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TRAUMA REPORT 2013



Trauma Service: Clinical and Injury Prevention team

Over the last three years the Comprehensive Children's Injury Center (CCIC) at Cincinnati Children's has continued to grow in an effort to be the leader in improving the care of the injured child from prevention through complete recovery. The CCIC is a unique partnership between Trauma Services, the Emergency Medicine and divisions throughout Cincinnati Children's caring for injured children.

The leadership of the CCIC and Cincinnati Children's Trauma Service appreciates the important contributions made by each individual who prevents or impacts the outcome for an injured child and their family. It remains our overarching goal to facilitate improvement in each of the phases of the continuum of care of the injured child through collaboration, research, prevention, education and advocacy.

A description of the growth of the CCIC and some of the exciting accomplishments and advances are shared in this report. Although traumatic injury remains the most common cause of preventable death and disability among children and adolescents, the exciting work of so many dedicated individuals is a testament to our ongoing commitment to the injured child and family.



*Richard A. Falcone, Jr, MD, MPH
Director, Trauma Service*



Richard A. Falcone, Jr, MD, MPH

WE KNOW HOW TO TREAT KIDS



The foundation of our Level I Trauma Center is the multidisciplinary team of specialty-trained healthcare experts, which includes trauma surgery, emergency medicine, orthopaedics, neurosurgery, rehabilitation, radiology, anesthesia, nurses, social workers, child life specialists and chaplains.

Coordination of Care

The core responsibility of the Trauma Service at Cincinnati Children's is to ensure that the injured child and their family receive optimal trauma care. This is accomplished through a collaborative model including trauma surgeons and trauma nurse practitioners as well as a variety of specialists throughout Cincinnati Children's. In addition to our physicians and nurse practitioners, a specialized team of core nurses who have a passion for, and additional training in the care of injured children, works in partnership to care for the child throughout their stay and facilitate the child's transition toward discharge. Specialists are requested as needed depending on the child's physical and emotional needs.

Finally, the Trauma Service leads a multidisciplinary team in ongoing performance improvement projects centered on the injured child. The goal of "being the best at getting better" is the heart of the Trauma Service philosophy. The Trauma Service, along with collaborating services, strives to continually learn, change and improve the

care that we provide in order to maximize the child and family's recovery.

Trauma Rehabilitation

One of our primary goals is to return children to their full potential after an injury. At Cincinnati Children's we therefore believe that rehabilitation begins the moment the child is admitted. Some children only require a brief assessment for potential needs in the future. Other children require more complex rehabilitation services, either in the hospital or on an outpatient basis. The Rehabilitation Service at Cincinnati Children's helps families cope with physically disabling conditions or navigate life after a traumatic injury. The rehabilitation team coordinates an individualized treatment plan to meet the child's medical, behavioral, educational and social needs.

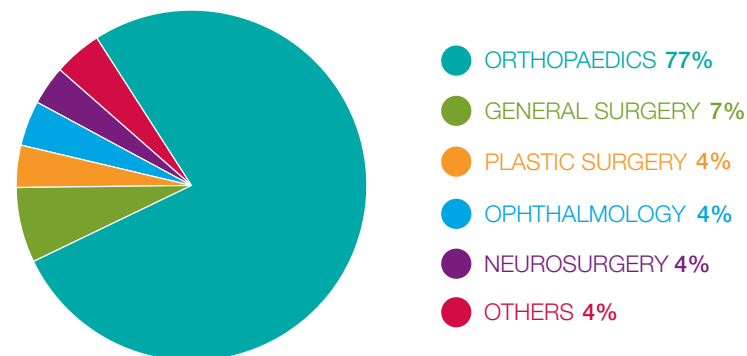
Family Centered Care

Cincinnati Children's and the Trauma Service have a strong belief in family centered care. The best way to care for children is to make the family part of the health care team. Parents and family members are a child's main source of strength and support. Families are allowed in the emergency department trauma bay, to be at the child's side, hold their hand and talk to the child. Families are encouraged to participate in their child's care. The Trauma Service realizes that the presence of family is strong medicine for the child's recovery.

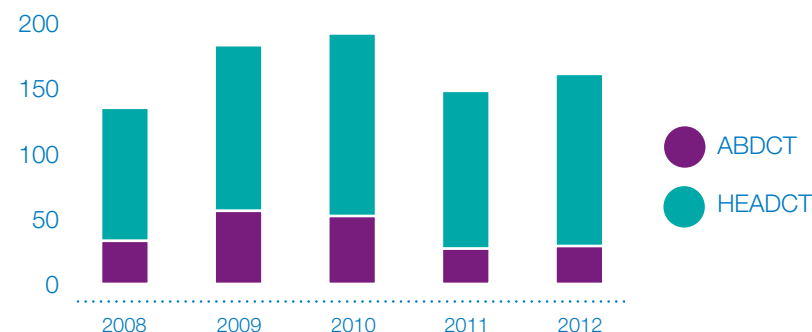
Advantages to a Pediatric Trauma Center

1	Trauma Team	Immediately available, 24 hours-a-day, 7 days a week
2	Pediatric Trauma Expertise	Full range of pediatric specialists
3	Hospital Resources	Immediate availability of an operating room
4	Optimal Care	Evidence based practice
5	Research	Leads to the adoption of nationwide innovative practice
6	Rehabilitation	Comprehensive in-hospital rehabilitation team
7	Outcome	Risk of death is significantly lower for children treated in a trauma center
8	Kids are Our Business	Health care professionals who enjoy caring for children

Top Services for Operative Case

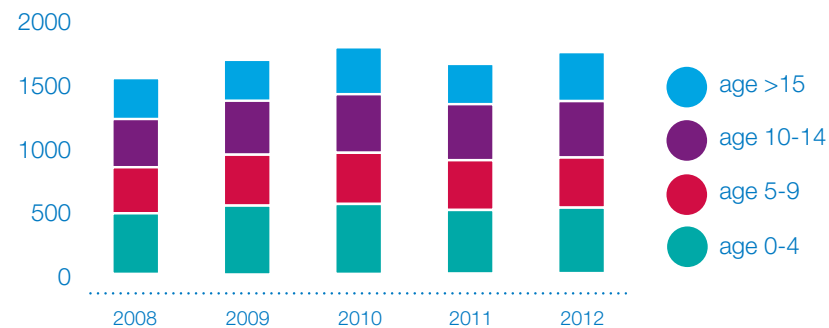


Head and Abdominal CT Scans



Number of Trauma Patients

Overall injury admissions have remained relatively stable over the last 4 years with over 1600 admissions a year.



