

Trauma and Burn Service Line Annual Report—FY2019

University of Colorado Hospital



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- University of Colorado Hospital
- Yampa Valley Medical Center

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University of Colorado Hospital Trauma Center Burn and Frostbite Center

Level I Trauma designation—American College of Surgeons and the State of Colorado.

Last survey: July 2018.

Next survey: July 2021.

The first and only American Burn Association Verified Burn Center in the Rocky Mountains.

Last survey: December 2018.

Next survey: December 2021.



Executive summary.

81% increase
in total volume since 2014.

↳ **16%** within the last year.

112% increase
in critically injured patients since 2014.

↳ **4%** increase within the last year.

86% increase
in Burn Center admissions since 2012.

↳ **11%** increase within the last year.

89% increase
in transfers into UCH Trauma Center
since 2014.

↳ **8%** increase within the last year.

55% decrease
in mortality of the most seriously
injured patients, which is in the top
10% of Level I Trauma centers in the U.S.

21 trauma-related publications
by TACS faculty 2018-2019.



Leadership—Trauma services and burn care.



Robert McIntyre Jr., MD, FACS
Trauma Medical Director



Anne Wagner, MD, FACS
*Burn and Frostbite Center
Medical Director and Trauma
Burn Liaison*



Franklin Wright, MD
*Medical Director, Surgery
Trauma Intensive Care Unit*



**Robbie Dumond
BSN, RN, TCRN, AEMT**
*Senior Director of
Trauma Services*



Kelly Bookman, MD
*Emergency Department
Medical Director*



April Kohler, MSN, RN
*Emergency Department
Director*



**Regina Krell
MS, RN, CEN, TCRN**
Trauma Program Manager



**Robyn Wolverton
MSN, RN, CEN, TCRN**
Trauma Outreach Manager



Nancy Biaggi, BA
Burn Outreach Manager



**Elyse Bueno
MS, APRN, ACCNS-AG, CCRN**
*Surgery Trauma Intensive Care
Unit Manager*



**Morgan Aranda
MSN, RN, CMSRN**
*Trauma Surgical Specialties
Unit Manager*



James Kelty, BSN, RN-BC
Burn Unit Manager



Justin Oeth, BSN, RN
*Emergency
Department Manager*

Providers.

Trauma surgeons



Maria Albuja-Cruz, MD, FACS



Lisa Ferrigno
MD, MPH, FACS



Laura Harmon, MD, MS



Juan-Pablo Idrovo, MD



Paul Montero, MD, FACS



Christopher Raeburn, MD



Lauren Steward
MD, MHSA, MPHS



Catherine Garrison
Velopulos, MD, MHS, FACS
Director of Trauma Research

Burn surgeons



Patrick Duffy, MD



Arek Wiktor, MD, FACS



Robert Neuman, MD
*Neuro-Intensive Care
Unit Director*

Neurocritical care

Trauma liaisons



Fareed Azam, MD
Trauma anesthesia liaison



Thomas Borges, MD
Trauma radiology liaison



Wayne Gluf, MD
*Director of
Neurosurgical Trauma*



Jason Stoneback, MD
*Chief of Orthopedic Trauma and
Fracture Surgery Service
Director, Limb Restoration Program*

Trauma and acute care surgery physician assistants

Veronica DeMary, PA-C
Andrea Gordon, PA-C
Brennen Griffin, PA-C

Jeff Huber, PA
Erin Lennon, PA, BS

Sarah Longyhore, PA-C, MMS
Chris Shults, PA-C

Burn and frostbite care advanced practice providers (APPs)

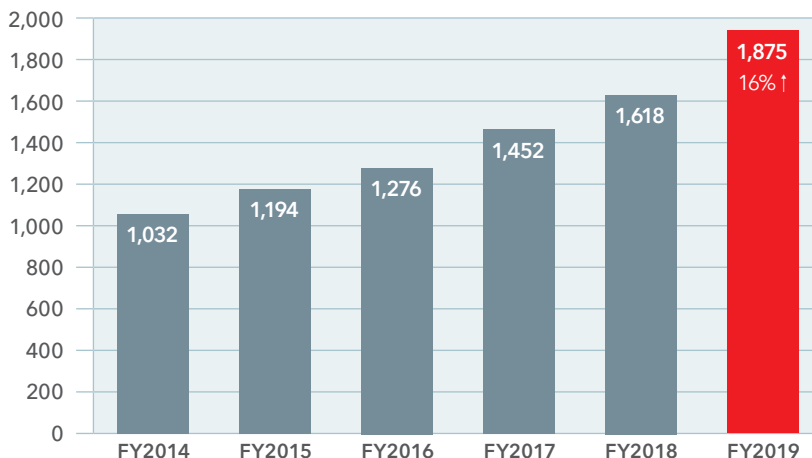
Amber Kohler, NP (APP Lead)
Julie Henderson, NP
Meghan Houlihan, PA

Kathryn Moser, NP
Maureen Scott, NP

Keturah Sloan, NP
Jennifer Stalilonis, PA

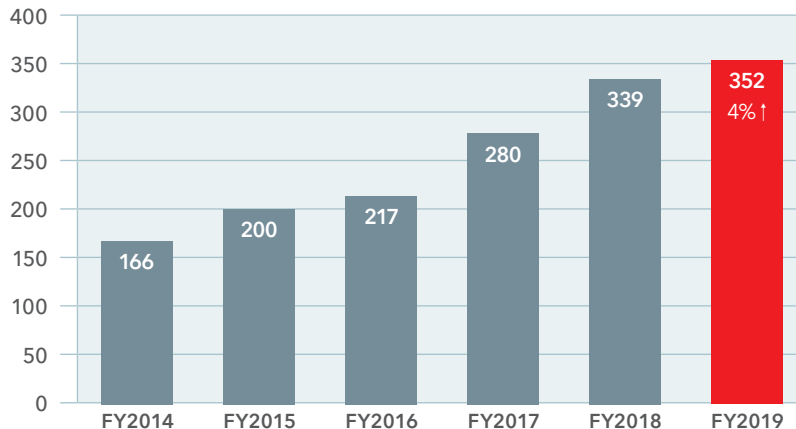
Trauma services and burn care patient volume.

81% increase since FY 2014.



Critically injured patient volume.

112% increase since FY 2014.

