OHSU

TRAUMA
Center

2020 Annual Trauma Program Report

Transforming Trauma Care

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Page 1 Photo of Tram Entering Fog – Courtesy of EdComm

2020 Annual Trauma Program Report

Highlights:

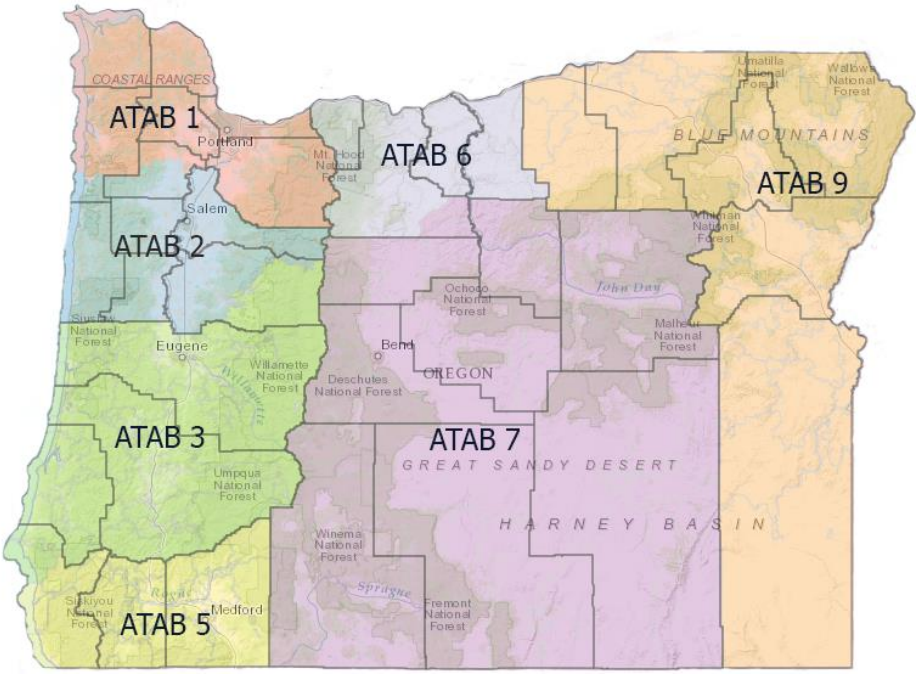
- **Patient Care:** The Trauma Service at OHSU treated 3,150 patients in 2020 a 4% increase in volume.
- **Injury:** Same level falls were the most common injury cause for all patients at 22% of the patient population
- **Age:** The volume of elderly patients rose 5.6% from 2019
- **Army Civilian (AMCT3)**: first military civilian collaboration established by the office of the surgeon general on the west coast.
- **Research and Funding:** The Trauma Laboratory had another productive year, publishing 56 research papers and receiving $2.3 million in funding for the year.
- **Trunkey Center** – seminars to connect the schools at OHSU, involved with care

ICU Rounds with Dr. Brasel – Photo courtesy of Dr. Schreiber

OHSU Trauma System Background

Oregon's statewide trauma system is based on landmark legislation. The state Legislature passed statutory authority in 1985 as ORS 431.607 – 431.633, under the leadership of the president of the Oregon Senate, John Kitzhaber, M.D., and signed into law by Governor Victor Atiyeh. With the implementation of the trauma system in May 1988, only two Oregon hospitals, OHSU and Legacy Emanuel Medical Center, were designated as Level I trauma centers. Injured individuals in the four-county metropolitan regions identified by pre-hospital rescue personnel or emergency medical technicians as meeting the criteria for severe injury are transported to one of these Level I centers. The Oregon Trauma System continues to grow and expand services to all injured Oregonians. In 2018, the first two level 1 Pediatric Trauma Centers, Doernbecher Children's Hospital and Randel Children's Hospital, joined the state-wide trauma system: both are American College of Surgeons verified Level 1 Trauma Centers.

Published research comparing inter-hospital transfer practices before and after implementation showed improvement in rapid transfer of critically injured patients to Level 1 and 2 trauma centers as well as improved outcomes.



Map retrieved from OHA Website

2020 OHSU Trauma Center Summary

- 3150 patients were treated at OHSU for traumatic injury
- 1848 patients (58.7 percent) were brought to OHSU from the scene of injury; 1302 (41.3 percent) were transferred from another hospital
- High Mechanism (21 percent) and Same Level Falls (22 percent) combined were the most common mechanism of injury for all patients, surpassing motor vehicle collisions (20 percent)
- High Mechanism and Same Level Falls were the leading cause of death (31 percent)
- Penetrating trauma was 9% of all trauma, an increase of 1% from the previous year.
- Injured patients were predominantly male (66 percent), this is unchanged from the previous year

Trauma Statistics

In 2020, the OHSU Trauma Program total patient volume increased by 125 patients, representing a 4 percent increase over the previous year.

Figure 1. Patient volume 2018 - 2020

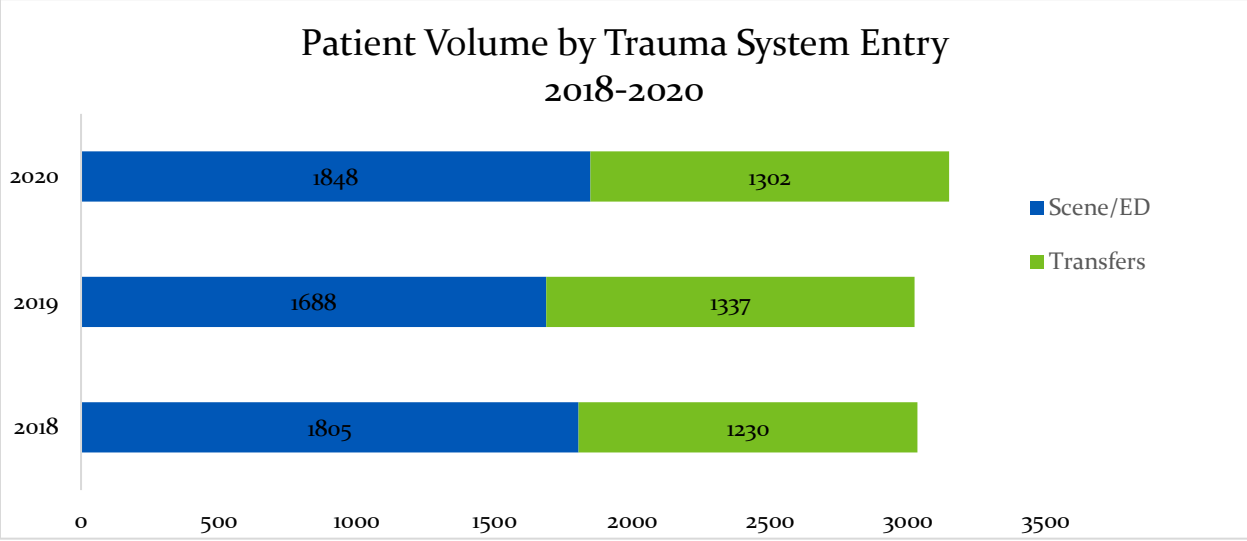


Figure 2. Gender distribution of patients treated by the OHSU Trauma Program

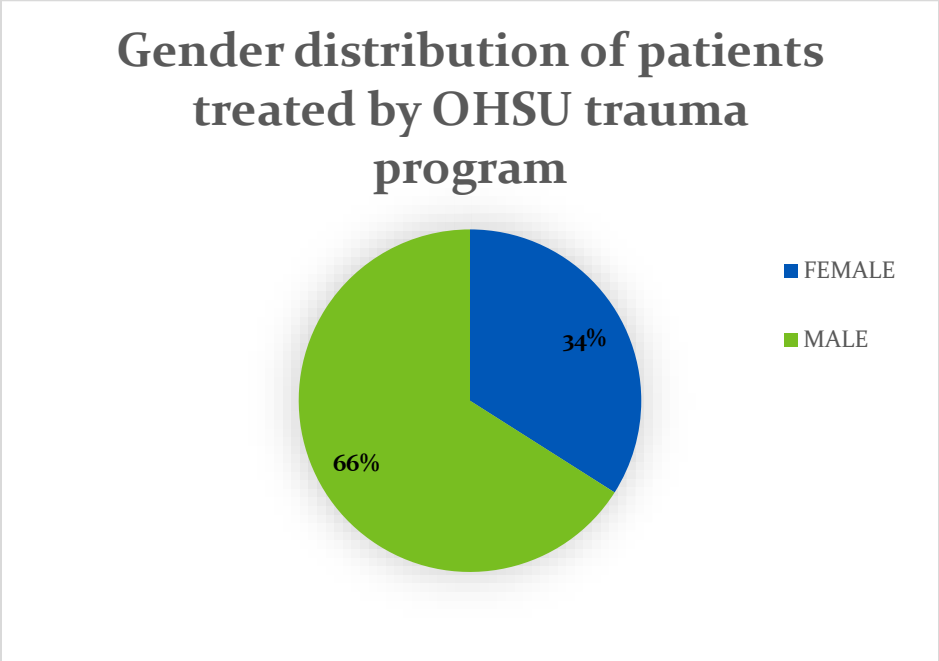
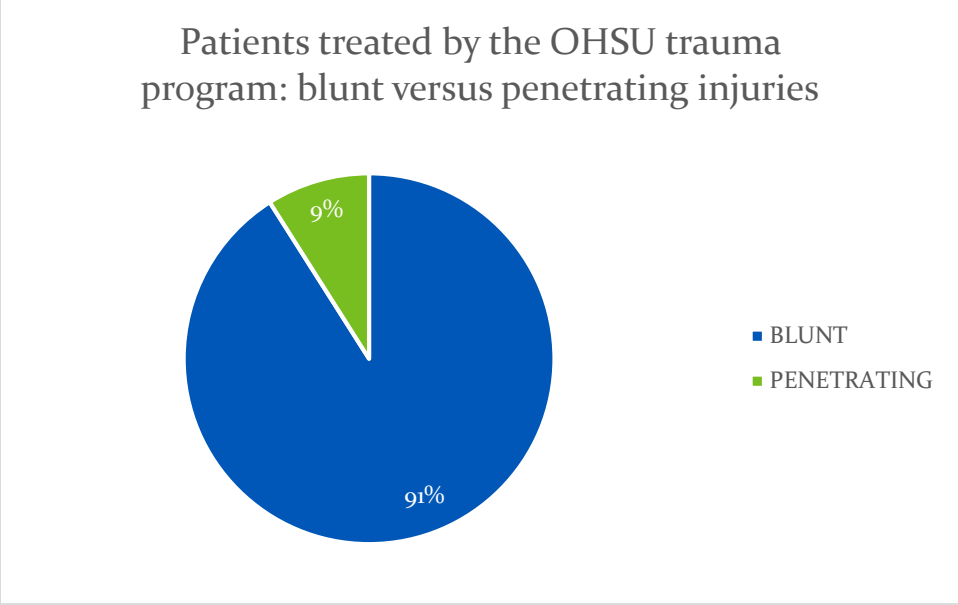
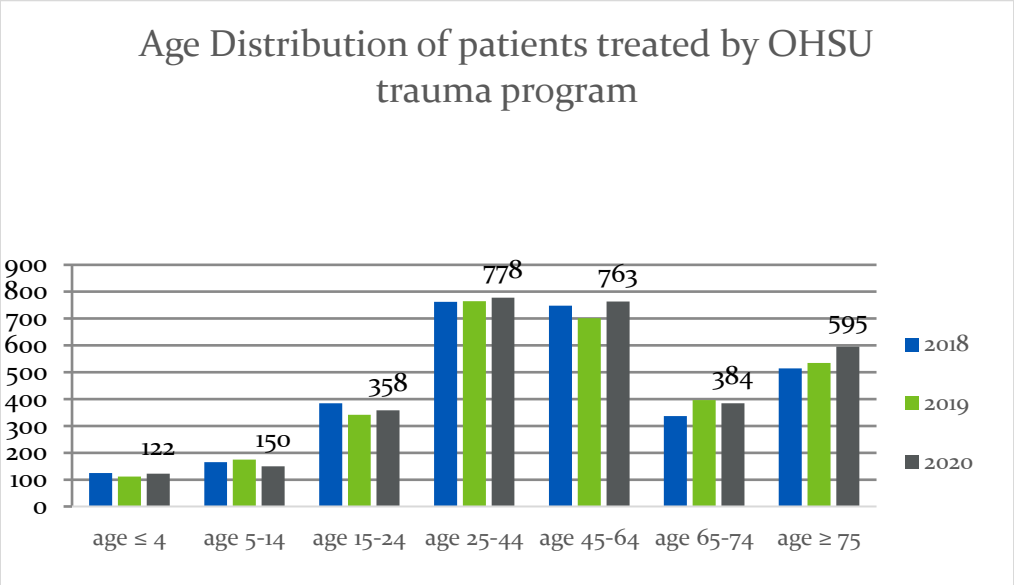


