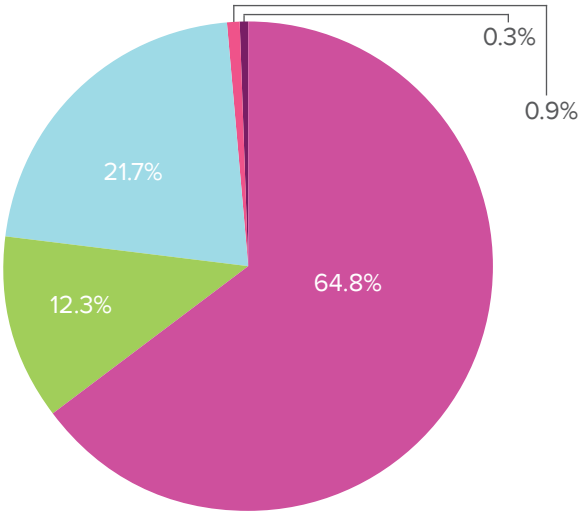
- Abuse
- Bicycle
- Cut/Piercing
- Drowning
- Fall
- Firearm
- ATV
- Motor Vehicle Crash
- Other
- Pedestrian
- Sports
- Struck By
- Suffocation
- Unknown

All data shown above reflect the period 2011–2015



Resuscitation Level by Year

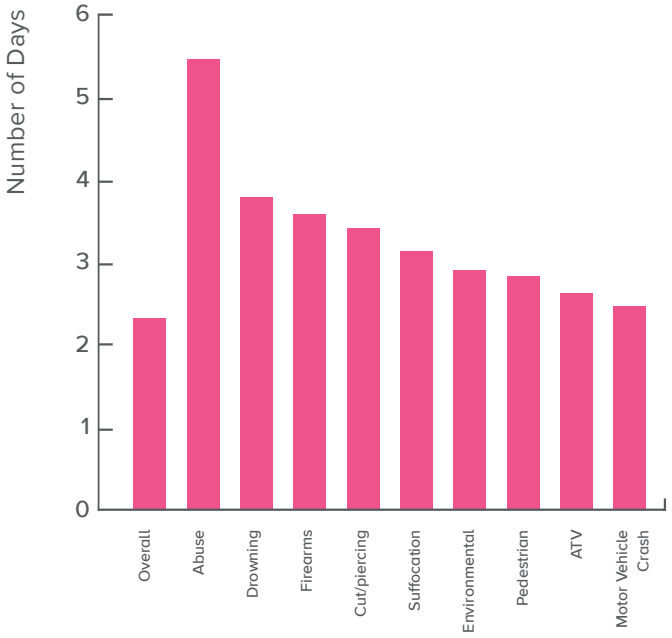
There are three levels of trauma resuscitation team activations: Trauma Stat (most severe injuries), Trauma Alert (moderate injuries) and Trauma Evaluation (mild injuries). The number of Trauma Alerts has almost doubled since 2011.



Mode of Arrival to Hospital for Patients on the Trauma Services

Over 60% of trauma patients are transported to Cincinnati Children's by ground ambulance.

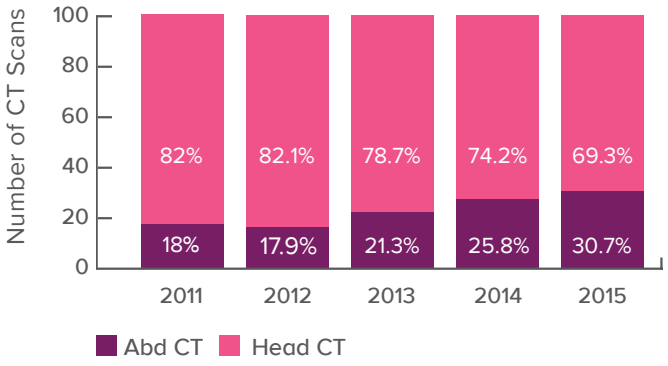
- Ambulance
- Air Transport
- Private Vehicle
- Walk-In
- Police Vehicle