COMPREHENSIVE CHILDREN'S INJURY CENTER

CCIC PARTICIPANTS

Health Policy	Mayerson Center
Government Affairs	EMS & Transport
Community Relations	Injury Free Coalition
DPIC	The Center for Simulation & Research
Data	Trauma Program
General Pediatrics & Community Outreach	Rehab Medicine
SafeKids	Hamilton County Health District
Sport Medicine	Development
Emergency Medicine	Marketing

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 CCHMC committed to addressing pediatric injury. The center has focused an initial emphasis on reducing the burden of pediatric traumatic brain injury (TBI) utilizing a "triple aim" approach to improve the population health, enhance the care experience and reduce the cost of care while improving the overall value. With this experience and increased collaborative effort, we hope to address other injuries and injury mechanisms as a team in the future.

The past three years provided successes including integration of injury coordinators, increased programming in high-risk communities, institution of a head injury follow-up clinic, submission for extramural research funding and initiation of a 5 year strategic plan. Within that strategic plan there are goals that include a focus on improving the outcomes, care experience and value of traumatic brain injury care at CCHMC and to expand the quality and quantity of funded injury related research and prevention outreach.

In the following sections of this report you will read more about our newly developed multi-disciplinary Head Injury Clinic, our improvement efforts to achieve faster symptom resolution for TBI patients, improved outcomes for severe TBI patients, reduction of unnecessary head CT scans and improved patient and family satisfaction. In addition, you will learn more about our efforts to reduce injuries throughout Hamilton County and some of the exciting research happening throughout CCHMC related to injury. Finally you will also learn more about how we are collaborating with other smaller trauma centers to improve the quality of care provided injured children.



HEAD INJURY CLINIC



A young girl is treated in our Head Injury Clinic.

Traumatic brain injury is the leading cause of acquired morbidity and mortality in children. As part of the CCIC, the multidisciplinary Head Injury Clinic was designed in 2011 to improve access and timeliness of care, patient and family satisfaction, and quality of care for children with all types of traumatic brain injury. Mild traumatic brain injury, or concussion, accounts for the majority of these injuries and often results in residual symptoms referred to as “post-concussion symptoms”. These symptoms may last days to weeks and negatively impact return to activities including school and sports. Recognizing the importance of concussions, the state of Ohio enacted new “Return-to-Play” concussion legislation on April 26, 2013 regulating the safe release of children to return to sports and concussion education.

At the Head Injury Clinic, patients and families benefit from an integrated approach to care to facilitate timely diagnosis and management of the patient’s concussion. A diverse group of multi-disciplinary professionals from Physical Medicine and Rehabilitation, Behavioral Medicine, Neurology, Neurosurgery, Emergency Department, Sports Medicine, and Trauma Services work together to provide comprehensive evaluation, treatment, education, and

follow-up services to optimize recovery. Evaluation includes neurological exams, cognitive and psychological assessments and formal assessment of balance and postural stability to monitor their recovery from the injury. To facilitate referrals, a new triage system was developed to identify the most appropriate provider for each patient to be scheduled with based on the child’s clinical symptoms and prior medical history.

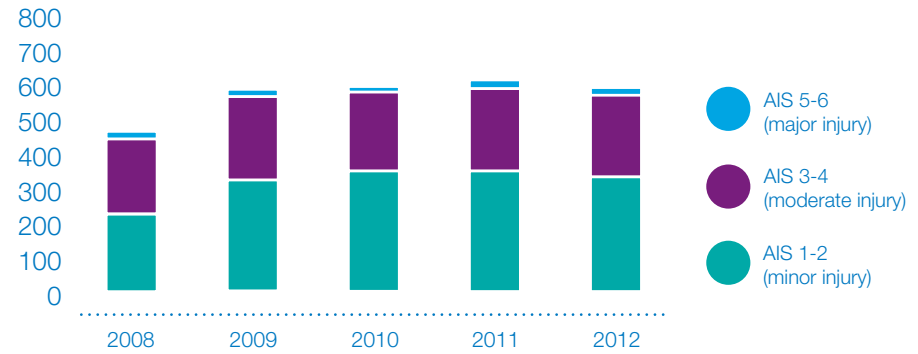
For more information about concussions and traumatic brain injuries or to make an appointment with the Head Injury Clinic at Cincinnati Children’s Hospital, please call 513-803-HEAD (4323).

“The development of the Head Injury Clinic has expedited the evaluation and treatment of children with head injuries, facilitated safe return to school and sports, and coordination of care.”

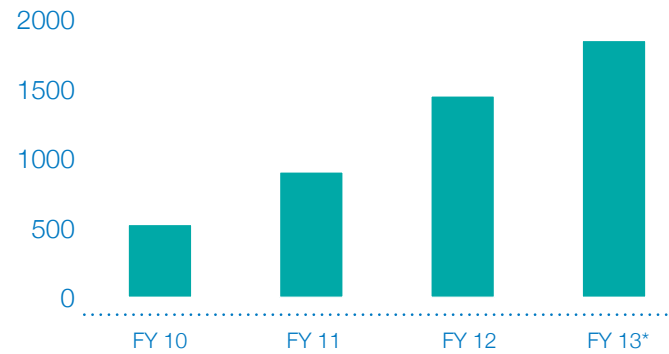
— *Becky Cook, DNP, MSN, CRNP-CP
Trauma Nurse Practitioner*

Head Injuries Grouped by AIS

Cincinnati Children's now admits approximately 600 children a year with traumatic brain injuries.

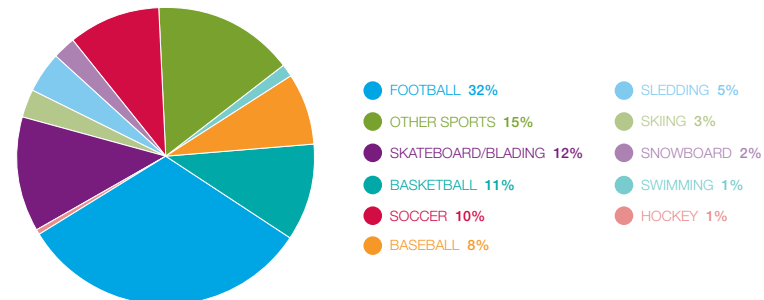


Outpatient Head Injury Clinic Patient Volume



Sports Injuries from 2008-2012

Sports injuries continue to increase and account for 14% of the injuries admitted at Cincinnati Children's.



POST-CONCUSSION SYMPTOM ASSESSMENT



Sport related activities account for 12% of children admitted with mild TBI/concussions

Symptom assessment following a concussion/mild traumatic brain injury is a valuable tool to document post-concussion symptoms and to monitor symptom resolution over time. At the outpatient Head Injury Clinic, the Immediate Post-Concussion Assessment and Cognitive Testing™ (ImPACT) is used to evaluate patients and includes the Post-Concussion Scale.