Figure 3. Patients treated by the OHSU Trauma Program: blunt versus penetrating injuries



OHSU has seen a one percent increase in penetrating trauma compared to previous year.

Figure 4. Age distribution of patients treated by the OHSU Trauma Program



The majority of patients treated were between the ages of 25-64 (48.9 percent), an increase of 5 percent from the previous year followed by patients age greater than 75 (18.9 percent) an increase of 9.2 percent.

Figure 5. Incidence by age of patients treated by the OHSU Trauma Program

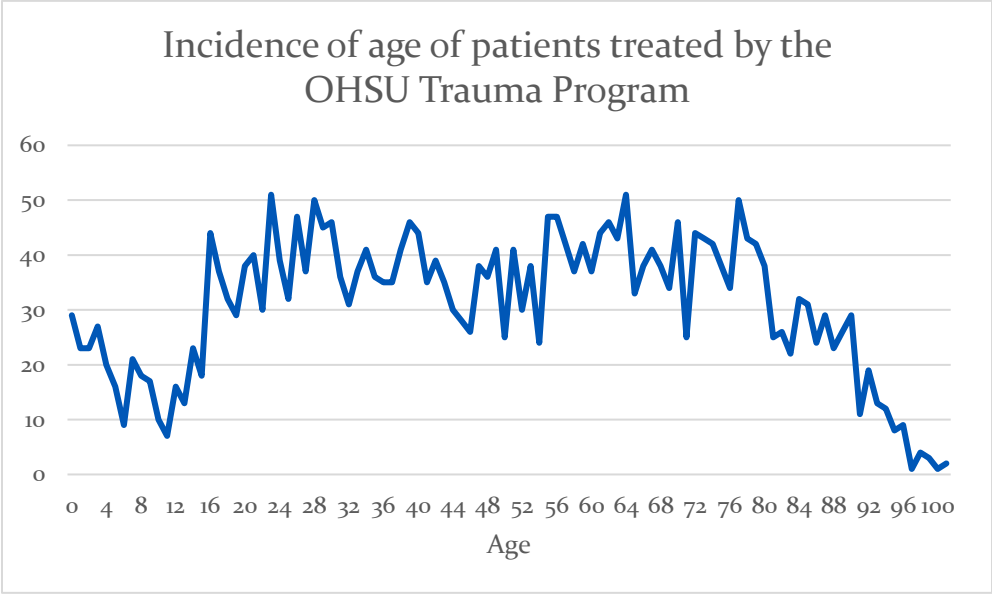
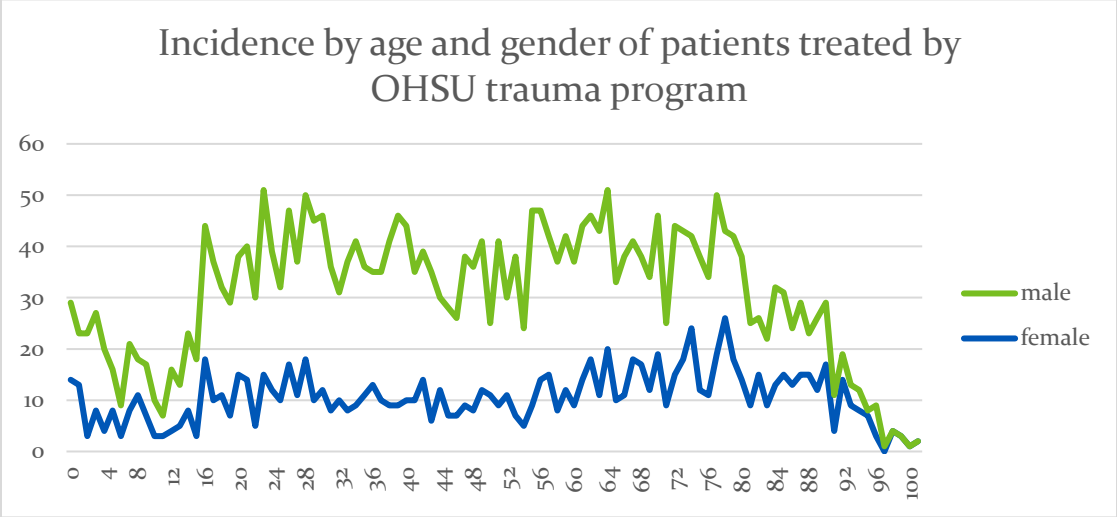


Figure 6. Incidence by age and gender of patients treated by the OHSU Trauma Program



The Auditorium in Springtime - Photo courtesy of EdComm

Month, day and time

Figure 7. Distribution of patients by month

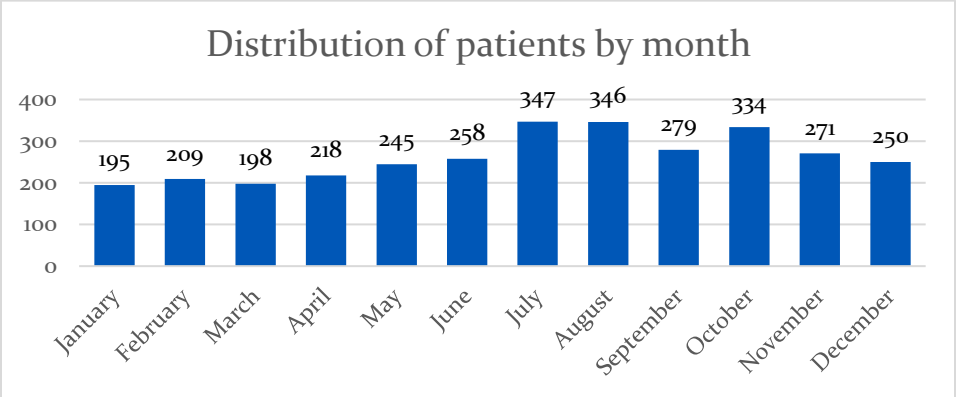


Figure 8. Distribution of patients by day of week

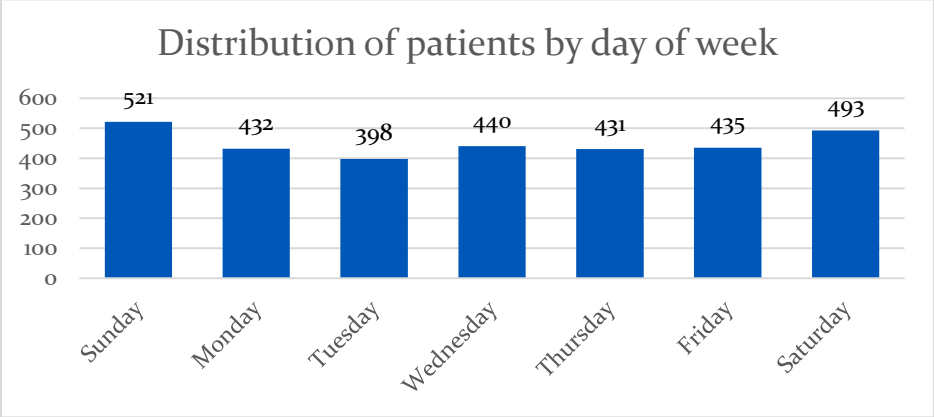
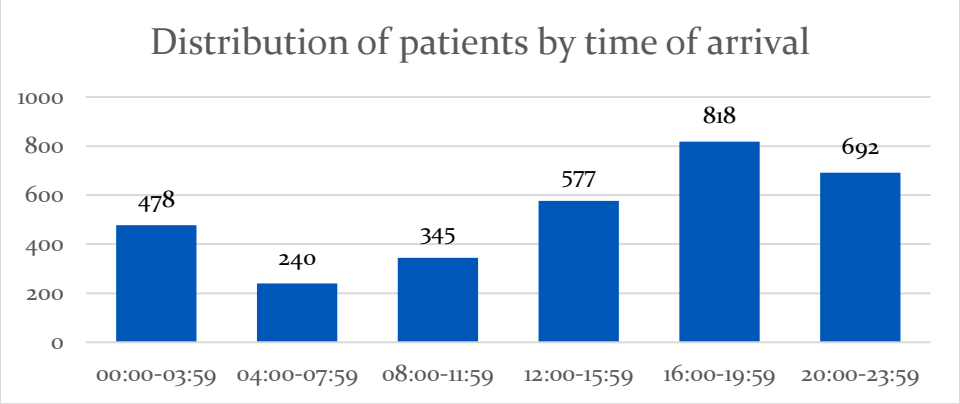


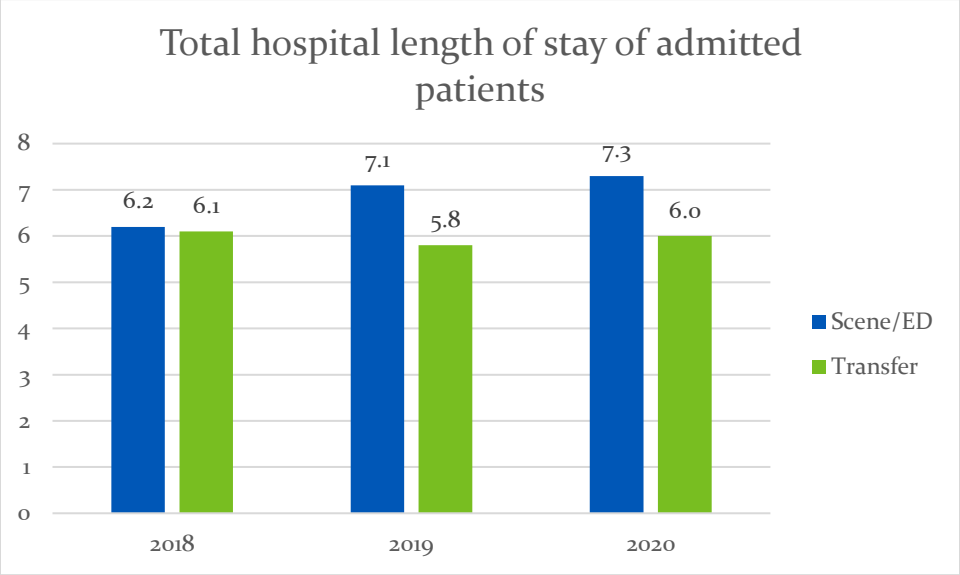
Figure 9. Distribution of patients by time of arrival



July and August were the busiest months for trauma, followed by October. Weekends and evenings remain the busiest times for trauma patients presenting to OHSU.