Average Length of Stay by Mechanism for Patients Admitted

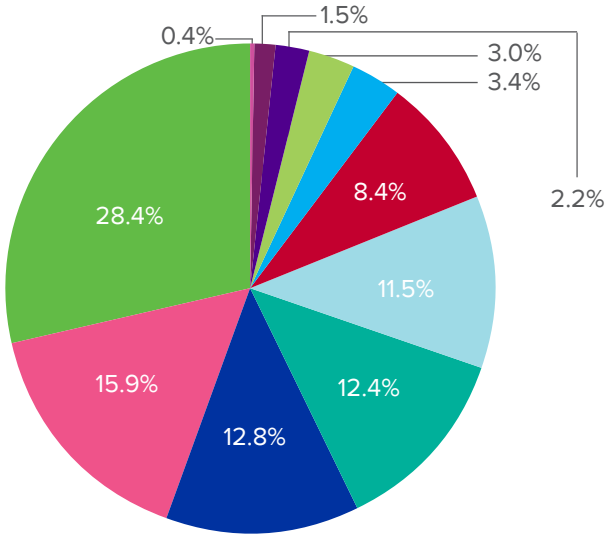
Hospitalization for child abuse and for drowning have the longest length of stay.

All data shown above reflect the period 2011–2015



Head and Abdominal CT Scans

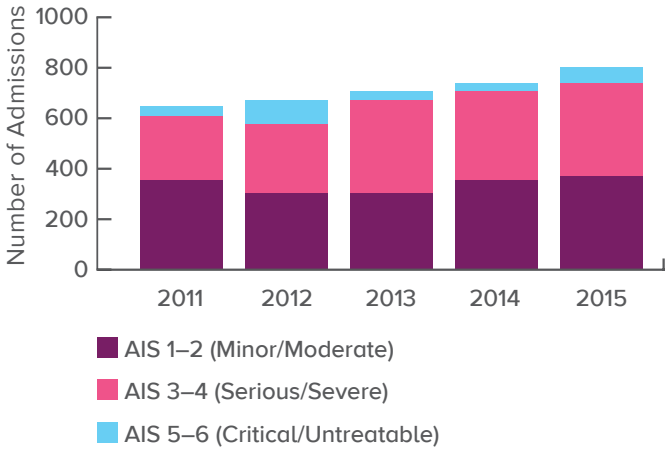
Over the past few years, although we have seen a decrease in the number of head CTs performed, there has been a slight increase in abdominal CTs; ongoing work continues to evaluate the appropriate use of imaging while limiting radiation exposure to children.



Percentage of Sports Injuries

Football continues to be the leading cause of sports injury for males, accounting for 36.7% of sports injuries while 21.1% of females sustained injuries while playing soccer.

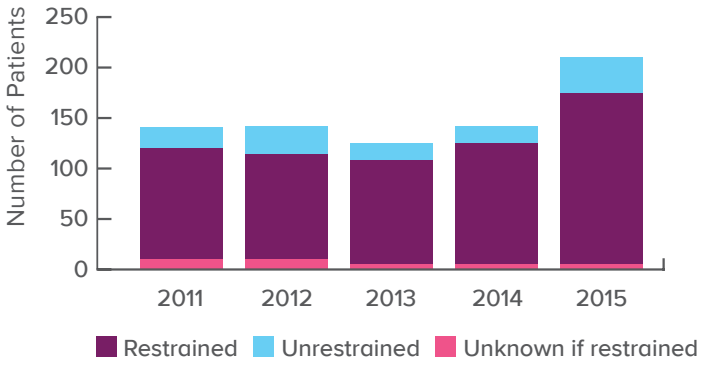
- Hockey
- Skiing
- Soccer
- Other Sports
- Swimming
- Sledding
- Skateboarding/blading
- Football
- Snowboarding
- Baseball
- Basketball