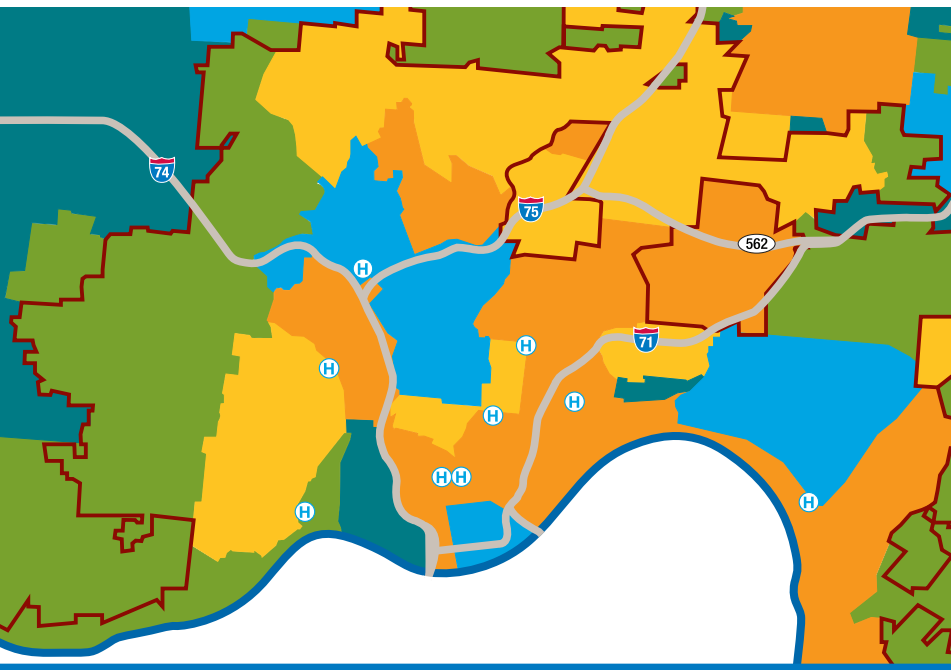
Working with the Comprehensive Children's Injury Center, the symptom assessment has now been incorporated into the inpatient setting for children age 5 years and older admitted to Trauma Services following a mild TBI/concussion. This information aids in helping the patient and families see the full spectrum of symptoms children suffer and are used to reinforce head injury education.

ImPACT tool is a 22 item checklist that measures the patient's current perception of symptoms on a 0-6 Likert scale. This self-report checklist provides objective data from the patient and family to monitor recovery and to support treatment recommendations, patient/family education, and activity restrictions following the concussion/mild TBI.

ImPACT

Symptom Assessment	
Date of initial concussion injury	
Assessment	
Test administered	
Concussion Symptoms	
Headache	
Nausea	
Vomiting	
Balance Problems	
Dizziness	
Fatigue	
Trouble falling asleep	
Sleeping more than usual	
Sleeping less than usual	
Drowsiness	
Sensitivity to light	
Sensitivity to noise	
Irritability	
Sadness	
Nervousness	
Feeling more emotional	
Numbness or Tingling	
Feeling Slowed Down	
Feeling mentally "Foggy"	
Difficulty concentrating	
Difficulty remembering	
Visual problems	
Total Assessment Score	

POPULATION HEALTH - NORWOOD



Injury report per 1,000 children age 1-4:

0.0 - 88.0

88.0 - 110.3

110.3 - 128.0

128.0 - 162.5

162.5 - 473.7

— Cincinnati city limit

H Health Centers

Cincinnati Children's and the Comprehensive Children's Injury Center have committed to reducing injuries in Hamilton County through a collaborative population health approach. After a careful initial review of injury data we initially began our work in Norwood, OH.

In 2011, Norwood had one of the highest rates of home injuries requiring an ED visit for children less than five years in Hamilton County. Over 50% of these injuries occurred in the home, the one place where children should be safest. Given the proven benefits of home safety interventions for children under five our initial interventions sought to expand the use of home safety devices.

In May and September of 2012, PIN (Preventing Injuries in Norwood), a hospital/community collaborative, successfully installed proven home safety equipment in over 130 Norwood homes with children <5 via its "Safety Day" model. Designed to help reduce the rate of pediatric home injuries and build community sustainability, the "Safety Day" model utilized an educator in training concept to equip Norwood Health Department staff with the skills to train other agency staff, Norwood community members and additional safety day volunteers on home safety education and equipment installation. In addition to the in-house training, Norwood families

were identified and enrolled to participate in the home safety outreach through collaborating neighborhood organizations. With the safety day model, PIN was able to successfully develop an effective and replicable home safety intervention that immediately increased safety in the homes of Norwood families.

To date the Safety Day intervention has demonstrated an 80% reduction in injuries in the treatment group – the homes that participated in the Safety Day intervention. Overall in Norwood, there was a 12% reduction in the number of injuries to children ages 1-4 from what we would have expected.

Encouraged by results of the Safety Day model, the leadership of Norwood and Lincoln Heights joined with leaders and community members from across Hamilton County for two Comprehensive Children's Injury Center (CCIC) Summits. Held in December 2012 and February 2013, these summits, themed "Building Safety on Your Block", unified communities with diverse economics, diverse backgrounds, and diverse needs to support the common mission of reducing injuries and improving safety for children. Knowledge sharing, resource building, and engagement exercises were conducted so that these

leaders would be empowered to continue the work. More than 90 community leaders, advocates, and residents representing 14 communities participated in productive discussions on the future of the work in their community and the tri-state area. Small groups were formed to discuss goals and inspiration, identify professionals and organizations needed for participation, acknowledge responsibilities of citizens, and brainstorm on how to engage others. "Working groups" were identified to help further efforts around different topics (i.e. education, home safety, pedestrian safety, teen driving, water safety, etc.) and discussions on possibilities and work requests were commenced.

Changing the injury rates in our community will require that we work collaboratively towards "Building Safety on Your Block" and with some early successes we are well on our way.

To get involved follow us on Facebook or visit us at cincinnatichildren.org/ccic.

Building **Safety** On Your Block



BUCKLE UP FOR LIFE



Buckle Up for Life, or *Abróchate a la Vida*, is a faith-based injury prevention initiative created in partnership between trauma specialists at Cincinnati Children's Hospital Medical Center and Toyota.