Length of stay

Figure 10. Total hospital length of stay of admitted patients



OHSU has seen a slight increase in total length of stay for all patients admitted. Notably, scene/ED admit patients continue to have a longer length of stay than patients transferred to OHSU for higher level of care.

Helicopter taking off from the roof of OHSU – Photo Courtesy of EdComm

Trauma Team Response

In 2018, the OHSU Trauma Program changed to a two-tiered system to evaluate injured patients. We continue monitor over and under triage levels of all cases using the Cribari matrix. The level of activation is based on information provided by pre-hospital personnel and indicates the staff response to the trauma bay (Tables I and II). In the Portland metropolitan area, paramedics evaluate patients at the scene of injury and enter them into the trauma system if they meet established triage criteria for serious injury. Our analyses indicate patients can be safely and efficiently treated with a limited team response, saving full trauma team activations for those truly critically injured patients.

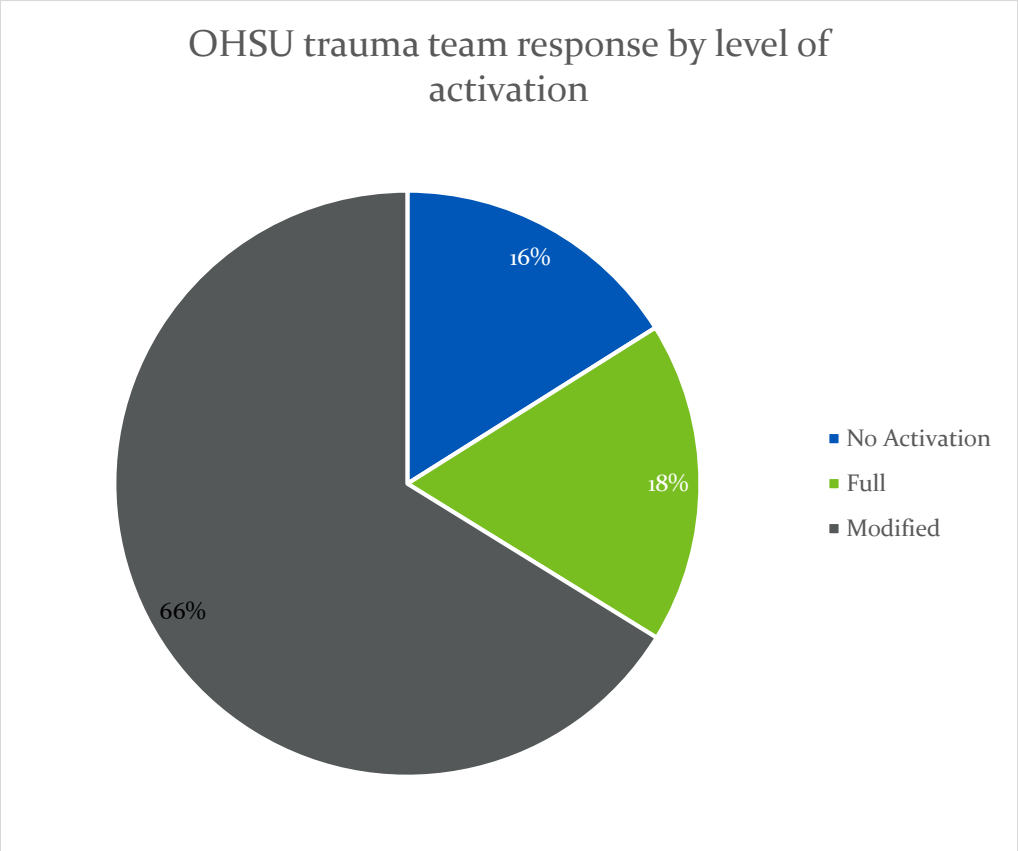
Table I. OHSU trauma team configuration based on triage criteria

Full	Modified
Staff trauma surgeon	
Staff anesthesiologist	
Staff ED physician	Staff ED physician
Trauma chief resident	Trauma chief resident
Emergency medicine resident	Emergency medicine resident
Respiratory care practitioner	Respiratory care practitioner
Primary trauma nurse	Primary trauma nurse
Trauma recording nurse	
Procedure nurse	Procedure nurse
Transportation aide	

ED = Emergency department

Trauma Team ready to receive a patient in the resuscitation room – Photo courtesy of Dr. Schreiber

Figure 11. OHSU trauma team response by level of activation

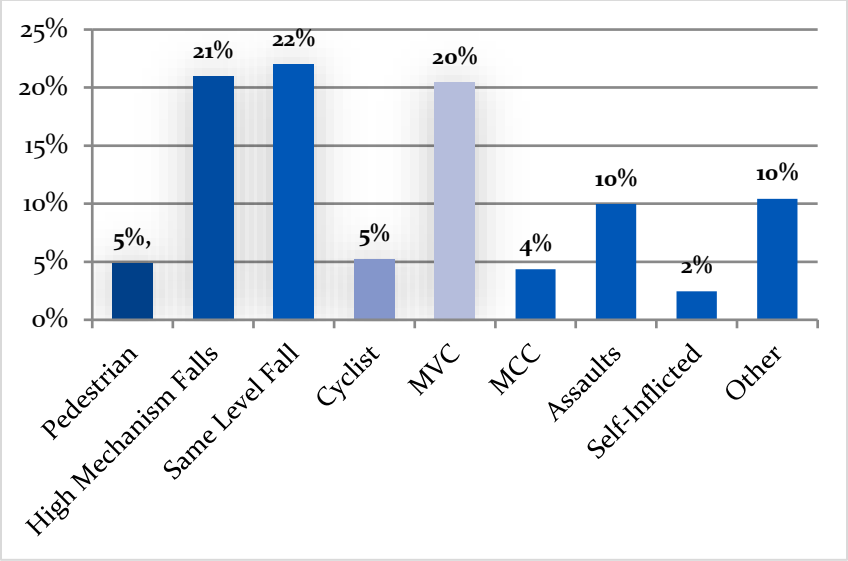


Non-activated trauma patients meet registry inclusion criteria based on the Oregon Health Authority definition and do not require immediate care or resuscitation.

Mechanism of injury

In 2020, falls were the leading cause of injury, surpassing motor vehicle collisions as the most common cause of injury. Motor vehicle collisions remain the most common mechanism of injury for the younger adults and falls are the leading cause of injury for patients age 65 and older.

Figure 12. Causes of injury for patients seen by the OHSU Trauma Program



Same level falls were the leading cause of injury in 2020, followed by other falls and MVC. High Mechanism falls include falls from height, ladder falls, falls from an animal, and other.

Figure 13: Incidents by injury type and age group

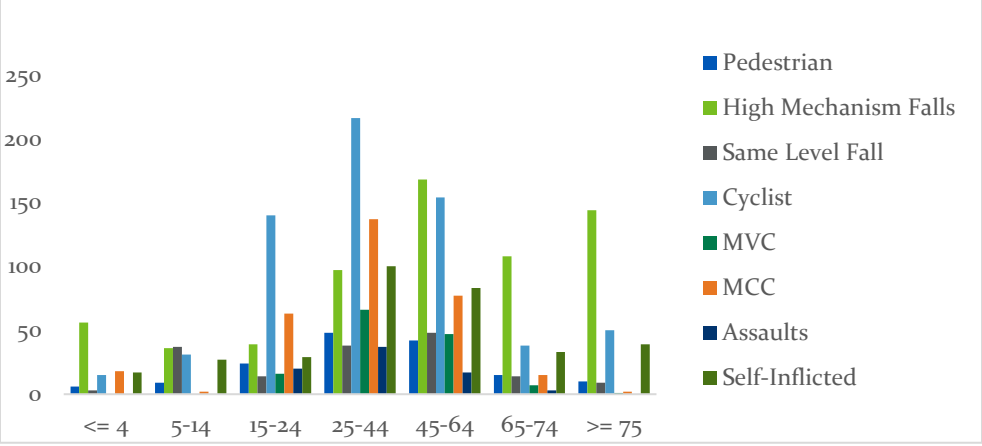
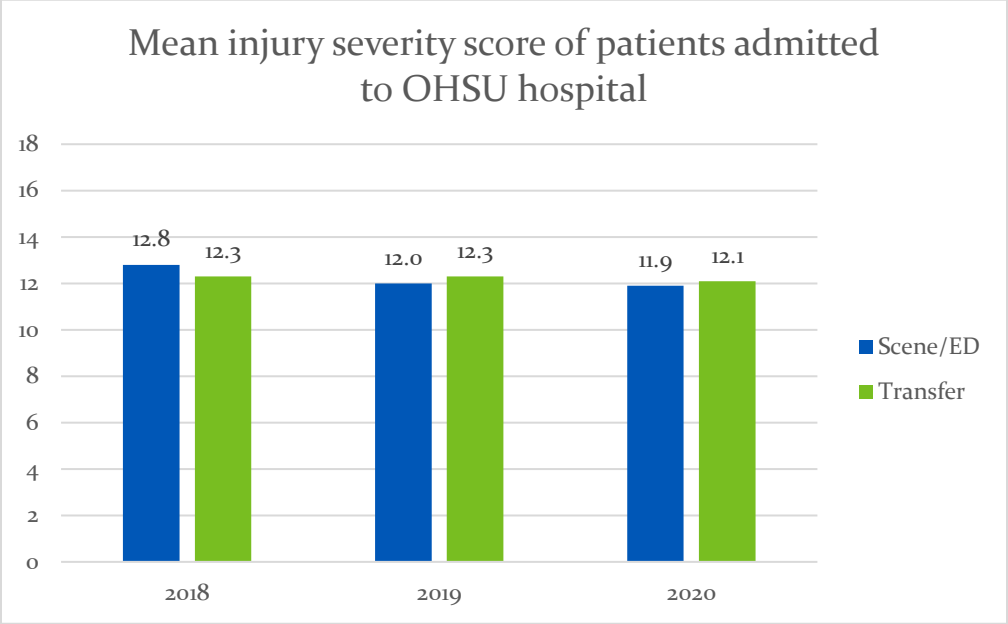


Figure 14 Mean injury severity score of patients admitted to OHSU Hospital

On average, patients transferred from other hospitals were slightly more injured than those admitted from the scene, representing a change from last year. However, patients were less injured overall than in previous years.