Head Injuries Grouped by AIS

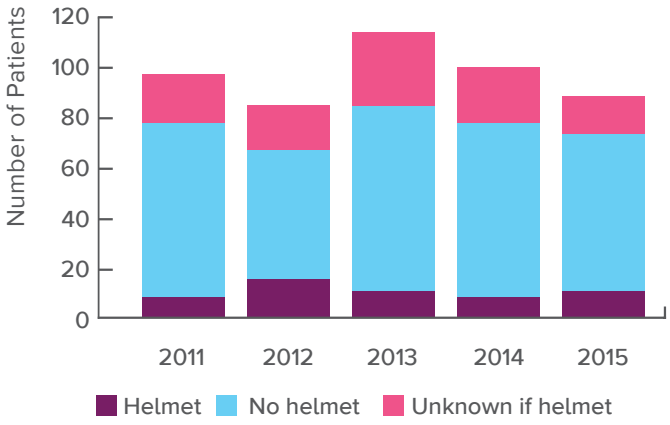
Cincinnati Children's now admits over 700 children a year with traumatic brain injuries, the majority of which are for minor and moderate injuries based on the Abbreviated Injury Scale (AIS).

All data shown above reflect the period 2011–2015



Restraint Usage for Children in Motor Vehicle Crashes

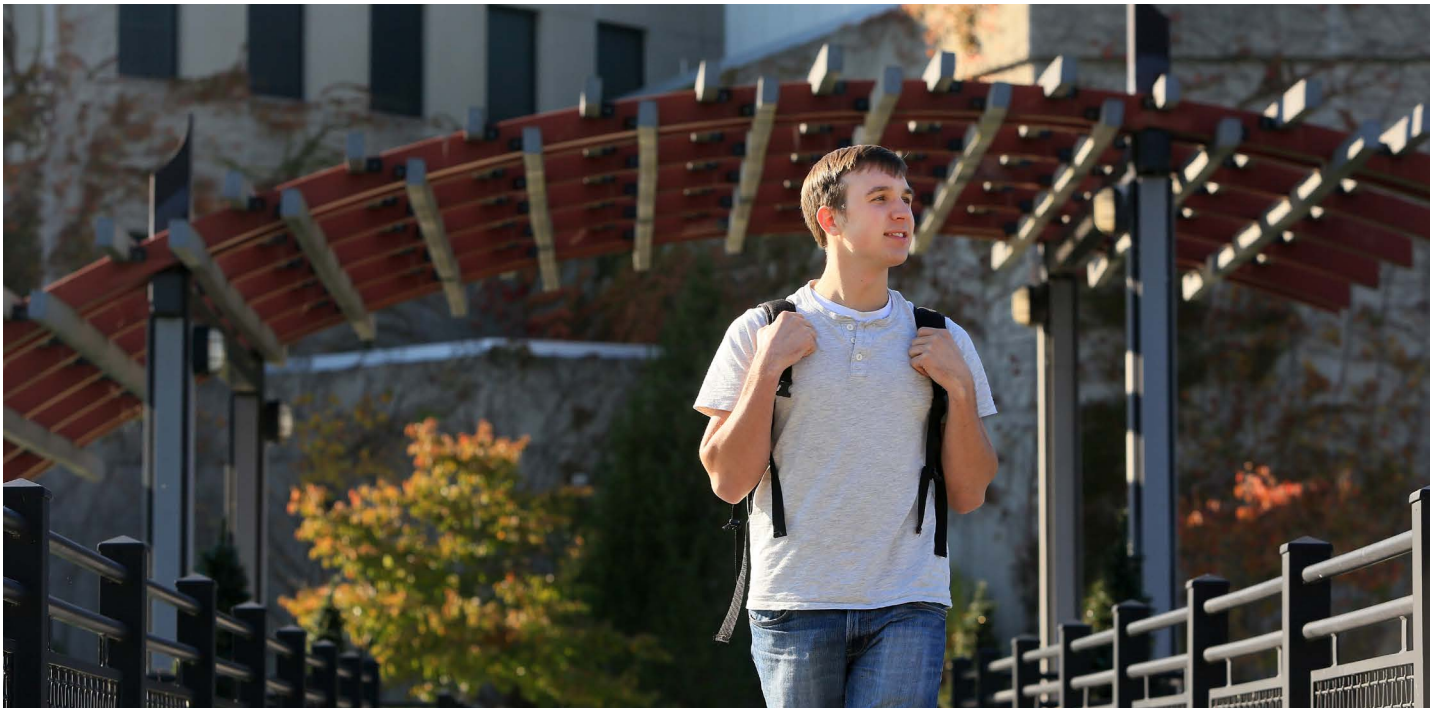
Although the majority of children presenting to our hospital following a motor vehicle crash are restrained an unacceptable rate of inappropriate or no restraint use continues.



