Scientific Session

48th Annual Resident and Fellow Trauma Paper Competition

Presented during the

103nd ANNUAL MEETING
of the American College of Surgeons
Committee on Trauma

Thursday, March 13, 2025
Chicago, IL

ACS Committee on Trauma
American College of Surgeons

The content and opinions expressed in these papers and presentations are those of the individual participants and not necessarily those of the American College of Surgeons.

633 N. Saint Clair St.
Chicago, IL 60611-3211

facs.org

Scientific Session

48th ANNUAL RESIDENT and FELLOW TRAUMA PAPER COMPETITION

103rd ANNUAL MEETING
of the
Committee on Trauma
American College of Surgeons

MODERATORS:
Warren C. Dorlac, MD, FACS
(Chair, Regional Committees on Trauma)
Margaret M. Morgan, MD, FACS
Julie Y. L. Valenzuela, MD, FACS

Thursday, March 13, 2025
Chicago, IL

Acknowledgements

The American College of Surgeons gratefully acknowledges the generous support from the following individuals and organizations for the 48th Resident and Fellow Trauma Paper Competition between **March 1, 2024, and January 31, 2025**:

John H. Armstrong, MD, FACS
Jeffrey A. Bailey, MD, FACS
Galinos Barmparas, MD, FACS
Allison E. Berndtson, MD, FACS
David P. Blake, MD, FACS
Craig J. Brenner, MD
Sigrid K. Burruss, MD, FACS
Warren C. Dorlac, MD, FACS
Kimberly T. Joseph, MD, FACS
Benjamin Mosher, MD, FACS
Thomas J. Schroeppel, MD, MS, FACS
George E. Vates, MD, FACS
Anonymous

Maryland Committee on Trauma
Missouri Committee on Trauma
Region VII Committee on Trauma
Trauma and Critical Care Educational Foundation (Kenneth L. Mattox, MD, FACS)

CONTINUING MEDICAL EDUCATION CREDIT INFORMATION

Accreditation

The American College of Surgeons is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

AMA PRA Category 1 Credits™

The American College of Surgeons designates this live activity for a maximum of **5.25** *AMA PRA Category 1 Credits*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Provider approved by the California Board of Registered Nursing, Provider Number CEP 17399 for 5.25 contact hours.

ADDITIONAL CME INFORMATION

CME

Successful completion of this CME activity, which includes participation in the evaluation component, enables the learner to earn credit toward the CME of the American Board of Surgery's Continuous Certification program.

Opt In to Automatically Send your CME Data to the ABS

By attending an ACS-accredited activity, you may choose to participate in the automatic transfer of your CME credits to the ABS via the ACCME.

The direct automatic transfer applies to all learners who have an ACS profile, are Diplomates of the ABS, and have provided their ABS ID and date of birth in the ACS MyCME Portal on the Board Certification page.

By updating your preferences using the simple steps below, you can opt in for this automatic transfer:

1. Log in to your **MyCME Portal.**
2. Select Send CME tab.
3. Check the box that states "Yes! I choose to opt in and permit the ACS to automatically transfer all my *ACS-accredited CME data* to my chosen specialty board earned March 1, 2021, and forward."

You can change your preferences and opt out at any time.

For more information or to request assistance, contact mycme@facs.org

PROGRAM OBJECTIVES

- Discuss current research in patient care for trauma injuries
- Evaluate new methods for treatment of trauma patients
- Expose residents and fellows to the practice of scholarly study, presentation, and discussion.

DISCLOSURE INFORMATION

In accordance with the ACCME Accreditation Criteria, the American College of Surgeons must ensure that anyone in a position to control the content of the educational activity (planners and speakers/authors/discussants/moderators) has disclosed all financial relationships with any commercial interest (termed by the ACCME as "ineligible companies," defined below) held in the last 24 months (see below for definitions). Please note that first authors were required to collect and submit disclosure information on behalf of all other authors/contributors, if applicable.

Ineligible Company: The ACCME defines an "ineligible company" as any entity producing, marketing, re-selling, or distributing health care goods or services used on or consumed by patients. Providers of clinical services directly to patients are NOT included in this definition.
Financial Relationships: Relationships in which the individual benefits by receiving a salary, royalty, intellectual property rights, consulting fee, honoraria, ownership interest (e.g., stocks, stock options or other ownership interest, excluding diversified mutual funds), or other financial benefit. Financial benefits are usually associated with roles such as employment, management position, independent contractor (including contracted research), consulting, speaking and teaching, membership on advisory committees or review panels, board membership, and other activities from which remuneration is received, or expected.
Conflict of Interest: Circumstances create a conflict of interest when an individual has an opportunity to affect CME content about products or services of an ineligible company with which he/she has a financial relationship.

The ACCME also requires that ACS manage any reported conflict and eliminate the potential for bias during the educational activity. Any conflicts noted below have been managed to our satisfaction. The disclosure information is intended to identify any commercial relationships and allow learners to form their own judgments. However, if you perceive a bias during the educational activity, please report it on the evaluation.

Continuing Medical Education Credit Information, cont.

Speakers / Authors	No relevant financial relationships to Disclose	Disclosure		
		Company	Role	Received
Rald V. M. Groven, MD	Rald V. M. Groven, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Terra M. Hill, MD, MSc	Terra M. Hill, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
John Kessler, MD	John Kessler, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Derek Krinock, MD	Derek Krinock, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Ashley Flinn Patterson, MD	Ashley Flinn Patterson, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Darby Little, MD	Darby Little, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Pawan Mathew, MD	Pawan Mathew, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Jessica L. Masch, MD	Jessica L. Masch, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Kajal Mehta, MD, MPH	Kajal Mehta, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Milandeep, MBBS, MS, MCh	Milandeep, MBBS, MS, MCh, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Alyscia Severence, MD	Alyscia Severence, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			

Continuing Medical Education Credit Information, cont.

Benjamin Stocker, MD	Benjamin Stocker, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			

SPEAKERS / AUTHORS	NO RELEVANT FINANCIAL RELATIONSHIPS TO DISCLOSE	DISCLOSURE		
		COMPANY	ROLE	RECEIVED
Gena V. Topper, MD	Gena V. Topper, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Franly A. Vasquez Burgos, MD	Franly A. Vasquez Burgos, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Gregory Wetmore, MD	Gregory Wetmore, MD, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
PLANNING COMMITTEE / EDITORIAL COMMITTEE	**NO RELEVANT FINANCIAL RELATIONSHIPS TO DISCLOSE**	**DISCLOSURE**		
		COMPANY	**ROLE**	**RECEIVED**
Warren C. Dorlac, MD, FACS		**Aspen Medical**	**Consultant for Aspen Medical**	**Salary received from Apsen Medical**
Andrew C. Bernard, MD, FACS	Andrew C. Bernard, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Cherisse D. Berry, MD, FACS	Cherisse D. Berry, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Meera Kotagal, MD, FACS	Meera Kotagal, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Thomas J. Schroeppel, MD, FACS	Thomas J. Schroeppel, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Raymond Fang, MD, FACS	Raymond Fang, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose			
Elizabeth N. Turner, MD, FACS	Elizabeth N. Turner, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Mayur B. Patel, MD, FACS	Mayur B. Patel, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			

Rishi Rattan, MD, FACS		**Intuitive Surgical; Apple Inc.**	**Consultant for Intuitive Surgical and Apple Inc.**	**Training grant Intuitive Surgical; Consultant fees Apple Inc.**
PLANNING COMMITTEE / EDITORIAL COMMITTEE	**NO RELEVANT FINANCIAL RELATIONSHIPS TO DISCLOSE**	**DISCLOSURE**		
		COMPANY	**ROLE**	**RECEIVED**
Jordan A. Weinberg, MD, FACS	Jordan A. Weinberg, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Brad J. Yoo, MD, FACS	Brad J. Yoo, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
DISCUSSANTS / CO-MODERATORS	**NO RELEVANT FINANCIAL RELATIONSHIPS TO DISCLOSE**	**DISCLOSURE**		
		COMPANY	**ROLE**	**RECEIVED**
Saman Arbabi, MD, FACS	Saman Arbabi, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Galinos Barmparas, MD, FACS	Galinos Barmparas, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
David P. Blake, MD, FACS	David P. Blake, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Sigrid Burruss, MD, FACS	Sigrid Burruss, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Benjamin L. Davis, MD, FACS	Benjamin L. Davis, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Christopher J. Dente, MD, FACS	Christopher J. Dente, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Michael Dingeldein, MD, FACS	Michael Dingeldein, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Victor Joe, MD, FACS	Victor Joe, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			

Continuing Medical Education Credit Information, cont.

