



**WVU** Critical Care &  
Trauma Institute



PUBLISHED SPRING 2019

## WVU Critical Care and Trauma Institute Report

## Table of Contents

|  |     |
|--|-----|
| Institute Introduction . . . . .   | .2  |
| Leadership and Team Page . . . . .   | .6  |
| Data and Outcomes Page . . . . .   | .7  |
| Trauma: We Fight for Your Life When You Can't . . . . .  | .9  |
| Expanding Access to Care for a Broad Range<br>of Critically Ill and Injured Patients . . . . . | .11 |
| Neurological Critical Care Unit . . . . .  | .13 |
| Surgical Intensive Care Unit . . . . .   | .15 |
| Medical Intensive Care Unit . . . . .  | .17 |
| Through the Lens of Our Patients and Families . . . . .  | .19 |
| Injury Prevention Outreach and Trauma Education . . . . .                                      | .21 |
| Redefining Medicine's Future. . . . .  | .25 |

## Dear Colleagues and Friends,

Life-threatening injuries occur every day, and people face critical illness and disease at increasing rates. As West Virginia's only academic health system, WVU Medicine is home to a Level I Adult Trauma Center and Level II Pediatric Trauma Center accredited by the American College of Surgeons.

Our team is equipped to treat the most critically injured and those who suffer from a catastrophic, life-threatening illness. With unwavering integrity and standing as champions for patients, we serve close to 4,000 patients each year. We understand the great privilege entrusted to us to ensure the delivery of extensive treatment at the most critical time. We do all we can to safeguard our patients and offer the best opportunity to recover.

Excellence in trauma, critical care, and injury prevention is our cornerstone. Research and our participation in national data registries helps uncover new approaches and response to treatment. Today, we have an opportunity to better understand and prevent trauma. I'm proud of the team's collaborative spirit that brings together clinical care, research, and academic and community outreach programs.

Patients deserve high-quality, high-touch services, and we continuously evaluate and implement new ways to provide excellent, timely care. Together, we're working to raise the clinical excellence across the continuum of our health system.

During times of trauma, time is critical. From our trauma bays to the operating rooms, to intensive care units, to integrated recovery programs – the WVU Critical Care and Trauma Institute is a place where patients and families come for extraordinary, life-saving care. In every aspect of our work, we take opportunities to positively impact those we serve. We are inspired by each person. That inspiration motivates us to strengthen community partnerships and continuously drive innovations and better outcomes for all.

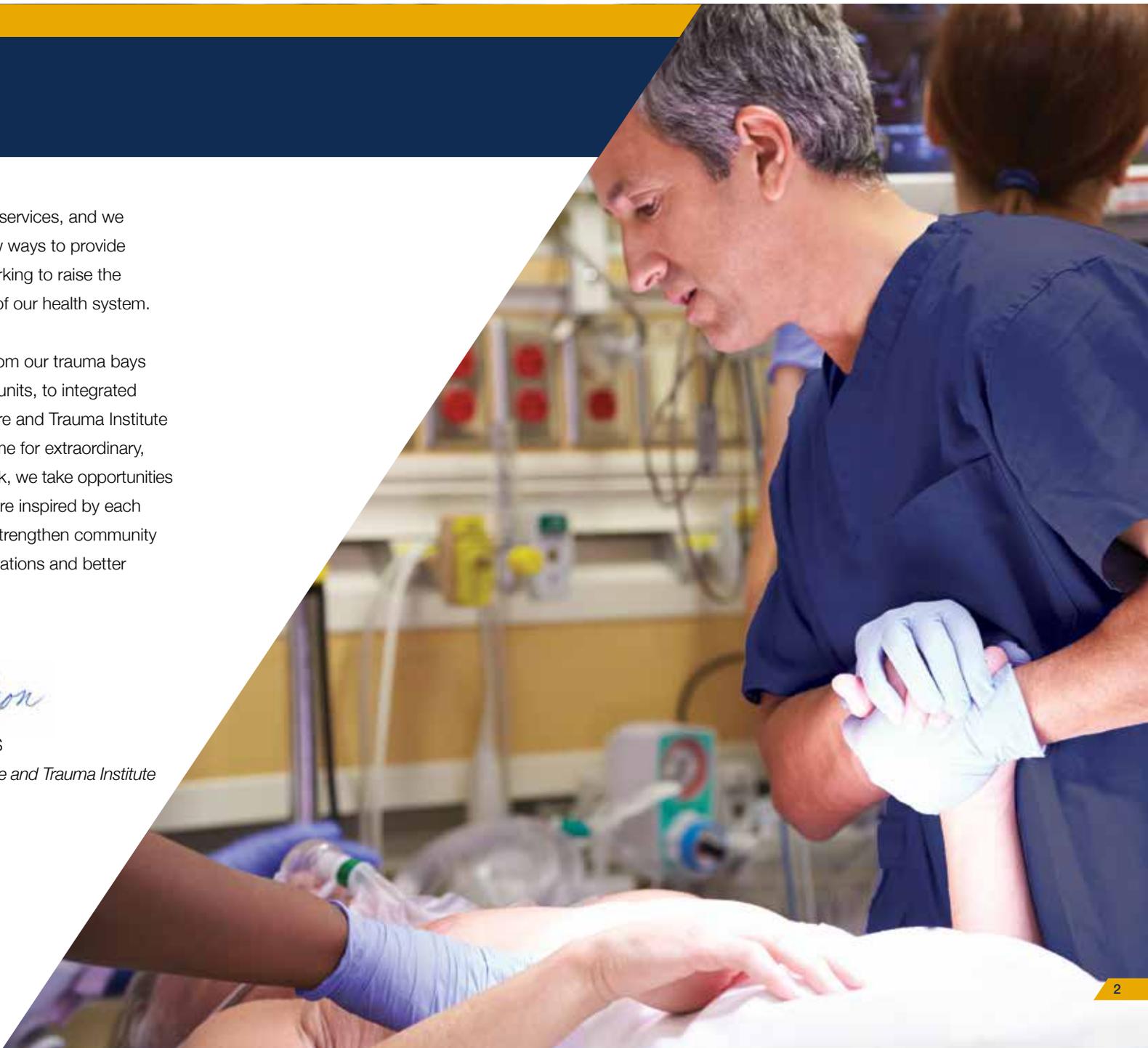


Sincerely,

A handwritten signature in blue ink that reads "Alison Wilson". The signature is written in a cursive, flowing style.

Alison Wilson, MD, FACS

*Director, WVU Critical Care and Trauma Institute*





## Timely, Skilled Interventions Play Key Role in Saving and Restoring Lives

WVU Medicine is home to the state's leading Critical Care and Trauma Institute impacting an evolving healthcare landscape and addressing unprecedented changes in trauma and critical care. The Institute spans across the most extensive health system in the state and brings together the pillars of academic medicine – cutting-edge research, academic teaching excellence, and the highest level of patient and family-centered care.

These pillars embedded in the foundation of the WVU Critical Care and Trauma Institute's core supports efforts to save thousands of lives each year. The Jon Michael Moore Trauma Center at J.W. Ruby Memorial Hospital in Morgantown serves as the flagship trauma center in the state of West Virginia. The Center holds a Level I designation from the American College of Surgeons as an Adult Trauma Center and as a Level II Pediatric Trauma Center.

### **Far-reaching care touches lives across the region**

Treating close to 4,000 critical care and trauma patients annually, the impact of the integrated practice is far-reaching – spanning treatment to patients from western Maryland, southwestern Pennsylvania, eastern Ohio, and Kentucky. West Virginia is also a temporary home to residents who travel to the state for employment opportunities and those who visit the abundant natural, recreational resources available throughout the state. When tragedy strikes, the trauma and critical care teams are ready – 24 hours a day, seven days a week.

