University of Colorado Hospital
Trauma-Burn Service Line Report

2017
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University of Colorado Hospital (UCH)
Trauma-Burn Center

- American College of Surgeons and State Level II Trauma Center
  - Last Survey: August 2016
  - Anticipated Survey: July 16-20, 2018

- The only American Burn Association Verified Burn Center in the Rocky Mountains
  - Last Survey: December 2017
  - Anticipated Survey: December 2020

Trauma-Burn

Executive Summary

- 40% increase in total volume 2014-2017
- 65% increase in critically injured patients 2014-2017
- 35% increase in burn center admissions 2014-2017
- 35% increase in transfers into UCH
- Overall death rate decreased from 3.1% to 2.4%
- In the most seriously injured patients, mortality decreased by 44%. This is 21 more patient lives saved in 2017 compared to 2014.
- 34 publications by TACS faculty 2015-2016
UCH Trauma-Burn Volume
40% increase in total patient volume 2014-2017

UCH Critical Trauma-Burn Volume
65% increase in critically injured patients 2014-2017

Critically injured patients = Injury Severity Score >15 (includes burn)
Top Traumatic Mechanisms of Injury
2017 Data

- Fall, 548, 38%
- MVC/PED/BIKE/MCA, 345, 24%
- Burn, 214, 15%
- Penetrating, 107, 7%
- Other, 238, 16%
University of Colorado Hospital is the only American Burn Association Verified Burn Center in the Rocky Mountain region.

A burn patient with arms crossed and thumbs attached to forearms to promote healing.

Hands after care from Burn Center and reconstructive surgery. She needs extensive rehabilitation but is returning to work and hopes one day to rock-climb again.
Burn Center Admission Breakdown

- Scald 18%
- Flame/Flash 43%
- Contact 8%
- Frostbite 11%
- Chemical 1%
- Electrical 3%
- Skin Conditions 10%
- Infections and Other Wounds 6%

Burn Clinic Patient Visits

(18% increase in New Burn Clinic Visits)

- FY 2016:
  - New Patients: 762
  - Total Patients: 2412
- FY 2017:
  - New Patients: 904
  - Total Patients: 2621
Demographics: Geriatric Admits vs. Non-Geriatric Admits by Fiscal Year

30.4% of all trauma patients admitted to UCHealth are geriatric patients > 65 years of age.

Top Inpatient Discharge Disposition

Our goal at discharge is that patients are recovered enough to either go home or into an active rehabilitation program. In FY 2017 we were able to accomplish this goal 85% of the time.
Mortality Rates: Total vs. Critically Injured

Mortality rates in UCH continued to decline in FY 2017 to an overall mortality of 2.4%. More importantly, mortality in the most critically injured improved year over year to 9.8%. Overall this is a decrease in mortality by 44% compared to 2014 even as volume grows.

<table>
<thead>
<tr>
<th></th>
<th>FY 2014</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
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</thead>
<tbody>
<tr>
<td>ISS &gt; 15</td>
<td>17.5%</td>
<td>13.4%</td>
<td>11.9%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Overall Mortality</td>
<td>3.1%</td>
<td>2.5%</td>
<td>2.4%</td>
<td>2.4%</td>
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</table>

44% decrease in critical injury mortality = 21 more lives saved in 2017
Referrals In

35% increase in transfers into UCH

In 2017, 73 more patients were transferred to UCH compared to 2016. 21 more patients originated from hospitals outside of the UCHealth system. In 2017, the increase in transfers from freestanding EDs and other UC Health hospitals to UCH was 52 patients.