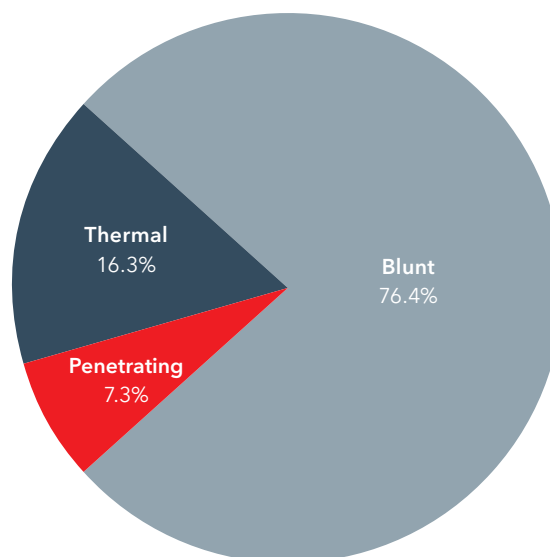


Critically injured patients = injury severity score greater than 15.

Top traumatic mechanisms of patient injury.

Causes:

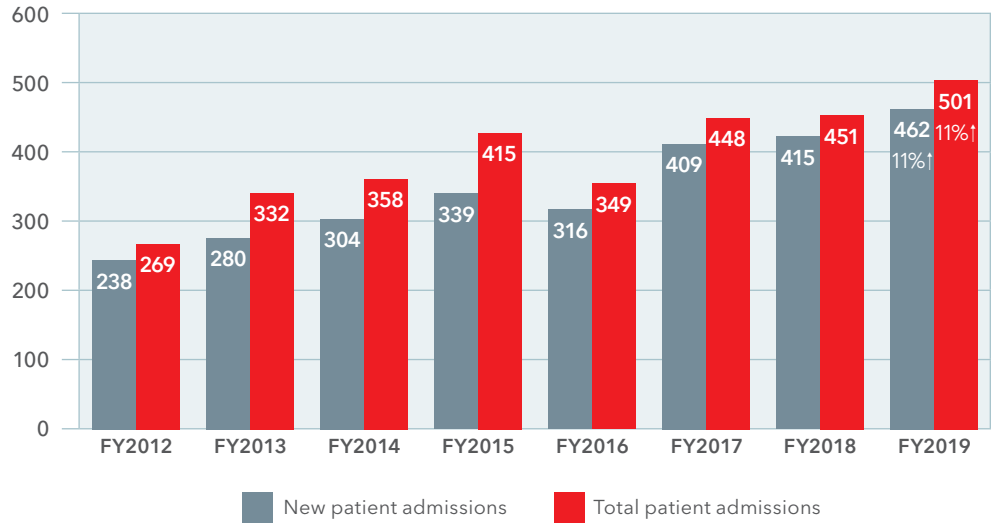
- Falls
- Assault
- Motor vehicle crash
- Motorcycle crash
- Pedestrian
- Fire
- Chemical exposure
- Gunshot wounds
- Stab wounds
- ATV, snowmobile or other vehicle



Burn and Frostbite Center volumes.

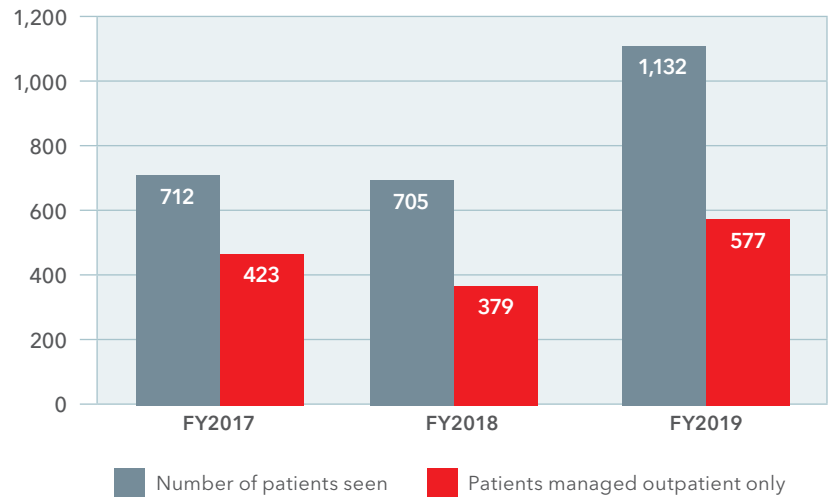
Center admissions

86% increase since FY 2012.



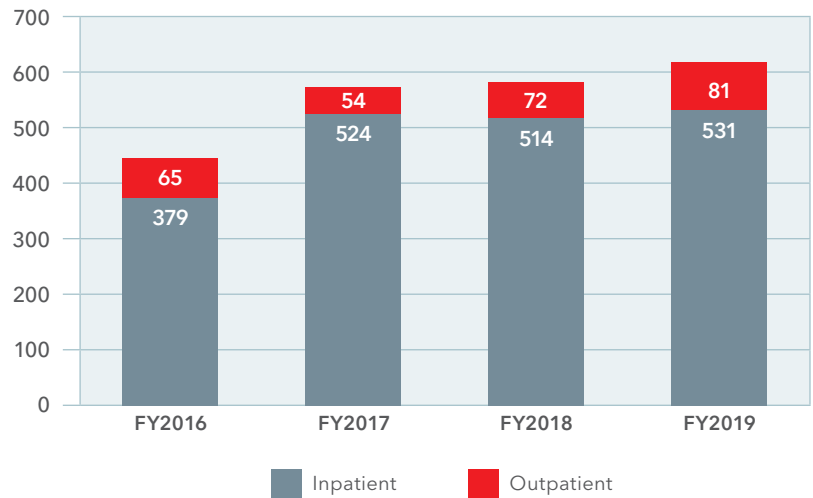
Clinic volume

60% increase in number of patients seen.



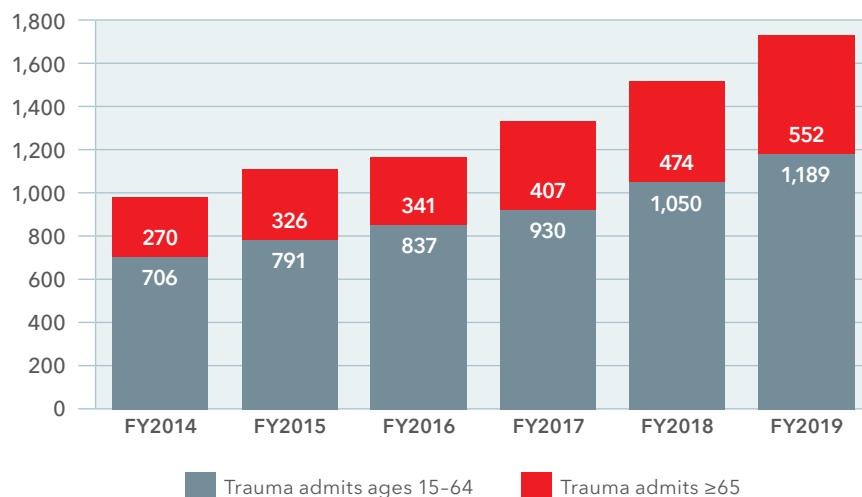
Operative cases

38% increase since FY 2016.