Trauma, severe injury, and complex critical illness and conditions require immediate medical and surgical care to give patients the best chance of survival. To bring our communities the very best in care, the Institute collaborates across traditional medical and surgical boundaries to help prevent, treat, and rehabilitate patients facing traumatic injury and critical care. Both in-hospital and community-based care – for patients living in rural areas without easy access to a Level I Trauma Center – is critical.

### **The power of collaboration**

The Institute commits to the continuous development of rural trauma teams and trains and builds relationships with EMS responders to identify and transport patients to minimize adverse outcomes. Working with smaller community hospitals allows us to bring life-saving care to patients right in their community.

This past year, patients who experienced multisystem injuries were cared for by numerous intensive care specialists and surgical subspecialists, including teams from neuroscience, cardiovascular, orthopaedics, gastroenterology, and plastic and reconstructive clinical disciplines.

**Verified as a Level I  
Adult Trauma Center  
and Level II Pediatric  
Trauma Center**

## When You Need Us

- 24-hour adult and pediatric trauma services
- Hybrid operating room with leading-edge technology
- Trauma bays and resuscitation suite
- Dedicated critical care units
- Dedicated high-speed CT scanner for full body scans
- Advanced monitoring equipment
- Highly skilled trauma and critical care nurses
- Injury prevention programs
- Emergency ground and air medical transportation

**“Our commitment to providing the highest quality care never waivers.”**

*– Alison Wilson, MD, Director, WVU Critical Care and Trauma Institute*

VISION

To transform lives and eliminate health disparities through a nationally recognized patient-centered system of care that includes:

- An expanded regional healthcare delivery system
- Consistent, integrated patient care recognized for delivering the right care in the right place at the right time at all sites
- Development of new approaches to improve healthcare, including team-based models of care, expanding WVU clinical and translational research
- Educational programs throughout the network recognized for training uniquely qualified healthcare team members and leaders
- A culture of performance and excellence throughout the network

MISSION

To improve the health of West Virginians and all we serve through excellence in patient care, research, and education.



West Virginia University Health System

- : Hospital
- : Clinic

WEST VIRGINIA UNIVERSITY HEALTH SYSTEM LOCATIONS

- |  |   |  |   |
|--|---|--|---|
| <p><b>1. BRIDGEPORT</b><br/>United Hospital Center</p>             | <p><b>4. GLEN DALE</b><br/>Reynolds Memorial Hospital</p>                                   | <p><b>8. NEW MARTINSVILLE</b><br/>Wetzel County Hospital<br/>(managed by WVUH)</p> | <p><b>11. RIPLEY</b><br/>Jackson General Hospital<br/>(managed by WVUH)</p>                   |
| <p><b>2. BUCKHANNON</b><br/>St. Joseph's Hospital</p>              | <p><b>5. KEYSER</b><br/>Potomac Valley Hospital</p>   | <p><b>9. PARKERSBURG</b><br/>Camden Clark Medical Center</p>                       | <p><b>12. SUMMERSVILLE</b><br/>Summersville Regional Medical<br/>Center (managed by WVUH)</p> |
| <p><b>3. GASSAWAY</b><br/>Braxton County Memorial<br/>Hospital</p> | <p><b>6. MARTINSBURG</b><br/>Berkeley Medical Center</p>                                    | <p><b>10. RANSON</b><br/>Jefferson Medical Center</p>                              | <p><b>13. OAKLAND, MARYLAND</b><br/>Garrett Regional Medical Center<br/>(managed by WVUH)</p> |
|  | <p><b>7. MORGANTOWN</b><br/>J.W. Ruby Memorial Hospital<br/>and WVU Medicine Children's</p> |  |   |



## WVU Critical Care and Trauma Institute Leadership



### **Alison Wilson, MD, FACS**

*Director, WVU Critical Care and Trauma Institute  
Skewes Family Chair for Trauma Surgery, WVU School of Medicine  
Professor and Chief, Division of Trauma, Emergency Surgery, and Surgical Critical Care, WVU Health Sciences Center*



### **Uzer Khan, MD**

*Medical Director, Surgical Intensive Care Unit  
Associate Program Director, General Surgery Residency  
Assistant Professor Surgery, WVU School of Medicine*



### **Robert Stansbury, MD**

*Medical Director, Medical Intensive Care Unit  
Director, Sleep Evaluation Center  
Interim Section Chief, Pulmonary, Critical Care,  
and Sleep Medicine  
Associate Professor, WVU School of Medicine*



### **Jennifer Knight Davis, MD**

*Medical Director, Jon Michael Moore Trauma Center  
Associate Professor, WVU School of Medicine*



### **Gregory Schaefer, DO, FACS**

*Associate Director, Surgical Intensive Care Unit  
and Director, Education  
Associate Professor, Trauma, Acute Care Surgery, and  
Surgical Critical Care, WVU School of Medicine*



### **Matthew Smith, MD**

*Medical Director, Neurological Critical Care Unit  
Assistant Professor, WVU School of Medicine*



### **Daniel Grabo, MD, FACS**

*Director, Trauma Education  
Associate Professor, WVU Critical Care and  
Trauma Institute*

## Using Data to Anticipate Needs and Change the Outcomes

At the WVU Critical Care and Trauma Institute, we embrace numbers. We use timely data and participate in national trauma registries to leverage information, guide program development, and evaluate our performance.

Over the past decade, our communities throughout the state of West Virginia and the region have faced unprecedented and growing challenges. One such devastating and traumatic change is the upswing in traumatic injury to older adults as well as the growing crisis of prescription and illicit drug overdose cases. Understanding this dilemma helps us develop comprehensive trauma-informed prevention and treatment approaches.

As healthcare needs change and evolve each year, the compilation of trauma and ICU data we collect and contribute to guides our efforts to continuously evaluate growing needs.

**Resource of Data  
has Potential to  
Improve Care**

### Data collection, integration, and sharing

The WVU Critical Care and Trauma Institute participates in data registries to collect and analyze data at various points of a patient's healthcare journey. This collaborative effort allows us to continuously improve quality through the analysis, refinement, and improvement of efforts. Data collection, integration, and sharing occurs:

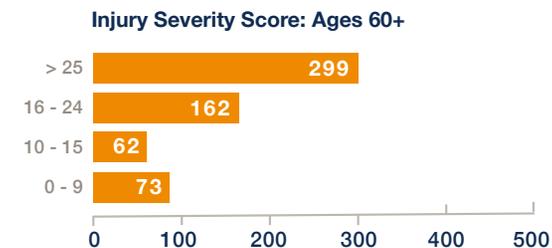
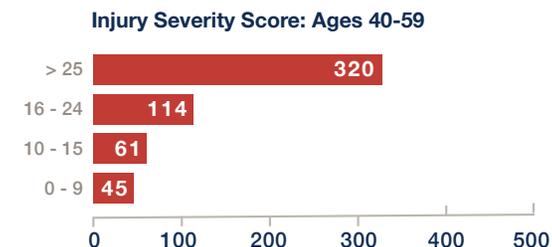
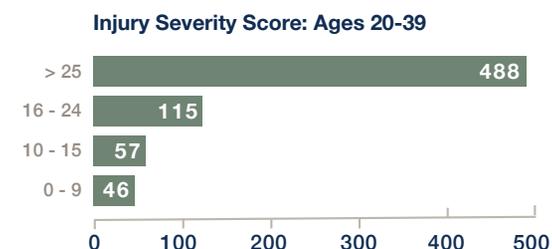
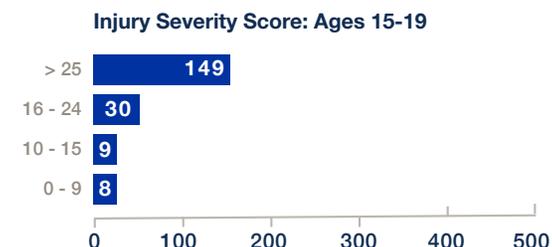
- Across multiple systems
- Pre-injury
- Prehospital data
- En route data
- In-patient hospital-based data
- Post-acute care data

### Leading cause of trauma

A closer look at trauma and critical care causes in West Virginia:

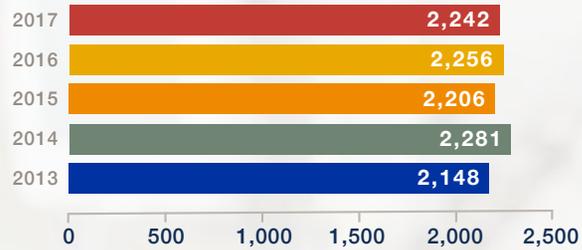
- Motor vehicle crashes
- Falls
- ATV accidents
- Motorcycle crashes
- Other

The knowledge we gain from data is fundamental to our quality improvement efforts, the development of patient safety programs, the building of a continuous learning environment, and our ability to seek optimal outcomes and new best practices for those we serve.

