One call. One number. DocLine is staffed 24/7 with critical care-trained nurses, ready to help with your:

- Transfer Requests
- Direct Admissions
- Specialist Consultations

Serving all UCHealth facilities, including:

- Broomfield Hospital
- Grandview Hospital
- Greeley Hospital
- Highlands Ranch Hospital
- Longs Peak Hospital
- Medical Center of the Rockies
- Memorial Hospital Central
- Memorial Hospital North
- Pikes Peak Regional Hospital
- Poudre Valley Hospital
- University of Colorado Hospital
- Yampa Valley Medical Center
## Contents

Hospital designations and executive summary ........................................ 4-5
Leadership, staff and liaisons ................................................................. 6-7
Trauma services and burn care volumes ................................................ 8
Top traumatic mechanisms of injury ....................................................... 8
Burn and Frostbite Center volume (admissions, volume and cases) ............. 9
Demographics, discharge volume and mortality rates .................................. 10
Referrals and transfers ............................................................................ 11
Prevention, education and training .......................................................... 12-13
Trauma services and burn care outreach ................................................ 14
Trauma services ....................................................................................... 15
John H. and Cynthia H. Schultz Lectureship in Surgery .............................. 16
Sarah V. and Ernest E. Moore Trauma Lectureship .................................... 16
Visiting Professors .................................................................................. 17
Burn laser therapy ................................................................................... 18
Limb Restoration Program ..................................................................... 19
Research labs .......................................................................................... 20-23
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% increase 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.

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

Justin Oeth, BSN, RN  
Emergency  
Department Manager

James Kelty, BSN, RN-BC  
Burn Unit 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

Neurocritical care

Robert Neuman, MD
Neuro-Intensive Care Unit Director

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.

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

Critically injured patients = injury severity score greater than 15.
Burn and Frostbite Center volumes.

**Center admissions**

86% increase since FY 2012.

![Graph showing the increase in center admissions from FY 2012 to FY 2019.](image)

**Clinic volume**

60% increase in number of patients seen.

![Graph showing the increase in clinic volume from FY 2017 to FY 2019.](image)

**Operative cases**

38% increase since FY 2016.

![Graph showing the increase in operative cases from FY 2016 to FY 2019.](image)
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

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

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

Pamela Michelli, BSN, RN
Trauma Nurse Clinician

Emily Quigly, BSN, RN
Trauma Nurse Clinician

Michelle Bowers
CSTR, CAISS

Peggy Clark, RN

Kathy L. Hoyland
CSTR, CAISS

Zac Lensgraf
Administrative Assistant

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

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.

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

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

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.

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

- 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

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

Implementation of improved blood resuscitation leads to a 50% reduction of mortality and severely-injured trauma patients

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.