Margaret M. Morgan, MD, FACS	Margaret M. Morgan, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Nicholas Namias, MD, FACS	Nicolas Namias, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
DISCUSSANTS / CO-MODERATORS	**NO RELEVANT FINANCIAL RELATIONSHIPS TO DISCLOSE**	**DISCLOSURE**		
		COMPANY	**ROLE**	**RECEIVED**
Purvi Patel, MD, FACS	Purvi Patel, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Timothy Plackett, MD, FACS	Timothy Plackett, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
David J. Schultz, MD, FACS	David J. Schultz, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Dave S. Shapiro, MD, FACS	Dave S. Shapiro, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
S. Rob Todd, MD, FACS	S. Rob Todd, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Roxanne Todor, MD, FACS	Roxanne Todor, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			
Julie Valenzuela, MD, FACS	Julie Valenzuela, MD, FACS, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.			

Year	1st Place	Runner(s) Up
1978	John A. Weigelt	Mary H. McGrath
1979	Joseph V. Boykin	Christopher C. Baker Frank D. Manart
1980	Robert Tranbaugh	Gary M. Gartsman John B. Moore
1981	Kenneth Kollmeyer	Kenneth A. Kudsk James Hammesfahr
1982	Raj K. Narayan	George S. Fortner Hani Shennib
1983	Mark DeGroot	Gregory Luna Mercedes Dullum
1984	Ronald B. O'Gorman	Louis Ostrow Frederick A. Moore
1985	Lawrence Reed	Frank Shannon M. Rebot
1986	Richard S. Downey	Richard Kiplovic Wiley W. Souba

Year	Basic Laboratory Science	Clinical Research
1987	1. Nicholas B. Vedder 2. B. Timothy Baxter	1. Eric DeMaria 2. John D.S. Reid
1988	1. Gary Fantini 2. David H. Livingston	1. Christoph Kaufmann 2. Tomasso Bochicchio
1989	1. David K. Magnuson 2. Matthew L. Cooper	1. Bradley Reeves 2. Danielle Desloges
1990	1. William J. Mileski 2. Gary A. Gelfand 2. Jon C. Walsh	1. Miguel Lopez Viego
1991	1. Roy W. Hong 2. Benjamin O. Anderson	1. Karl Illig 2. Carson Agee
1992	1. Michael O'Reilly 2. David Bensard	1. William S. Hoff 2. Juan Manuel Sarmiento-Martinez
1993	1. Thomas T. Sato 2. Paul A. Taheri 2. Alastair C. J. Windsor	1. Patricia Yugueros
1994	1. James T. Wilson 2. Robert F. Noel Jr.	1. Stefan J. Konasiewicz 2. Paul J. Gagne
1995	1. Donald W. Pate	1. Russell R. Lonser

Resident and Fellow Trauma Paper Competition – Past Winners

Year	Basic Laboratory Science	Clinical Research
	2. Carol J. Cornejo	2. John J. Keleman
1996	1. Kenneth E. Drazan 2. Carlton C. Barnett Jr.	1. Peter D. Wearden 2. Nicholas Namias
1997	1. Randy J. Irwin 2. Molly M. Buzdon	1. Preston R. Miller 2. Katharina Pellegrin
1998	1. Geoffrey Manley 2. Gregory J. McKenna	1. E. Lynne Henderson 2. Juan P. Carbonell
1999	1. Andrew Kramer 2. D. Kirk Lawlor	1. Garret Zallen 2. Avery B. Nathens
2000	1. Philip P. Narini 2. George D. Oreopoulos	1. Joseph T. Rabban 2. Avery B. Nathens
2001	1. Deepa Soni 2. Daron C. Hitt	1. John-Paul Veri 2. Moishe Lieberman
2002	1. Jonas Gopez 2. Steven Casha	1. Ram Nirula 2. Seong K. Lee
2003	1. Eve C. Tsai 2. Katherine Barsness	1. Steven Fox 2. David J. Schultz
2004	1. Rachel G. Khadaroo 2. Manuel B. Torres	1. Matthew Rosengart 2. Carlos V. R. Brown
2005	1. John M. Hwang 2. Aaron M. Cheng	1. Felicia Ivascu 2. Stephanie P. Acierno
2006	1. Preya Ananthakrishnan 2. Jessica Deree	1. Alexander L. Eastman 2. David O. Francis
2007	1. Alexander Q. Ereso 2. Sagar S. Damle	1. Alexandra Mihailovic 2. Heather F. Pidcoke
2008	1. Jason M. Seery 2. Elizabeth A. Sailhamer	1. Joseph F. Golob Jr. 2. Sherene Shalhub
2009	1. Elizabeth A. Sailhamer 2. Reed B. Kuehn	1. Alexios A. Adamides 2. Joseph DuBose
2010	1. Angela L. F. Gibson [Reg 5] 2. Arash Farahvar [Reg 2]	1. Barbara Haas, [Reg 12] 2. Thomas M. Schmelzer [Reg 4]
2011	1. Laura E. White [Reg 6] 2. Marlene Mathews [Reg 2]	1. Levi D. Procter [Reg 4] 2. Matthew D. Neal [Reg 5]
2012	1. Laura E. White [Reg 6] 2. Alex Cuenca [Reg 4]	1. Kristin Cook [Reg 2] 2. Jennifer Roberts [Reg 5]
2013	1. Abubaker A. Ali [Reg 5] 2. Isaiah R. Turnbull [Reg 7] 2. Kristin L. Long [Reg 4]	1. Eiman Zargaran [Reg 11] 2. David A. Hampton [Reg 10]
2014	1. Michaela C. Kollisch-Singule [Reg 2] 2. Matthew W. Ralls [Reg 5]	1. Hunter B. Moore [Reg 8] 2. Vanessa J. Fawcett [Reg 10]

Resident and Fellow Trauma Paper Competition – Past Winners

Year	Basic Laboratory Science	Clinical Research
2015	1. Simone M. Langness [Reg 9] 2. Michaela C. Kollisch-Singule [Reg 2]	1. Deepika Nehra [Reg 10] 2. Cherisse Berry [Reg 3]
2016	1. Rachel M. Russo [Reg 13] 2. Sarah Ogle [Reg 9]	1. James P. Byrne [Reg 12] 2. Lynn Hutchings [Reg 15]
2017	1. Teresa C. Rice [Reg 5] 2. Theresa Chan [Reg 9]	1. Stephanie A. Mason [Reg 12] 2. Sabrina Balakrishnan, MBBS [Reg 16]
2018	1. Michael Valliere [Reg 7] 2. Theresa Chan [Reg 9]	1. Luke R. Johnson [Reg 13] 2. Jarred R. Gallaher [Reg 4]
2019	1. Elliott Williams [Reg 9] 2. Patricia Martinez-Quinones [Reg 4]	1. Hope Villiard [Reg 7] 2. Parin Boonthum [Reg 16]
2020	1. Julia R. Coleman [Reg 8] 2. Amanda M. Chipman [Reg 3]	1. Alexandra Dixon [Reg 10] 2. Jetan H. Badhiwala [Reg 12]
2021	1. Julia R. Coleman [Reg 8] 2. Zachary A. Matthay [Reg 9]	1. Max Marsden [Reg 15] 2. Eric Walser [Reg 12]
2022	1. Jessie W. Ho [Reg 5] 2. Mark Berry [Reg 9]	1. Luis I. Ruffolo [Reg 2] 2. Mary Bokenkamp [Reg 1] 2. Jeongyoon (Jenny) Moon [Reg 12]
2023	1. Terry (TJ) R. Schaid [Reg 8] 2. Jennifer A. Munley [Reg 4]	1. Karan K'Souza [Reg 11] 2. Ann Polcari [Reg 5]
2024	**Overall 1st, 2nd, 3rd Place** 1. Lauren Gallagher [Reg 8] 2. Adam D. Price [Reg 5] Tie 3. Sophia Engel [Reg 15] Tie 3. Jennifer A. Munley [Reg 4]	**Achieving Excellence in Surgery through Equity** 1. Armaan K. Malhotra [Reg 12]

Competition in 2026

Look ahead at the 2026 Competition –

Deadline for regional first place submission of region winners - ***December 10, 2025!***

Regional first place winners automatically present at March COT Annual Meeting.