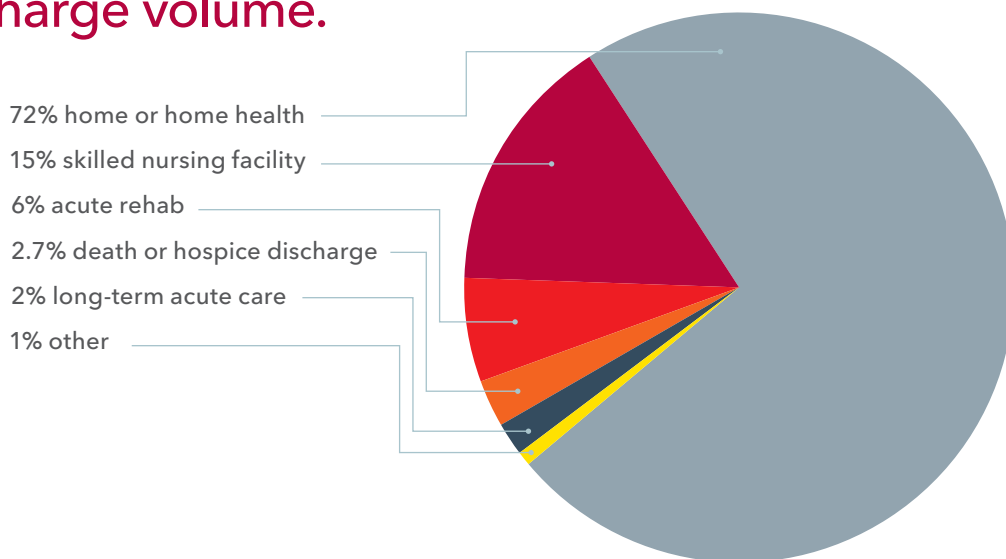
Trauma services and burn care patient demographics.

Admissions by age
(31% of admissions are greater than or equal to 65 years of age).



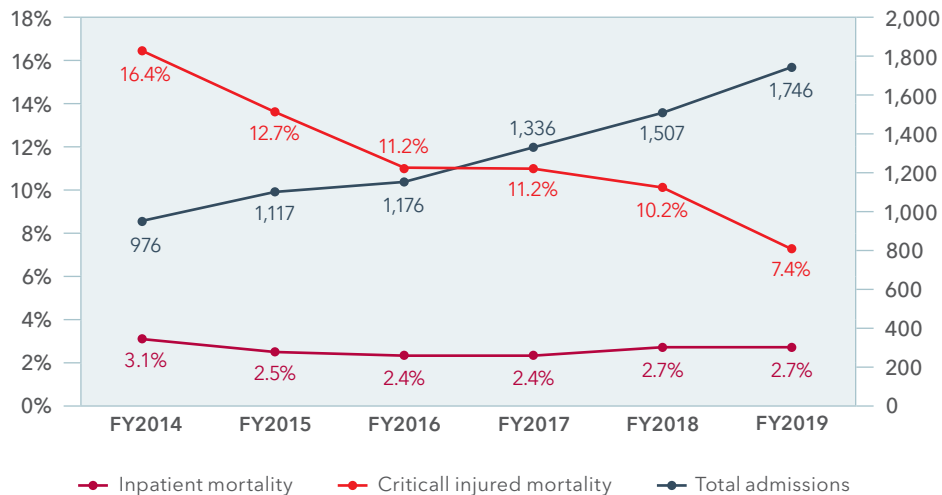
Inpatient discharge volume.

78% of patients are discharged to home or rehabilitation.



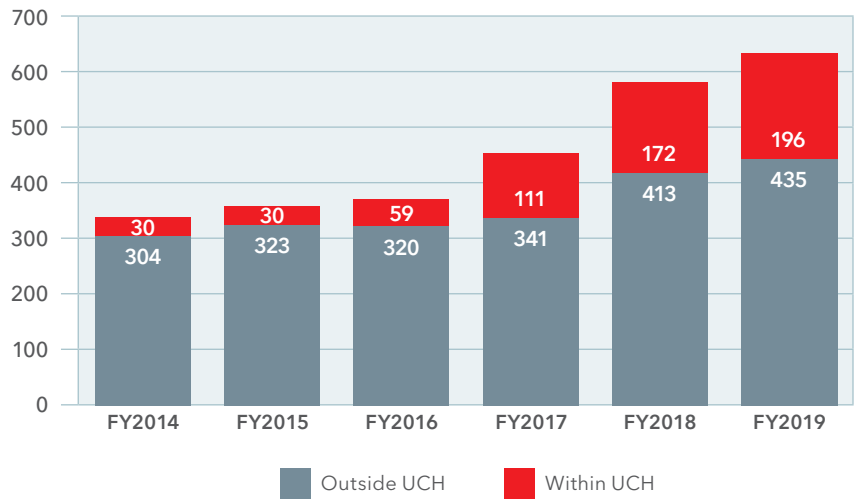
Total mortality versus critically injured mortality rates.

Top 10% mortality rate in U.S., with a 55% decrease in critical injury mortality since FY 2014. Which means 24 more lives saved.