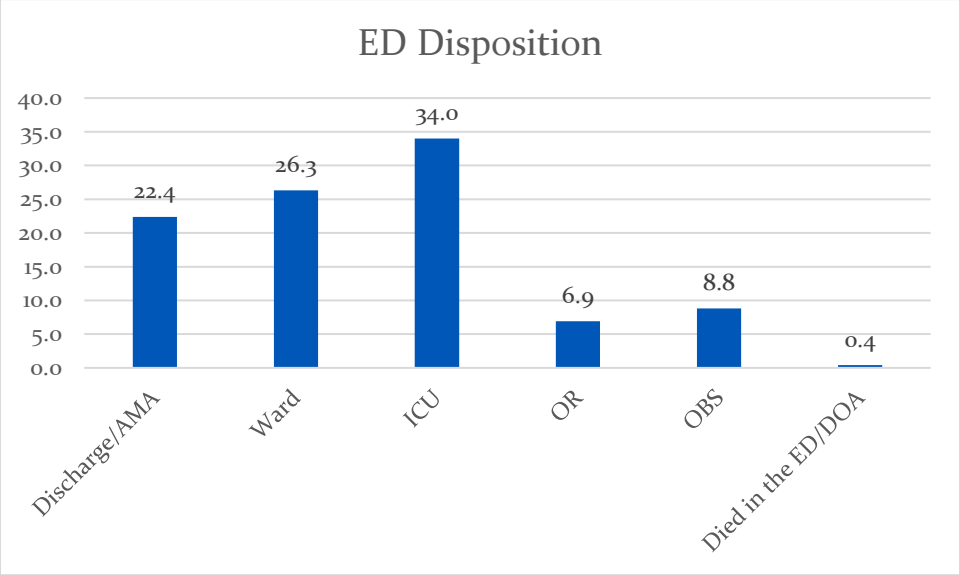


Spring blossoms outside Mackenzie Hall – Photo Courtesy of EdComm

Hospital admissions via OHSU Trauma Program

In 2020, the OHSU Trauma Program admitted 2222 patients (71 percent) to OHSU (Figure 15). Elderly patients were more likely to require hospital admission. Over 61 percent of patients were able to return home after admission (Figure 17).

Figure 15. ED Disposition



The majority of patients required admission to the Intensive Care Unit (ICU) (34 percent), with over 22 percent of patients leaving from the ED.

Figure 16. Patients requiring hospitalization after trauma team resuscitation

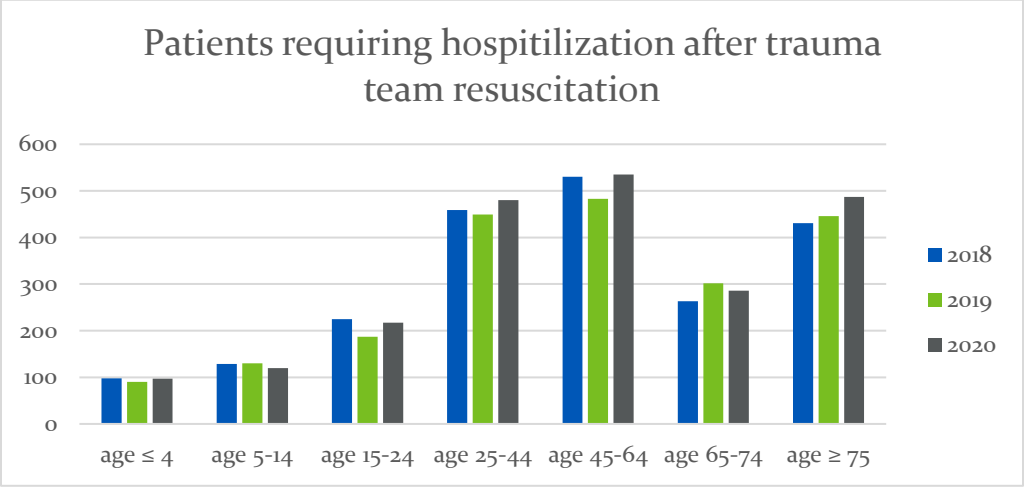
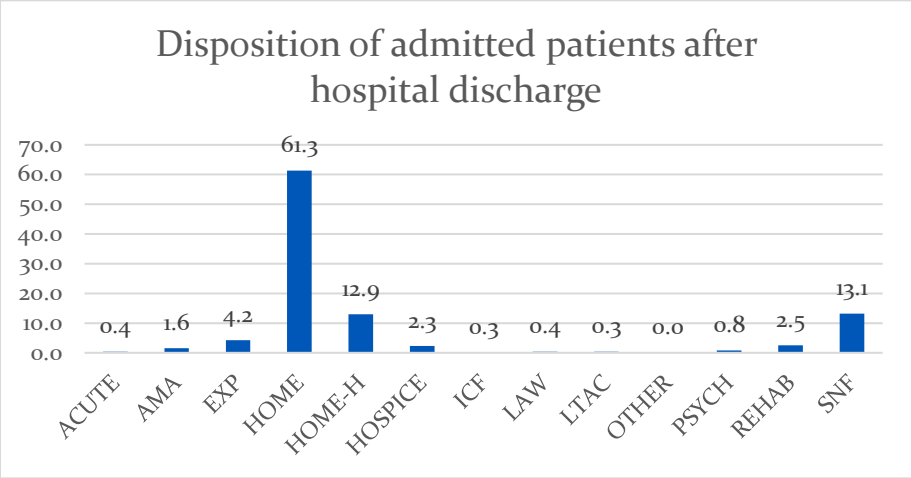


Figure 17. Disposition of admitted patients after hospital discharge



The majority of trauma patients (61 percent) discharge home following their hospitalization, with a skilled nursing facility and home with home health support being the other most common discharge dispositions.

Mortality

In 2020, 111 patients (3.5 percent) died: three patients died on arrival to OHSU, 13 died in the ED, and 21 in the OR.

Figure 18. Total deaths by arrival status

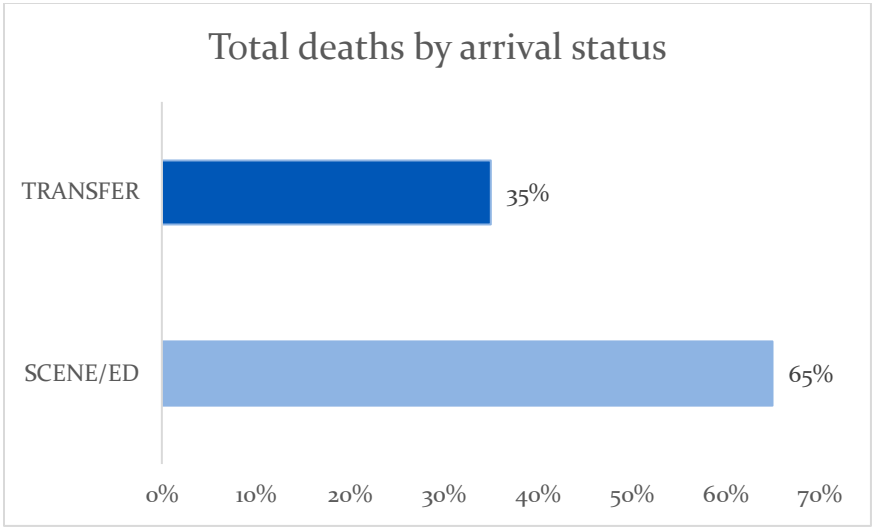


Figure 19. ED Disposition for Deaths in 2020

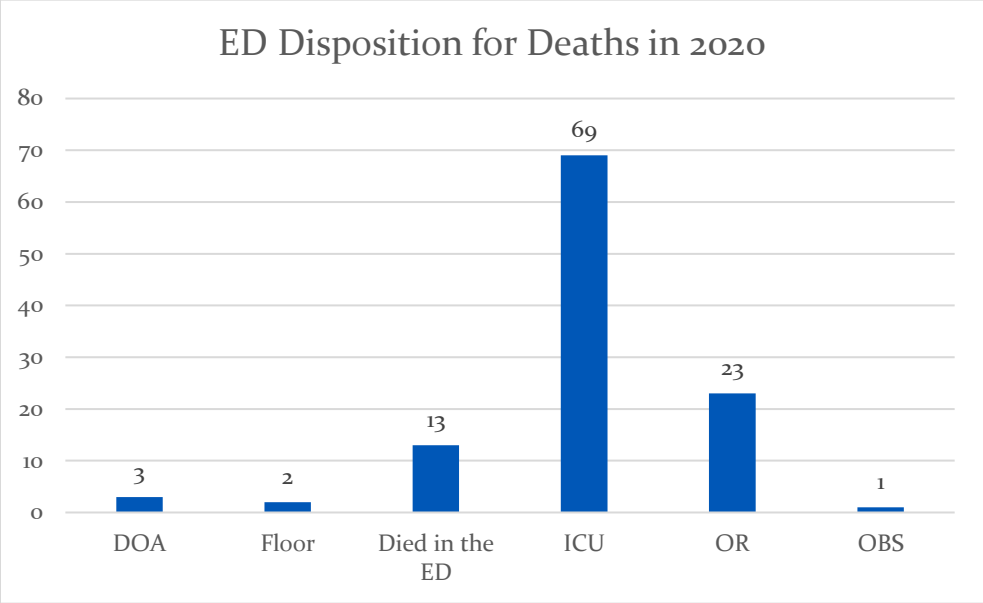
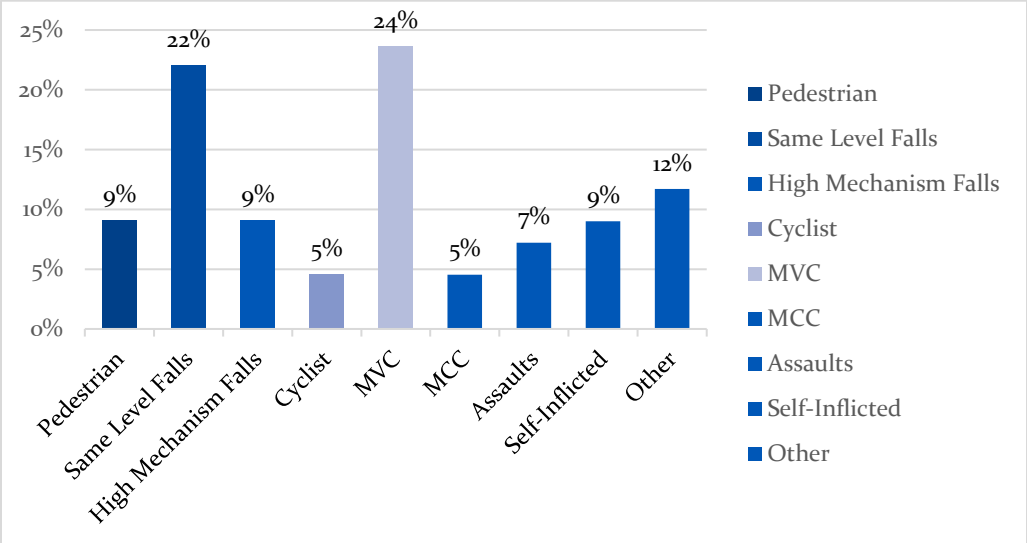


Figure 20. Cause of death

Falls (same level and high mechanism) are the leading cause of death, accounting for thirty-one percent of all deaths in 2020.



Care for patients age 65 and older

In 2020, the OHSU Trauma Team treated 963 patients age 65 and older, a 9 percent increase. Of these, 472 (49 percent) were transferred to OHSU from another hospital or clinic. Most of the patients were injured in falls. Of the 963 injured patients, 763 (79.2 percent) required hospital admission.