The program was originally designed to educate members of the African American and Hispanic community about child passenger safety and help address the extraordinarily high number of African American and Hispanic children, teens and adults killed or injured in automobile crashes. This innovative program partners child passenger safety experts and church leaders to help keep children and their parents safer in their cars. The program has consistently resulted in significant improvements in appropriate restraint use by participating families.

Given the success of our regional implementation, a national expansion of Buckle Up for Life is underway in the cities of Houston, San Antonio, Chicago, Philadelphia, Las Vegas, Orange County, Los Angeles and Cincinnati. This expansion is made possible through a grant program funded by Toyota and administered by Cincinnati Children's.

Buckle Up for Life is the product of one of the largest corporate partnerships for

Cincinnati Children's and has been featured in internal hospital publications like "For the Children Magazine", "Round the Center" and Cincinnati Children's annual report. In addition, Cincinnati Children's and Buckle Up for Life were also featured in the 2012 Discovery Channel's "Life behind the Wheel" documentary which can be accessed from the buckleupforlife.org page.

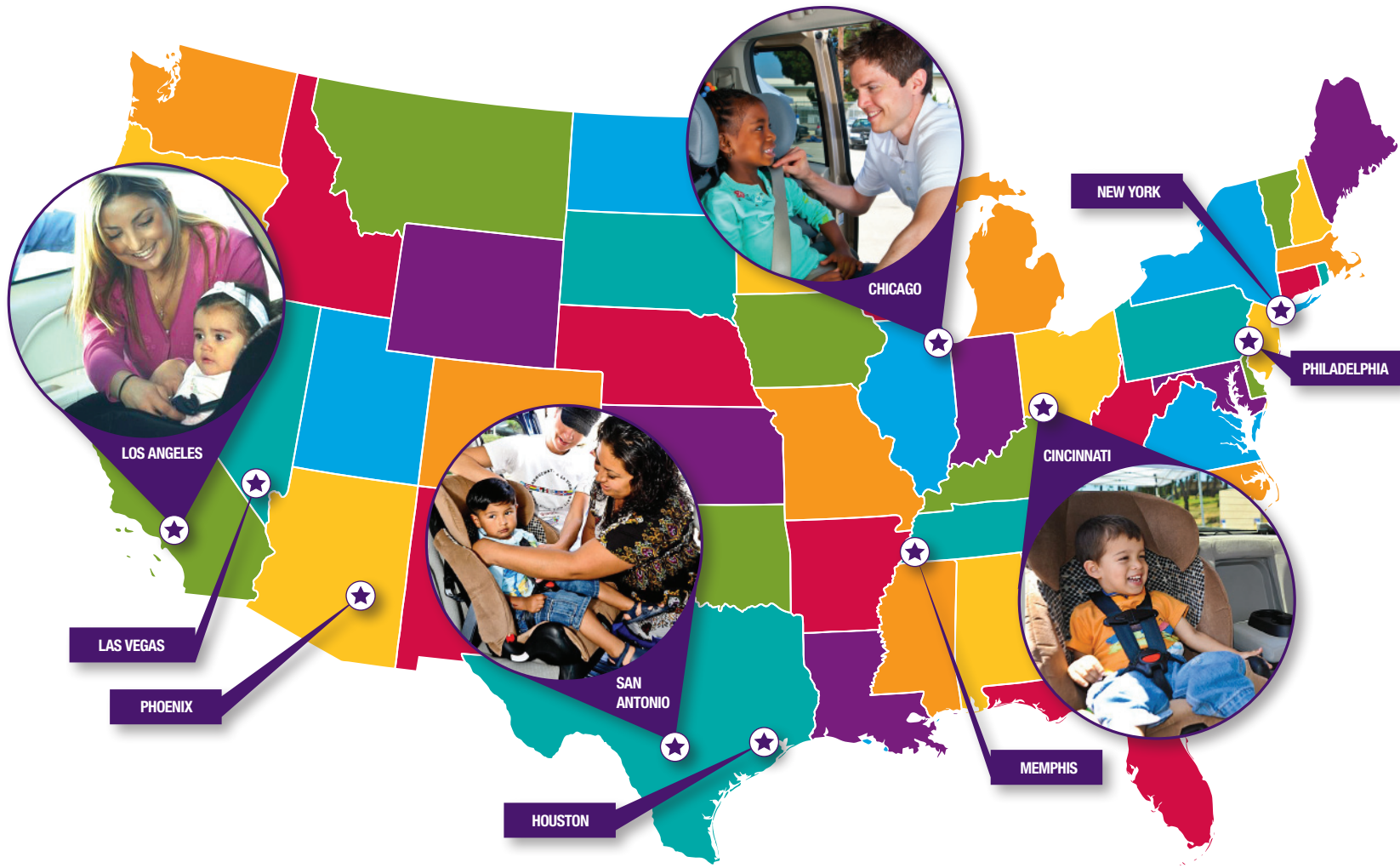
To date the program has been implemented in 42 churches, in 9 cities and through a combination of program implementation and media outreach has touched the lives of 35,000 people.

For more information about Buckle Up for Life, visit us at buckleupforlife.org.

"Watching Buckle Up for life grow from a local initiative to a national program has been a dream come true. Toyota's partnership has enabled us to spread awareness and educate our communities on making child passenger safety a priority."

— Gloria Del Castillo, CPST-I

Program Manager Buckle Up for Life



- Chicago, IL:** Ann & Robert H. Lurie Children's Hospital
- Cincinnati, OH:** Cincinnati Children's Hospital Medical Center
- Houston, TX:** Texas Children's Hospital, Houston
- Las Vegas, NV:** Children's Hospital of Nevada at UMC
- Los Angeles, CA:** Children's Hospital Los Angeles
- Memphis, TN:** Le Bonheur Children's Hospital
- New York, NY:** Steven and Alexander Cohen Children's Medical Center of NY
- Philadelphia, PA:** Children's Hospital of Philadelphia
- Phoenix, AZ:** Phoenix Children's Hospital
- San Antonio, TX:** University Health System, San Antonio

CHILD PASSENGER SAFETY



A child with special needs is fitted for a car seat

One of the most important investments you can make for your young child's future is a child restraint (car seat). In the United States, motor vehicle crashes are the most common cause of death and severe injury to our children. A car seat prevents your child from being thrown about or out of the vehicle. In a crash, a car seat spreads the crash forces over the body, contacting at the strongest points, protects the head and spinal cord, and helps to slow down the body.

- It is always important to make sure that you have the correct seat for the age and size of your child and that you choose a car seat that fits into your vehicle and is one that you will use correctly every time.
- Always refer to your specific car seat manufacturer's instructions and read the vehicle owner's manual on how to install the car seat using the seatbelts or the LATCH system.
- Keep your children in their car seats as long as they fit within the manufacturer's weight and height requirements.
- The American Academy of Pediatrics recommends that a child remain in a rear-facing seat until age two years or until they have reached the upper weight (or height) limit of the seat.