Second place Regional winners will not be reviewed for presentations in March but will be eligible for a scholarship to attend the Mattox Vegas Trauma, Critical Care & Acute Care Surgery (TCCACS) annual meeting in Las Vegas, Nevada. The scholarship program has previously awarded meeting registration and hotel accommodations.

All selected presenters will be required to ***submit a submission-ready manuscript by February 1, 2026***; the manuscript will be considered part of the final winner selection in March.

Prizes to be awarded will recognize the First and Second Place Winners in both Basic Science and Clinical Research papers.

Inclusion of *"Achieving Excellence in Surgery through Equity"* ***prize***

For detailed information on next year's competition, please refer to the Resident and Fellow Trauma Paper Competition web page at:
https://www.facs.org/quality-programs/trauma/committee-on-trauma/trauma-papers-competition/

Region 1 **Pawan Mathew, MD**
Yale School of Medicine, New Haven, CT
"Cellular Telephone Activity as a Predictor of Trauma Patient Volume in New England: A Study from the Research Consortium of New England Centers for Trauma (ReCONECT)"

Region 2 **Gena V. Topper, MD**
Cooper University Hospital, Camden, NJ
"Sex Dimorphic Outcomes After Whole Blood Resuscitation"

Region 3 **John Kessler II, MD**
University of Maryland, Baltimore, MD
"Plasma MicroRNA Biomarkers for Multiorgan Injury Prediction after Blunt Trauma"

Region 4 **Alyscia Severance, MD**
University of Mississippi Medical Center, Jackson, MS
"Understanding the Community Experience of Firearm Violence in the Deep South: A Needs Assessment"

Region 5 **Gregory Wetmore, MD**
University of Cincinnati Medical Center, Cincinnati, OH
"The Utility of UCHL1 as a Marker of Hemorrhagic Shock"

Region 6 **Derek Krinock, MD**
University of Arkansas for Medical Sciences/Arkansas Children's Hospital, Little Rock, AR
"Preventable Pediatric Trauma Transfers in a Rural State"

Region 7 **Terra Hill, MD, MSc**
University of Kansas Medical Center, Kansas City, KS
"Risk Factors of Intimate Partner Violence: Breaking the Cycle of Repeat Violence"

Region 8 **Benjamin Stocker, MD**
University of Colorado Anschutz Medical Campus, Denver, CO
"Protease-Activated Receptor 1-Derived Biased Agonist Peptide Mitigates Endotheliopathy of Trauma In Vitro"

2025 Regional Winners, cont.

Region 9 **Jessica Masch, MD**
University of California San Diego, San Diego, CA
"Cyborg Surgeons: AI-Assisted Decision-Making in Trauma Care"

Region 10 **Kajal Mehta, MD, MPH**
Harborview Medical Center, University of Washington, Seattle, WA
"Enteral-based Resuscitation for Major Burn Injuries in Nepal: Results from a Pilot Hybrid II Effectiveness-Implementation Randomized Trial"

Region 12 **Darby Little, MD**
University of Toronto, Toronto, ON, Canada
"Evaluating Disparities in Burn Injury Outcomes for Uninsured Patients in a "Universal" Healthcare System"

Region 13 **Ashley Nicole Flinn Patterson, MD**
San Antonio Uniformed Services Health Education Consortium, San Antonio, TX
"Bridging the Gap in Wartime Hemorrhage Control: Endovascular Detection and Treatment of Non-Compressible Torso Hemorrhage in a Swine Model"

Region 14 **Franly Arismendy Vasquez Burgos, MD**
Hospital Dr. Salvador B. Gautier, Santo Domingo, Dominican Republic
"Impact of the Optic Nerve Sheath Diameter Variability in Patients with Medical and Surgical Management of Traumatic Brain Injury"

Region 15 **Rald V. M. Groven, MD, PhD**
RWTH Aachen University Hospital, Aachen, Germany
"Combined C5 and CD14 Inhibition Balances Immunological MicroRNA Responses After Multiple Trauma in Pigs"

Region 16 **Milandeep, MBBS, MS, MCh**
JPN Apex Trauma Center, New Delhi, India
"Impact of Psychosocial Intervention on Quality of life in Patients with Post-Traumatic Limb Amputation/s: A Randomized Controlled Trial"

Institution and location current at time of Paper/Abstract submission

Region 5 **Gregory Wetmore, MD**
University of Cincinnati Medical Center, Cincinnati, OH
"The Utility of UCHL1 as a Marker of Hemorrhagic Shock"
Discussant: Michael W. Dingeldein, MD, FACS

Region 16 **FMilandeep MBBS, MS, MCh**
JPN Apex Trauma Center, New Delhi, India
"Impact of Psychosocial Intervention on Quality of life in Patients with Post-traumatic limb Amputation/s: A Randomized Controlled Trial"
Discussant: Christopher J. Dente, MD, FACS

Region 3 **John Kessler II, MD**
University of Maryland, Baltimore, MD
"Plasma MicroRNA Biomarkers for Multi-organ Injury Prediction after Blunt Trauma"
Discussant: Victor C. Joe, MD, MBA, FACS

Region 12 **Darby Little, MD**
University of Toronto, Toronto, ON, Canada
"Evaluating Disparities in Burn Injury Outcomes for Uninsured Patients in a "Universal" Healthcare System"
Discussant: Saman Arbabi, MD, MPH, FACS

Region 10 **Kajal Mehta, MD, MPH**
Harborview Medical Center, University of Washington, Seattle, WA
"Enteral-based Resuscitation for Major Burn Injuries in Nepal: Results from a Pilot Hybrid II Effectiveness-Implementation Randomized Trial"
Discussant: Sigrid K. Burruss, MD, FACS

Region 15 **Rald V. M. Groven, MD, PhD**
RWTH Aachen University Hospital, Aachen, Germany
"Combined C5 and CD14 Inhibition Balances Immunological MicroRNA Responses After Multiple Trauma in Pigs"
Discussant: D. Roxanne Todor, MD, MBA, FACS

Institution and location current at time of all Paper/Abstract submissions.

THE AFTERNOON SESSION WILL RUN 3:30-6:00 PM (SAME LOCATION)

2025 Presentation Order, cont.

Region 7 **Terra Hill, MD, MSc**
University of Kansas Medical Center, Kansas City, KS
"Risk Factors of Intimate Partner Violence: Breaking the Cycle of Repeat Violence"
Discussant: S. Rob Todd, MD, FACS

Region 13 **Ashley Nicole Flinn Patterson, MD**
San Antonio Uniformed Services Health Education Consortium, San Antonio, TX
"Bridging the Gap in Wartime Hemorrhage Control: Endovascular Detection and Treatment of Non-Compressible Torso Hemorrhage in a Swine Model"
Discussant: David P. Blake, MD, MPH, DMCC, FACS

Region 9 **Jessica Masch, MD**
University of California San Diego, San Diego, CA
"Cyborg Surgeons: AI-Assisted Decision-Making in Trauma Care"
Discussant: Purvi P. Patel, MD, MHPE, FACS

Region 6 **Derek Krinock, MD**
University of Arkansas for Medical Sciences/Arkansas Children's Hospital, Little Rock, AR
"Preventable Pediatric Trauma Transfers in a Rural State"
Discussant: David J. Schultz, MD, FACS

Region 14 **Franly Arismendy Vasquez Burgos, MD**
Hospital Dr. Salvador B. Gautier, Santo Domingo, Dominican Republic
"Impact of the Optic Nerve Sheath Diameter Variability in Patients with Medical and Surgical Management of Traumatic Brain Injury"
Discussant: Nicholas Namias, MD, MBA, FACS

Region 2 **Gena V. Topper MD**
Cooper University Hospital, Camden, NJ
"Sex Dimorphic Outcomes after Whole Blood Resuscitation"
Discussant: Timothy P. Plackett, DO, MPH, FACS