Helmet Usage

The number of children arriving at our hospital after being involved in a bicycle accident while not wearing a helmet remains high and further prevention efforts are needed.

All data shown above reflect the period 2011–2015



New Discoveries Lead to Better Outcomes

Trauma Services

The Trauma Services staff have continued to engage in research projects in order to accomplish the goal of preventing injuries and providing the highest level of injury care. Recent efforts have focused on the criteria used to alert trauma teams of a traumatically injured patient. Trauma Centers across the United States use a variety of criteria to activate trauma teams. Our research focuses on determining what set of criteria is best able to appropriately activate a trauma team. These criteria include patient characteristics that identify the most severely injured patients based on the type of injury to identify the level of care required by the patient. A patient that meets one of these criteria triggers activation of the trauma team with the appropriate staff and resources. Proper activation improves patient care and makes efficient use of staff and resources.

In 2015 we led a study examining state-wide pediatric trauma under-triage. This study sought to determine the pediatric under-triage rate in the state of Ohio, to describe the variations in pediatric under-triage rates based on distance factors and to compare injury and patient characteristics between children appropriately triaged to those under-triaged.

We have also collaborated with other Trauma Centers on a variety of trauma related issues such as the development of a clinical prediction model to determine which children can safely avoid abdominal computed tomography (CT) scanning during the initial evaluation of blunt trauma. Another collaborative research study involved a review of pancreatic trauma, the disease process and outcomes after surgical management to better understand both effective and non-effective diagnostic and management strategies and to identify potential areas for further prospective study.

Learn more about **Trauma Services**.

Neurosurgery

"Routine surveillance imaging following mild traumatic brain injury may not be necessary" was presented by one of our neurosurgery residents at the Pediatric Trauma Society Annual Meeting and as a poster at the American Association of Neurological Surgeons/Congress of Neurological Surgeons Pediatric Section Meeting. This was a retrospective review of 154 patients with mild traumatic brain injury admitted to our center. We found that few patients who sustained a mild traumatic brain injury with a Glasgow Coma Score of 13-15 and had an intracranial hemorrhage experienced clinical decline. Importantly, all patients that required neurosurgical intervention were identified by clinical changes and not by repeat imaging alone. We hope these findings will further stimulate discussions about refining algorithms for imaging pediatric patients with traumatic head injuries.

Learn more about **Neurosurgery**.

Division of Sports Medicine

The Division of Sports Medicine continues to actively engage in research to promote and ensure the health and well-being of pediatric and adolescent athletes. Over the past decade, our researchers have been funded by the NIH and NFL Charities, and continue to disseminate salient findings related to risk factors and prevention of ligamentous knee injuries, particularly anterior cruciate ("ACL" as known to athletes) injuries in female athletes, at national and international conferences. Identification of risk factors and prevention training programs continue to be our area of research expertise, and we have expanded with

NIH funding to include the study of patellofemoral pain (knee pain) in female athletes, targeted real time biofeedback training for adolescents, sport specialization in youth, and the negative outcomes associated with exercise deficit disorder in youth. In addition, we have utilized innovative behavioral assessments to explore the associations between perceptual-motor fitness and collisions to prevent both concussion and collision-based musculoskeletal injuries on the field of play. The Division of Sports Medicine is lead investigation site for an innovative approach to protect the brain from the inside out to mitigate brain slosh and the resultant injury from head impacts. We are also leading an early research coalition, housed at the medical center that will coordinate and complete the associated clinical trials for concussion-prevention technology.