- The safest place for children 12 and under is always in the back seat.

Cincinnati Children's Hospital Medical Center has a Fitting Station Program where you can come to have your car seat checked by a child passenger safety instructor or technician. This expert has gone through a 40 hour class to learn how to properly install car seats. Car seat checks are performed Monday through Friday from 9:00 AM – 3:00 PM. Call 513-636-7865 to schedule an appointment.

cincinnatichildrens.org/ccic

"While nearly all parents/caregivers believe that their car seats are installed properly, statistics show that 8-9 out of 10 car seats are NOT installed correctly. Using the right car seat that is properly installed and used every time can reduce injury by 85-90%"

— Donna Laake, RN, CPST-I
Injury Prevention Coordinator

PEDIATRIC TRAUMA TRANSFORMATION COLLABORATIVE

Pediatric Trauma Transformation Collaborative Components

Quality Improvement Support

Development of pediatric filters

Review audits of QI filters

Development of corrective action plan

Ensure loop closure

Review pediatric complications

Trauma simulation training

2-4 hour blocks with maximum
of 8 participants (on site/4 hour
CME/session)

Development of distance training
program

On-line core curriculum (10 hrs.
CME/yr. available)

Lecture at local trauma symposium
(1 hr. CME/yr.)

Quarterly interesting case conferences

Resource MD and program
management consultations

Monthly review of pediatric trauma
cases via teleconference

Annual site visit

Participation in ACS verification visit

Cincinnati Children's Trauma
Guideline Package

Cincinnati Children's ED resource
manual

1 month surgeon observership

1 week nurse observership

At Cincinnati Children's Hospital Medical Center, our mission is not only to improve the lives of children in our community, but to improve the lives of children across the nation and the globe.

Keeping with the spirit of this mission, the Pediatric Trauma Transformation Collaboration (PTTC) was developed. This outreach program provides education and essential training to hospitals interested in pursuing or maintaining Level II 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.

Why Choose the Cincinnati Children's PTTC?

For the past twenty years, Cincinnati Children's has been verified as an American College of Surgeons (ACS) verified level I trauma center. As one of the largest children's hospital-based trauma services, Cincinnati Children's is a leader in pediatric trauma care and improving the outcome for injured children. Expertise in evidence-based practices along with knowledge of current research and latest trends regarding injury prevention, trauma resuscitations and clinical care, provides the PTTC the foundation to expertly assist partnering hospitals.

Program Benefits

- Overall, enhanced safety and quality of care for injured children
- Greater access to pediatric specific education and support for the healthcare team
- Reduced need to transfer injured children away from their community and family
- Increased community awareness of the partnering facilities commitment to improving pediatric trauma care in their region

Customized Training and Consultation

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 CME, monthly case reviews, real-time consultations, hands-on training and simulation experience.

SIMULATION CENTER



The trauma team participates in the SIM training with computerized high tech pediatric mannequins.

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 throughout the region to improve multi-disciplinary team performance and to practice communication and clinical skills in a safe environment

The Simulation center has a staff of 17 which includes coordinators, education specialists, a program director, AV specialist, simulation technician and two medical directors. 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.

The HPS are capable of reacting much like a real patient such as exchanging oxygen, producing palpable pulses, audible heart and lung sounds as well as other physiologic cues such as pupillary responses and EKG waveforms. The simulators allow for real-time "patient" responses to treatments the team provide.

The Simulation program has expanded to the Pediatric Trauma Transformation Collaborative (PTTC) with teams from

our collaborating partner hospitals coming to Cincinnati Children's to learn teamwork and communication skills. Scenarios based on real trauma patients are run with a formal debriefing after each simulation. These team members play an important role when they return to their institutions, teaching and championing an environment of collaboration and the delivery of high quality care.

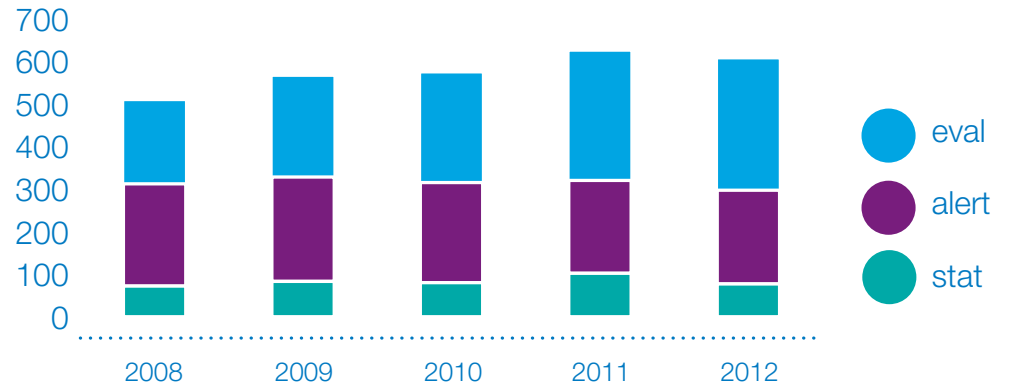
In addition to the trauma service the Center for Simulation and Research offered 299 programs, 60 in situ simulations and hosted 4,450 learners in 2012. Simulation programs include courses for providers in ECMO, NICU, Transport, PICU and CICU.

"The use of simulation-based training for our trauma teams is a vital part of our program. These sessions bring together the key bedside providers and provide a safe practice environment where knowledge and skills are increased and latent threats are identified through post-simulation debriefing sessions. "

— Dr. Gary Geis
Medical Director, Center for Simulation
and Research

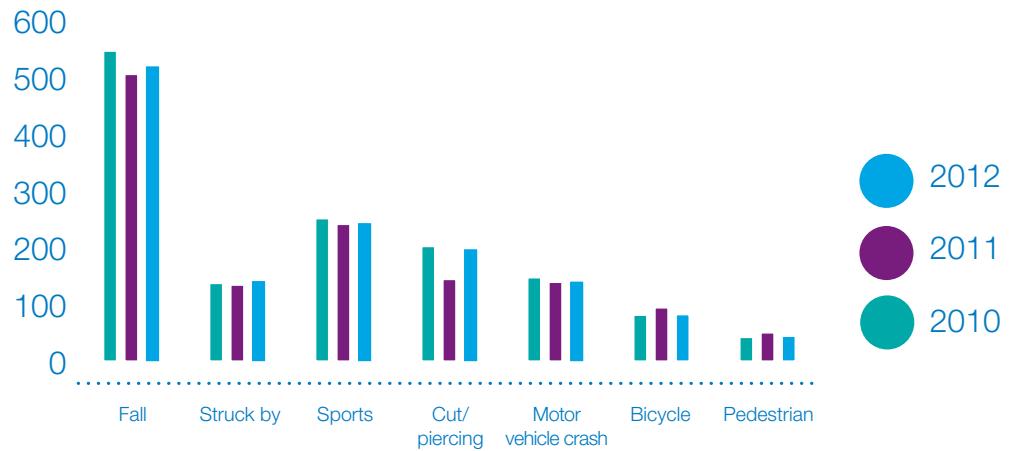
Resuscitation Level by Year

There are three levels of trauma resuscitation team activations: Trauma Stat (most severe injuries), Trauma Alert (moderate injuries) and Trauma Evaluation (mild injuries).