Region 8 **Benjamin Stocker, MD**
University of Colorado Anschutz Medical Campus, Denver, CO
"Protease-Activated Receptor 1-Derived Biased Agonist Peptide Mitigates Endotheliopathy of Trauma In Vitro"
Discussant: Elizabeth N. Turner, MD, CM, MS, FACS, FABA

Region 4 **Alyscia Severance, MD**
University of Mississippi Medical Center, Jackson, MS
"Understanding the Community Experience of Firearm Violence in the Deep South: A Needs Assessment"
Discussant: David S. Shapiro, MD, MHCM, FACS, FCCM

Region 1 **Pawan Mathew, MD**
Yale School of Medicine, New Haven, CT
"Cellular Telephone Activity as a Predictor of Trauma Patient Volume in New England: A Study from the Research Consortium of New England Centers for Trauma (ReCONECT)"
Discussant: Galinos Barmparas, MD, FACS

The Utility of UCHL1 as a Marker of Hemorrhagic Shock

Gregory C. Wetmore, MD, Ellen R. Becker, MD, Matthew R. Baucom, MD, Adam D. Price, MD, Robby C. Shondel, BS, Maia P. Smith, PhD, Rebecca M. Schuster, MD, Timothy A. Pritts, MD, PhD, FACS, Michael D. Goodman, MD, FACS

Background:
Ubiquitin carboxyl-terminal hydrolase L1 (UCHL1) is a deubiquitinating enzyme studied for its potential as a serum biomarker of traumatic brain injury (TBI). However, there is limited data to support the use of UCHL1 in critically injured or polytrauma patients. Previous data from our lab demonstrated that in murine models serum UCHL1 is not specific to TBI given dramatic elevations seen in isolated hemorrhagic shock. In this study, we hypothesized that UCHL1 is a better marker of hemorrhagic shock rather than isolated head injury in human critically injured and polytrauma patients.

Study Design:
Serum samples were collected from 425 ICU admitted trauma patients on arrival, 24, and 72 hours at a single urban, Level 1 trauma center from September 2021 through August 2022. Samples were retrospectively analyzed for UCHL1 via ELISA. Supplementary clinical data were collected from medical record review. TBI was defined as the presence of intracerebral findings on radiographic imaging. Blood transfusion was used as a surrogate for hemorrhagic shock and characterized as massive (>4 units packed RBC or whole blood in the first four hours), submassive (1-4 units), or no transfusion. Statistical analysis included univariate, Kruskal-Wallis, and Spearman correlation analysis.

Results:
The cohort was severely injured with a mean (SD) Injury Severity Score of 22.6 (12.1) and a 30-day mortality rate of 9.8%. UCHL1 level was associated with TBI diagnosis at arrival ($p=0.02$) but not at 24 or 72 hours). Mean UCLH1 was significantly elevated in massive transfusions patients at 24 (rho= 0.21) and 72 (rho= 0.19) hours with an associated $p<.001$. In addition, mean UCHL1 was significantly elevated in the 30-day mortality group at arrival, 24, and 72 hours ($P<0.04$). When compared to lactic acid, the current standard marker in shock and resuscitation, mean lactic acid was also elevated with massive transfusion at arrival (rho=0.38), 6 (rho=0.19), and 24 (rho=0.25) with $p<0.002$ at all points. Mean lactic was also elevated in the 30-day mortality group at arrival, 6, and 24 hours ($p<0.04$).

Conclusions:
Serum UCHL1 levels are dramatically elevated after both TBI and hemorrhagic shock in critically ill trauma patients. UCHL1 is not specific to isolated head injury given its significant elevation with hemorrhagic shock. Given these findings, UCLH1 may be a better indicator of global hypoperfusion, as in hemorrhagic shock or severe TBI, rather than isolated head injury. The statistical associations with shock and 30-day mortality even to 72 hours make UCHL1 a possible specific marker of shock and resuscitation progression which could be applied to rapid bedside assessment.

Table 1. Mean (SE) UCHL1 and lactate levels in patients with TBI or transfusion requirement.

	0hr UCHL1 pg/mL	24hr UCHL1 pg/mL	72hr UCHL1 pg/mL	0hr Lactic mMol/L	6hr Lactic mMol/L	24hr Lactic mMol/L
No TBI	1544 (144)	867 (114)	652 (91)	-	-	-
TBI	2105 (272)	836 (143)	594 (126)	-	-	-
No Transfusion	1629 (158)	794 (110)	549 (79)	2.7 (0.16)	2.3 (0.10)	1.9 (0.19)
Submassive	1619 (214)	815 (158)	540 (132)	4.2 (0.26)	2.8 (0.23)	2.3 (0.25)
Massive	2781 (619)	1520 (415)	1644 (457)	5.0 (0.60)	3.6 (0.47)	2.8 (0.48)

Impact of Psychosocial Intervention on Quality of Life in Patients with Post-Traumatic Limb Amputation/s: A Randomized Controlled Trial

Milandeep, MBBS, MS, MCh, Sagar R, Sagar S, Priyadarshini P, Kumar A, Alam J, Bagaria D, Chaudhary N, Gupta A, Mishra B, Sahu A, Pandey S, Kumar S.

Introduction:
Annually, an estimated 1.19 million individuals succumb to acquired trauma on a global scale, with an additional 20-50 million individuals experiencing various forms of disability. Rapid industrialization and motorization have propelled Road Traffic Injury (RTI) to become leading cause of Disability Adjusted Life Years (DALYs) and significant number of amputations. Post-traumatic amputations engender a tumultuous array of emotions for the individual affected which ranges from general anxiety disorders to depression and can even lead to self-harm. These amputations are abrupt in nature and hence impart and heighten psychological impact on patients compared to amputations stemming from other medical reasons. Hence, study was designed to evaluate the effect of brief psychosocial intervention on Quality of Life of post traumatic amputees.

Material and Methods:
This was a Randomized control study. Patients >18 years of age, well oriented and coherent, with social support and with no prior history of psychological illness who underwent post traumatic extremity amputation/s were taken. Baseline questionnaires for psychological assessment were filled as soon as possible after the surgery with informed consent. These patients were randomized (n=74), and conventional care was given to Group A (n=39) and psychosocial intervention was given to Group B (n=35) for 7 weeks. Patients of both the groups were asked to fill in the same questionnaire after 8 weeks post first assessment.

Results:
74 patients with post- traumatic amputation/s were enrolled in the study. Mean age of cohort was 32.8 years with male predominance (n=70). RTI as the most common mechanism of injury. All 4 domains (physical health, psychological health, social relationship, environment domain) WHO total and Overall quality of life showed significant improvement in both the groups but there was significant difference between the groups. Depression was significantly decreased in both the groups in 8 weeks but there was no significant difference between two groups (p=0.101). Same trend was followed by anxiety and stress. But body image showed a significant improvement in Group B than Group A (p= 0.023).

Conclusions:
Our study did not manifest any observable positive effects on indicators such as quality of life, depression, stress or anxiety but positive alterations were seen on body image. But positive results might be observed in the quality of life of amputees if larger study with longer duration of psychosocial intervention is conducted.

Region 3 – Basic Science

Plasma microRNA Biomarkers for Multi-Organ Injury Prediction after Blunt Trauma

John Kessler, MD, Chanhee Park, PhD, Ziyi Li, PhD, Andrew O. Suen, MD, Shiming Yang, PhD, Rosemary Kozar, MD, FACS, Lin Zou, PhD, Brittney Williams, MD, Peter Hu, PhD, Wei Chao, MD, PhD

Background:
In the setting of traumatic injury post stabilization, patients are at an increased risk of morbidity and mortality due to secondary multiorgan injury. However, our abilities to predict the downstream pathophysiology and adverse outcomes of trauma is limited. Extracellular miRNAs (ex-miRNAs) are believed to be the upstream driver for trauma-induced inflammation and other pathophysiological responses. Released from injured tissues, ex-miRNAs lead to proinflammatory cytokine production and endothelial activation. Recent studies from our lab demonstrate that plasma miRNAs are markedly upregulated in trauma patients and exhibit a remarkable pro-inflammatory property. The current project is aimed to test a panel of plasma miRNAs for their association with various trauma pathophysiology as well as the predictive abilities of plasma miRNAs for trauma-induced multiorgan injury.