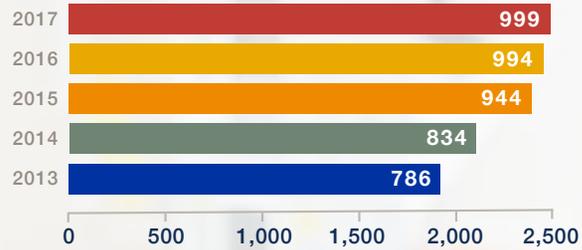




#### Number of Trauma Patients



#### Number of Patients Transferred from Other Healthcare Facilities



#### Survival Rate of Patients



2017: **98%**  
2016: **97%**  
2015: **98%**  
2014: **97%**  
2013: **97%**



## TRAUMA CARE

### We Fight for Your Life When You Can't

#### **Working together to prevent injuries and impact trauma outcomes**

With a mission to provide excellent leading-edge patient and family-centered care to those facing traumatic injury, during the first 48 hours, 45 different care providers touch a trauma patient. This team effort ensures that “we fight for your life when you can’t,” says Jennifer Knight Davis, MD, medical director of the WVU Medicine Jon Michael Moore Trauma Center and associate professor of surgery in the WVU School of Medicine. “Through our leadership participation in trauma organizations and national research, the Institute and its multidisciplinary team are seen as respected leaders in the field and recognized for excellence in the delivery of care.”

#### **Exchange of knowledge and new technologies advance care**

Leaders within the Critical Care and Trauma Institute participate in the *Eastern Association for the Surgery of Trauma* – a national organization working to advance science in the area of care and rehabilitation of injured patients. The group works on several initiatives, including the evaluation of practice management guidelines for diaphragmatic pacing for ventilator-dependent patients with high cervical spine fractures.

A new tool, called *Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA)*, is being used in selected patients for the management of hemorrhagic shock with uncontrolled abdominal, pelvic, or lower extremity bleeding. A minimally invasive REBOA catheter is placed into the femoral artery for patients who have a life-threatening extenuigal truncal hemorrhage. “In considering when to initiate this strategy, we follow recommendations outlined by the American College of Surgeons Committee on Trauma and the American College of Emergency Physicians indications,” says Jennifer Knight Davis. “As an academic health system, we’re able to continuously evaluate and explore new ways to bring less-invasive, timely, critical care to trauma patients. It’s a collaborative effort working with teams from vascular surgery, acute care surgery, and trauma surgery to develop internal guidelines for its integration into our clinical practice.”

#### **Observational trial evaluates the benefit of operative fixation**

Working to uncover the most advanced, evidence-based care, the trauma team is conducting observational research on rib fractures and operative fixation in severely injured patients. Conservative treatment, including respiratory assistance and pain control, guides practice management protocol. However, based on treatment algorithms within the Institute, the team is working to understand and

evaluate whether operative fixation of fractured ribs leads to better patient outcomes. Discovering new best practices leads the team's efforts.

### Analyzing and reviewing care improves performance

For 20 years, the Institute has maintained well-established, multidisciplinary monthly reviews to examine any complications and system quality improvement areas of injured patients treated at the hospital. The meeting, recognized by the American College of Surgeons, is comprised of experts from all different specialties who are engaged in a review process. "Dr. Alison Wilson (WVU Critical Care and Trauma Institute director) inspires cross-disciplines to become involved and engaged in the PI process," says Knight Davis. "She has developed a positive culture where we examine cases and occurrences through a nonpunitive, collaborative process." This process opens the door to continuously review and analyze the care delivered to optimize care for future patients.

### Trauma and the elderly: A growing epidemic

Incidence and severity of trauma amongst the geriatric population continue to rise. It's an epidemic nationwide, taking care of older adults who often may have a host of preexisting medical conditions and then experience a trauma-related injury. "This increases the complexity of their care," says Knight Davis. Evidence shows that patients do better when treated at a Level I Trauma Center and one that is more experienced in taking care

of older patients. "When we look at WVU Medicine data, we participate in a quality outcomes database called TQIP. It looks at both Level I and Level II Trauma Centers across the country, and WVU Medicine ranks high performing for geriatric trauma patients. Through aggressive management and comprehensive care, we'll continue to advance treatment in this area."



One system delivers on the power of academic medicine

#### TRAUMA TEAM

Available 24 hours-a-day, 7 days-a-week

#### TRAUMA EXPERTISE

Specialists collaborate on each case

#### SYSTEM RESOURCES

Trauma bays, state-of-the-art critical care units, high-tech operating rooms, on-site imaging technology, evidence-based practices

#### RESEARCH

Drive change in healthcare and bring innovation to the forefront

#### ACADEMICS

Teach and inspire the next generation of providers

#### OUTCOMES

Death risk lowers when treated at a Level I Trauma Center



## Expanding Access to Care for a Broad Range of Critically Ill and Injured Patients

The WVU Critical Care and Trauma Institute is the hub of critical care units and trauma services for WVU Medicine. The critical care units (CCUs) are equipped with complex machines and monitoring devices designed for the unique needs of critically ill patients and postoperative patients requiring care 24-hours a day, seven days a week.

The CCUs, although distinct, work together expertly to manage risk, secure better outcomes, and increase patient and family satisfaction, while operating at a low cost. The team brings together advanced critical care specialists, including:

- **Surgeons and Physicians**
- **Nurse Practitioners and Critical Care Nurses**
- **Anesthesiologists**
- **Pulmonologists**
- **Pharmacists**
- **Registered Dietitians**
- **Respiratory Therapists**
- **Physical and Occupational Therapists**
- **Social Workers**
- **Physical and Therapy**
- **Speech-Language Pathology**
- **Nutritionists**

“The critical care units greatly set WVU Medicine and the WVU Critical Care and Trauma Institute apart,” says Alison Wilson, MD, director of the WVU Critical Care and Trauma Institute. “Each unit has a dedicated approach to providing excellent patient care. We’re able to provide the best available care for patients who need neurological, surgical, and medical intensive care.”

#### **Nurses play critical role in advancing care**

The WVU Critical Care and Trauma Institute leans on the strength of its nurses. Each has a personal commitment to continually improve safety, quality of care, and patient experience. “Nurses in the CCUs are at the core of quality improvement projects and play a vital role in patient outcomes,” says Smith. “Because our patients’ length of stay can be a little longer, our nurses build a bond with our patients and their family members. They get to know each patient and his or her journey, understand their unique care plan, and can anticipate needs. These attributes are critical to the successful outcomes each unit delivers.”