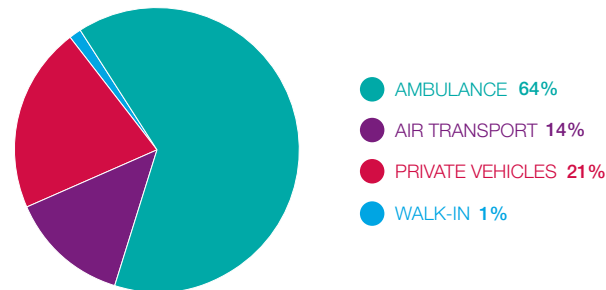
Leading Cause of Injury - Admitted Patients

Falls remain the leading cause of childhood injury for admitted patients and those treated and released from the Emergency Department.



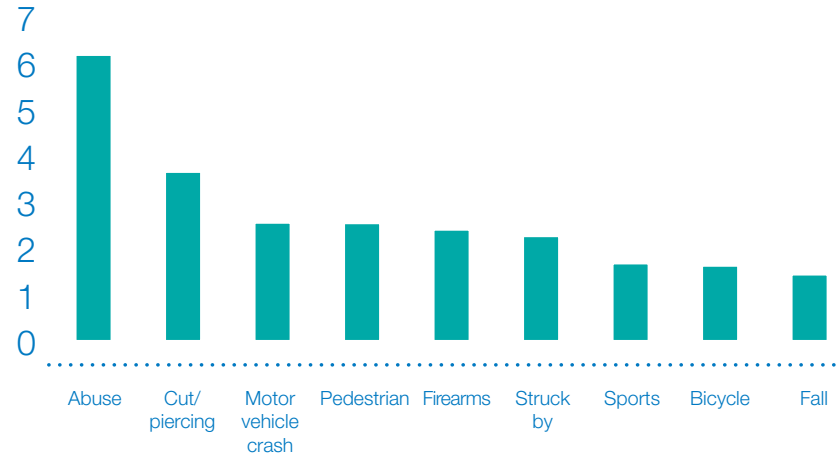
Mode of Arrival to Hospital for Patient's on the Trauma Service: 2008 - 2012

The majority of patients followed by the trauma service are transported by ground ambulance.



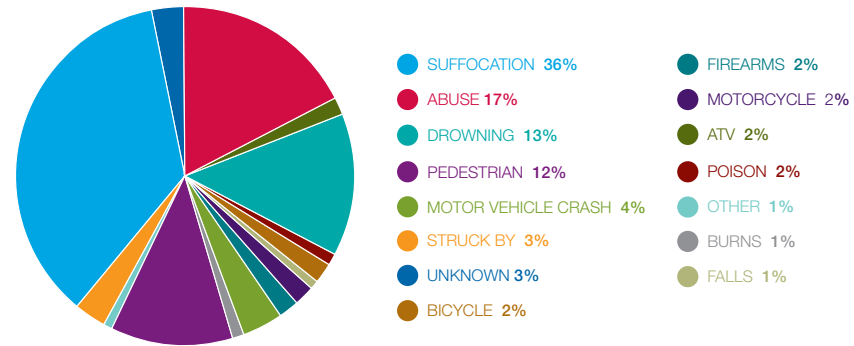
Average Length of Stay by Mechanism for Patient's Admitted from 2008-2012

Hospitalization for child abuse and for a penetrating injury have the longest longest length of stay.



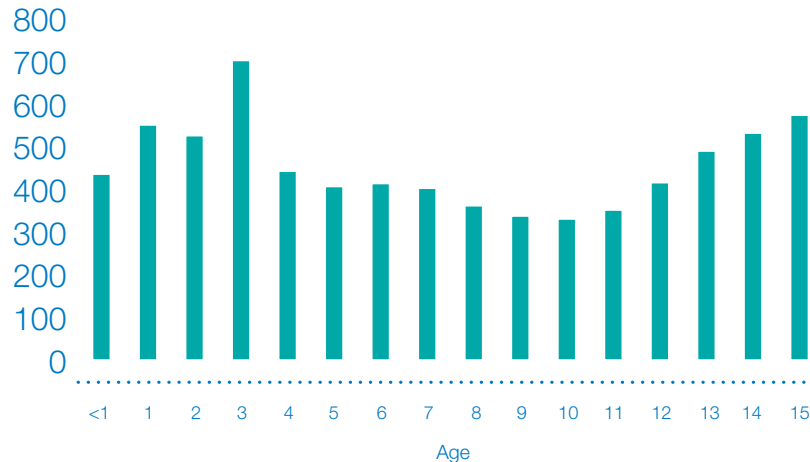
Causes of Death Due to Injury 2008 - 2012: 103 Total Deaths

Overall mortality rate has remained constant at 1% over the past five years, with suffocations, abuse, drownings and pedestrians struck as the leading causes.



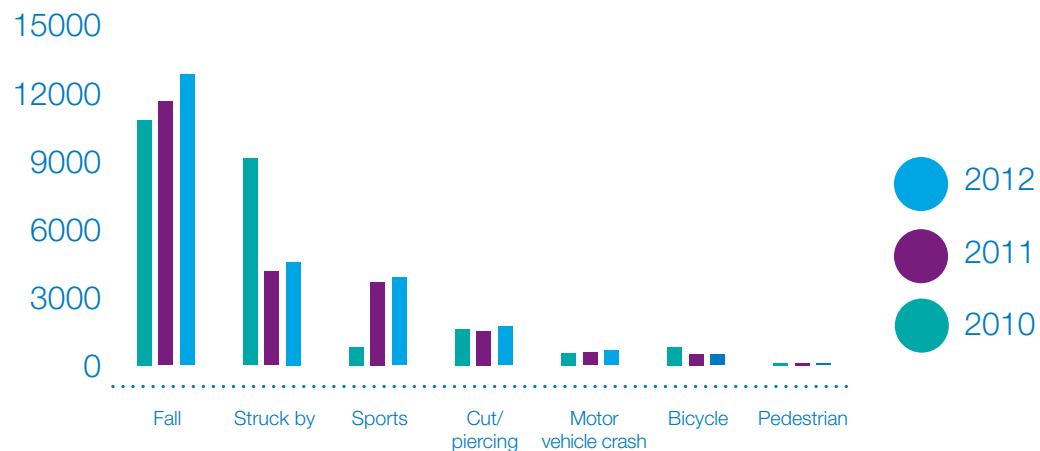
Admitted Injured Patient's Age: 2008 - 2012

Peak age of child admitted to the hospital for injuries is age 3 and lowest at age 9. A trending upward is noted during the pre-adolescent and adolescent years.