Study Design:
A panel of 12 miRNA biomarker candidates were selected based on four criteria following plasma RNA-seq analysis: 1) > 1.5 fold upregulated (n=10, trauma / control), 2) most abundant, 3) ability to induce IL-6 production in a cell-based assay, and 4) p-value ranking. For evaluation of the selected miRNAs, 48 patients with blunt trauma and 24 healthy age and sex matched controls were enrolled for a statistical power of 0.86. Trauma patients were further grouped as severely injured (Injury severity score (ISS) > 15) or less severely injured (ISS ≤ 15). Clinical data and blood samples were collected upon admission on day 1. Plasma RNA was extracted using Qiagen miRNeasy micro kit and cel-miR-39-3p spike-in control was added prior to RNA extraction for extraction variance control. QIAcuity One digital PCR system was used to quantify miRNA copy numbers. Inflammatory and coagulation mediators as well as organ injury markers were measured through fluorescent bead-based multiplex Luminex assay. The statistical significance of miRNA expression and clinical data was assessed by using parametric t-test with Welch's correction, one-way ANOVA, and Bonferroni test.

Results:
All 12 selected ex-miRNA biomarker candidates were markedly upregulated in the trauma cohort compared to the healthy controls (6.8-79.4 fold, $p<0.001$). Nine miRNAs were expressed higher in severely injured patients compared to less severely injured ($p<0.05$). Additionally, in plasma injury makers, S100B and Enolase2, both markers of brain injury, showed increased levels in trauma patients. D-dimer, tissue factor, von Willebrand factor, and P-selectin were increased in the trauma patients indicating increased coagulation activation, and blood clotting. Next, most ex-miRNA biomarker candidates are moderately ($r>0.4$ and $p<0.05$) or strongly ($r>0.7$ and $p<0.05$) correlated with inflammation (IL6, CXCL2, IL8), endothelial glycocalyx degradation and injury (syndecan-1), lung injury (ANG2), brain injury (enolase 2 and S100B), and coagulation activation (vWF-A2). In clinical laboratory data, AST, ALT, lactate, and white blood count were all elevated in severely injured patients, indicating liver injury, increase of anerobic metabolism, and leukocyte mobilization, respectively. Most ex-miRNA biomarker candidates are moderately or strongly correlated with clinical makers of liver injury (AST,

ALT, T-BIL) and coagulation (PT, INR). Finally, using the Random Forest modeling, our data show that the panel of 12 miRNAs can predict severe liver injury (ALT, AST, T-BIL), brain injury (enolase2, S100b), ISS, Lactate, D-dimer, inflammation (IL-6, IL-8), and presence of organ injury (AUROC ≥ 0.7).

Conclusion:
This pilot study demonstrates this panel of plasma miRNAs have broad correlations with pro-inflammatory protein mediators and possess good abilities to predict trauma severity, coagulopathy, inflammation, and multiple organ injuries.

Region 12 – Clinical Research

Evaluating Disparities in Burn Injury Outcomes for Uninsured Patients in a "Universal" Healthcare System

Darby Little, MD, Dave Gwun, Ryan Huang, Barbara Haas, MD, PhD FACS, Stephanie Mason, MBBCh, PhD, FACS

Introduction:
Lacking health insurance has been previously shown to be associated with poor outcomes for burn patients in two-tier healthcare systems. However, outcomes for burn patients by insurance status in a universal healthcare system have not been previously described.

Materials Methods:
A retrospective chart review was conducted at a single centre in Toronto, Canada, from January 1, 2010, to December 31, 2023. Only a patient's first acute burn admission was included. Univariate analyses were conducted using chi-square, ANOVA, or Kruskal-Wallis tests. Multivariable regression models were employed to adjust for possible confounders.

Results:
A total of 2480 patients were identified. Patients were categorized into three insurance groups: provincial or national insurance (n = 2141), worker's compensation (n = 270), and no governmental insurance (n = 68). Univariate analysis demonstrated significant differences by insurance status for length of stay, number of surgeries, complications, discharge disposition, and mortality ($p < 0.05$). Multivariable regression analyses revealed that patients without governmental insurance had greater odds of being discharged without supports compared to those with insurance ($p < 0.001$), while patients with worker's compensation had significantly longer length of stay ($p = 0.003$) and reduced risk of mortality ($p = 0.02$), after adjusting for clinical and demographic characteristics.

Conclusion:
This study sheds light on the complex interplay between insurance status and burn injury outcomes within a universal healthcare system. By identifying disparities in discharge disposition, the findings underscore the need for targeted interventions aimed at improving post discharge support for uninsured burn patients.

Enteral-based Resuscitation for Major Burn Injuries in Nepal: Results from a Pilot Hybrid II Effectiveness-Implementation Randomized Trial

Kajal A. Mehta MD, MPH, Raslina Shrestha MBBS, Pariwesh R. Bista BS, Manish K. Yadav, MBBS, MCh, Tam N. Pham, MD, FACS, Shankar M. Rai, MBBS, MCh, Kiran Nakarmi, MBBS, MCh, Barclay T. Stewart, MD, PhD, FACS

Introduction:
Resuscitation for major burns is challenging in low-resource settings, including low- and middle-income countries, rural facilities, during prolonged military field care, and mass casualty incidents. Enteral-based resuscitation (ER) has operational advantages in austere settings and is recommended by leading guidelines. However, there are no data to inform ER safety, effectiveness and implementation in real-world scenarios.

Methods:
We conducted a single-center hybrid type II effectiveness-implementation pilot randomized controlled trial at the largest burn center in Nepal. Adults and children with 15-40% TBSA burns who arrived within 24 hours of injury were included. The intervention arm received goal-directed ER with WHO oral rehydration solution administered orally or via nasogastric tube, with intravenous (IV) fluid supplementation as indicated for gastrointestinal (GI) intolerance, persistent oliguria, or shock. Standard of care arm received goal-directed IV resuscitation. Both arms received education, supplies, flowsheets, and communication tools. Resuscitation endpoints, symptoms, biomarkers and clinical outcomes were measured. The Consolidated Framework for Implementation Research was used to identify challenges and facilitators of ER and IV resuscitation implementation via provider focus group discussions (FGD), patient in-depth interviews (IDI), and quantitative measures of protocol fidelity. Results from the pilot phase (80 subjects) are presented.

Results:
Provider FGD and patient IDI informed development of context-appropriate ER and IV protocols and implementation strategies. Patient demographics between arms were similar (Table 1). Primary outcome of achieving goal urine output was similar between groups, although 24-hour resuscitation volume was higher in the ER group. More patients in ER experienced gastrointestinal (GI) symptoms, however incidence of aspiration events, acute kidney injury (AKI), renal failure, and death during resuscitation were similar between arms. These pilot data suggest that an appropriate sample size for the complete trial is 120 subjects.

Implementation of our CDR led to a decline in CT rate from 0.68 scan/patient to 0.48 scan/patient (p=0.006) with a corresponding 36% reduction in non-indicated scans (p=0.07). Overall rule compliance was 73.6%. After applying the rule-specific inclusion and exclusion criteria, applicability was the highest in QMH algorithm, followed by PECARN, CHALICE and finally CATCH.

Conclusion:
An ER protocol was safely and effectively implemented in a low-resource environment. Resuscitation endpoints and adverse event endpoints are similar between arms, although ER causes more GI symptoms. ER is likely a safe and effective resuscitation adjunct in low-resource environments when needed.