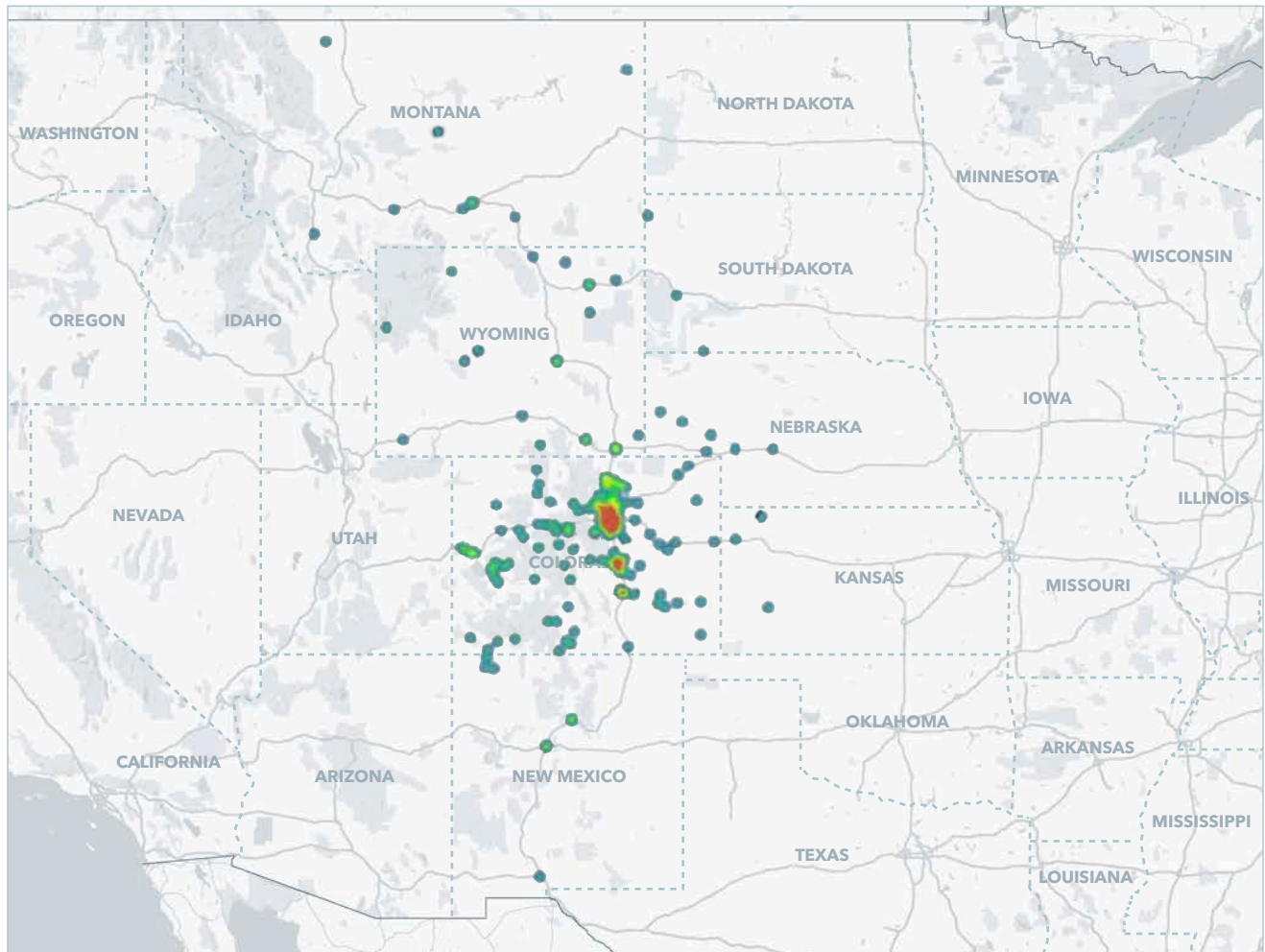
Referrals in.

89% increase in transfers since FY 2014.



Trauma and burn transfers (FY 2019).

University of Colorado Hospital received transfers from 107 facilities in nine states and Canada.



Trauma injury prevention (FY 2019).

- Statewide injury prevention collaboration
 - Colorado Young Drivers Alliance.
 - Safe Kids subcommittee—Denver metro teen drivers.
 - Colorado Trauma Network injury prevention subcommittee.
 - SEMTAC injury prevention committee.
 - Ambulatory Services Patient and Employee Safety (ASPES fall protection).
- Stop the Bleed®
 - 931 people now know how to Stop the Bleed.
 - Training for course instructors.
- Fall prevention—Stepping On and tai chi for arthritis.
 - Five seven-week programs, one tai chi class, 54 participants.
- “What do you consider lethal?”
 - Four presentations, 809 participants.
- P.A.R.T.Y.—preventing alcohol and risk-related trauma in youth
 - 26 programs, 892 students and staff.
 - Featured on 9News.



Burn education and injury prevention.

- 44 Grand Round and Conference presentations in six states
- Advanced Burn Life Support (ABLS)
 - Five courses, 85 providers, nurses and EMS providers in two states.
- Electrical lineman education
 - Seven courses, 210 workers reached.
- American Burn Association
 - Three podium and four poster presentations.
- Frostbite prevention for the homeless
- “It happens in seconds.”—training for firefighters



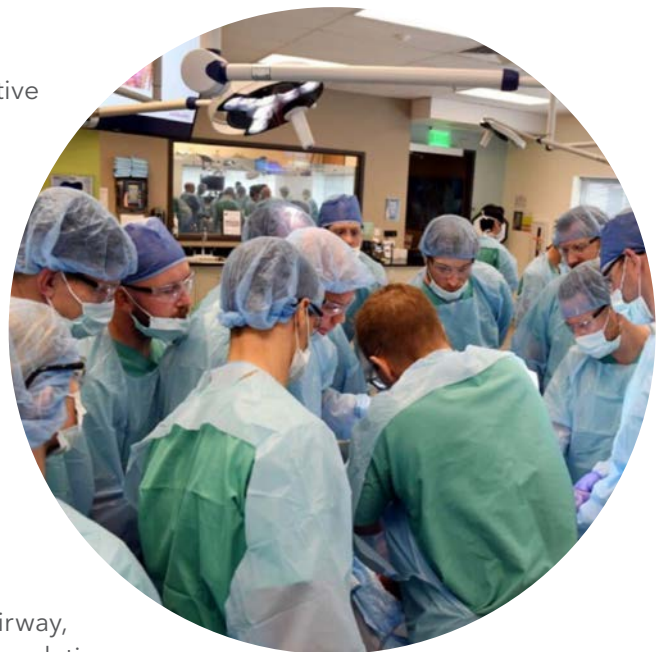
Trauma education.

- Physician/resident: ATLS, ASSET
 - ATLS—two courses, 32 participants.
 - ASSET—two courses, 16 participants.
- Nursing: Trauma Nursing Core Course and Trauma Care After Resuscitation
 - TNCC—five courses, 85 nurses.
 - TCAR—40 nurses.
- Grand Rounds
 - Nine Department of Surgery trauma-related Grand Rounds, including three Visiting Professors.



EMS cadaver training.

FBI and EMS providers specializing in responding to active shooters, hostage crises, airline hijackings and terrorist attacks, among other emergencies, came from around the country to the Center for Surgical Innovation on the Anschutz Medical Campus on two separate occasions in FY2019 to learn, through hands-on training with CU School of Medicine/UCHealth trauma surgeons and emergency medicine physicians, how to triage and manage patients with life-threatening injuries. Among those involved in the training were UCHealth EMS Medical Director Daniel Willner, MD, and UCHealth Trauma Surgeons Laura Harmon, MD, and Erik Peltz, DO.



Each training session involved extensive didactic and hands-on training with a focus on the management of airway, breathing and circulation status in the injured patient population. One after the next, the FBI agents and EMS providers practiced intubation skills. After his turn, an FBI agent from Los Angeles explained, “Being able to interact with a cadaver—real tissue—is invaluable, priceless training. The mannequin’s rigid plastic. There’s no feel. There’s no tongue that gets in the way. You’re not looking them in the eye. When I do this, I think about my kids: How am I going to save one of their lives?” The trauma program at University of Colorado Hospital will continue to support these courses and hopes to offer them more frequently in the coming years.

Source: uchealth.org/today/fbi-learn-from-cadavers

Trauma services and burn care outreach (2019).