Learn more about the **Division of Sports Medicine**.

Pediatric Orthopaedic Surgery

The Division of Pediatric Orthopaedic Surgery continues to increase our work within pediatric trauma. Throughout the past two years, our staff has delivered a robust collection of publications, presentations, and posters throughout the country and internationally. Our comprehensive team of surgeons and support staff continue to push, not only for high quality management of pediatric trauma, but also use innovative research to increase the functional outcomes of children. Nerve injury, expedited operative fracture care, quality of life following an injury, and reducing costs and variability in care have been just a few of our providers' foci these past years. Collaboratively, along with multiple other divisions within Cincinnati Children's, the Division of Pediatric Orthopaedic Surgery will continue to make strides in the care of the pediatric trauma patient.

Learn more about the **Division of Pediatric Orthopaedic Surgery**.

Mayerson Center for Safe and Healthy Children

The Mayerson Center is striving to improve the diagnosis of child abuse by performing research to identify factors that differentiate abusive injuries from accidental injuries and to create clinical decision rules to standardize the assessment of children who present with a bruise or skull fracture. The Mayerson Center is also collaborating with the Ohio Children's Hospital Association hospitals on a quality improvement project to better identify "sentinel injuries"— injuries in infants under six months of age, such as bruises, cuts, or fractures that are highly suspect of physical abuse—and to intervene early in order to prevent recurrent child abuse.

Research is also being conducted by the Mayerson Center to evaluate the long-term developmental outcomes of children who have suffered an abusive head injury as well as the mental health and behavioral outcomes of children who are treated with the Child and Family Traumatic Stress Intervention following a traumatic experience. The Mayerson Center is performing research to evaluate the prevalence of adverse childhood experiences as well as to determine their impact on child health and development. Specifically, studies are assessing whether and how the adverse childhood experiences of parents impact the health and development of young children before

the age of two and whether and how the adverse experiences of children with attention deficit hyperactivity disorder impact treatment response and educational, legal, and health outcomes.

Learn more about the **Mayerson Center**.

Physical Medicine & Rehabilitation

Shari Wade, PhD and Brad Kurowski, MD made important contributions to our understanding of influences on recovery following traumatic brain injury (TBI) including social-environmental and genetic influences. Partnering with the Division of Biostatistics and Epidemiology, they have used novel statistical approaches to better understand neuropsychological profiles following TBI and trajectories of recovery over time. They have also expanded their work to identify evidence-based interventions to facilitate short and long-term recovery. Additional findings from Dr. Wade's multi-center study evaluating the efficacy of web-based counselor assisted problem solving provides further insights into its effects on parent-child conflicts and social behavior. Results from Dr. Kurowski's study of the benefits and biologic correlates of aerobic exercise in the management of post-concussion syndrome in children support the potential utility of aerobic exercise to hasten recovery in youth with persistent post concussive symptoms.

Dr. Nate Evanson is doing animal research using mouse models to examine the effects of environmental adversity and enrichment on TBI recovery. He received the Rehabilitation Medicine Scientist Training Grant to complete this work. Dr. Evanson is also using animal models to characterize metabolic aspects of recovery after TBI.

Dr. Kurowski received funding from the National Institutes of Health (NIH) to characterize the association of genetics and environment with recovery after severe brain injury in children and Dr. Wade received NIH funding to perform secondary data analysis on several of her previously funded multisite clinical trials in pediatric TBI.

Learn more about **Physical Medicine & Rehabilitation**.

Critical Care Medicine Research

Research efforts within the Division of Critical Care Medicine span from basic to translational, clinical and improvement science. Our major areas of focus cover the fundamental syndromes and physiological derangements that are often encountered in critically ill children: sepsis, hemorrhagic shock, ischemia-reperfusion injury, lung injury, and kidney injury.