Table 1. Patient demographics and intravenous (IV) and enteral-based resuscitation (ER) measures

	IV resuscitation *(n=38)*	**Enterally-based resuscitation** *(n=42)*	**p value**
Patient age, median ([med], IQR)	43.5 years (24.3-61.5)	46.5 years (30.0-65.0)	0.558
Burn size (% TBSA), med	26.5% (20.0-35.8)	29.0% (20.0-34.3)	0.681
Time from injury to resuscitation, med	13.3 hours (8.0-18.1)	11.1 hours (8.5-15.5)	0.523
Achieved goal urine output (n, %)	16 (42.1%)	14 (33.3%)	0.563
24-hour resuscitation volume, med	4.12 mL/kg/%TBSA (3.26-5.61)	5.46 mL/kg/%TBSA (4.52-6.68)	0.012
Arterial lactate at 24 hours, med	1.60 (1.20, 2.40)	1.80 (1.30, 2.08)	0.888
GI symptoms* during resuscitation (n, %)	8 (21.1%)	28 (66.7%)	0.001
Aspiration during resuscitation (n, %)	0 (0%)	0 (0%)	0.655
AKI during resuscitation (n, %)	14 (36.8%)	15 (35.7%)	1.00
Renal failure within 72 hours (n, %)	2 (5.3%)	2 (4.8%)	1.00
Death within 72 hours (n, %)	0 (0%)	0 (0%)	0.655

*GI symptoms are considered any of the following: nausea, bloating, distension, diarrhea, vomiting

Combined C5 and CD14 Inhibition Balances Immunological MicroRNA Responses after Multiple Trauma in Pigs

Rald V. M. Groven, MD

Background:
Multiple trauma can exert severe immunological responses at sites of injury and in the systemic circulation. Modulating the post-traumatic immune response may therefore offer therapeutic potential in the treatment of multiply traumatized patients. A novel combined inhibition therapy targeting C5 and CD14, can facilitate such a modulation. Among the cellular communication mechanisms that are involved in regulating the immune response after trauma, are microRNAs (miRNAs), key gene expression regulators with known involvements in trauma immunology and tissue regeneration. The aim of this study was therefore to investigate the effect of the novel combined C5/CD14 inhibition on the expression of miRNAs at the fracture site and in the systemic circulation over time, in a standardized porcine multiple trauma model. Furthermore, the expression of the mRNA targets of the obtained deregulated miRNAs were profiled at the fracture site and in end organs.

Methods:
The multiple trauma model consisted of bilateral femur fractures, blunt chest trauma, liver laceration, and pressure controlled hemorrhagic shock. General anesthesia was maintained throughout the whole study and animals were monitored under ICU-standards for 72 h. Two experimental groups were defined: intramedullary nailing (IMN; n=8), and IMN with combined C5/CD14 inhibition (n=4). Fracture hematoma, fractured bone, unfractured control bone, lung, and liver samples were collected. Extracellular-vesicles (EVs) were isolated from plasma at 1.5, 2.5, 24, and 72 hours post-trauma. MiRNA qPCR array analyses were performed on pooled fxH, fX, CB, and EV samples. *In silico* mRNA target prediction and mRNA qPCR analyses were conducted on all samples.

Results:
The miRNA qPCR arrays and mRNA analyses showed that, compared to IMN, the combined C5/CD14 inhibition group exhibited potent anti-inflammatory miRNA and mRNA responses at the fracture site, while downregulating anti-osteogenic miRNAs. Furthermore, the combined C5/CD14 inhibition treatment reduced the expression of pro-inflammatory and pro-fibrotic EV-carried miRNAs in the systemic circulation and that of their respective downstream mRNA targets in the lung and liver.

Conclusion:
Combined C5 and CD14 inhibition promoted anti-inflammatory miRNA and mRNA expression at the injury site, while preserving osteogenesis by downregulating anti-osteogenic miRNAs. In the systemic circulation, the C5/CD14 inhibition reduced inflammatory miRNA expression, which matched with the results from the in vivo mRNA target analyses in the lung and liver. Thus, C5/CD14 inhibition may be a novel therapeutic to modulate post-traumatic immune responses and decrease systemic effects of surgical trauma.

THE AFTERNOON SESSION WILL RUN 3:30-6:00 PM (SAME LOCATION)

Region 7 – Clinical Research

Risk Factors of Intimate Partner Violence: Breaking the Cycle of Repeat Violence

Terra M. Hill, MD, Lauren T. Kerivan, MD,
Christopher A. Guidry, MD, FACS, Robert D. Winfield, MD, FACS

Objective:
Intimate partner violence (IPV) is a global health concern, spanning generations and countries. Given the social, cultural, and psychological complexities associated with IPV, it remains under-addressed. We aim to identify commonly associated risk factors in those who have experienced IPV and explore the relationship between IPV and social vulnerability.

Methods:
A retrospective, cross-sectional review of adult patients' IPV injury at our ACS verified Level I Trauma Center between 2012 to 2022 was performed. County-level Social Vulnerability Index (SVI) scores were obtained from the 2022 CDC and Agency for Toxic Substances & Disease Registry and divided into quartiles with a range of 0 to 1 from lowest to highest social vulnerability. Incidence rate ratios (IRRs) were produced between SVI-quartiles and location of patients' residences with a multivariable Poisson regression model. Lastly, a thematic analysis of the relationship status of perpetrator, location of the incident, and context of these encounters was completed.

Results:
In total, 129 patient encounters were reviewed. The majority (81%) were females and patients had a median age of 36 years. Injury patterns differed with the sex of patients, with 88.6% of blunt injuries occurring in female patients, while 55.6% of penetrating trauma occurred in male patients ($p < 0.0001$). A prior history of IPV was reported in 36% of encounters, in these, 91.5% were in females ($p = 0.05$) and 90% were associated with alcohol misuse ($p=0.03$). SVI-designations were identified for counties of Wyandotte and Johnson of Kansas and Clay and Jackson of Missouri. The highest SVI (fourth quartile) was in Wyandotte county and lowest (first quartile) in Johnson County, with Clay and Jackson counties being in the second and third quartiles, respectively. Comparing the highest to the lowest SVI neighborhoods, the IRR was 12.9 ($p <0.0001$). Thematic analysis revealed that the majority of patients experiencing IPV were injured by a current, unmarried significant other, occurring within their homes, almost 10% involved a long duration of physical abuse and/or being held under captivity, and almost 20% reported being strangled and/or experiencing a loss of consciousness.

Conclusion:
Communities with greater social vulnerability are associated with higher rates of IPV. In addition, more than a third of IPV patients had a prior history of IPV. With this, we believe the greatest opportunity for injury prevention of IPV is through an expansion of services of our Hospital Based Violence Intervention Program for those surviving an initial episode of IPV as well as community development and investment of socially vulnerable neighborhoods.

Bridging the Gap in Wartime Hemorrhage Control: Endovascular Detection and Treatment of Non-Compressible Torso Hemorrhage in a Swine Model

CPT Ashley N. Flinn Patterson, MD, CPT Maria E. Navarro, MD, Anna Rogalska, DO,
Jason Rall, PhD, Stephanie S. Combs, RN,
MAJ Theodore G. Hart, MD, LTC(P), Marlin W. Causey, MD

Background:
The landmark paper *Death on the Battlefield* [1] highlighted that 24% of fatal battlefield injuries are potentially survivable, 91% of which resulted from lethal hemorrhage. The challenge in modern combat casualty care lies in stabilizing and sustaining casualties until they can reach definitive treatment at a Role 3 Facility (or Field Hospital). Resuscitative endovascular balloon occlusion of the aorta (REBOA) revolutionized the temporization of vascular injuries in the torso or pelvis, broadly referred to as non-compressible torso hemorrhage (NCTH); however, REBOA ultimately serves as a non-targeted means of hemorrhage control and is a bridge to invasive open cavitary surgery via laparotomy or thoracotomy to definitively treat the injury. Our research laboratory focuses on advancing effective hemorrhage control techniques closer to the point of injury using minimally invasive, easily transportable endovascular diagnostic and treatment modalities in deployed environments.

Methods:
A 12-animal pilot study was initiated to both develop a reproducible NCTH model in swine (*Sus scrofa*) and to test the feasibility of endovascular localization of an aortic injury using intravascular ultrasound (IVUS) and a novel prototype multi-sensor pressure catheter (MSPC) consisting of equally spaced pressure sensors that report intravascular pressures along its length. This was followed by a 10-animal treatment study performed without fluoroscopic guidance utilizing IVUS or MSPC techniques to deploy a covered stent(s) to obtain hemostasis after localization. Baseline pre-injury data was gathered from each endovascular device prior to creation of an aortic injury with aortic punch biopsy. In the treatment group, IVUS or MSPC was used to localize aortic injury and deploy a stent at the injury site. Data was collected from the IVUS or MSPC until the animal met death criteria and was euthanized. In the case of stent placement, the thoracic aorta was explanted to evaluate the accuracy of stent placement.