Trauma and Burn Transfers, Excluding UCHealth Facilities
Injury Prevention 2017

- **Just Drive**
  - Distracted driving prevention for adults
  - 15 Presentations
  - 286 Participants

- **Stepping On**
  - An elderly fall reduction program
  - 7 Programs (7 weeks each)
  - 5 “Booster” Sessions
  - 108 Seniors

- **Party Prevent**
  - Alcohol and Risk-Related Trauma in Youth
  - 41 programs from Colorado Springs to Fort Collins
  - 1259 Students

- **STOP THE BLEED**
  - Helmet Distribution
  - 16 Courses including train the trainer courses
  - 84 Helmets
  - 202 Participants

  - 105 Firefighters Trained

Community Involvement:
- Denver Metro Teen Drivers
- Colorado Youth Drivers Alliance

**OVER 1,900 COMMUNITY MEMBERS IMPACTED BY OUTREACH EFFORTS**
2017 Trauma and Burn Outreach

CONFERENCES AND SYMPOSIUMS

13 Major Symposium Appearances
11 Physicians Involved in Outreach Reaching Over 1,700 Participants

OUTREACH VISITS

80 Outreach Visits Completed

FUTURE OUTREACH

25 Outreach Events Scheduled for the Future
UCHealth Burn Center Application

- Provides a means for remote consultation with the UCH Burn Center
- HIPPA compliant transfer of photos and demographic information
- First provider in the Rocky Mountain Region to offer the application
- Presentation as best practice at 2018 American Burn Association Annual Conference
UCHealth in the Western Trauma Association Multi-Center Study of Blunt Thoracic Aortic Injury (BTAI)

• The Medical Center of the Rockies, Memorial Hospital and University of Colorado Hospital made up 3 of the 7 centers contributing patients to the WTA Study.

• There were 316 adult patients. Of the 259 who survived to treatment
  o Thoracic Endovascular Aortic Repair (TEVAR) was performed in 176 (68.0%)
  o Open repair in 28 (10.8%)
  o Hybrid TEVAR and open repair in 4 (1.5%)
  o 51 (19.7%) did not have surgery

• Only one death attributed directly to BTAI occurred. The remaining 13 deaths were due to multi-system trauma or head injury. Survival in the treated group was 95%.
2014

2015


2016


2017
32. SR Shackford, MD, CE Dunne, MPH, R Karmy-Jones, MD, W Long III, MD, MA Schreiber, MD, J Watson, MD, C Watson, BS, R McIntyre Jr., MD, L Ferrigno, MD MPH, ML Shapiro, MD, K Southerland, MD, JA Dunn, MD, C Cribari, MD, P Reckard, MD, TM Scalea, MD, M Brenne. TEVAR is the new standard for operative management of blunt thoracic aortic injury: A Western Trauma Association Multi-Center Study. Journal Trauma Acute Care Surgery 2017 in press.
38. Weimer, S., Burleson, J., Mancuso, M., Bell, C., Flynn Makic, MB. (2017) Evaluating the Effectiveness of End-Tidal Carbon Dioxide (EtCO2) Monitoring during Burn Wound Care in the Non-Intubated Patient Population. Journal of Burn Care and Research. Published online March 2017. DOI: 10.1097/BCR.0000000000000560


Invited Lectures

2014


2) McIntyre Jr. RC. Small Bowel Obstruction; Respiratory Critical Care; Cardiac Critical Care. The American College of Surgeons Comprehensive General Surgery Review Course. Chicago, IL June 2014.

2015


4) McIntyre Jr. RC. Small Bowel Obstruction; Respiratory Critical Care; Cardiac Critical Care. The American College of Surgeons Comprehensive General Surgery Review Course. Chicago, IL June 2015.

5) McIntyre Jr. RC. Priorities in Trauma Management; Trauma Induced Coagulopathy; ED Thoracotomy and REBOA. 45th Annual Wyoming EMS Conference August 2015

6) Wright F. Priorities of Management of the Unstable Trauma Patients. 45th Annual Wyoming EMS Conference August 2015

2016

7) Ferrigno L. Critical Care course instructor at University Hospital in Mirebalais, Haiti. Conducted all lectures in French. February 22-26, 2016

8) Peltz EP. Massive transfusion and post injury coagulation, 43rd annual Rocky Mountain Trauma and Emergency Medicine Conference. Denver Colorado, June 2016

9) Peltz EP. Massive Transfusion and post-injury coagulopathy, Grand Rounds, Cheyenne Regional Medical Center. Cheyenne WY June 2016


