



CRASH, FALL, OR FIRE

WHEN SECONDS COUNT, ONLY
THE BEST IS GOOD ENOUGH

It was an ordinary winter night in Connellsville, Pa. and 24-year-old Josh Roe was hungry. He jumped in his friend's car and headed out to grab a quick bite to eat. But, he never made it. The car was broadsided by a bread truck just a few yards from the convenience store.

Within minutes, ambulances arrived on the scene of crumpled metal and shattered glass. The paramedics assessed the situation and immediately called for STAT MedEvac helicopters. The team

found Josh trapped in the car and unresponsive. They extracted him from the car and opened an airway for him to breathe. The young father had no response to light, sound, or touch. He had suffered a severe traumatic brain injury and paramedics knew he needed immediate specialized care to survive.

Josh was flown 40 miles to the UPMC Presbyterian Trauma Center, where a team of trauma experts was ready to do everything possible to save his life.

Like Josh, most people don't think about being in a car crash, falling off a roof, or being burned in a house fire. But when the unexpected happens in southwestern Pa., the emergency and trauma teams at UPMC's three Level 1 trauma centers offer the highest level of specialized care for critically injured patients.

The Trauma Care More People Count On

Patients suffering from major traumas, such as falls from heights, head or spinal cord injuries, multiple broken bones, or internal injuries, require a team of experts to reduce the chance of death or disability. Emergency departments at community hospitals can handle illnesses and injuries that don't appear to be life threatening, but hospitals with designated trauma centers are fully equipped to provide the most advanced level of care at all times. "Trauma centers are ready to save lives at any time, for any type of serious injury," says Donald Yealy, MD, chair of the Department of Emergency Medicine. "They're equipped with some of the best specialists that have been extensively trained to reduce the chance of death or disability."

UPMC's trauma centers cover one-third of the state, from southwestern Pa., to Erie in the north, and admit between 11,000 and 12,000 adult trauma patients each year.

In fact, the trauma center at UPMC Presbyterian is the busiest adult center in the state. In addition, more than 1,700 children with traumatic injuries are admitted to Children's Hospital of Pittsburgh of UPMC, the region's only Level I pediatric trauma center. "Many children are injured because of a fall down a flight of stairs or off of playground equipment," says Barbara Gaines, MD, director of the Benedum

Pediatric Trauma and Injury Prevention Programs. "We do an extremely thorough evaluation to determine the extent of their injuries, as well as any impact the injuries might have on their growth." Children with burn injuries are typically treated at UPMC Mercy's Trauma and Burn Center, which offers a specialty pediatric burn unit.

Changing Trauma Care Worldwide

Over the past 25 years, UPMC's trauma teams have saved thousands of lives of people who weren't expected to live based on prediction scales used in trauma medicine. "At UPMC, we have developed many techniques for saving patients that have become the standard of care," says Andrew Peitzman, MD, chief of General Surgery and UPMC Trauma Services. "We wrote the first

Josh was rushed to the trauma bay, where the team of trauma doctors and nurses evaluated him and rapidly developed a care plan. According to the scoring system used by trauma centers around the world, a patient with Josh's level of brain injury was unlikely to survive. A UPMC neurosurgeon had joined the team and recommended that while in an induced coma, an investigational technique be used to cool Josh's brain to potentially minimize brain damage and give him a better chance of survival.

When Josh awoke from his coma, he remained in intensive care until he gained enough strength to be transferred to the UPMC Rehabilitation Institute's brain injury unit. One of the most advanced programs in the nation, the dedicated brain injury unit incorporates traditional therapies with the latest robotic and gaming technology to help brain-injured patients recover as fully as possible.

prospective study that proved the benefits of CT scans in saving lives," he says. UPMC's trauma experts also "wrote the book" on trauma care, *The Trauma Manual*, that is used in trauma surgeon training programs throughout the U.S. and is about to be published in its fourth edition.

"We're using new technology, such as high definition fiber tracking, to view connections within the brain after a traumatic brain injury," says Dr. Peitzman. "And UPMC's research into tissue regeneration makes it seem possible that in the future we will be able to implant neurons into patients with severe brain or spinal cord injuries to re-grow broken connections and restore function.

"We are committed to redefining how trauma care is provided around the world, so that more lives are saved, and with better outcomes," says

Dr. Peitzman. "It's incredibly gratifying to pull a patient from the jaws of death, and see him or her fully recover to live a normal life, having kids and grandkids."