Results:
Twelve animals entered the pilot study weighing an average of 82 kilograms. Heparinization was routinely added to the model to prevent thrombosis of intravascular sheaths and catheters. The 3.6-4.0mm aortic punch biopsies were preferred given thrombosis of smaller sizes (2.8mm) and rapid hemodynamic collapse in larger sizes (4.8-6mm). IVUS imaging demonstrated several diagnostic clues to free hemorrhage to include aortic wall disruption and the ability to confirm aortic control using Chromaflo on the 0.018” platform. MSPC demonstrated the ability to detect a difference in pressure between sensors above and below the known site of injury including real-time calculation utilizing pulse pressure differences between sensors. In the treatment group, all injuries were able to be visualized on IVUS as a disruption in the hyperechoic aortic wall. The metal stent grafts could be visualized on the IVUS output as a “crown-like” array of hyperechoic lines. The stent was successfully placed over the aortic injury in 5 out of 6 stent placements of the 5 animals in the IVUS group based on confirmatory fluoroscopy and posthumous visual inspection. In the MSPC group, 5 stents were deployed in 5 animals with 3 covering the injury.

Region 13 Basic Science, cont.

Conclusion:

Our study demonstrates the feasibility of two portable endovascular technologies to localize and guide treatment of lethal hemorrhage. These findings highlight the potential to advance from the non-targeted control of REBOA and to expand treatment of hemorrhage in the absence of fixed-imaging fluoroscopic guidance which is highly applicable in forward surgical or austere settings. The ability to deliver less invasive surgical approaches would mirror treatment of similar injuries in civilian trauma. The treatment portion of our study was limited by the use of these technologies in parallel. However, we observe that the development of a single, streamlined device combining visualization of an injury with IVUS guided by real-time hemodynamic measurements above and below the injury with MSPC would overcome these limitations and allow for targeted balloon occlusion and/or stent treatment localized to an aortic injury. Future investigations will focus on the applicability of this approach to other forms of NCTH such as solid organ injuries and branch-vessel injuries commonly treated by embolization or catheter-directed techniques typically requiring fixed imaging in civilian trauma.

[1]Eastridge BJ, Mabry RL, Seguin P, et al. Death on the battlefield (2001-2011): implications for the future of combat casualty care [published correction appears in J Trauma Acute Care Surg. 2013 Feb;74(2):706. Kotwal, Russell S [corrected to Kotwal, Russ S]]. *J Trauma Acute Care Surg*. 2012;73(6 Suppl 5):S431-S437. doi:10.1097/TA.0b013e3182755dcc

Disclaimers:

- The views expressed are those of the presenters and do not reflect the official views or policy of the Department of Defense or its Components
- The experiments herein were conducted according to the principles set forth in the National Research Council's Guide for the Care and Use of Laboratory Animals (8th ed.), and the Animal Welfare Act of 1966, as amended.
- The views of Philips are not necessarily the official views of, or endorsed by, the US Government, the Department of Defense, or the Department of the Air Force. No Federal endorsement of Philips is intended.
- The presenters do not have any financial interest in the companies whose materials are discussed in this presentation and no federal endorsement of the companies and materials is intended.
- This research was funded by the Defense Health Agency Research and Development Directorate (J9).
- No authors have any individual relevant disclosures.

Cyborg Surgeons: AI-Assisted Decision-Making in Trauma Care

Jessica L. Masch, MD, John Austin, MD, Laura N. Haines, MD, FACS
Allison E. Berndtson, MD, FACS, Jarrett E. Santorelli, MD, FACS

Introduction:
The use of artificial intelligence (AI) in healthcare is expanding, with potential applications in clinical decision-making. One area of interest is using AI to assist in managing acutely injured trauma patients by providing recommendations for the next steps in care. This study aimed to evaluate the ability of ChatGPT, a large language model, to respond to different trauma patient scenarios and dictate appropriate clinical actions. We hypothesized that ChatGPT would perform comparably to senior surgical residents in recommending next steps for trauma patients.

Study Design:
Three trauma patient scenarios, each with 3-5 critical decision points, were presented to ChatGPT and a group of five senior surgical residents (PGY-3 or higher). Before presenting the scenarios, ChatGPT was provided with the University of California San Diego institutional trauma handbook to reference standardized protocols. An expert panel of trauma surgeons evaluated the responses using a Likert scale (1-5) for appropriateness, accuracy, and adherence to standard trauma care guidelines. The same scenarios were presented to the residents, and their responses were graded using the same criteria.

Results:
ChatGPT demonstrated remarkable proficiency in handling all of the presented trauma scenarios. A comparison of ChatGPT and resident scenario scores is reported in Table 1.

Comparison of Resident and ChatGPT Scenario Scores

	Resident 1	Resident 2	Resident 3	Resident 4	Resident 5	Mean Resident Score	Mean ChatGPT Score	p-value
Scenario 1	4.17±0.29	3.25±0.25	3.50±0.87	4.17±0.29	4.25±0.43	3.87±0.59	4.58±0.14	p<0.001
Scenario 2	4.83±0.29	3.00±0.50	3.17±0.29	3.17±0.29	4.00±0.00	3.63±0.77	5.00±0.00	p<0.001
Scenario 3	4.41±0.52	3.83±0.29	2.83±0.29	4.17±0.29	4.67±0.29	3.98±0.72	5.00±0.00	p<0.001

Table 1: Comparison of Resident and ChatGPT Scenario Scores

Conclusion:
The high scores achieved by ChatGPT suggest that large AI language models can perform at or above the level of senior surgical residents in managing trauma patient scenarios. By ensuring adherence to established protocols, AI can improve the consistency and quality of trauma care. This technology holds significant potential, especially for rural and non-trauma centers, where access to experienced trauma specialists may be limited. AI-driven decision support tools could provide real-time guidance, enabling these centers to manage complex trauma cases more effectively and align patient care with best practices. Future studies should focus on integrating AI into clinical workflows, enhancing its specificity, and expanding its use to improve patient outcomes across diverse healthcare settings.

Region 6 – Clinical Research

Preventable Pediatric Trauma Transfers in a Rural State

Derek J. Krinock, MD, Macllain Edington, BS, Savannah Walker, MD, FACS, Esma Birisci, PhD, Shonda Grappe, MSN, Lindsey L. Wolf, MD, MPH, Deidre L. Wyrick, MD, FACS

Introduction:
In a rural state, children with traumatic injuries are often first evaluated by a medical provider at a non-dedicated pediatric facility. This individual will then make the determination of whether the patient's condition warrants transfer to a pediatric trauma center (PTC). We sought to evaluate the preventable transfers (PTs) in the pediatric trauma population of our rural state.

Methods:
We performed a single-site retrospective cohort study at a level 1 PTC, evaluating all patients <18 years old who presented as an activated trauma transfer from an outside facility between 1/2018-12/2023. PTs were defined as patients who were discharged from the emergency department or admitted for <24 hours without requiring operation or cross-sectional imaging following transfer. Bivariate analysis compared PTs to patients characterized as unpreventable transfers (UPTs) and multivariable logistic regression determined predictors of PT.

Results:
We included 762 patients with mean age of 10.3 years (SD=5.6) and 65% (n=496) were male. Twenty-six percent (n=200) of patients were determined to be PTs, with 112 patients discharging from the emergency department after transfer. PTs had a lower mean injury severity score (ISS) than UPTs (8.8 versus 18.7, p<0.001). Injury to the head (p<0.001), chest (p=0.012), abdomen (p=0.015), appendicular skeleton (p<0.001), and nonaccidental trauma (p=0.011) were associated with UPT. Patients requiring subspecialty consultation with neurosurgery (OR=0.379, 95%CI=0.204-0.701, p=0.002) or otolaryngology (OR=0.455, 95%CI=0.212-0.974, p=0.043) were less likely to be PTs. Eighty-six percent (n=112) of patients discharged from the emergency department following transfer were classified as PTs (Table).

Conclusion:
A quarter of activated trauma transfers were classified as preventable, with over half of those patients being discharged from the emergency department. Several factors were associated with PTs, most notably injury severity. Telemedicine consultation with a pediatric trauma team may provide a potential method to improve pre-transfer triage for mild and moderately injured children.