- Conferences and symposiums
 - 20 appearances, over 3,000 attendees.
- Outreach visits
 - 53 outreach visits, six states.
- 2020 conference lineup
 - Eagle County EMS Conference
 - EMS and Fire Conference, Grand Junction
 - Rocky Mountain Rural Trauma Conference, Bozeman, MT
 - South Dakota State Trauma Conference
 - Santa Fe Trauma Conference
 - UCHealth Disaster Conference
 - UCHealth Trauma, Critical Care and EMS Symposium
 - Vail Health Mini-Conference
 - Valley View Trauma Conference
 - Wyoming Trauma Conference



Trauma and burn services department.



Regina Krell, MS, RN, CEN, TCRN
Trauma Program Manager



Robyn Wolverton MSN, RN, CEN, TCRN
Trauma Outreach Manager



Nancy Biaggi, BA
Burn Outreach Manager



Laurie Lovedale, MPH
Trauma Injury Prevention Coordinator



Shane Urban, BSN, RN
Trauma Research Coordinator RN II



Elizabeth Weber BSN, RN, CCRN
Burn Program Coordinator



Stephanie Vega MBA, BSN, RN, CCRN-K, CSTR
Trauma Clinical Quality Specialist



Eve Lindemann BSN, RN, CCRN
Trauma Nurse Clinician



Pamela Michelli, BSN, RN
Trauma Nurse Clinician



Emily Quigly, BSN, RN
Trauma Nurse Clinician

Trauma services and burn care registrars



Michelle Bowers
CSTR, CAISS



Peggy Clark, RN



Kathy L. Hoyland
CSTR, CAISS



Zac Lensgraf
Administrative Assistant



Lori Kennard
RHIA, CSTR, CAISS



Bethany Schmoker



Angela Vasilatos, BS

The 11th Annual John H. and Cynthia H. Schultz Lectureship in Surgery.



Ronald M. Stewart, MD
*University of Texas Health,
San Antonio*

Firearm Injury Prevention Strategy and Process From the American College of Surgeons Committee on Trauma

Dr. Stewart has actively led the development of an integrated civilian-military trauma system that serves all of South Texas, covering more than 26,000 square miles. In 2001, he was appointed by then Governor George W. Bush to the Texas Governor's EMS and Trauma Advisory Council, where he served for 15 years as the Chair of the Systems committee. He was a founding member of the National Trauma Institute. For the last 20 years he has served on the American College of Surgeons (ACS) Committee on Trauma (COT). Currently he is the ACS Medical Director of Trauma Programs.

During his tenure as the ACS COT Chair, he spearheaded a plan to implement a National Trauma Action Plan aimed at eliminating preventable trauma deaths by 1) improving trauma systems, 2) increasing high-quality trauma research, 3) increasing the quality of trauma patient data and 4) advancing trauma education and training in both military and civilian settings. He worked to lead an approach to firearm injury prevention that has encouraged collegial, professional and substantive dialogue from surgeons and citizens from all points of view, with the goal of reducing the burden of firearm injury and death.

The 3rd Annual Sarah V. and Ernest E. Moore Trauma Lectureship.



Alden H. Harken, MD
*Professor Emeritus
of Surgery
University of California,
San Francisco-East Bay*

The Value of Asking Questions

Dr. Harken is Professor Emeritus of Surgery in the UCSF-East Bay Surgery Program. He is board-certified by the American Board of Surgery and the American Board of Thoracic Surgery. In 2005 and 2006, surgical residents voted Dr. Harken the Julia Burke Outstanding Teacher of the Year. Recently, Dr. Harken was honored with the Lifetime Achievement Award from the Society of University Surgeons (SUS).

After completing his undergraduate work at Harvard College in 1963, Dr. Harken graduated from Case Western Reserve Medical School in 1967. He completed surgical and pediatric cardiovascular residencies at the Peter Bent Brigham Hospital and the Boston Children's Medical Hospital in 1973; then he joined the Walter Reed Army Institute of Research in Washington, D.C., where he was an investigator, and gained the rank of Lieutenant Colonel.

In July 1976, Dr. Harken accepted a position at the University of Pennsylvania in the Division of Cardiothoracic Surgery, where he became well known as a dedicated and highly respected scientist. In 1983, Dr. Harken accepted the position of Chairman of the Department of Surgery at the University of Colorado Health Sciences Center, and for the next two decades as a vigorous advocate of surgical residency training, he promoted multiple surgical programs and served as the Principle Investigator of Colorado's NIH Trauma Program Project Grant and Surgical Research Training Grant.

Trauma visiting professors lectures.



Surgical Rescue

Andrew B. Peitzman, MD

- Distinguished Professor of Surgery
- Mark M. Ravitch Endowed Chair in Surgery Vice Chair, Clinical Services, Department of Surgery Executive Vice Chairman University of Pittsburgh, School of Medicine



The Global Burden of Trauma—Perspectives From Experiences Working With Doctors Without Borders

John Lawrence, MD

President, Doctors Without Borders-USA

- Doctors Without Borders
- Pediatric surgeon, Maimonides Medical Center



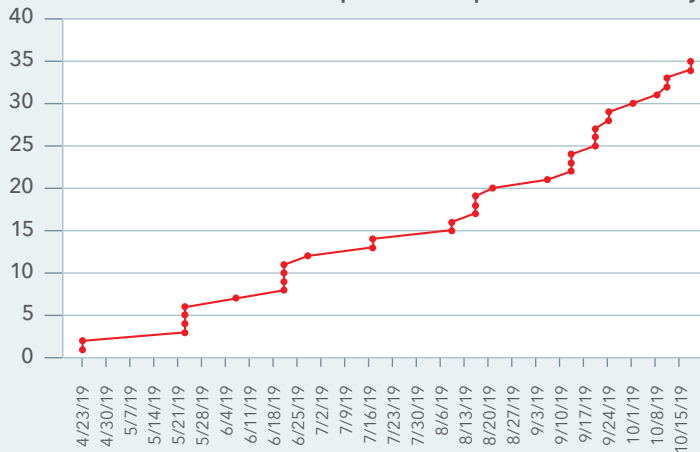
2019 Global Humanitarian Surgical Skills Workshop

Burn laser therapy for scar rehabilitation.

Laser therapy is a new and innovative program led by Patrick Duffy, MD. Dr. Duffy and his team provide patients with effective, less invasive options for management of challenging post-burn scar symptoms, including pain and itch.

Two state-of-the-art systems are being used, including a 10,600nm CO₂ laser and intense pulsed light (IPL) device to treat symptomatic hypertrophic hypervascular burn scars.

Laser therapy cases where patients experienced a reduction in medication use and improved itch, pain and scar liability.