Figure 21. Patient volume, age 65 and older

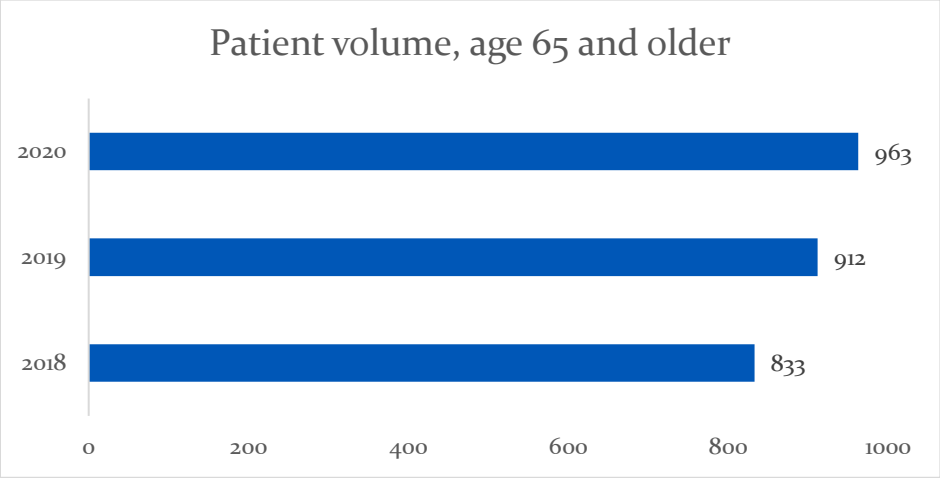
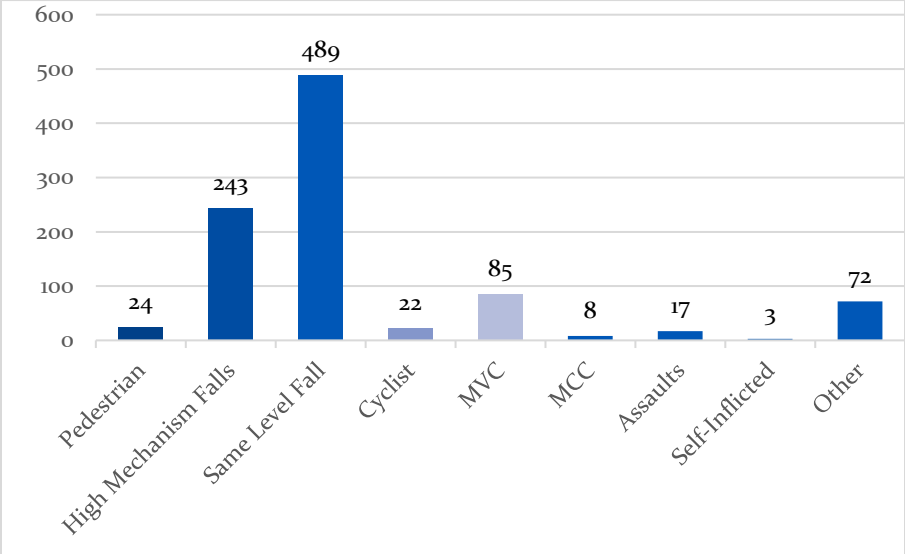


Figure 22. Mechanism of injury, patients 65 and older



Falls represent the leading cause of injury for patients age 65 and older (76 percent). Same level falls is the leading mechanism of injury at 51 percent, followed by High Mechanism Falls (falls from height, ladder falls, and other) representing 25 %.

Dr. Donald D. Trunkey Center for Civilian and Combat Casualty Care

Launched in April 2020 in honor of the late emeritus OHSU chair of surgery Dr. Donald D. Trunkey, the **Donald D. Trunkey Center for Civilian and Combat Casualty Care** is on a mission to synergize and advance trauma research, innovation, and patient care across OHSU and the Pacific Northwest. To date, the Center, led by Martin Schreiber, M.D., has created a research consortium that spans across 18 different departments and 3 schools at OHSU, regional research hubs like the Veterans Administration and Pacific Northwest National Laboratory, and numerous industry partners.

The **Trunkey Center Seminar Series** has served as a centerpiece of activity and helped catalyze the Center's growth. Each month the Seminar Series brings together around 100 researchers working across trauma-related disciplines, highlights cutting edge research in the field, and serves as a focal point for new collaborations. Speakers include basic scientists, clinicians, engineers, epidemiologists, and public health experts, many of whom were brought together for the first time by the Trunkey Center. The series has a central role to play as the Center continues to grow and amplify research in trauma by fostering interdisciplinary collaboration, increasing research funding, and accelerating bench to bedside discoveries.

Join the Trunkey Center mailing list to receive news updates and invitations to the Trunkey Center monthly seminar series.

Photo courtesy of the Donald D. Trunkey Center

Army Military Civilian Trauma Training Team (AMCT^3)

In 2016, the National Academy of Science, Engineering and Medicine produced a report titled "A National Trauma Care System: Integrating Military and civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury". A critical part of this national movement is the integration of active duty personnel in busy civilian trauma centers with the goal of maintaining combat readiness especially during times of low operational tempo. The majority of healthcare delivered in military medical treatment facilities is related to maintenance of health in relatively healthy warfighters and delivery of care to beneficiaries. Few facilities have active trauma programs. Therefore, during periods of low operational tempo, it is necessary for active military health providers to work in civilian trauma centers. The program is titled Army Military Civilian Trauma Training Team or AMCT^3.

Five active duty Army personnel arrived at OHSU in September of 2018. This group included a general surgeon, an emergency medicine physician, a CRNA, an ICU nurse, and an ED nurse. These individuals integrated into their work areas caring for patients, side by side with OHSU employees. The program was initiated out of the Office of the Surgeon General of the Army and two programs, one on each coast were chosen to start. The other program is housed at Cooper University Hospital in New Jersey. Since that time, the OHSU program has added an OR nurse and a cardiothoracic surgeon. OHSU was chosen due its rich history of collaboration with the military and the strong presence of military career personnel. The first cohort of AMCT3 soldiers completed their rotation in June 2021 and a permanent party Forward Resuscitation Surgical Detachment has been assigned to OHSU with a start date in 2022.

Legislation to fund civilian trauma centers that house these programs, known as Mission Zero has been signed into law and is currently awaiting appropriation. The Office of the Surgeon General has now increased the footprint of the program and has AMCT3 centers in North Carolina, Tennessee, Illinois, Washington, and Wisconsin. The future plan involves developing programs to house each of the Army's 49 Forward Resuscitation Surgical Detachments.

Photo courtesy of Dr. Schreiber

Surgical Critical Care Fellowship

The Surgical Critical Care fellowship was founded over 20 years ago and remains the only fellowship committed to training trauma surgeons in Oregon. Since its inception, the fellowship has grown to accept four fellows each year. Fellows are selected during a competitive application cycle. OHSU received 157 candidate applications in 2020, accepting 4 fellows for the 2020-2021 academic year.

The fellowship is composed of a one-year training program housed at the only University-based quaternary medical center in Oregon. Fellowship rotations are designed to provide exposure to a broad range of critically injured and critically ill patients.

Fellows spend six months rotating on the Trauma Surgical Intensive Care Unit (TSICU) where they work with teams of Advanced Practice Providers, residents and attending trauma surgeons. Fellows also work closely with a multi-professional team of nurses, respiratory therapists, pharmacists, therapists, chaplains, and social workers. Fellows are responsible for leading continuity and management of critically ill patients in the TSICU. These patients include trauma patients as well as surgical services such as emergency general surgery, oncology, hepatobiliary, minimally invasive, colorectal, transplant, OB/GYN, and bariatric surgery. In addition to their clinical duties, they have well as medical student and resident education.

Fellows complete a 6-week rotation in the Portland VA Medical Center Surgical ICU. Fellows lead the management of critically ill cardiothoracic and surgical patients at PVAMC. During their remaining time, fellows have the opportunity to select electives in critical care units including pediatrics, medicine, cardiothoracic surgery, burns, and neurosurgery. Additional opportunities are available in radiology and echocardiography and more.

Administrative responsibilities include formulating and implementing new ICU policies and guidelines, choosing up-to-date and relevant articles for the weekly trauma breakfast journal club, participating in the ICU quality committee, leading ICU curriculum lectures to the residents, and presenting grand rounds during the fellowship.

2021 Surgical Critical Care Fellows and Dr. Laszlo Kiraly. Photo courtesy of Dr. Kiraly

Trauma Outreach Education

The OHSU Trauma Center continued their Trauma Outreach Education Initiatives in 2020. In response to the COVID -19 pandemic, in-person education sessions transitioned to a virtual format when possible. The transition to a virtual format resulted in increased participation in the annual Northwest States Trauma and the Fall Trauma Nursing Conferences.

Conferences

13th Annual Fall Trauma Nursing Conference

- 466 participants
- Participants from 13 states, 2 provinces, and 1 Melbourne, Australia
- The transition to a virtual format provided an opportunity to record presentations for archived review by participants

31st Northwest States Trauma Conference

- Changed to a virtual session
- 505 participants, including: 79 physicians, 24 advanced practice providers, 353 registered nurses, 29 EMT/EMT-P, 2 allied health, and 8 undefined registrations
- Participants from 17 states and 1 province
- The transition to a virtual format provided an opportunity to record presentations for archived review by participants

Weekly Trauma Conference

The Trauma and Acute Care Surgery Service continued to host weekly Trauma Conference. Chief residents present trauma and emergency general surgery EGS) cases to a multi-disciplinary participant group.

Trauma Education Courses

Advanced Trauma Life Support® (ATLS®)

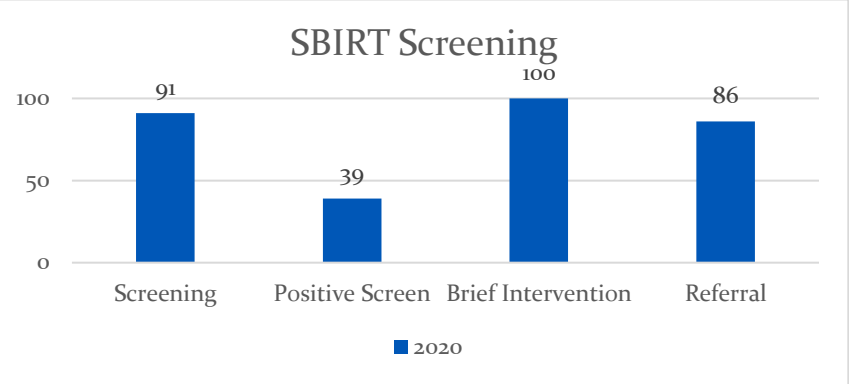
- 5 Hybrid ATLS courses were hosted
- 56 participants completed the training
- Supported one ATLS course at St. Charles Hospital in Bend, OR

Rural Trauma Team Development Course (RTTDC)

- RTTDC courses were paused during 2020 due to restrictions of group gathering and the inability to physically distance during the simulation component of the course.