Myron Rickens, director of UPMC Prehospital Care, also emphasizes that ongoing education plays an important role in saving lives. "We're partnering with paramedics and other first responders to provide the latest trauma education," he says. "Getting the patient to the hospital is sometimes the most critical part of trauma care, so we're always teaming up with paramedics so they are prepared with the latest techniques and treatments."

The Quickest Route to Care

"What we have learned through years of treating trauma patients is that it's critical to minimize time at the scene," says Paul Paris, MD, Medical Command physician. "Every step in the response to a trauma is important, but it's critical to get the patient stabilized and to a trauma center as quickly as possible so they can get advanced care and immediately go to the operating room if necessary."

In cases where a trip by ground would potentially place the patient's life in jeopardy, a helicopter is requested. It takes the crew of a STATMedEvac helicopter just four to five minutes to prep the aircraft and lift off.

While paramedics typically decide where to take the patient for care, it's the patient's right to request a specific hospital or trauma center. "Patients should know that if their condition is potentially life- or limb-threatening, a Level I trauma center such as those at UPMC Presbyterian, UPMC Mercy, and Children's Hospital of Pittsburgh has experts on hand 24 hours a day, every day of the year," explains Dr. Paris.

The Team that Saves Lives

Every major trauma patient is greeted by the trauma team: a group of experts, including a trauma surgeon, an emergency medicine physician, and other specially trained physicians and medical professionals. Leading the team is the trauma surgeon, who oversees the initial evaluation of patients, assigns roles to each member of the trauma team, performs life saving procedures, and follows patients throughout their hospital stay.

Trauma surgeons are prepared for any life-threatening injury, and have training to evaluate, resuscitate, and operate on multiple regions of the body. "If a patient has a life-threatening injury and needs immediate surgery, it's the trauma surgeon who operates. Surgery can be started within minutes of the patient's arrival," explains Louis Alarcon, MD, medical director of Trauma Surgery at UPMC Presbyterian.



Behind the Scenes: Orchestrating Every Move

Eight men and women sit in relative darkness, watching monitors filled with maps, helicopter tracking systems, and live shots of helipads; answering calls from paramedics, hospital emergency physicians, and commercial airline pilots; and tracking vital information about sick and injured patients from a 10-county area. It's the UPMC Medical Command Center, and it coordinates vital emergency and trauma care for the City of Pittsburgh EMS system along with nearly 150 other emergency ambulance services and 15 commercial airlines.

Medical Command physician Paul Paris, MD, explains the process. "After paramedics arrive and evaluate the patient, they call the command center to tell us where they are heading and what the hospital should expect," he says. "Our team immediately notifies that emergency department and appropriate staff, whether it's the trauma team, the stroke team, or the cardiac team."



Louis Alarcon, MD, and Charissa Pacella, MD, work together and share responsibilities when a trauma patient arrives, making sure that everything the patient needs is provided.

Charissa Pacella, MD, chief of the Emergency Department at UPMC Presbyterian, observes that trauma surgeons and emergency medicine specialists work hand in hand to coordinate treatment. "I'll work with the trauma surgeon to determine exactly what we need to do based on the circumstances," she says. "We'll get the initial life saving treatments in place, such as IV (intravenous) access, and if needed, plan for surgery."

Thinking Fast in the Race Against Time

Working with the emergency specialists, the trauma surgeon then makes rapid life saving decisions by determining what is likely to kill the patient within the first 60 seconds, then the next five minutes, and the next 30 minutes, addressing each possibility in a logical progression. "Sometimes we're called adrenaline junkies because we thrive on the fast pace of treating patients with acute injuries," says Dr. Alarcon.

Trauma patients are taken directly to the trauma bay, a hybrid emergency operating room. "By the time the patient arrives, the team already is assembled in the trauma bay ready to do whatever it takes to save that patient's life," says Dr. Pacella. Many

emergency procedures are performed in the trauma bay, including open-chest cardiac massage, control of active bleeding, and other urgent interventions that may mean the difference between life and death. Patients needing more in-depth surgery are moved immediately to the operating room, where any number of surgical specialists might participate, from orthopaedic surgeons and neurosurgeons, to plastic surgeons, head and neck surgeons, burn specialists, and liver surgeons.

When Other Experts Join the Care Team

Daniel Bursick, MD, enjoys fast cars and is a track instructor for racing enthusiasts, where he emphasizes the need for safety behind the wheel. As a neurosurgeon, he is highly interested in safety, for drivers on the street as well as on the racetrack.