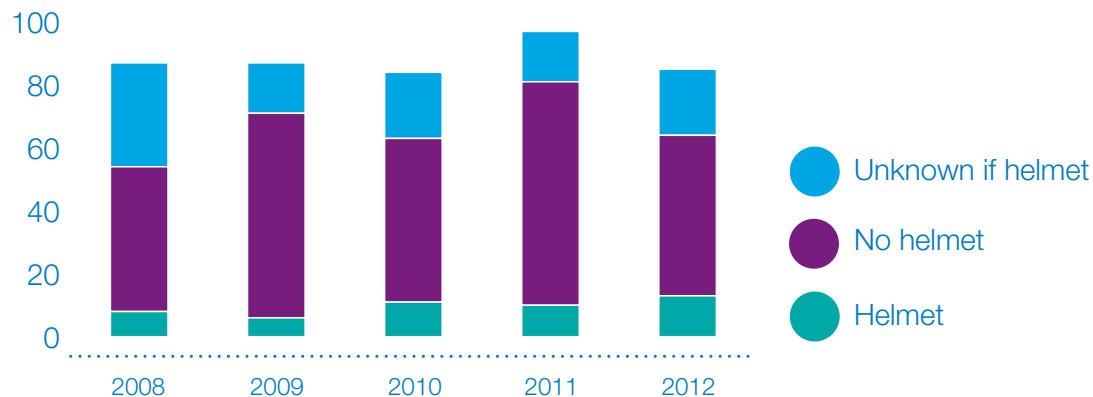
Leading Cause of Injury - Patients Treated & Released from the ER

CGHMC's registry data mirrors national trends with falls being the leading case of pediatric injury.



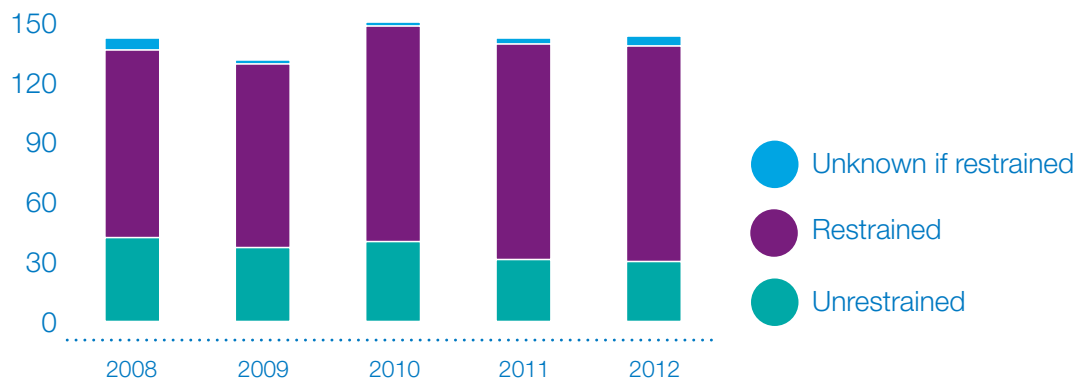
Helmet Usage

Helmet usage for children admitted for injuries after a bicycle accident continues to be low.



Restraint Usage for Children in Motor Vehicle Crashes

While the number of children restrained in motor vehicle crashes has not increased significantly, since 2008 the number of unrestrained children decreased by 40%.



INJURY RESEARCH

Trauma Services

The Trauma Services staff has continued to engage in research projects in order to accomplish the goal of preventing injuries and providing the highest level of injury care. Over the past several years we have led two multi-site studies partnering with the other trauma centers in Ohio as well as several outside of the state. These studies have led to refinements in the criteria trauma centers utilize to activate their trauma teams as well as to expand our understanding of the outcomes of children suffering mild traumatic brain injuries. The members of Trauma Services have published over 10 manuscripts and presented at over 20 regional and national meetings over the last 3 years.

Trauma Services has also utilized quality improvement science techniques to identify key research areas. Over 50% of trauma team members are actively involved in a quality improvement initiative including one project that has been submitted for state funding as a research project. Our comprehensive trauma registry continues to be an invaluable data source for investigators within our institution and has been utilized for numerous research studies both at CCHMC and in collaboration with other trauma centers.

In addition, this year we have led an extensive review of the entire trauma system within the state of Ohio in preparation for a consultation visit by the American College of Surgeons Committee on Trauma.

cincinnatichildrens.org/service/t/trauma/research/

Physical Medicine and Rehabilitation

The Division of PM&R has been actively engaged in a wide variety of federal and state funded research projects to identify predictors of recovery following TBI and to develop and test interventions to facilitate child and family adaptation and functioning following injury. Toward this end, the division has published 48 peer-reviewed papers on pediatric TBI and obtained nearly \$12 million in federal and state grant funds since 2009. Division staff/faculty also gave more than 60 national and international presentations and hosted a day-long TBI Summit in conjunction with the 2012 conference of the Ohio Center for Autism and Low Incidence disorders (OCALI).

cincinnatichildrens.org/research/divisions/p/physical-med-rehab/default/

Pediatric Orthopaedic Surgery

The Division of Pediatric Orthopaedic Surgery supports the mission of the CCHMC Trauma Service and the CCIC through its 10 full-time faculty members who actively take pediatric orthopaedic trauma call or hand call and our extensive pediatric orthopaedic resident program. Since 2010, the Division has contributed 35 publications focused on pediatric trauma. Highlights from this body of work include two national organization evidence-based clinical practice guidelines focused on pediatric trauma (femoral shaft fractures & supracondylar humeral fractures) and a systematic review aimed at providing safer care in the setting of pulseless supracondylar humeral fractures (a limb-threatening injury).