Nurses are vital members of the daily rounding and huddles. Daily rounding on each patient provides an additional level of expertise in the overall treatment of patients and the support to their families. To be successful and ensure the delivery of best outcomes, specialists come together every day through rounding. These individuals have focused expertise and understand the nuances of disease and work to advanced care in a multidisciplinary manner. Often, patients in a CCU have experienced the most perilous diseases and conditions. The nurses provide more than medical skills; they are leaders in the area of conflict resolution and communication, skilled in all levels of patient monitoring, and working to ensure the highest level of care.

**Although distinct, the critical care units work together expertly to manage risk, secure better outcomes, and increase patient and family satisfaction, while operating at a low cost.**



## Neurological Critical Care Unit

A little over one year ago, WVU Medicine opened its 10-bed, dedicated Neurological Critical Care Unit (NCCU) bringing the highest level of around-the-clock and closely monitored care to patients throughout West Virginia and surrounding states. As the only fully functioning neurocritical care unit in the region, the team of board-certified, fellowship-trained neurointensivists work with specialists across multiple disciplines.

“The critical care unit is designed with the patient in mind, and our state-of-the-art technology ensures each patient receives the best possible care from an integrated team,” says Matthew Smith, MD, director of the Neurological Critical Care Unit and associate professor at WVU School of Medicine. “Neurocritical care is a team sport, and every one of our patients has touch-points from numerous specialties.”

“The field of neurocritical care is an exciting new area. Most recently, we witnessed a national expansion in this specialized area of clinical practice. Neurological intensive care units are a novel concept in healthcare, only recently becoming common in academic medical centers around the nation.”

Neurocritical care is at the intersection of all neuroscience, where specialists come together to work with the most

challenging organ system in the body. Patients are known to do better in a specialized unit under the care of staff who are trained and experienced in that field.

Discovery, through basic science and clinical research, uncovers the latest clinical advances and technologies which help improve medical care. “We’ve set out to expand resources to care for the most critically ill and injured patients – those facing trauma and those with complex conditions, including brain tumors, seizure disorders, and patients with complex neurovascular conditions.”

### Treatment for critical neurology and neurosurgical conditions

A large regional referral base brings patients with a full range of neurology and neurosurgical conditions, including patients with brain tumors, brain trauma, intracerebral hemorrhage, Guillain-Barre’ syndrome, neuromuscular diseases, and patients who suffer from severe spinal cord injuries and stroke. Neurological diseases and conditions are complex says Smith. “Not only is it critical to understand standard protocols and interventions, but it is critical to engage a multidisciplinary team that understands secondary brain injury and the management of care for both critically ill neurological patients and post-operative surgical patients.”

Every day, the team makes decisions that keep the patient top priority. This decision-making drives efficiencies, collaboration, and nursing strategies. “We’re a collaborative

team working to lower mortality and increase functional outcomes,” says Smith.

### Advanced monitoring improves outcomes

In addition to the frequent and expert clinical exams conducted at the bedside, many patients require advanced monitoring for post insertion of various invasive brain monitoring devices. We lean on the expertise of our nurses to provide the highest level of patient monitoring for those who experienced a craniotomy for trauma, cerebral aneurysm repair, or tumor resection and those who had minimally-invasive endovascular procedures. The team is highly advanced in monitoring intracranial pressure (ICP), brain tissue oxygen, bedside chemical analysis, cerebral blood flow, jugular venous saturation, and continuous electroencephalographic (EEG) monitoring.

“We’re developing new treatment protocols as well as new advanced monitoring and multimodal monitoring to provide first-in-class monitoring of a patient’s brain health while in the Neuro CCU,” says Smith.

### Recognized as a comprehensive stroke center

This past year, the neuroscience team worked to achieve the highest certification in stroke care – The Joint Commission’s Gold Seal of Approval and the American Heart Association/American Stroke Association’s designation as a Primary Stroke Center. The distinction resulted from a rigorous on-site evaluation that measured the institution against more than 100 standards for stroke

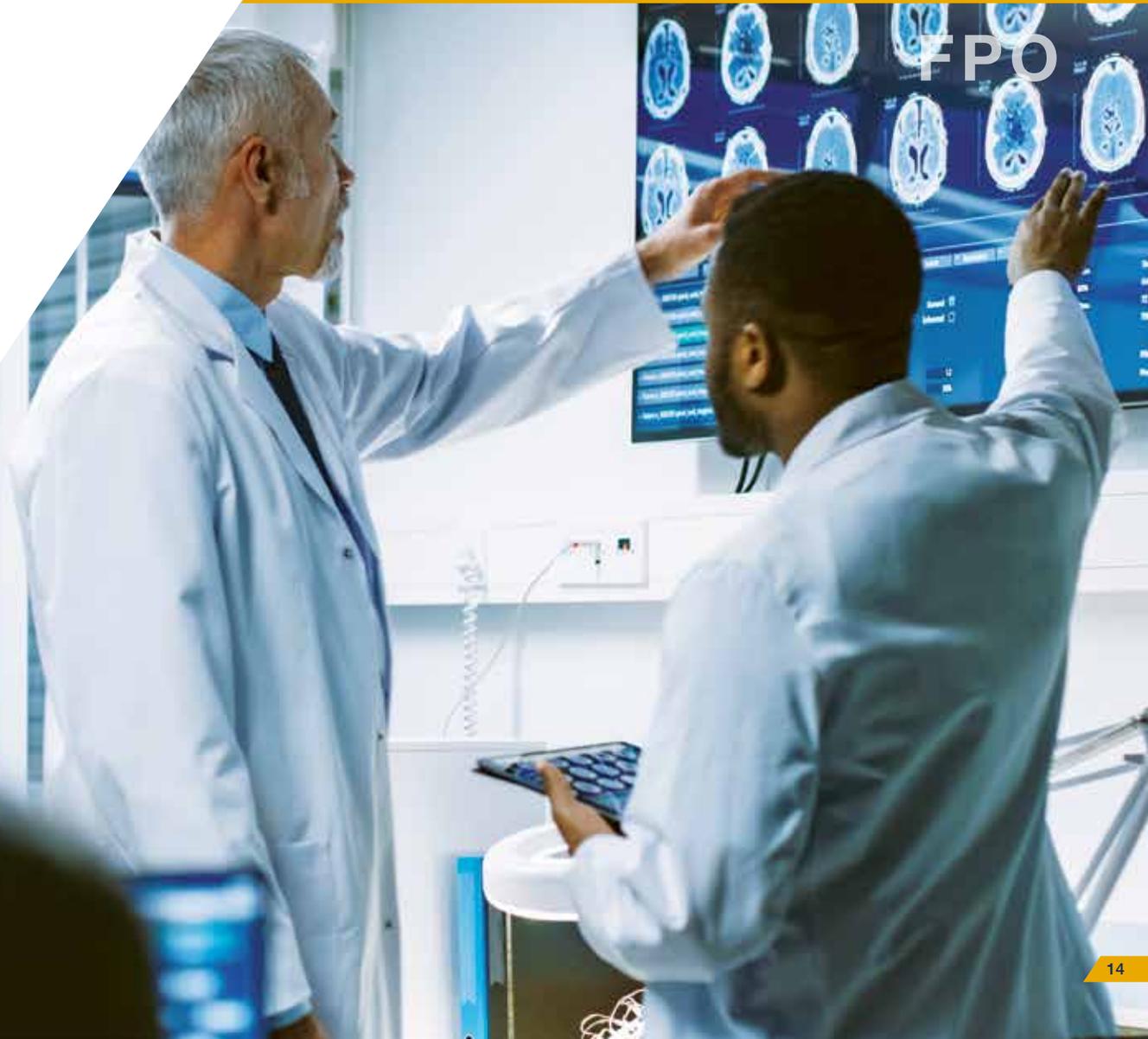
“The critical care unit is designed with the patient in mind, and our state-of-the-art technology ensures each patient receives the best possible care from an integrated team,”

– Matthew Smith, MD, director of the Neurological Critical Care Unit and associate professor at WVU School of Medicine

care. The designation recognizes the team’s capability to treat the most complex stroke cases.