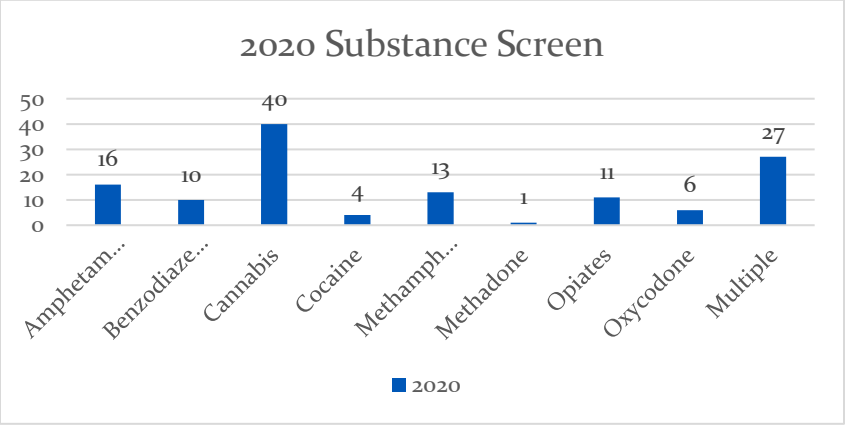
Injury Prevention

Figure 23. Screening, Brief Intervention and Referral to Treatment



- SBIRT screening provides early identification and treatment for those with substance use disorders and for those who are at risk for developing those disorders.
- A serum ethanol level is drawn on all patients age 12 and over who have a trauma activation.
    - 23.9% of patients tested had a positive serum ethanol level
- Each patient is asked two brief screening questions: one alcohol question and one drug question.
    - Patients with a serum ethanol level greater than zero receive further social work (SW) screening and intervention.
    - 16 percent of all patients had screening for substances
        - 35 percent of patients screened had none detected
- Patients discharged before SW intervention and referral receive a letter with drug and alcohol education and resources mailed to their home address.

Figure 24. Substance Screen Results



ThinkFirst Activity Report

- Reached 50,210 individuals with injury prevention programs, community events, and injury prevention materials
- Distributed 3,000 bike helmets to community members
- Distributed 1,000 safety lights, and retroreflective items to community members
- Provided injury Prevention materials and curriculum to 112 Educators
- Targeted 127 school with injury prevention programs
- Participated in 39 meetings with community partners related to injury prevention

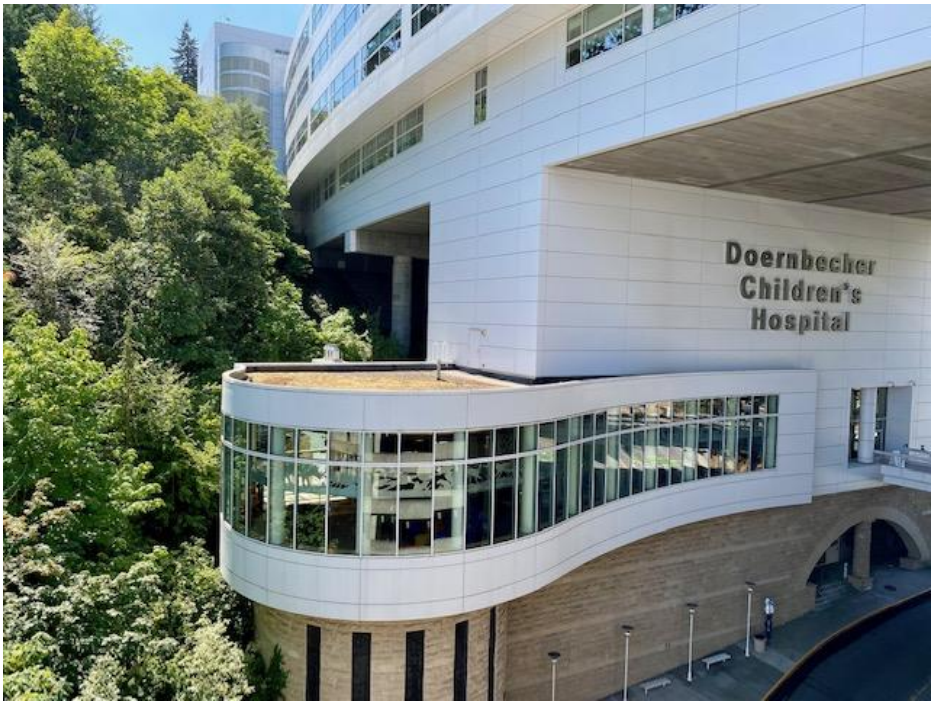
Matter of Balance

OHSU ThinkFirst offers the Matter of Balance Coach Training courses. During these courses, coaches are trained to run the Matter of Balance program at their local facility. Matter of Balance is a nationally recognized course designed to reduce the fear of falling and increase activity levels among older adults. OHSU also offers a two-hour fall prevention seminar for those unable to commit to an eight-week course.

Table II. Fall Prevention Activities

Activity	# Participants
Fall prevention seminar participants	67
Matter of Balance course participants	109
Matter of Balance Courses held at facilities	5

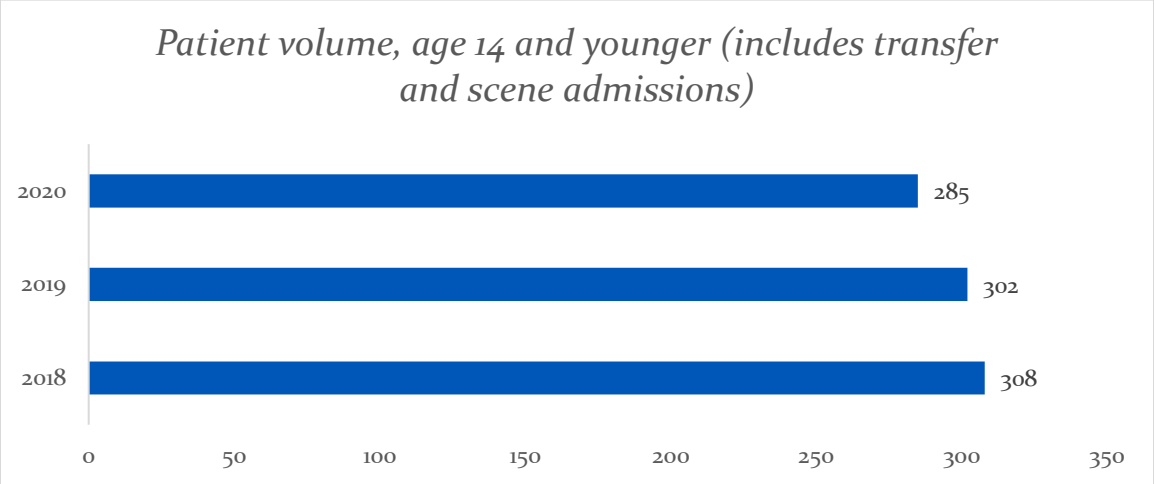
Portland Aerial Tram at Sunrise – Photo Courtesy of EdComm



OHSU Doernbecher Children's Hospital – Photo courtesy of Lori Moss

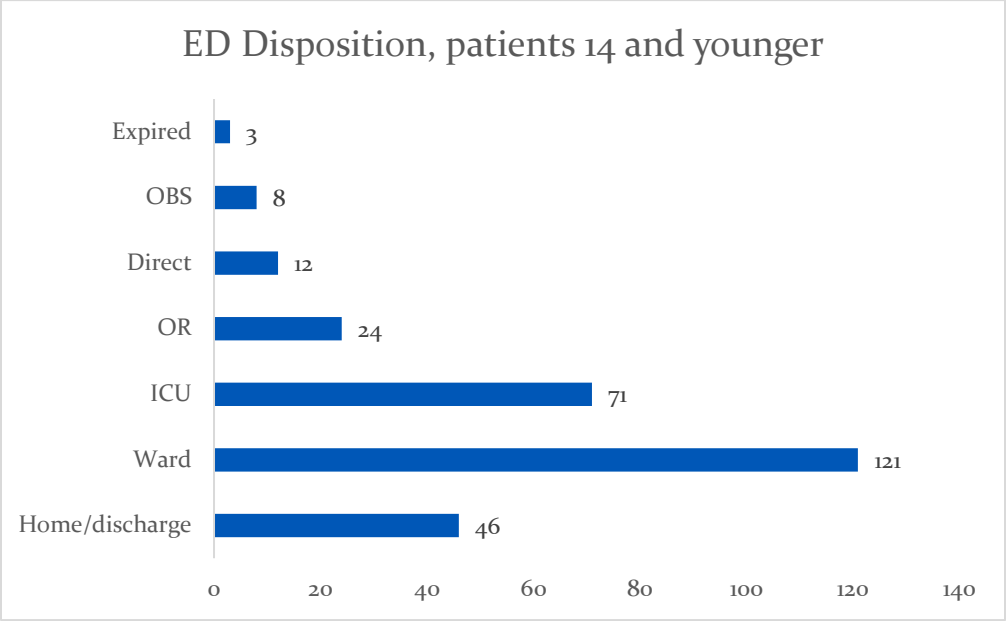
Care for patients 14 and younger

Figure 25. Patient volume, age 14 and younger (includes transfer and scene admissions)



In 2020, the OHSU trauma team evaluated 285 patients aged 14 and younger. Of these, 178 (62 percent) were transferred to OHSU from hospitals around the Pacific Northwest. Of the total pediatric trauma volume, 229 (80 percent) were admitted to Doernbecher Children's Hospital: 75 (33 percent) to the ICU, 129 (56 percent) to the ward, and 24 (10 percent) to the OR, 8 children (3 percent) died as a result of their injuries.

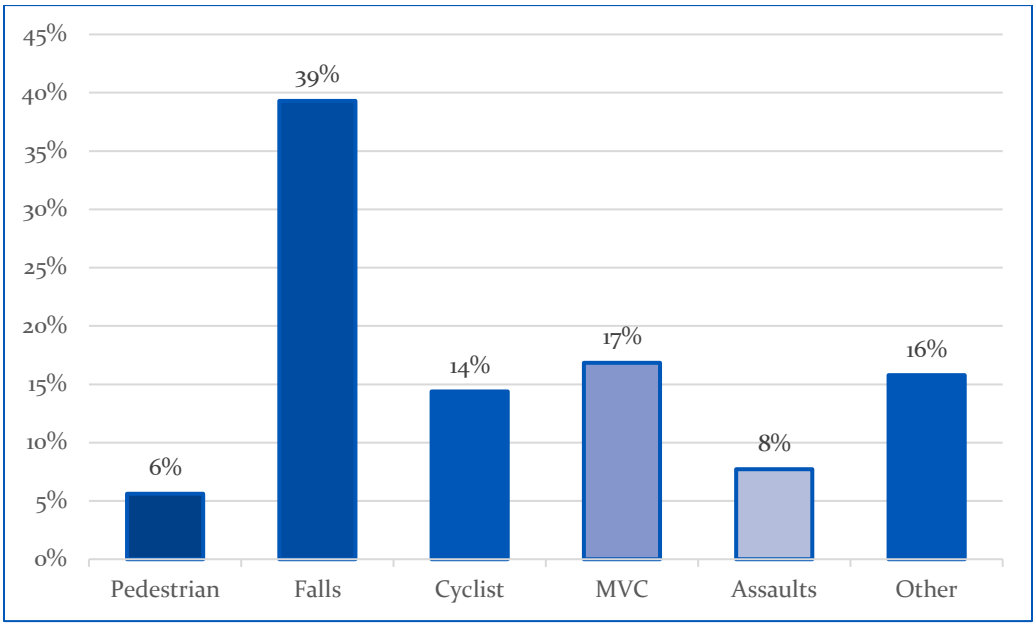
Figure 26. ED Disposition, patients 14 and younger



273 (96 percent) patients entered the OHSU Doernbecher trauma system though the Emergency Depart: 54 (20 percent) discharged home, 216 (95 percent) were admitted to inpatient units, and 3 (1 percent) expired in the emergency department.