- 25 patients treated with 30 operative sessions in the first five months.
- Each patient treated generates an average of eight reconstructive procedures for scar rehabilitation.
- Additional operative resources obtained to meet increased demand.
- Follow-up from laser scar therapy provides opportunities for additional surgical scar management with tissue rearrangements, contracture releases and scar resurfacing when laser alone is inadequate.



Limb Restoration Program.

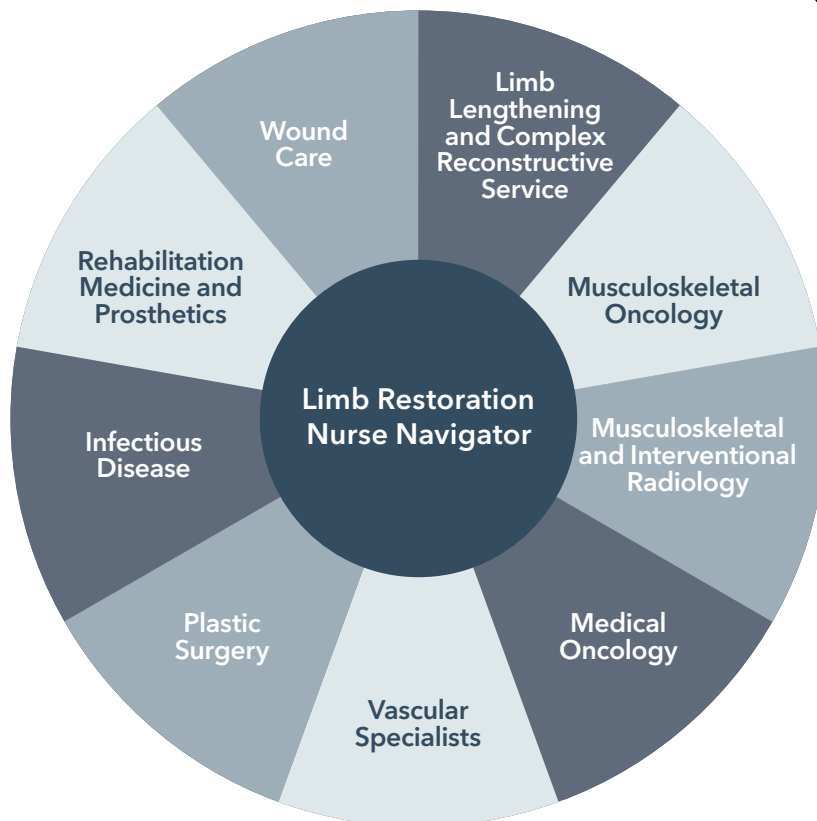
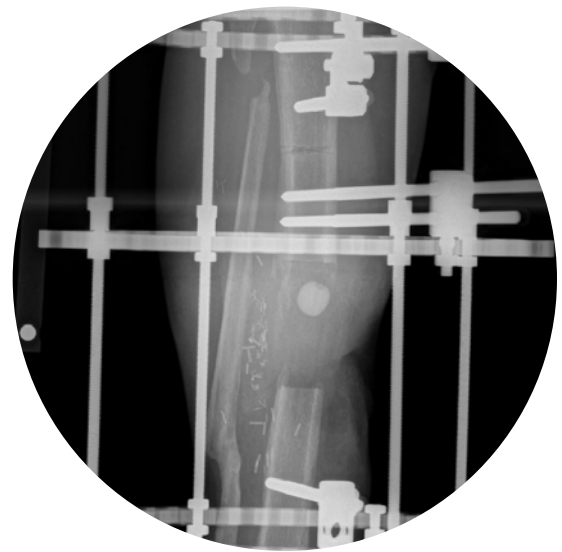
Our internationally recognized multidisciplinary Limb Restoration Program, led by Dr. Jason Stonback, is dedicated to restoring patients' limbs, returning them to function and giving them back any quality of life they have lost. The program has more than 20 experts in their respective specialties; our team cares for patients in 30 states and six countries.

With state-of-the-art treatment options and the multidisciplinary collaboration of several specialty services, the Limb Restoration Program allows us to diagnose and treat the most challenging cases, including being one of the few programs in the world to offer osseointegration for amputees.

Our limb restoration team meets every week to review and consult on all cases, ensuring that patients receive the best custom treatment plan possible for their situation.

Conditions treated:

- Bone infections
- Nonunions/malunions
- Limb lengthening and deformity correction
- Vascular diseases
- Chronic wounds
- Congenital conditions/deformities
- Amputated extremities

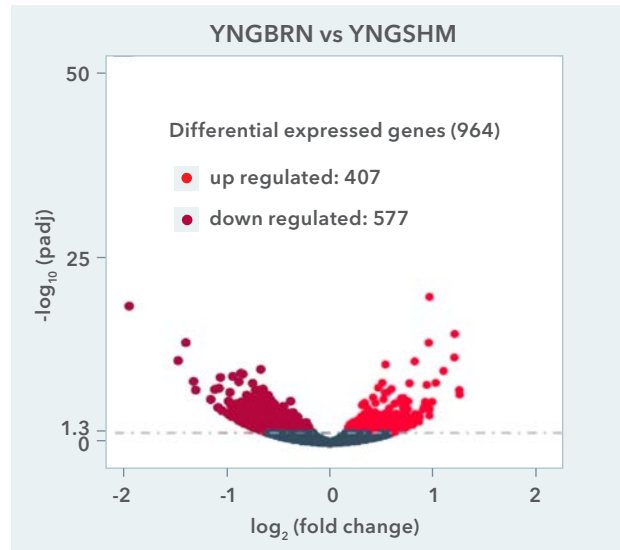


Elizabeth J. Kovacs, PhD

Burn, alcohol and aging research lab

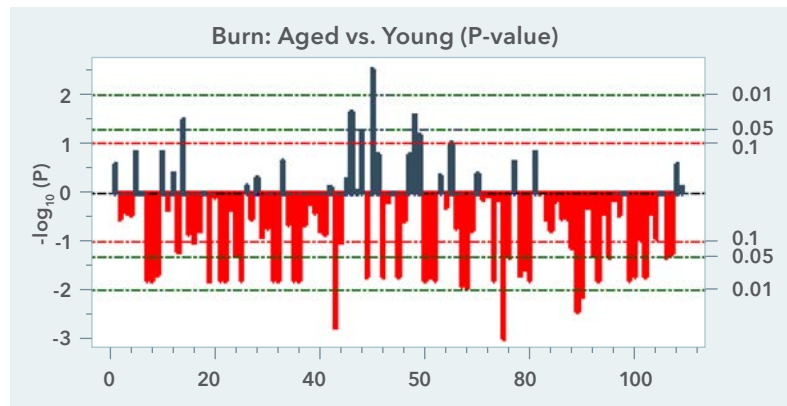
Research focus:

- Multi-organ system response in burn patients and murine models.
 - Ethanol effects on recovery from injury (NIH R01).
 - Aging, macrophage mediators and burn trauma (NIH R01).
 - Mesenchymal stem cells and inflammation after burn (NIH R21).
 - Multi-organ inflammatory response after burn trauma (VA Merit Award).
- Alcohol and aging and response to infection.
 - Alcohol and lung immunity in the aged (NIH R21).
 - Ethanol and pulmonary innate immunity in a murine model of aging (NIH F31, sponsor).