Many of the trauma patients he cares for at UPMC Mercy have suffered severe head and spine injuries as the result of a car or motorcycle crash. "We are fortunate at UPMC to have so many experts from many fields who are dedicated to caring for trauma patients, whether it's noon or midnight," he says. Dr. Bursick wouldn't have it any other way.

"UPMC Mercy has a history of treating trauma patients going back more than 100 years. There are photos of horse-drawn ambulances bringing patients here from the steel mills and the wharves, and it's natural for us to continue that commitment." Of course, the practice of trauma medicine has evolved dramatically since that time. "Today, we can have a patient in a total body high-resolution CT scanner within three minutes of arrival," says Dr. Bursick.

A Structure for Recovery

"Trauma patients often have multiple severe injuries that require the expertise of an orthopaedic trauma specialist," says Ivan Tarkin, MD, chief of the Division of Orthopaedic Trauma. "An orthopaedic surgeon is always available as part of the multidisciplinary trauma team," he explains. "If a patient needs surgery for a broken leg or arm, a knee fracture, or if there's severe pelvic or hip damage, we're there to operate right away and make sure that patient starts the recovery process as quickly as possible."

Dr. Tarkin values the long-term relationships he develops with his patients and their families. "I continue to see some of my trauma patients many years later," he says. "Sometimes their musculoskeletal injuries are so

severe that the patient needs multiple reconstructive operations and prolonged rehabilitation. I help patients during their recovery to ensure they heal correctly and maximize their long-term functionality."

UPMC Mercy is the region's only combined burn center and Level 1 trauma center, with the specialists and technology to treat burn patients of any age.

Soothing the Damage of Burns

When trauma patients come to UPMC Mercy with severe burns, a team of burn specialists is ready to provide life saving treatment, explains Jenny Ziembicki, MD, medical director of the UPMC Mercy Burn Center. "One of the first things we do is secure the airway, and then check for an inhalation injury," says Dr. Ziembicki. "Once we get the patient stabilized, we move them up to our burn unit to begin receiving hydrotherapy." Hydrotherapy uses warm running water to help the healing process of a burn injury. For large, severe burns, the burn center is researching new technology called a "skin gun," developed at the University of Pittsburgh's McGowan Institute for Regenerative Medicine. "The skin gun takes healthy skin cells from the burn patient and sprays it on the burn wound. It can heal the burn within days, and really speed the overall recovery process," says Dr. Ziembicki.

Returning to the Daily Routine

After the medical emergency is over, rehabilitation, including occupational and physical therapy, plays a significant role in a patient's long-term recovery. "When trauma patients come in to our rehab center, they are usually in pretty



Rehabilitation patient John Rizzi plays a video game exercise using a robotic therapy arm that helps him regain movement and functionality.

bad shape," explains Michael Boninger, MD, chair of the Department of Physical Medicine and Rehabilitation. "We're there every step of the way to guide the recovery process, and, as a result, we develop personal and lasting relationships with our patients."

Depending on the type of injury, rehabilitation patients may undergo a variety of comprehensive therapies. "We have some of the best therapists available and always use an integrated approach with our patients," says Dr. Boninger. "In the morning, we might use a robotic treadmill to help patients learn to walk again without assistance, and then work on their cognitive skills in the afternoon with robotics and gaming exercises.

"From severe cognitive issues to debilitating orthopaedic and spinal cord injuries, we've seen it all and know how to deliver the optimal care to help patients achieve their recovery," he says. "It's just great to see patients walk out of the hospital knowing that just a few weeks or months ago they were barely able to function," says Boninger. "It's about the best thing in the world."

For more information about UPMC's trauma centers, visit UPMC.com/Trauma.



Josh and his son, Justin, enjoy the outdoors and go hiking and fishing on a regular basis.

Several years later, Josh is near full recovery. He enjoys hunting and fishing with his son, Justin, and even aspires to be a motivational speaker. His mother, Tammy Barca, sees her son's recovery as a testament to the care he received, from the initial treatment at the accident, to when his brain was cooled to minimize damage, all the way through his rehabilitation. "Josh's neurosurgeon, the trauma doctors, the nurses who took such good care of him, the rehab specialist, were all simply amazing," she says.*

Scan the code to watch the video "Back from the Brink," featuring Josh's story and other amazing trauma survivors.



*Josh's treatment and results may not be representative of all similar cases.



When a severe burn patient arrives, Jenny Ziembicki, MD, medical director of the UPMC Mercy Burn Center, knows exactly what's needed to save someone's life.