Highly specialized nurses play a critical role in the recovery of stroke patients by providing rapid, around-the-clock care, through frequent neurological assessments and by closely monitoring patients’ conditions while in the NCCU.

To improve access to specialized care in underserved areas, physicians began offering telemedicine for many conditions, including stroke. Today, the tele-stroke program currently serves seven hospitals throughout West Virginia and western Maryland. “We’re always evaluating ways to bring better care closer to where the patient lives,” says Smith. “Tele-stroke and tele-neurology are a way we can do just that.”





## Surgical Intensive Care Unit

The Surgical Intensive Care Unit (SICU), staffed by a multidisciplinary team of experts, provides care for critically ill patients before and after surgery. This unit offers the highest level of care to the sickest surgical patients in West Virginia and the surrounding region. Moreover, the staff in the SICU — led by the nursing team — is dedicated to the unit. A core group of nurses, in fact, has elected to work solely in the SICU, providing a core knowledge base that is crucial for continuity. “We’re fortunate to have ICU nurses throughout the institution,” says Gregory Schaefer, DO, associate director of the SICU. “Our SICU nurses are at the forefront of not only surgical critical care but critical care in general.”

In the past year, the SICU staff has worked to improve care through many initiatives aimed at empowering staff, improving quality, and reducing risk to patients. The SICU is also working to support healthcare efforts in the community and surrounding areas. For example, the unit has collaborated with disaster management committees to develop responses to mass casualty situations, so if there is an influx of trauma patients or other types of traumatic injuries, the Critical Care and Trauma Institute has the surgical and triage capabilities to provide support through the SICU.

**Nurses focus intensively on all aspects of nursing care and life support and have expertise in identifying the slightest imbalance or deviation in a patient’s condition.**

### **SICU liberation improves patient care**

Through a sponsored grant, the SICU Liberation project works to implement best practices within ICUs and across surgical care to improve patient care. This process improvement initiative, led by Dr. Schaefer, is run through the Society of Critical Care Medicine, and focuses on the ABCDEF bundle — a care assessment aimed at improving the assessment for pain, agitation, and delirium. The bundle encourages providers to utilize better choices for managing ICU conditions. For example, assessments include evaluating medication, analgesia, and sedation use, early mobility and exercise, and mechanical ventilator use.

WVU Medicine and the Critical Care and Trauma Institute are one of 69 adult ICUs selected to pilot the SICU Liberation project and ABCDEF bundle. WVU Medicine’s ICUs collected more than 10,000 patient days’ worth of data to evaluate the effects of the SICU Liberation project and the ABCDEF bundle, providing much-needed data, which can aid in supporting the improvement of critical care nationwide.





“Every day, we work to deliver care to our patients that revolves around not just a single viewpoint but multi-disciplinary care. That’s why we round in a manner that incorporates all these different understandings.”

– Gregory Schaefer, DO, associate director of the SICU

### **Brain roadmap empowers staff to improve care**

A key part of the SICU Liberation process, the brain roadmap empowers SICU nurses to share information related to the ABCDEF bundles, discuss mobility plans, engage family members, and advocate for patients and families to ensure effective communication. These practices are shared with nurses in other ICUs.

“Every day, we work to deliver care to our patients that revolves around not just a single viewpoint but multi-disciplinary care. That’s why we round in a manner that incorporates all these different understandings,” says Schaefer.

### **Quality Improvement efforts lead to better outcomes**

Improving quality of care is crucial to ensuring positive patient outcomes. For example, over the last five years, the SICU team has developed a program to reduce pressure ulcers, or bedsores, in patients — a common problem among patients who are hospitalized for an extended period.

In addition, the SICU team recognized an increase in the number of falls, motor vehicle accidents, injuries, and other trauma among geriatric patients in recent years. The staff understands the risk profile of this population and has taken steps to mitigate danger in the SICU.

To facilitate quality improvement, the SICU staff and administration have collaborated with the other intensive care units to consolidate all policies and procedures amongst all ICUs under one umbrella. This practice helps avoid silos among the ICUs, improving communication and leading to improvement in care.

To ensure continued improvement efforts, the SICU staff holds monthly conferences to discuss any case complications, patient safety, and issues to review for improvement. The conferences are led and delivered by senior residents. These efforts are supported by quality improvement policy and SICU improvement.

## Medical Intensive Care Unit

The 28-bed Medical Intensive Care Unit (MICU) provides needed critical care services to the sickest medical patients in West Virginia and the surrounding states. With increasing demand for MICU and other critical care services, the WVU Critical Care and Trauma Institute added a second MICU care team to provide care for patients. Also, the MICU implemented a pilot program in 2018 for in-house critical care coverage by fellows. This program was met with tremendous success and enabled additional staffing opportunities for this needed area. These staffing adjustments became effective in July 2018.

As a leader in critical care services in the community, the Institute is on the cutting edge of caring for the sickest medical patients throughout the region. In the last year, the MICU has worked to improve its clinical services to provide better patient care, education to grow the pool of MICU caretakers, and research to advance care in the future.

**Our compassionate patient and family-centered care environment allows for open communication and information sharing.**



### Clinical service improvements lead to better patient outcomes

As an important community provider of MICU services, a key component of the Institute's efforts in the MICU is continuous improvement in the clinical services provided. These improvements have been especially significant regarding screening protocols, allowing both internal and transferred patients to receive optimal care quickly. With these protocols in place, providers can more accurately identify individuals who require intensive care, decreasing the number of individuals who get sicker while waiting for care.

One of these protocols is for severe acute respiratory disease syndrome (ARDS) patients, ensuring that appropriate, aggressive measures are implemented quickly to improve outcomes. These tactics range from prone positioning to bringing in extracorporeal membrane oxygenation (ECMO) teams.

### Continuous education of staff and trainees grows provider pool

The Critical Care and Trauma Institute has developed into an environment that is rich in educational opportunities and scholarly pursuits for new trainees. Many of the internal trainees at WVU Medicine have identified these opportunities and wish to pursue critical care training, including in the MICU. With this opportunity, the MICU has increased its involvement in the Critical Care and Trauma Institute. This has led to improved cooperation across units to educate physicians, trainees, and support staff on new policies and practices.

Because of this desire for critical care training, the MICU is applying for an increase in the total complement of pulmonary and critical care fellows. While this education benefits the fellows, it also provides an additional level of care in support of patients.

Further, the MICU staff has increased the involvement of its faculty in the Fundamental Critical Care Support (FCCS) course. Trainees are now required to participate in this course to ensure they have a good baseline knowledge and exposure in critical care.

Round-the-clock, in-house physician coverage has an important impact on lower mortality rates.

### **New research fuels new opportunities for patient care**

Continuous research means continuous improvement in the area of patient care. The MICU staff has seen an increased interest by WVU faculty in pursuing scholarly work pertaining to critical care with significant success over the past year, resulting in several research articles being published in credible journals and publications. One benefit of this research is increased collaboration among physicians across critical care units and other multi-disciplinary groups as they work to develop research and critical care projects. This collaboration has led to ongoing and new projects developed in the MICU with the support of the Critical Care and Trauma Institute.



## Through the lens of our patients and families

At the WVU Critical Care and Trauma Institute, we approach patient care through the lens of our patients and family members. This is the lens through which we evaluate everything we do and the philosophy that guides our interactions with those we treat and work.

**“The chance of survival that first night was minimal,” says Kathy Eckenrode, Kevin’s wife. “We really thought that he was going to die. We are forever grateful to the team.”**

### **“I remember being in the water and thinking I was going to drown.”**

My family got me out of the lake, and with all the injuries I had sustained, I was in extreme pain and just thought this is it. This is how my life was going to end.