Accomplishments in the last 12 months:

- Seven scientific presentations
- One Presidential address
- One international and two national conferences
- Two university visiting professor presentations
- 14 manuscripts published/in press
- 19 abstracts at national/international conferences
- Trainees
 - Six short oral presentations
 - Four travel awards



Grants:

- Continuing: NIH, NIA R01 Age & Burn YR15; NIGMS R01 Alcohol Burn YR18; NIAAA R21 MSC & Burn YR2
- New and approved to fund: NIAAA R21 Alcohol & Aging; VA Merit Award Burn Biomarkers; NIAAA R13 Meetings Grant
- NIGMS R35 MIRA Burn Microbiome; NIA R01 Age & Burn
- Trainees: NIH F31 H Hulsebus (alcohol, aging and lung infection); NIH K08 J-P Idrovo (age, burn and liver)

Team:

- Elizabeth J. Kovacs, PhD—professor
- Juan-Pablo Idrovo, MD—assistant professor
- Rachel McMahan, PhD—assistant research professor
- Trainees
 - Kiran Dyamenahalli, MD/PhD—fellow
 - Devin Boe—MSTP student
 - Holly Hulsebus, MPH—PhD student
 - Kevin Najarro, MS—lab manager
 - Juliet Mullen—PRA
- Major collaborators
 - Ellen Burnham, MD, MS
 - Mashkoor Choudhry, PhD
 - Sean Colgan, PhD
 - Dan Frank, PhD
 - Anne Wagner, MD
 - Arek Wiktor, MD
 - Cara Wilson, MD

Catherine G. Velopulos MD, MHS, FACS

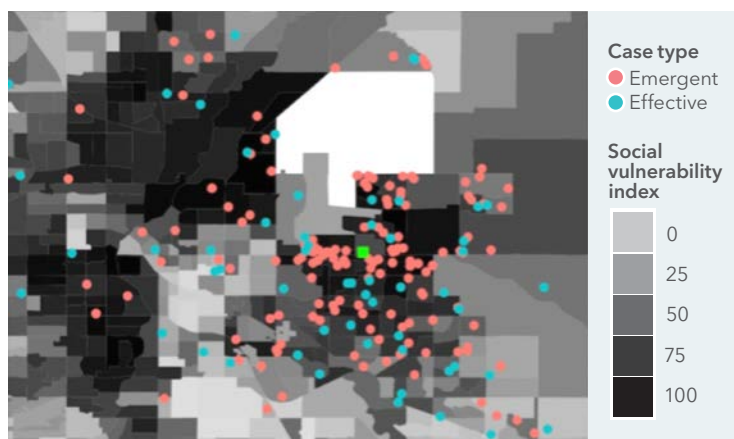
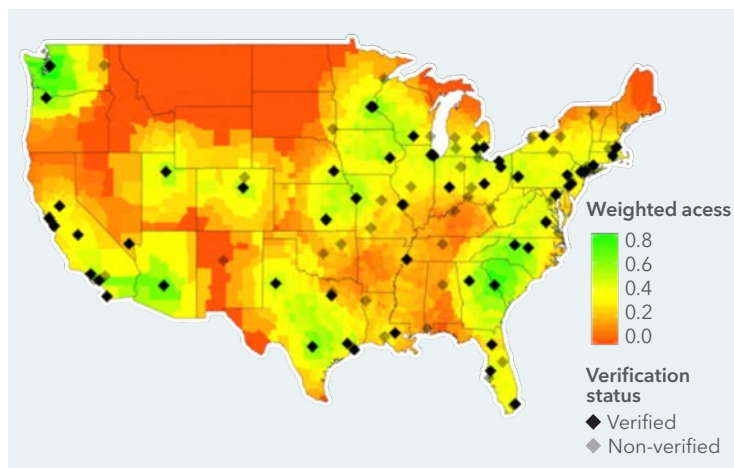
Health services research lab

Research focus:

- Examining disparities in surgical outcomes/access to care.
- Hospital-based violence-intervention programs/intimate-partner violence.
- Geographic information systems.
- Mentoring CU-UNITE urban underserved track.

Accomplishments in the last 12 months:

- 10 national scientific presentations –five full-podium, three quick shots and two posters.
- 11 publications–four first authored by research resident, two first authored by medical students.
- Two manuscripts in revision.
- Awarded as Co-I on \$950,000 Department of Justice grant to evaluate Denver Health Hospital-Based Violence Intervention Program (AIM).
- Dr. Carmichael sponsored by SOAR for ACS Health Services research course.
- R01 surgical disparities submitted–modifiable factors in emergent presentation of potentially elective general surgical disease for patients who are insured or insurance-eligible.



Team

- Catherine G. Velopulos, MD, MHS, FACS– associate professor, Vice-Director Surgical Outcomes & Applied Research (SOAR), Director of Trauma Research
- Shane Urban BSN, RN–trauma research nurse
- Heather Carmichael, MD–research resident
- Collaborators with CDPHE
 - Kirk Bol, MSPH
 - Ethan Jamison, MPH
- Medical and undergraduate students
 - Joshua Abolarin, MS2
 - Samantha Klaas
 - Andrea Kramer
 - Martin Moe
 - Allison Moore, MS2
 - Sara Muramoto, MS3
 - Billy Tran, MS4
 - Lesley McClafferty

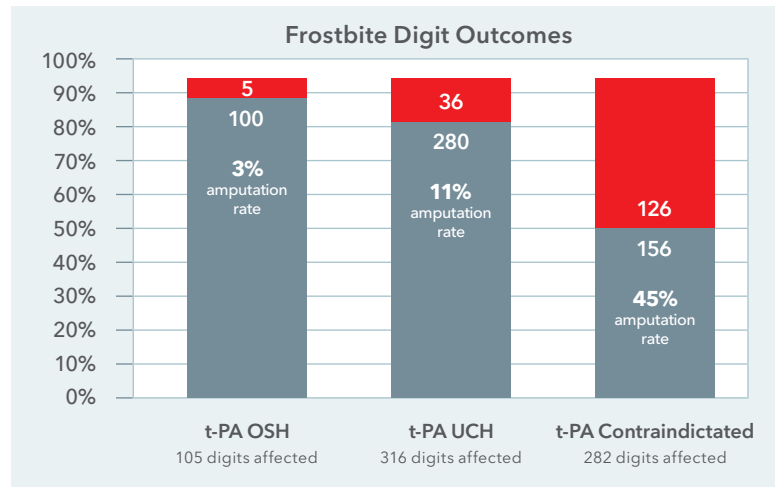
Burn unit clinical research

Research focus:

- Early frostbite therapy (TPA).
- ASD/PTSD in burn survivors.
- Drugs of abuse in burn and frostbite populations.
- Mobile app technology for triage.
- Elderly burn care.
- Burn resuscitation and coagulopathy.
- Glutamine supplementation in burn patients (ReEnergize Trial).