Photo courtesy of Lori Moss

Figure 27. Mechanism of injury, patients 14 and younger



The “other occurrences” category includes patients with sports-related injuries, those struck by a falling object, and those with injuries accidentally inflicted by others.

Figure 28. Types of Falls, patients 14 and younger

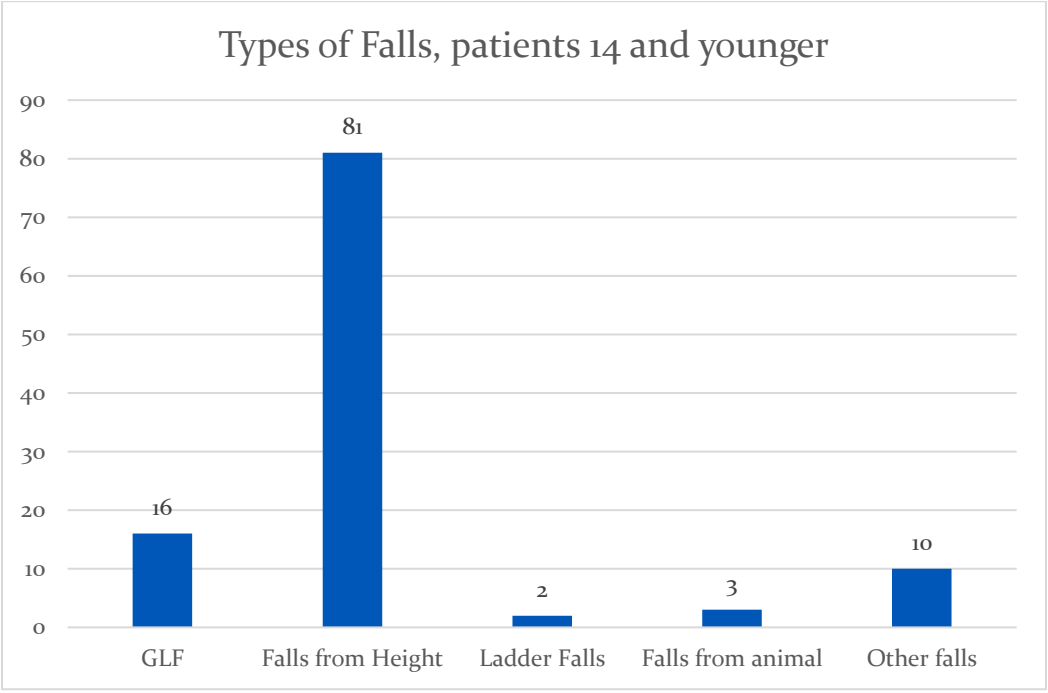
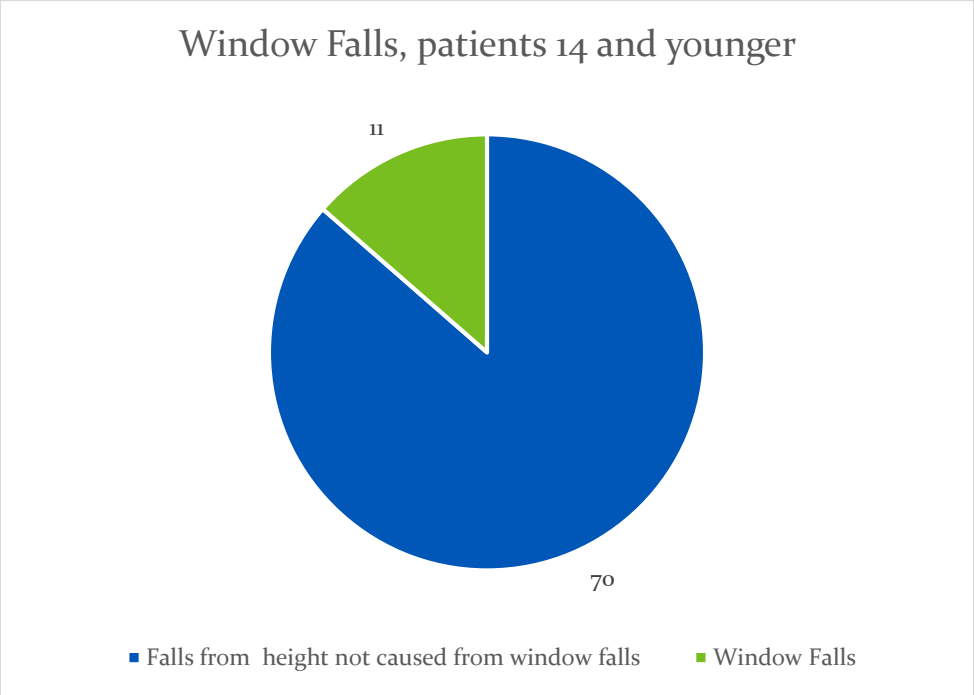
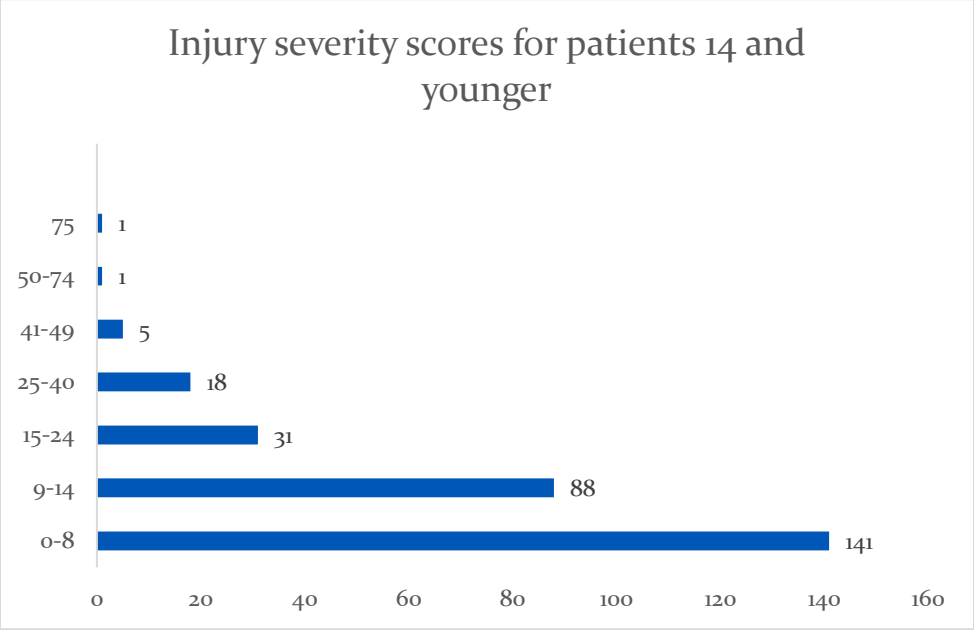


Figure 29. Window Falls, patients 14 and younger



11 of the 81 patients who sustained injuries resulting from a high mechanism fall, fell out of windows.

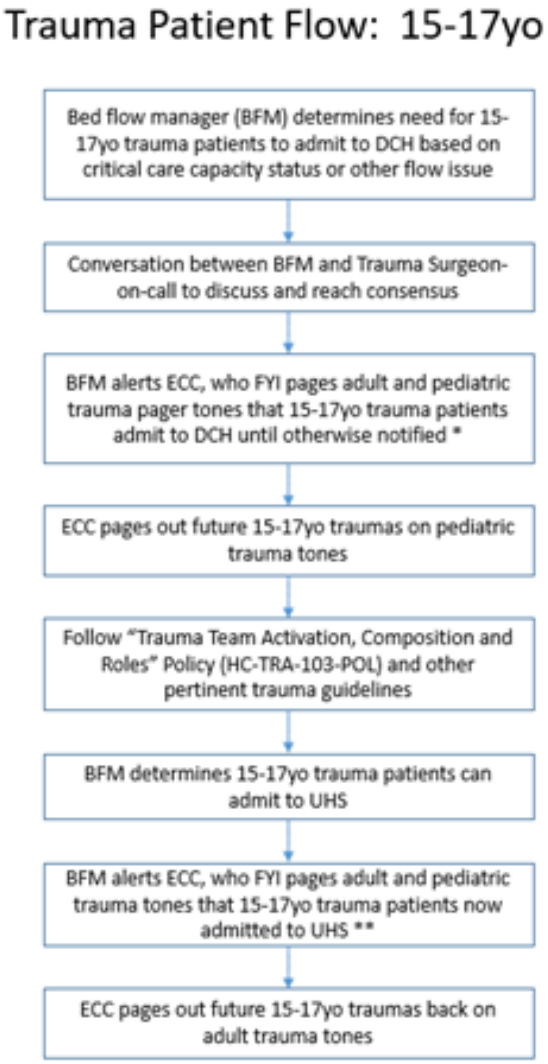
Figure 30. Injury severity scores for patients 14 and younger



Trauma Age Exception Protocol

Doernbecher Provided Expanded Trauma Services to Ease Critical Capacity Issues

With the surge in COVID 19 hospital admissions and a higher than average trauma volume, OHSU has experienced intermittent critical capacity issues. The trauma programs at OHSU and Doernbecher worked together to develop and implemented a patient flow process to extend Doernbecher trauma services to patients up to the age of 17 years when bed availability is tight on the adult side. In October of 2020, the Trauma Age Exception Process launched. Mission Control in consultation with the Administrator on Duty and Bed Flow Manager assess the ability to admit critical care patients. When bed space is limited in OHSU, the Trauma Age Exception Process is activated. During this time, trauma patients age 15-17, who would normally be activated as adults and admitted to OHSU, are activated as pediatric trauma and admitted to Doernbecher. When OHSU is no longer at critical capacity, the Trauma Age Exception Process is ended. Since this process when live, the age exception has been activated nine time for a total of roughly hours 3,214 hours or 134 days, and accounting for an additional 32 trauma patients moving through the pediatric trauma system. The number one mechanism of injury for this swing group was motor vehicle collisions, followed by "bike" accidents (bike, motor bike, dirt bike, ATV etc.) and snow sport injuries (skiing, sledding, snowboarding etc.).



Pediatric Injury Prevention

OHSU Doernbecher Injury Prevention Program

The OHSU Doernbecher Injury Prevention Program (DCH IPP) is dedicated to reducing preventable injuries in children throughout the Pacific Northwest through outreach and education provided by the Tom Sargent Safety Resource Center (TSSC). The TSSC sells low-cost home safety supplies, sport helmets, medication and firearm lock boxes, and sleep sacks as well as:

Photo courtesy of Lori Moss

- Providing public and professional education and training.
- Increasing access to low-cost safety supplies and resources.
- Encouraging health care providers, families and community leaders to get involved in finding ways to reduce injury.
- Supporting safety-related advocacy in the Pacific Northwest.