Pretty quickly the EMTs arrived. There was a retired EMT neighbor at the house next to where we were staying. She jumped in to help. I am lucky because in my family we have a doctor and a couple registered nurses. They were there helping. The EMTs took care of me and transported me to the helicopter headed to WVU Medicine Jon Michael Moore Trauma Center in Morgantown – a nationally designated Level I Trauma Center.

**This is the story of Kevin Eckenrode.** While enjoying himself at a family reunion at Deep Creek Lake in Maryland, he drifted under the boat and was struck by the propeller multiple times.

His injuries were massive – life-threatening. His pelvis was in multiple pieces, and he was eviscerated.

“By all measures, there have been very few survivors of a trauma of this magnitude. His survival was only possible through the superior work and diligence of the entire team of first responders and staff and physicians,” Alison Wilson, MD, director of the WVU Critical Care and Trauma Institute and a key physician in Eckenrode’s case, says.



That first night in the hospital, the team completely focused efforts on just stopping the bleeding. In the operating room, trauma and orthopaedic surgeons tried to control his bleeding. Interventional radiologists then performed a pelvic embolization to stop pelvic bleeding, and Eckenrode returned to the operating room, where surgeons recreated his pelvis to stop the venous bleeding. He experienced acute renal failure, which was anticipated due to his injuries, and a nephrology team came in at midnight to perform dialysis so he could return to the operating room for further reconstruction of his pelvis and left side.



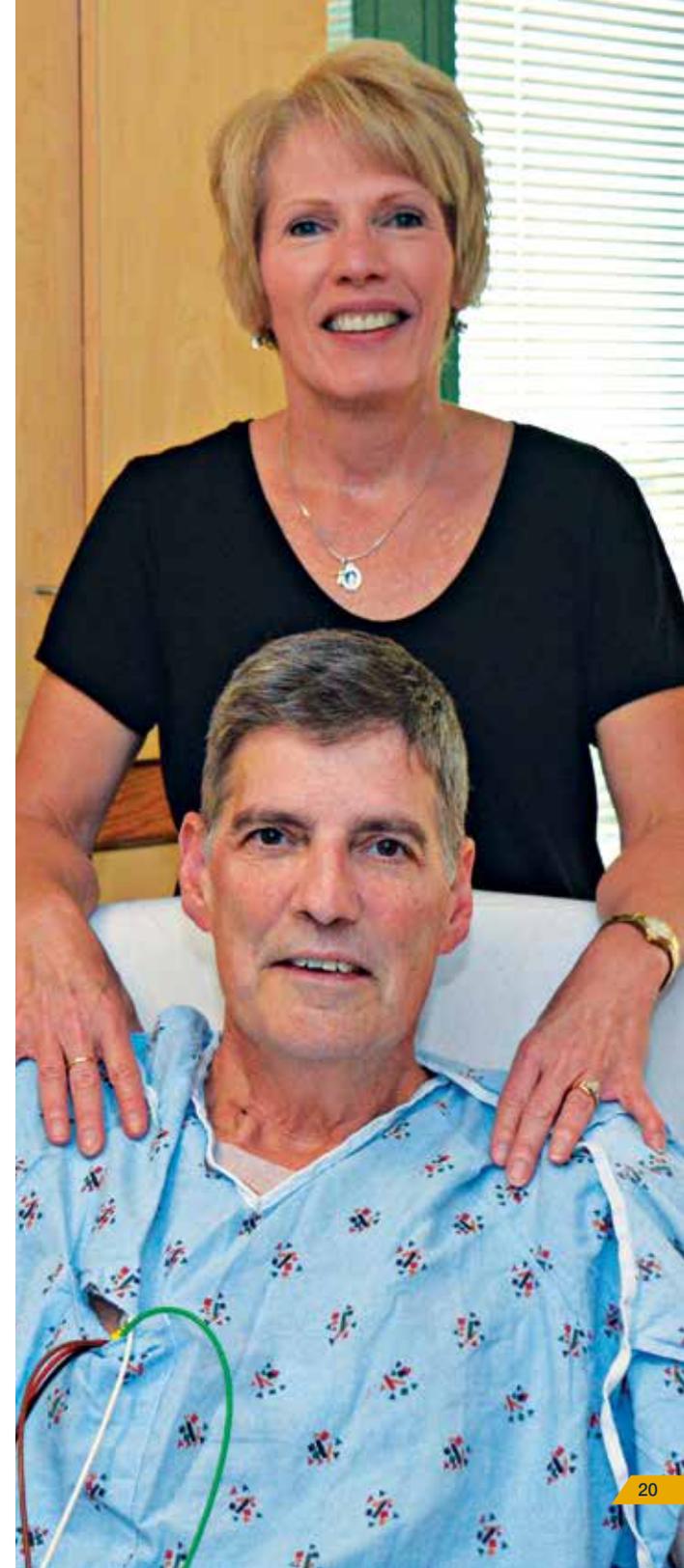
“We converted his blood type several times throughout the surgery because we depleted certain types of blood,” Wilson says. “Around 300 people provided care to Kevin during his first 72 hours, including several who weren’t on call but came in to help due to the severity of the case.”

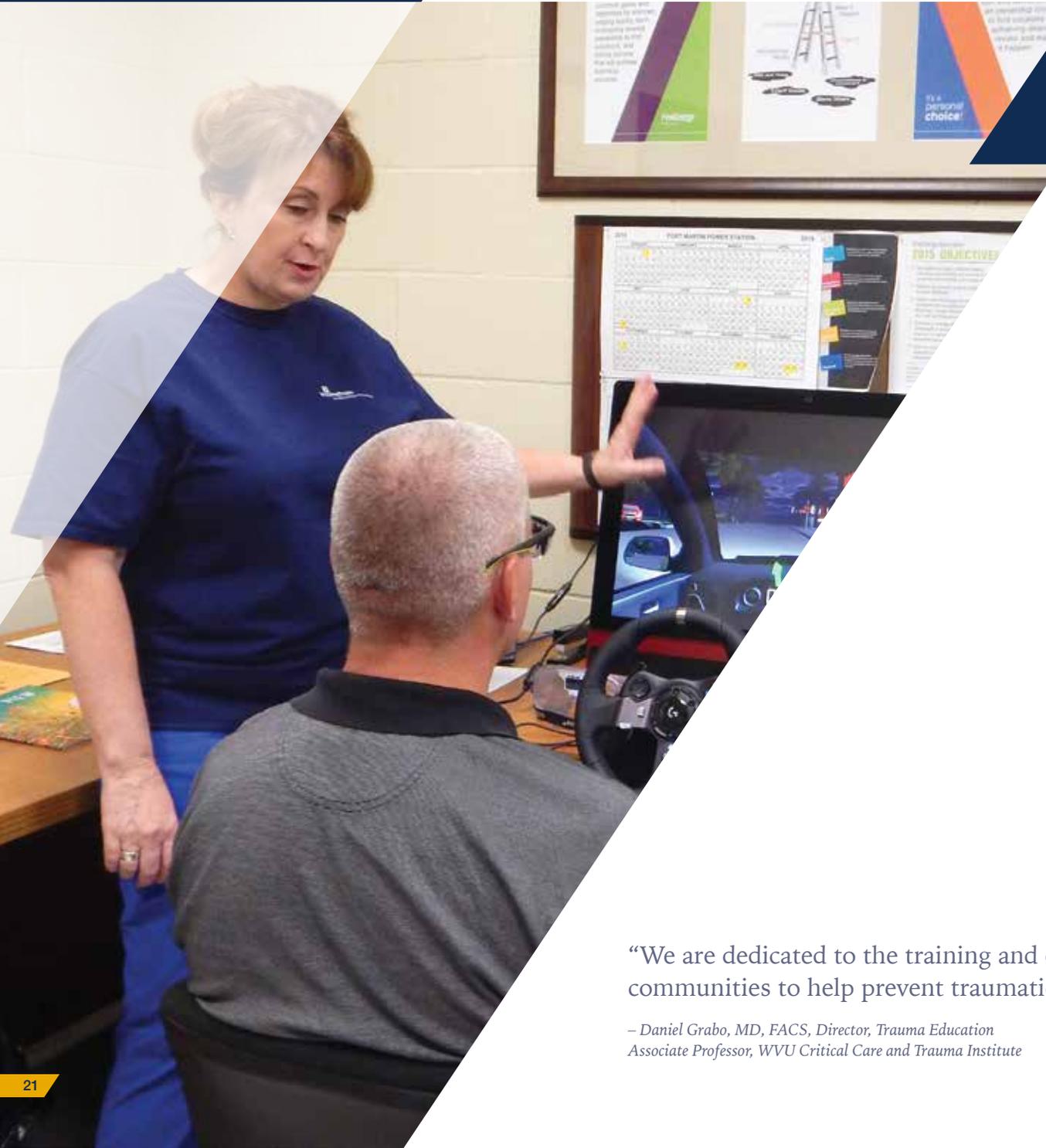
It was Friday when Eckenrode arrived at the Trauma Center. On Monday, he was off the ventilator, and on Tuesday he took his first steps with a walker and ate some ice cream. After several weeks in a rehabilitation facility, he celebrated Thanksgiving and Christmas at home with his family.