12) Wagner A. Burn Management, UCHealth Trauma, Critical Care, and EMS Symposium. Colorado Springs, Colorado August 2016


15) Velopulos, CG. Cheyenne EMS Series. “Trauma in Extremes of Age – Pediatric and Geriatric.” Laramie County Community College, September 2016

18) Wagner AL. Acute Burn & Frostbite Care, Vail Valley Medical Center Mini Trauma Conference, Vail, CO. July 2016
19) McIntyre Jr. RC. Small Bowel Obstruction; Respiratory Critical Care; Cardiac Critical Care. Anticoagulation Management; Venous Thromboembolism. The American College of Surgeons Comprehensive General Surgery Review Course. Chicago, IL June 2016
20) Wright F. Mechanisms of Injury in Trauma. UCH Health Trauma, Critical Care & EMS Symposium, Colorado Springs, CO, August 2016

21) Wagner AL. Acute Care of Frostbite, Colorado Pediatric Trauma Conference, University of Colorado Children’s Hospital, Aurora, CO. November 2016

2017
30) Wiktor, A. Hash Oil, UC Health EMS Conference, Aurora, CO March 2017
32) Peltz EP. Massive Transfusion, Damage Control Resuscitation and Post Injury Coagulation Disturbances Grand Rounds, Trinity Health, Minot. ND April 2017
36) Wagner AL. Acute Burn Care in 2017: What’s new and how do we do it – a survival guide. Annual Rocky Mountain Trauma & Emergency Medicine Conference. Beaver Creek Resort, Beaver Creek, CO. June 17, 2017
Research Presentations

2014

2015

2016
7) Slaughter A, Peltz E “Post-Shock Accumulation of Succinate Accelerates Fibrinolysis Via Platelet Dependent Mechanism”. Academic Surgical Congress; February 2nd, 2016, Jacksonville, FL
Research Presentations (cont.)

2017


20) Heelan-Gladden AA, Vega S, McIntyre RC, Peltz ED, Wright FL. Activation of Massive Transfusion Protocols Utilizing the “ABC” Score and Immediate Availability of Thawed FFP Prior to Patient Arrival for Early Balanced Resuscitation Reduces Mortality Associated with Penetrating Trauma. Colorado American College of Surgeons Committee on Trauma. August 2017; Colorado Spring, CO.

## Awards and Achievements

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<thead>
<tr>
<th>Name</th>
<th>Award</th>
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<tbody>
<tr>
<td>Peltz, E</td>
<td>University of Colorado Hospital: Extraordinary Service Award</td>
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<tr>
<td></td>
<td>Medical Staff of The University of Colorado, 2016</td>
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<tr>
<td>McIntyre, RC Jr.</td>
<td>Best Doctors in Denver, Surgical Critical Care 2015, 2016, 2017</td>
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<tr>
<td>Wagner, AL</td>
<td>Extraordinary Service Award, Medical Staff, Univ. of Colorado Hospital, 2017</td>
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### Leadership Positions

<table>
<thead>
<tr>
<th>Name</th>
<th>Position and Details</th>
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<tbody>
<tr>
<td>Ferrigno, L</td>
<td>Vice Chair, American College of Surgeons Committee on Trauma, Colorado. 2016-2017</td>
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<tr>
<td>McIntyre, RC Jr.</td>
<td>Treasurer Western Trauma Association 2015, 2016, 2017</td>
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<tr>
<td>Velopulos, CG</td>
<td>Association for Academic Surgery</td>
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<td></td>
<td>Publications Committee, 7/2012-2/2016</td>
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<td></td>
<td>Program Committee, Annual Meeting 2/2017 – present</td>
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<td></td>
<td>Eastern Association for the Surgery of Trauma</td>
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<td></td>
<td>Practice Management Guidelines Committee; GRADE Expert; 7/2012-1/2016</td>
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<td></td>
<td>Program Committee, 1/2016-Present</td>
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<tr>
<td>Wright, FL</td>
<td>Southwestern Surgical Congress, Budget and Finance Committee, July 2015-Present</td>
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<tr>
<td>Kovacs, E</td>
<td>President-elect, Shock Society 2017</td>
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<td>Dumond, R</td>
<td>American College of Surgeons Trauma Quality Improvement Program (TQIP) Training</td>
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<td>Project Team and Conference Planning Committee</td>
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1/2016 – Present | Surgical Outcomes and Applied Research (SOAR), CU-UNITE Urban Underserved Track | Capstone Mentor for Medical Students and Research Mentor for Resident, Dr. Catherine Velopulos:

**Billy Tran**, CU Medical Student (Class of 2019)
Proposed Capstone (proposal submitted and accepted) – CU-UNITE student. Using ArcGIS for quantifying factors related to lived environment and Markov modeling for a cost-utility analysis of converting emergent general surgery to elective surgery through improved access to primary care and screening in the Park Hill Neighborhood.

**Sara Muramoto**, CU Medical Student (Class of 2021)
At-Risk Intervention and Mentoring (AIM) Program – in conjunction with Katie Bakes, MD. Analysis of the intervention program through pre/post risk survey and structured interviews. 2017 EAST Templeton Injury Prevention Scholarship Finalist.

**Heather Carmichael MD**, CU Surgical Resident
Using Geographic Information Systems to link data to address surgical healthcare disparities and violence prevention. Analysis of the Colorado Violent Death Reporting System – Abstracts submitted to the 2018 Academic Surgical Congress and Western Trauma Association Annual Meeting

2014– Present | University of Colorado Trauma Research Center T32 National Service Research Award Mentorship Dr. Erik Peltz

<table>
<thead>
<tr>
<th>T32 Research Fellow</th>
<th>Mentor Responsibilities</th>
<th>Achievements of Mentee</th>
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<tbody>
<tr>
<td>Dr. Anne Slaughter</td>
<td>• T32 mentor 2014-2016</td>
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<tr>
<td></td>
<td>• Education and supervision of investigational development (background research, hypothesis, methods, data analysis, data interpretation)</td>
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<td></td>
<td>• Presentations: mentorship and constructive review of poster and oral presentations for local and national forums</td>
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<tr>
<td></td>
<td>• Mentorship of authoring/successful submission of scientific, peer reviewed publication</td>
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<td>• Mentorship and co-authored Project Mu- Metabolomics for the P50-“Trauma Primes Cells” NIH grant renewal</td>
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<td>• 3rd place, Earl Young paper completion, Western Trauma Association 2016</td>
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<td>• UCH, Ben Eiseman Basic Science Award-2016</td>
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<td>• ACS Committee on Trauma, resident paper competition, Region 8 winner- 2016</td>
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<td></td>
<td>• Oral presentation, ASC 2016</td>
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<td>• Poster presentation, 38th Annual Conference on Shock, 2015</td>
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<td>• Oral presentation, SWSC 2015</td>
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<td>• Oral presentation, scientific forum, ACS 2015</td>
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<td>• Co-author publication, Shock 2016</td>
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<td>• 1st author publication, JTACS 2016</td>
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<td>• Co-author publication, Shock 2015</td>
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<td>• 1st author publication, Shock 2015</td>
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## Student and Resident Mentorship (cont.)

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<tr>
<th>T32 Research Fellow</th>
<th>Mentor Responsibilities</th>
<th>Achievements of Mentee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Toni Bacon</td>
<td>T32 mentor 2014-2016</td>
<td>3 co-author peer reviewed publications │ Oral and poster presentations at national forums</td>
</tr>
<tr>
<td>Dr. Alex Morton</td>
<td>T32 mentor 2014-2016</td>
<td>3 co-author peer reviewed publications │ Oral and poster presentations at national forums</td>
</tr>
<tr>
<td>Dr. Peter Einersen</td>
<td>T32 mentor 2015-present</td>
<td>1st author publication │ Development of advanced evaluation of TEG assessment with 2 manuscripts in process/submission</td>
</tr>
<tr>
<td>Dr. Geoff Nunns</td>
<td>T32 mentor 2016-present</td>
<td>Oral presentation, ASC 2017 │ Oral presentation, SWSC 2017</td>
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