cincinnatichildrens.org/service/o/orthopaedic-surgery/research/

Division of Emergency Medicine

The Division of Emergency Medicine is a member of the Pediatric Emergency Care Applied Research Network (PECARN) and currently is one of six nodes with CCHMC the lead partnering with St Louis Children's and Milwaukee Children's Hospitals. There are 18 centers in the network, 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 45 manuscripts, with seminal papers including the PECARN CT Decision Rule for Minor Head Injury (Lancet, 2009), the Risk Factors for Cervical Spine Injury in Children (Annals of Emergency Medicine, 2011) and the Decision Rule for Abdominal CT in Blunt Trauma (Annals of Emergency Medicine, 2013). 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 work on decision rules and biomarkers in non-accidental trauma, the epidemiology of domestic violence in teens, the diagnostics (clinical, biomarkers and imaging) of mild head injury, 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.

cincinnatichildrens.org/research/divisions/e/emergency/team

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 the salient findings related to risk factors and prevention of ligamentous knee injuries, particularly anterior cruciate injuries (“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 to include the study of patellofemoral pain (knee pain) in female athletes, sport-related concussion, targeted training for adolescents, sport specialization in youth, and the negative outcomes associated with exercise deficit disorder in youth. Over the past 3 years our division has contributed over 100 publications and more than 50 in the past year in these areas of research.

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Pediatrics

Ongoing federally funded work to evaluate home safety and injury prevention has continued to expand within the Division of Pediatrics. This work includes the evaluation of the effectiveness of installation of home safety equipment in preventing injuries in young children. The work has additionally investigated the influence of parental depression on maternal supervision as well as the looking at the positive impact of reducing health care costs by preventing injuries in the home. Building upon the positives finding from this work, home safety interventions are being translated into work in improving population health by partnering with community members and agencies.

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Drug and Poison Information Center (DPIC)

The DPIC serves a population of 3.7 million in 20 Ohio counties. DPIC is one of the largest drug and poison information centers in the country, with 27 American Association of Poison Control Center Certified Specialists in Poison Information and 51 staff certified in National Incident Management Systems. The DPIC collaborates with multiple regional agencies, sends alert faxes to approximately 60 regional hospitals on public health issues and gathers and evaluates poison control data. In addition, the DPIC has active programming to promote healthy drug- free lifestyles. Furthermore, DPIC was honored by a visit from the Drug Czar, Gil Kerlikowske, who held a press conference at CCHMC to announce the nation’s new drug policy.

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Division of Critical Care Medicine

Research efforts within the Division of Critical Care Medicine cover the fundamental syndromes and physiological derangements that are often encountered in critically ill and injured children. The Division of Critical Care Medicine is engaged in clinical research projects related to traumatic brain injury. Physicians are leading an investigation regarding the use of higher volume hypertonic (3%) saline in the management of pediatric traumatic brain injury. Additionally, the division is collaborating with investigators from the Divisions of Pediatric Neurosurgery and Neurology at CCHMC and the Department of Neurosurgery at the University of Cincinnati College of Medicine to conduct a prospective observational pilot study to determine whether cortical spreading depressions occur in children and its impact on recovery from traumatic brain injury.

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Mayerson Center for Safe and Healthy Children

The Mayerson Center for Safe and Health Children research focuses on correctly identifying children with physical abuse. This research also evaluates the outcomes following physical abuse, namely abusive head trauma. Some highlights of this research includes studies evaluating the impact of unemployment on abuse rates, predictors of developmental outcome following abusive head injuries, and the role of screening labs in evaluating for potential abuse.

In addition, there is ongoing work to investigate risk factors for traumatic stress among patients evaluated for sexual abuse and markers of post-traumatic stress disorder in sexually abused adolescent girls.

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TRAUMA SERVICE PUBLICATIONS (2010 - 2013)



A multicenter prospective analysis of pediatric trauma activation criteria routinely used in addition to the six criteria of the American College of Surgeons. Falcone RA, Haas L, King E, Moody S, Crow J, Moss A, Gaines, et al. *Journal of Trauma and Acute Care Surgery*, 2012, 73(2), 377-384.

Effect of an educational intervention on nursing staff knowledge, confidence, and practice in the care of children with mild traumatic brain injury. Cook RS, Gillespie GL, Kronk R, Daugherty MC, Moody S, Allen LJ, Shebesta KB, Falcone RA. *Journal of Neuroscience Nursing*, 2013, 45(2), 108-118.

Significant rate of misuse of the hare traction splint for children with femoral shaft fractures. Daugherty MC, Mehlman CT, Moody S, LeMaster T, Falcone RA. *Journal of Emergency Nursing* 2013, 39(1), 97-103.

Assessment of factors associated with the delayed transfer of pediatric trauma patients: an emergency physician survey. Beaudin M, Daugherty M, Geis G, Moody S, Brown RL, Garcia VF, Falcone RA. 2012, *Pediatric Emergency Care*, 28(8), 758-763.

Role of computed tomography and clinical findings in pediatric blunt intestinal injury: a multi-center study. Chatoorgoon K, Brown RL, Garcia VF, Falcone RA. 2012, *Pediatric Emergency Care*, 28(12), 1338-1342.

Use of a mild traumatic brain injury guideline to reduce inpatient hospital imaging and charges. Goldberg J, McClaine RJ, Cook RS, Garcia VG, Brown RL, Crone K, Falcone RA. 2011, *Journal of Pediatric Surgery*, 46, 1777-1783.

In situ simulation: detection of safety threats and teamwork training in a high risk emergency department. Patterson MD, Geis GL, Falcone RA, LeMaster T, Wears RL. 2012, *BMJ Quality & Safety*, submitted for publication.

Child passenger safety: an evidence-based review. Barraco RD, Cheng JD, Bromberg WJ, Falcone RA, Hammond JS, Lui FY, Sandhu RS, Scaff DW. 2010, *Journal of Trauma Injury Infection and Critical Care*, 69(6); 1588-1590.

Socioeconomic disparities in infant mortality after nonaccidental trauma: a multicenter study. Rangel EL, Burd RS, Falcone RA. 2010, *Journal of Trauma Injury Infection and Critical Care*, 69(1), 20-25.

Unnecessary imaging, not hospital distance, or transportation mode impacts delays in transfer of injured children. Chatoorgoon K, Huezko K, Rangel E, Francois N, Schweer L, Daugherty M, Koehn M, Ricketts C, Brown RL, Garcia VF, Falcone RA. 2010, 26(7); 481-486.

Epidemiology of injury and the impact of health disparities. Brown RL. 2010, *Current Opinion in Pediatrics*, 22(3); 321-325.

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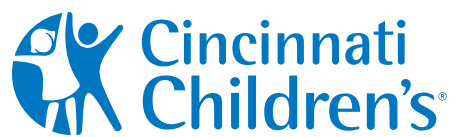
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