“If any one part of the team hadn’t come together like they did, Mr. Eckenrode’s outcome could have been very different.”

– Alison Wilson, MD  
Director of the WVU Critical Care and Trauma Institute





## Injury Prevention Outreach and Trauma Education

### Community Engagement

According to the Centers for Disease Control and Prevention, traumatic injury is the leading cause of death for people under the age of 44. In an average year, the Institute treats close to 4,000 lives. These include elderly patients who have taken life-threatening falls and individuals who sustained injuries from vehicular crashes, blunt force, penetrating wounds, and industrial incidents. That's a volume of 10 patients a day. And, unfortunately, the number grows each year.

“We’re on a mission to help reduce that number,” says Daniel Grabo, MD, director of trauma education for the WVU Critical Care and Trauma Institute. “We’re proud to develop and implement education programs for those who care for trauma and critically ill patients. This training goes beyond the traditional classroom and utilizes patient simulation and disaster response training.”

“We are dedicated to the training and education of our communities to help prevent traumatic injuries and deaths.”

– Daniel Grabo, MD, FACS, Director, Trauma Education  
Associate Professor, WVU Critical Care and Trauma Institute

## COMMUNITY-FOCUSED INJURY PREVENTION PROGRAMS

- **Stop the Bleed**
- **Distracted and Impaired Driving Simulation**
- **Senior Lifestyles and Injury Prevention (SLIP)**
- **Pediatric Injury Prevention Education**
- **Pedestrian Safety Initiative**

### Stop the Bleed program

Injury prevention programs can make unparalleled changes in community behaviors and have shown that an informed community can make a difference.

“The Stop the Bleed Program focuses on the major factors leading to death – hemorrhage,” says Grabo. “Working to uncover best practices for controlling hemorrhage is critical, so is training for everyone in our community on what to do in an emergency bleeding situation. Through the regional Stop the Bleed Initiative, this is best accomplished through the training of medical personnel, emergency responders, and law enforcement.”



Since becoming involved in the campaign in 2017, more than 400 community members have been trained on the Stop the Bleed initiative, and through train-the-trainer events, more than 200 new Stop the Bleed instructors are ready to train others. Institute staff members provide courses to local law enforcement, sororities and fraternities at WVU, local businesses, and other groups interested in completing the training.

### Senior Lifestyles and Injury Prevention (SLIP)

Falls are the leading cause of traumatic injury in the older population. Participating in a national injury prevention program provided by the Society of Trauma Nurses, Institute teams work to help the older adult population stay safe by recognizing fall risks in their home and community. Team members help seniors take steps to fall-proof their homes and surroundings.

### Pediatric Injury Prevention Education

Injuries are the leading cause of death and disability in children with most being preventable. The trauma center's pediatric trauma coordinator routinely provides age-appropriate injury prevention presentations at schools and children's health fairs throughout the region. ATV safety, playground safety, and bicycle/helmet safety are programs regularly requested by schools. During the 2018 WVU Medicine Children's Kids Fair, the trauma center partnered with a local law firm to provide bicycle helmets to all of the children in attendance.

### Pedestrian Safety Initiative

When two WVU students were victims of a tragic pedestrian accidents, their tragedy affected the entire region. It raised awareness of the need for a pedestrian safety initiative within the community. Collaborating with the WVU and community partners, Dr. Knight Davis serves as part of a team addressing pedestrian safety – in particular within Morgantown. “The team works to develop a plan to move forward scientifically to improve the safety of people who are walking around Morgantown,” says Knight Davis.



**The WVU Critical Care and Trauma Institute is working to keep our communities safe and injury free.**

## CARE PROVIDER EDUCATION PROGRAMS

- The Advanced Trauma Life Support® program
- Rural Trauma Team Development Course (RTTDC)
- The Fundamental Critical Care Support FCCS
- Trauma Informed Care
- Lunch and Learn
- Edu-Blast Communication

The provider education through WVU and the Institute is on pace to train more than **200** critical care providers by the end of 2019.

### **The Advanced Trauma Life Support® program**

Since the inception of the WVU Critical Care and Trauma Institute, physicians and clinicians have completed annual courses in the Advanced Trauma Life Support (ATLS) program offered through the American College of Surgeons. This additional training supports the commitment to form effective teams that systematically improve patient care.



### **Fundamental Critical Care Support**

The Fundamental Critical Care Support course, launched in 2016, is a two-day course developed by the Society of Critical Care Medicine. More than 11,000 providers participate each year. The comprehensive course covers critical care issues and a paradigm for providers to begin managing patients in the early stages of care.

The course benefits any provider who takes care of critically ill patients on a routine basis or has exposure to critically ill patients but is not the primary component of their job. The course is a pre-requisite for any resident physician who rotates through an intensive care unit and

for any adult mid-level practitioner who treats critically ill patients. “Patients can be assured that our teams across the hospital system are capable of recognizing the needs of a critically ill patient,” says Gregory Schaefer, DO, associate director of the Surgical Intensive Care Unit and education director.

“The lectures are given by experts in the field, and topics focus on aspects of revolving critical illness, shock, and acute respiratory failure; renal failure; electrolyte dysfunctions; and pharmacology of critical illnesses,” says Schaefer.