A key part of the injury prevention program mission is partnering with other local, state and federal agencies to promote injury prevention education. Through a partnership with Cease Fire Oregon gun cable locks are available at no cost to any gun owner. The DCH IPP also partners with the OHSU Doernbecher Department of Adolescent Psychiatry to provide free medication lock boxes and firearm storage boxes to all families who are caring for a child at risk or who have attempted suicide. This service is available through the OHSU Doernbecher Emergency Department, OHSU Doernbecher inpatient units, or the Doernbecher Department of Adolescent Psychiatry clinic. The center offers low-cost helmets for biking, skiing and other sports and makes sure the helmets fit properly. Families can also purchase low-cost home safety gates, electrical outlet covers, cabinet latches/locks, window stops and guards, and toilet locks. Educational materials are available in all areas of injury prevention to help keep children safe at home and on the go are also available. The center offers the ODOT grant to low-income families that

need a car seat along with the offering the Buckle Up for Life program to provide free car seats to families in need. The distribution of these car seats requires the family to participate in installation and positioning education.

In response to the Covid-19 pandemic, the OHSU TSSC responded by providing virtual home safety assessments, infant safety education sessions, and car seat education sessions to meet the injury prevention educational needs to families. The TSSC also began to provide virtual sales with curb side pick up to ensure families were able to access and obtain the injury prevention resources during the Covid pandemic. These virtual services will continue to be a service provided by the DCH Injury Prevention Program through the TSSC. The DCH IPP has also partnered with Cribs for Kids and Kohl's to supply education and free portable cribs to any family that needs a safe place for their infant to sleep. All safe sleep and car seat educational materials are available in English, Spanish and an additional 7 languages to meet the needs of families.

Dr. Benjamin Hoffman, the Tom Sargent Safety Center medical director, fits a bicycle helmet on Alex Chen. (OHSU/Boone Speed Photography)

ThinkFirst Oregon

ThinkFirst is an organization dedicated to reducing brain, spinal cord and other traumatic injuries and fatalities by educating youth, parents and community members across Oregon.

ThinkFirst for Kids was developed in 1994 for grades 1 through 3. It provides information about the structure and function of the brain and spinal cord, motor vehicle and pedestrian safety, bicycling, water play, playgrounds, recreation and sport activities, as well as teaching about the dangers of weapons and conflict resolution skills.

ThinkFirst for Youth was started in 2007 and includes presentations and classroom curricula for grades 4 through 8. Anatomy lessons and classroom activities help students develop a practical understanding of their bodies' abilities, limitations and vulnerability to injuries. Exercises build communication and conflict resolution skills, increasing self-confidence and students' ability to make safe choices when on their own or in the face of peer pressure.

Statewide Child Passenger Safety Instructor Development Grant

Coordinate staffing for Child Passenger Safety Technician trainings throughout Oregon

The OHSU Doernbecher Injury Prevention Program (DCH IPP) continues to be awarded the Statewide Child Passenger Safety (CPS) Instructor Development and Technician Training Grant in October 2020. This grant from the Oregon Department of Transportation Safety Division recognizes the Doernbecher Injury Prevention Program as the NHTSA-Oregon State Child Passenger Safety Training Coordinator. Responsibilities of this grant require the DCH IPP to provide administrative and instructional support to coordinate staffing for Child Passenger Safety Technician trainings throughout Oregon. This includes providing CPS Technician certification courses, continuing education units, certification renewal opportunities, and community education workshops to meet the training needs of all Oregon CPS Technicians. This support being provided to technicians and communities is proactive in nature; NHTSA reports misuse data as 3 out of 4 car seats are installed incorrectly, and a study conducted by OHSU Doernbecher Injury Prevention Program (Tom Sargent Safety Center (TSSC)) in 2015 reported 95% of families discharging from OHSU Mother Baby Unit had serious misuse of child safety seat at time of discharge. With the knowledge of this data, the DCH IPP acts locally and across the state to help children, one of the most vulnerable sections of our population. The DCH IPP team provides inpatient hospital education and works with partners to educate and certify technicians to strengthen community outreach thereby supporting safe travel for all of Oregon's children.

Pediatric Critical Care & Neurotrauma Recovery Program

Combining the neurological and physical needs of the pediatric trauma patient after discharge

Children who receive trauma care in our facility may not be done healing when they leave OHSU Doernbecher (DCH) and often require trauma follow-up related to surgical interventions or medical management. Often cognitive or behavioral conditions are identified at the trauma follow-up visit and require specialized referrals for treatment to

teams better versed to treat the pediatric and adolescent mind. In 2019, the DCH Trauma Program sought out a partnership with the DCH Neurocritical Care (NCC) Team to combine the trauma clinic follow-up with an NCC visit and the Pediatric Critical Care & Neurotrauma Recovery Program (PCCNTRP) was launched.

All patients coming to DCH for trauma care are referred to the PCCNTRP while they are inpatient and are evaluated buy a neurocritical care attending and a neurophysiologist to establish baseline data and guide inpatient coping. Once a patient is ready for discharge, they are scheduled into the Wednesday PCCNTRP where they will receive ongoing cognitive and behavioral evaluation, address return to school needs, and monitor for post-traumatic stress disorder, as well as having an evaluation with a pediatric trauma nurse practitioner. The goal of this venture is to reduce the number of visits required for follow up and better integrate neurocognitive care in the pediatric trauma patient. This approach has been so successful, that our adult trauma counterparts have requested similar access to the program. The PCCNTRP now sees all OHSU patient on the adult side up to the age of 21 years.

Trauma & Acute Care Surgery Research

In 2020, the Trauma Research Laboratory received $2,371,920 in research funding from the Department of Defense, National Institutes of Health, foundations, and industry. The research group continues to work with the consortiums such as LITES, SIREN, and CLOTT with additional studies beginning in 2020. Newly funded projects for 2020 include:

- Developing a Novel Therapy for Rhabdomyolysis – a collaborative project between Martin Schreiber, MD and Michael Hutchens, MD in the Department of Anesthesiology.
- OHSU 3D Printed CRISIS Ventilator – Albert Chi, MD and his team's innovative approach to address medical ventilator shortages during the pandemic.

The Trauma Research Laboratory continued to remain active with human subjects and animal research in 2020 despite the COVID-19 pandemic. Current active studies involving patients include:

- Shock, Whole Blood and Assessment of TBI (SWAT)
- The Pathogenesis of Post-Traumatic Pulmonary Embolism: A Prospective Multi-Center Investigation by the CLOTT Study Group (CLOTT 2)
- Brain Oxygen Optimization in Severe Traumatic Brain Injury – Phase 3 (BOOST-3)
- A Prospective Randomized Trial Comparing Two Standard Doses of Enoxaparin for the Prevention of Thromboembolism in Trauma Patients
- Prehospital Kcentra for Hemorrhagic Shock
- Prehospital Airway Control Trial (PACT)
- Use of Hypertonic Saline after Damage Control Laparotomy to Improve Early Primary Fascial Closure
- Allogeneic Bone Marrow-derived human Mesenchymal Stromal Cells for the Treatment of Acute Respiratory Distress Syndrome after Trauma
- An Evaluation of Telemedicine and Its Role in Palliative Care
- Use of Whole Blood for Massive Transfusions
- Use of Virtual Reality as a Distraction Technique to Limit Opiate Use in Traumatic and Surgical Wound Dressing Management
- Strategy to Avoid Excessive Oxygen for Critically Ill Trauma Patients (SAVE-O2)
- Predictors of Low-Risk Phenotypes after Traumatic Brain Injury Incorporating Proteomic Biomarker Signatures (PROTIPS)
- Evaluation of the Trauma Population During the COVID Pandemic: A Multicenter Study
- Sleep Outcomes in Children with Concussion and Acute Brain Injury

Just before OHSU shutdown most research due to the COVID-19 pandemic, Dr. Schreiber and his team completed two large animal studies evaluating the use of mesenchymal stem cells and prothrombin complex concentrate to prevent ARDs in lung contusion and hemorrhagic shock model. Sample and data analysis continue in 2021.

Residents, Alix Dixon, MD and Shannon Howard, MD left the research lab and returned to their clinical responsibilities. Dr. Dixon continued her winning streak in 2020 by winning the Earl G. Young Resident Prize for Clinical Research at the 50th Annual Western Trauma Association meeting, the National Resident Paper Competition at the 43rd Annual Committee on Trauma meeting, and for the second year in a row the Resident Paper Competition at the Region X Committee on Trauma meeting.

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Pediatric Research

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Trauma and Acute Care Surgery Faculty

Martin Schreiber, M.D., Chief of Trauma
Speaking topics: Transfusion; Resuscitation; What you need to know about DVTs; Lessons learned in the War on Terror; Modern methods of hemorrhage control; Blast injury; Novel blood products; Modulation of coagulation; Thromboelastometry and trauma

Karen Brasel, M.D., M.P.H.
Speaking topics: Post traumatic stress disorder; Ethics in trauma

Albert Chi, M.D.
Speaking topics: Targeted muscle re-innervation and advanced prosthetics

Mackenzie Cook, M.D.
Speaking topics: Long-term outcomes after injury; Curriculum development in surgical education and optimizing autonomy for trainees

Arvin Gee, M.D.
Speaking topics: Utilizing minimally invasive surgical techniques in trauma and emergency general surgery; Management of appendicitis and diverticulitis

Nick Jaszczak, M.D.
Speaking topics: Rural trauma team development course; General trauma

Laszlo Kiraly, M.D.
Speaking topics: Surgical nutrition; Education of medical students and residents

Darren Malinoski, M.D.
Speaking topics: General trauma; Organ donation

Mitch Sally, M.D.
Speaking topics: Inflammation and response to injury; Organ donation; Mechanical ventilation

Phil Van, M.D.
Speaking topics: Military trauma care; General trauma

David Zonies, M.D.
Speaking topics: ECMO; Military trauma care; Advanced ventilator management

Trauma Nursing Faculty

Heather Wong, MHS, BSN, RN
Trauma Program Director

Jody Berryhill, BSN, RN
Trauma Coordinator

Lori Moss, BSN, RN, CCRN
Pediatric Trauma Program Manager

Trauma Advanced Practice Providers

Kristy Aghayan
Trauma Physician Assistant

Diana Clapp
Trauma Nurse Practitioner

Staci Colovos
Trauma Nurse Practitioner

Laura Dillon
Trauma Physician Assistant

Lynn Eastes
Trauma Nurse Practitioner

Erica Gibson
Trauma Nurse Practitioner

Mindy Hamilton
Trauma Nurse Practitioner

Kristen Haynes
Trauma Nurse Practitioner

Jessica Jurkovich
Trauma Nurse Practitioner

Nicole Kirker
Trauma Nurse Practitioner

Ryan McMahon
Trauma Phvsician Assistant

Emma Schaus
Trauma Phvsician Assistant

Scott Sherry
Emergency General Surgery Physician assistant

Michelle Simons
Trauma Nurse Practitioner

Amanda Staudt
Trauma Nurse Practitioner

Pediatric Trauma Faculty

Kenneth Azarow, M.D.

Marilyn Butler, M.D.

Elizabeth Fialkowski, M.D.

Cynthia Gingalewski, M.D.

Nick Hamilton, M.D.

Margo Hendrickson, M.D.

Mubeen Jafri, M.D.

Sanjay Krishnaswami, M.D.

Katrine Lofberg, M.D.

Andrew Zigman, M.D.