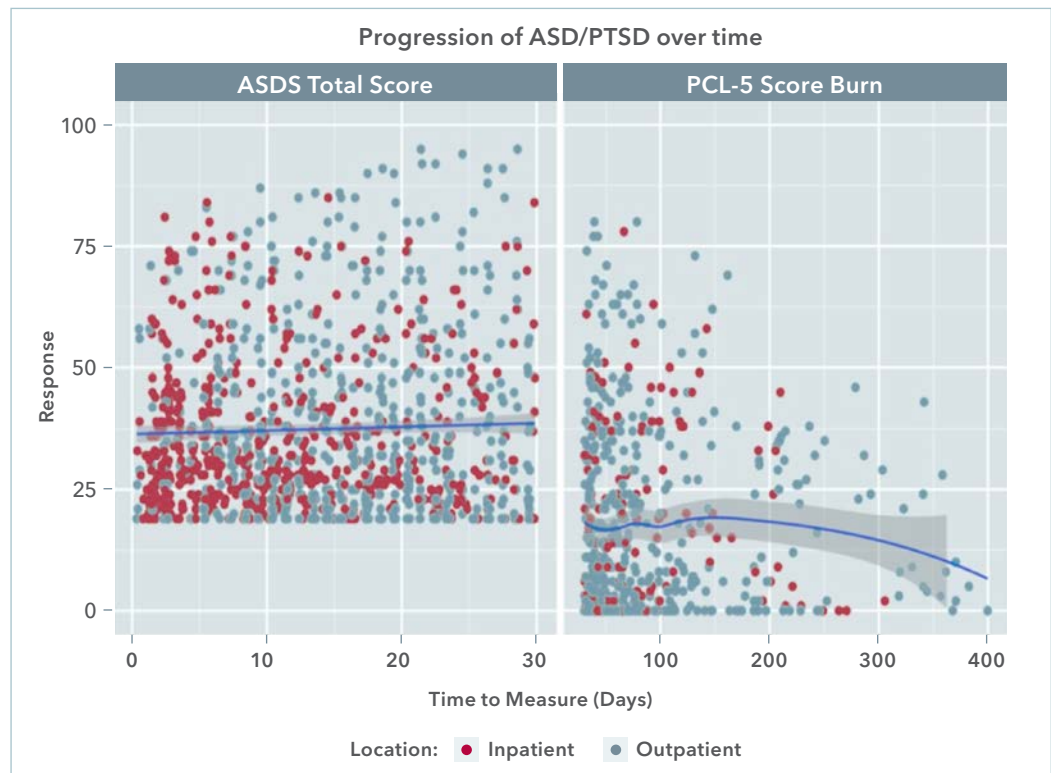
Accomplishments in last 12 months:

- 10 abstracts accepted at three national conferences.
- Five podium presentations.
- Three published manuscripts.
- 5th highest enroller of patients in ReEnergize trial (out of 80 sites worldwide).



Team:

- Anne Wagner, MD–Burn and Frostbite Center Medical Director
- Arek Wiktor, MD–Assistant Medical Director, Burn and Frostbite Center
- Patrick Duffy, MD–Assistant Professor of Surgery
- Heather Carmichael, MD–Research resident
- Julia Coleman, MD–Research resident
- Kiran Dyamenahalli, MD–Research resident
- Tyler Smith–PRA



Franklin Wright, MD

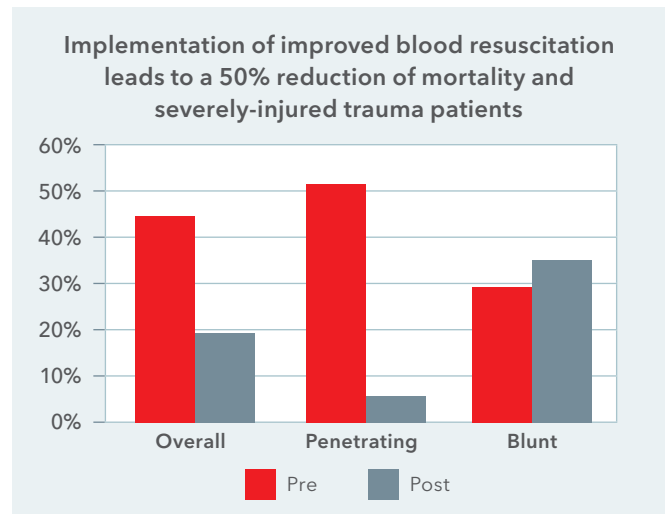
Pre-hospital and trauma/ICU quality improvement research lab

Research focus:

- Pre-hospital trauma.
- Quality improvement and process improvement projects.
- Optimizing early trauma care (EMS and ED/trauma bay) and ICU care.

Accomplishments:

- Five scientific presentations—four national, one local and two full-podium.
- One publication, one manuscript in revision and one in submission.
- Co-investigator on faculty CEPS grant.
- Ongoing ICU QI/PI projects with nursing leadership.



Team:

- Franklin Wright, MD—Assistant professor
- Erik Peltz, DO—Assistant professor
- Heather Carmichael, MD—Research resident
- Allie Kovar, MD—Research resident
- Jacob Mago, MS4—Medical student

Comparison of Pre-Hospital MTP Activation Triggers

	EMS-G (≥ 3 points)	Pre-hospital ABC score (≥ 2 points)	Shock index
Sensitivity	89% (72-98%)	46% (27-66%)	85% (78-92%)
Specificity	84% (78-89%)	94% (89-96%)	79% (76-82%)
ROC area	0.866 (0.803-0.930)	0.827 (0.786-0.868)	0.822 (0.782-0.861)

Research impact (FY 2019)

- 21** publications
- 54** invited lectures
- 22** research presentations
- 9** book chapter contributions

UCHealth University of Colorado Trauma Center

12505 E. 16th Ave.
Anschutz Inpatient Pavilion 2, 1st Floor
Aurora, CO 80045

UCHealth Burn and Frostbite Center - Anschutz Medical Campus

12605 E. 16th Ave.
Anschutz Inpatient Pavilion, 3rd Floor
Aurora, CO 80045

For more information about the University of Colorado Hospital Trauma and Burn Service Line Annual Report (FY2019), please call 720.848.4805.

Trauma and Burn Care

uchealth.org