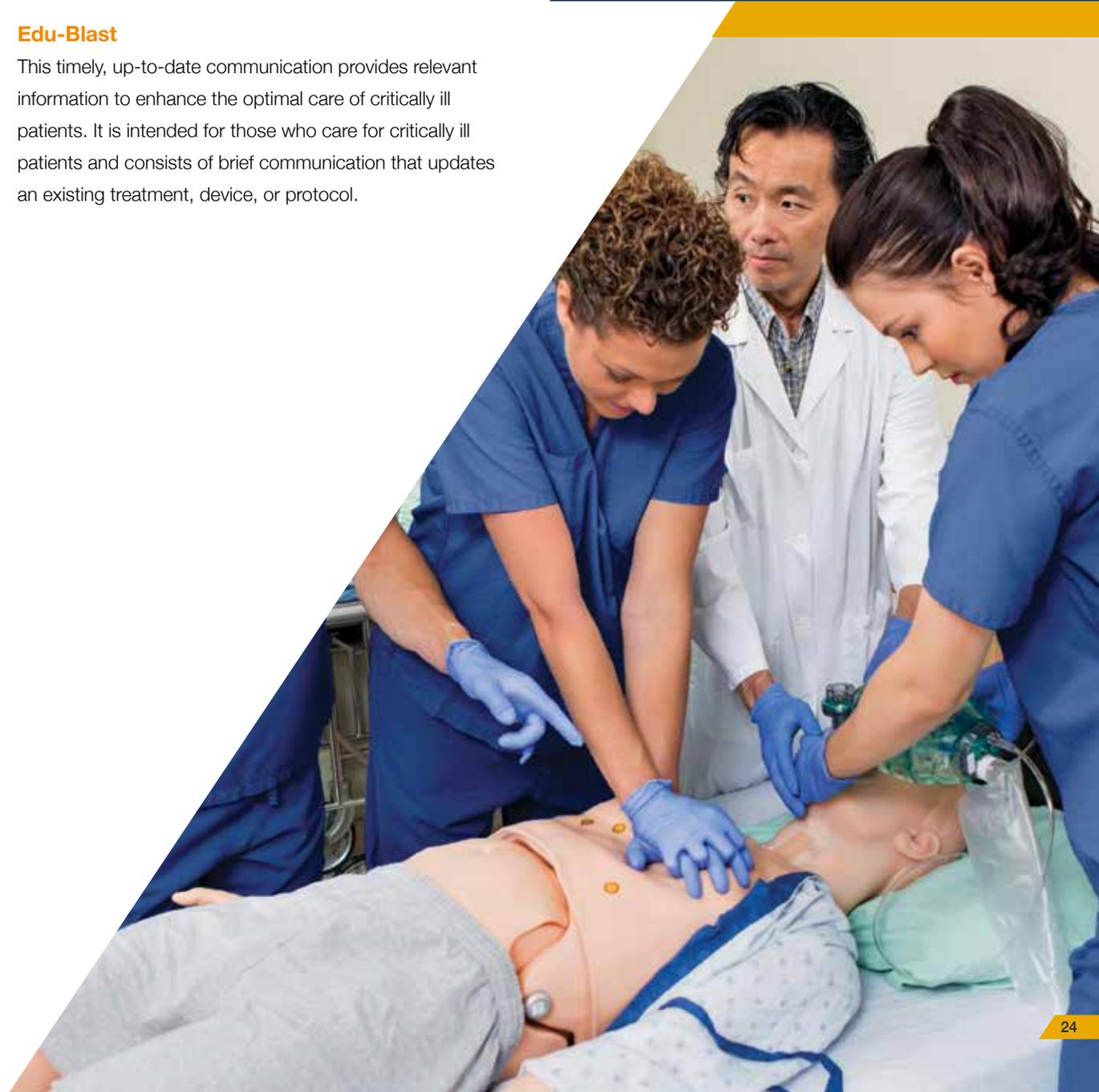
As a member of the national committee working to develop the curriculum, Schaefer and the team developing the seventh edition and will co-author the first chapter of the new textbook. As the premiere site for the delivery of critical care education across the state, WVU Medicine is the only site within the state of West Virginia offering this course with plans to launch a pediatric course in the near future.

### **Lunch and Learn**

The Institute works with sister hospitals to offer training and education to providers and referring physicians. The Lunch and Learn program offers an hour-long live stream covering pertinent topics, such as how to manage a patient with acute hemorrhage relevant to cardiac care or the evolving care of a patient with septic shock.

### **Edu-Blast**

This timely, up-to-date communication provides relevant information to enhance the optimal care of critically ill patients. It is intended for those who care for critically ill patients and consists of brief communication that updates an existing treatment, device, or protocol.



## Redefining Medicine's Future

### **Training the Next Generation of Leaders**

WVU Medicine is the clinical engine of the WVU School of Medicine and proud to be the only academic health system in the region. Nursing, medical, and health sciences students come from around the world to study under the instruction of some of the nation's greatest medical minds. Each year, the Schools of Medicine, Nursing, Pharmacy, Dentistry, and Public Health welcome more than 3,600 students and have numerous residents and fellows rotating throughout their walls each year. The more than 1,200 board-certified physicians and advanced practice nurses remain on the very forefront of medical innovation, imparting the newest information to our future healthcare leaders.

“To accomplish the goal of preventing injuries and providing the highest level of care, researchers examine and evaluate criteria used to alert and activate trauma teams.”

– Jennifer Knight Davis, MD  
Medical Director, Jon Michael Moore Trauma Center  
Associate Professor, WVU School of Medicine



## Examples of the diverse research taking place at the WVU Critical Care and Trauma Institute and West Virginia University include the following:

**Coal workers pneumoconiosis and silicosis.** *Clinical Decision Support: Pulmonary Medicine* 2nd Edition Decisions Support in Medicine, LLC. Sangani R and **Stansbury RC**. In: Heffner, Grippi. Kotloff

**Respiratory Mechanics in a Patient Requiring Neuromuscular Blockade.** *Annals of the American Thoracic Society.* **Stansbury RC**, Long J, Petsonk

**Small airways dysfunction and abnormal exercise responses – a study in coal miners.** *Annals of the American Thoracic Society.* Petsonk EL, **Stansbury RC**, Beckman-Wagner.L, Long J

**Antifibrinolytics in a rural trauma state: assessing the opportunities.** *Trauma Surgery Acute Care Open.* Bardes JM, Palmer A, Con J, **Wilson A**, Schaefer G.

**Trauma laparoscopy from 1925 to 2017: Publication history and study demographics of an evolving modality.** *Journal Trauma Acute Care Surgery.* Coleman L, Gilna G, Portenier D, Auyang E, **Khan U**, Grabo D, **Wilson A**, Szoka N

**The Effect of Sporting Events on Medical Transport Time at a Level 1 Trauma Center: a Retrospective Cohort Study.** *W V Med J.* Bonasso P, Lucke-Wold BP, Riffon M, Long D, **Wilson A**, Knight J.

**A team approach to effectively discharge trauma patients.** *J Surg Res.* Bardes JM, Khan U, Cornell N, **Wilson A**

**Derivation and Validation of a Prognostic Model to Predict 6-Month Mortality in an Intensive Care Unit Population.** Sarah Hadique, Stacey Culp, Rahul G. Sangani, Kyle D. Chapman, Saad Khan, John E. Parker, Alvin H. Moss

**Monitoring modalities and assessment of fluid status: A practice management guideline from the Eastern Association for the Surgery of Trauma.** *Journal Trauma Acute Care Surgery.* Plurad DS, Chiu W, Raja AS, Galvagno SM, **Khan U**, Kim DY, Tisherman SA, Ward J, Hamill ME, Bennett V, Williams B, Robinson B

## Research Shapes the Future of Healthcare

As the premier Level I Adult Trauma Center and a Level II Pediatric Trauma Center for WVU Medicine, the Jon Michael Moore Trauma Center in partnership with West Virginia University brings together basic scientists and surgeon-scientists who not only save lives but work to uncover new and better ways to save lives through trauma-related and critical care research.

Robust research funded by the National Institutes of Health and other prestigious national entities span from efforts to advance basic science to translational to cutting-edge surgical research to improve science impacting the health outcomes for critically injured and acute patients.

Significant areas of research focus on trauma, surgical critical care, and emergency general surgery. To accomplish the goal of preventing injuries and providing the highest level of care, researchers also examine and evaluate criteria used to alert and activate trauma teams. Through our experience, we understand the appropriate activation of teams improves patient care and outcomes.

Developing practice-management guidelines for assessing the appropriate amount of fluid and blood products to give patients who are in shock is also a key area of study.



**Learn more about WVU Critical Care  
and Trauma Institute**

For information on the WVU Critical Care and Trauma  
Institute, visit [WVUMedicine.org/trauma](http://WVUMedicine.org/trauma).

**Donor Information**

To support our programs at the WVU Critical Care and  
Trauma Institute, please contact the Office of Philanthropy  
by calling **304-293-3711** or visit [give.wvu.edu](http://give.wvu.edu).