The PPARg pathway is another major focus of the division that is being addressed using a multifaceted approach. Molecular- and animal-based studies in the division have identified PPARg as a key negative modulator of inflammation and ischemic injury in animal models of myocardial ischemia, hemorrhagic shock and sepsis. These studies may soon lead to the Phase 1 trial of a PPARg agonist in pediatric sepsis.

Our researchers work closely with clinicians and care teams that provide critical care services at Cincinnati Children's.

Learn more about the **Critical Care Medicine Research**.

Drug and Poison Information Center (DPIC)

The Drug and Poison Information Center (DPIC) is one of the largest poison control centers in the country. Serving 24 Ohio counties with a combined population of 5.8 million. DPIC has averaged over 40,000 human exposure cases/year. The Center's Pharmacovigilance Medical Communication Unit continues to gather and evaluate safety data on public health issues such as poisoning, water quality, common household detergents, alcohol sanitizers and terrorism preparedness.

DPIC and its People of Color Wellness Alliance (POCWA) program has recently been awarded a 5 year Grant to Implement the Cincinnati-Community Oriented Trauma System (C-COTS). This collaborative of behavioral health, social service, youth service, and other providers will implement a systems approach to provide assessments, interventions, skills building, and behavioral health services in the urban core of Cincinnati, Ohio. These services will start among youth and their families in school and community settings.

Learn more about the **Drug and Poison Information Center (DPIC)**.

Division of Emergency Medicine

The Division of Emergency Medicine (EM) is a member of the Pediatric Emergency Care Applied Research Network (PECARN), which conducts high-priority, multi-institutional research on the prevention and management of acute illnesses and injuries in children and adolescents. The network has published over 100 manuscripts, with papers including the Cervical Spine Injury Patterns in Children (Pediatrics, 2014), Clinical Decision Support for a Multicenter Trial of Pediatric Head Trauma: Development, Implementation, and Lessons Learned (Applied Clinical Informatics, 2016) and Anticipated Resource Utilization for Injury versus Non-injury Pediatric Visits to Emergency Departments (Injury Epidemiology, 2016). EM has recently been an enrolling site in the Prehospital and ED Validation of Risk for Cervical Spine Injury (C-SPINE) project.

Division members also collaborate with Trauma and other disciplines with involvement in the Comprehensive Children's Injury Center, working to improve prevention, education, advocacy, and policy efforts locally, regionally, and nationally. Specific divisional research foci include ongoing work on decision rules and biomarkers in mild head injury, screening for suicide risk in teen-aged patients, and the delivery of high quality care for high risk conditions such as critical procedures and endotracheal intubation through the Center for Simulation and Research and the Medical Resuscitation Committee.

Learn more about the **Division of Emergency Medicine**.

Our **Staff**

Richard A. Falcone, Jr., MD, MPH, Director, Trauma Services
Rebeccah L. Brown, MD, Associate Director, Trauma Services
Victor F. Garcia, MD, Founding Director, Trauma Services
Lynn J. Haas, MSN, CNP, Trauma Program Manager
Patrick W. Edmunds, MPA, CCIC Program Manager

Administrative Support

Ashley Coleman
Genia L. Goodin, AAB, CPST

Clinical Management

Erin Butt, MSN, APRN, PPCNP-BC
Rebecca S. Cook, DNP, MSN, CRNP-PC
Margot C. Daugherty, MSN, MEd, CEN, RN, EMT-P
Juan Gurria, MD
Kaaren B. Shebesta, MSN, CRNP-AC/PC
Mary Ellen Watts, RN

Data Management

Taunya R. Kessler, CCS
Margie A. Koehn, CSTR
Jessica Johnson, MBC

Research Management

Suzanne Moody, MPA, CCRP

Injury Prevention

Nicole Aldridge, MEd, CPST
Gloria M. Del Castillo, CPST
Dawne P. Gardner, MBA, CPST
Emily R. Gehring, MPH, CPST
Donna Laake, RN, CPST-I
Emily O. Lee, CPST-I
Stephanie Lyons, CPST
Corazon Ochanda, MPH, CPST
Fernando X. Rico-Alarcon, CPST