Table. Measured Outcomes

Outcomes	Overall	Unpreventable	Preventable	p-value
Discharged from ED	130 (17)	18 (14)	112 (86)	<0.001
No operative intervention	445 (58)	245 (55)	200 (45)	<0.001
Admitted to hospital				
Admitted to ICU	294 (39)	285 (97)	9 (3)	<0.001
Length of stay <24 hours	287 (38)	87 (30)	200 (70)	<0.001
Average length of stay, hours, mean (SD)	133.8 (287.3)	153.1 (305.4)	14.3 (5.1)	<0.001

Impact of the Optic Nerve Sheath Diameter Variability in Patients with Medical and Surgical Management of Traumatic Brain Injury

Franly A. Vásquez-Burgos, MD, Juan C. Salcedo-Moreno, MD, Cesar O. Quintero-Moreno, MD, Francisco J. Rojas-Collazos, MD, Santiago Cardona-Collazos, MD, Johana A. Moreno-Drada, PhD, Lina M. Villegas-Trujillo, MSc, Oscar A. Escobar-Vidarte, MD, Andrés M. Rubiano, MD

Background:
Traumatic Brain Injury (TBI) is a significant public health issue especially in less resourced settings. High intracranial pressure (ICP) is associated with poor prognosis and mortality. Invasive monitoring of ICP is not widely available and due to this, ultrasound has emerged as a promising diagnostic tool. This study aims to identify changes in Optic Nerve Sheath Diameter (ONSD) ultrasound values in TBI patients undergoing surgery and their association with clinical and imaging findings factors.

Study Design:
We conducted a retrospective observational study involving 35 patients with TBI who underwent surgical intervention. The database included ONSD measurements at admission, both pre- and post-surgery, along with clinical, neuroimaging, and invasive monitoring variables. Bivariate analysis using ANOVA was performed to assess differences between groups.

Results:
82.9% of the patients included were men with a mean age of 43.40±19.45 years. 28.7% experienced severe TBI, whereas 37.1% experienced mild TBI. 31.4% presented reduced compliance defined with an ONSD>6 mm, 40% showed optic nerve asymmetry greater than 0.5mm on admission, and 62% had an image with surgical indication at admission. Statistically significant differences were observed between the ONSD at admission and pre and postsurgical measurements (p=0.001). Pre-surgical ONSD measurements in those who died and in those who lived were greater than the post-surgical measurements of ONSD (p=0.006 [0.107; 0.740]).

Conclusion:
ONSD might serve as a prognostic indicator for patients with TBI undergoing surgery, given that reduced compliance upon admission is linked to higher mortality rates.

Keywords:
Traumatic brain injury, decompressive craniectomy, intracranial pressure, optic nerve sheath diameter, ultrasound.

Region 2 – Clinical Research

Sex Dimorphic Outcomes after Whole Blood Resuscitation

Gena V. Topper, MD

Background:
Contemporary whole blood (WB) used for resuscitation in the civilian setting years, demonstrates fewer complications, lower subsequent transfusion volumes, and a possible survival advantage over component therapy (CT) alone. Female patients receiving CT, in particular, experience fewer in-hospital complications and lower overall mortality after hemorrhagic shock, potentially due to baseline endogenous hypercoagulability and immunologic response after injury. We hypothesized that pre-menopausal female patients (<52 years) treated with whole blood have improved outcomes and lower subsequent transfusion requirements as compared to similar male and post-menopausal female patients.

Methods:
This is a retrospective cohort analysis using the American College of Surgeons National Trauma Data Bank (NTDB) including patients between 18-90 years, transfused ≥ one unit of WB between 1/1/2020-12/31/2022. Patients who were pregnant, died within one hour, had a pre-existing bleeding disorder, were transferred from another facility, were on anticoagulation or antiplatelet therapy, or had a Head Abbreviated Injury Scale (AIS) score >2 were excluded. Data on demographic characteristics, comorbidities, injury characteristics, and patient disposition were collected. A subgroup analysis was conducted for patients who underwent massive transfusion (MT), defined as receiving at least four units of any blood product in the first four hours of admission. The primary outcome was in-hospital mortality. Logistic regression and Cox regression were used to model factors that contributed to mortality, and linear regression was used to model the secondary outcomes; intensive care unit length of stay (ICU LOS), hospital LOS (HLOS), ventilator days, discharge disposition, in-hospital complications, and blood product utilization. Multivariate analysis was conducted using women <52 as the reference group.

Results:
14,445 patients were included: 9,139 male patients aged 18-51, 1,359 female patients aged 18-51, 2,925 male patients aged 52-90, and 1,022 female patients aged 52-90. On univariate analysis, males received more WB and blood products than females in both age groups (all $p<0.005$), yet men were more likely to develop an AKI than their age-matched female counterparts (3.5% vs 2.1%, $p=0.007$ in patients <52; 6.6% vs 3.2%, $p<0.001$ in patients ≥52). Male and female patients <52 had equivalent mortality, yet in patients ≥52, females demonstrated a lower mortality (17.4% vs 13.9%, $p=0.01$). Males ≥52 were also more likely to have a respiratory complication (1.8% vs 0.9%, $p=0.045$). On multivariate analysis, mortality increased with two or more in-hospital complications, an AIS chest or abdomen >3, MT , and being an older male or female compared to being a younger female patient (all $p<0.001$). Higher SBP on admission was protective against mortality ($p=0.002$). HLOS increased with the occurrence of hospital events ($p<0.001$), having at least one comorbidity ($p<0.001$), or being a younger male or female ($p=0.002$ and 0.005). ICU LOS increased with any in-hospital complications ($p<0.001$).

Blood product utilization was decreased with higher admission SBP ($p<0.001$), increased with AIS chest or abdomen >3 ($p<0.001$), or being a male of any age compared to a younger female ($p<0.001$). Among those who underwent MT (6,849 male, 1,131 female), female patients received one less unit of blood product in the first four hours of admission ($p<0.001$).

Conclusion:
After receiving WB, female patients of all ages required fewer subsequent blood transfusions, had fewer complications, and improved mortality compared to male patients despite more severe injuries and longer interval between admission and hemorrhage control procedure. This coincides with recent basic science data. Further research is required to elucidate the mechanisms of this advantage.

Region 8 – Basic Science

Protease-Activated Receptor-Derived Biased Agonist Peptides Mitigate Endotheliopathy of Trauma in Vitro with Unique Metabolomic Signature

Benjamin W. Stocker, MD, Christopher Erickson, PhD, Sanchayita Sen, MS, Otto Thielen, MD, Lauren T. Gallagher, MD, Kirk Hansen, PhD, Angelo D'Alessandro, PhD, John H. Griffin, PhD, Laurent O. Mosnier, PhD, Mitchell J. Cohen, MD, FACS

Background:
Traumatic injury causes systemic inflammation and endotheliopathy. In addition to its anticoagulant function which results in trauma-induced coagulopathy, activated protein C (aPC) is cytoprotective via protease-activated receptor (PAR) signaling. We hypothesized that PAR-derived biased agonist peptides would mimic aPC and mitigate the endotheliopathy of trauma *in vitro*.

Study Design:
Endothelial cells (EC) were grown to confluence and pretreated for 5 minutes with PAR1 or PAR3 peptides or recombinant 3K3A-aPC. Recombinant 3K3A-aPC fully retains aPC's PAR signaling but less than 10% of its anticoagulant activity. EC were then subjected to 10% final volume *ex vivo* trauma plasma (TP) collected from severely injured trauma patients. The electrical resistances across EC were measured using electric cell-substrate impedance sensing (ECIS). Decreasing resistance signifies an increase in permeability. A larger area under the curve (AUC) corresponds to less permeability. Calibrated automated thrombogram (CAT) was used to measure thrombin production in TP with the addition of 3K3A-aPC or PAR-derived peptides in EC-lined wells.

Results:
Pretreatment with PAR1 peptide decreased TP's permeability effect (AUC 0.46 vs. 0.42, p=0.03, Figure 1) and mitigated the initial resistance drop caused by TP (normalized resistance 0.61 vs. 0.50, p=0.03). The PAR1 peptide's permeability protection was similar to 3K3A-aPC (AUC 0.46 vs. 0.47, p=0.69). PAR3 peptide pretreatment did not significantly alter the effects of TP. PAR1 peptide did not affect thrombin production while 3K3A-aPC significantly blunted the production of thrombin in TP as measured by CAT (Figure 2).

Conclusion:
Pretreatment with the PAR1-derived peptide mitigates the endotheliopathy caused by TP. While 3K3A-aPC affects thrombin production, the PAR1 peptide did not hinder thrombin production. Thus, PAR1 peptide agonism may be a promising therapeutic to treat the endotheliopathy of trauma without directly affecting coagulation after trauma.

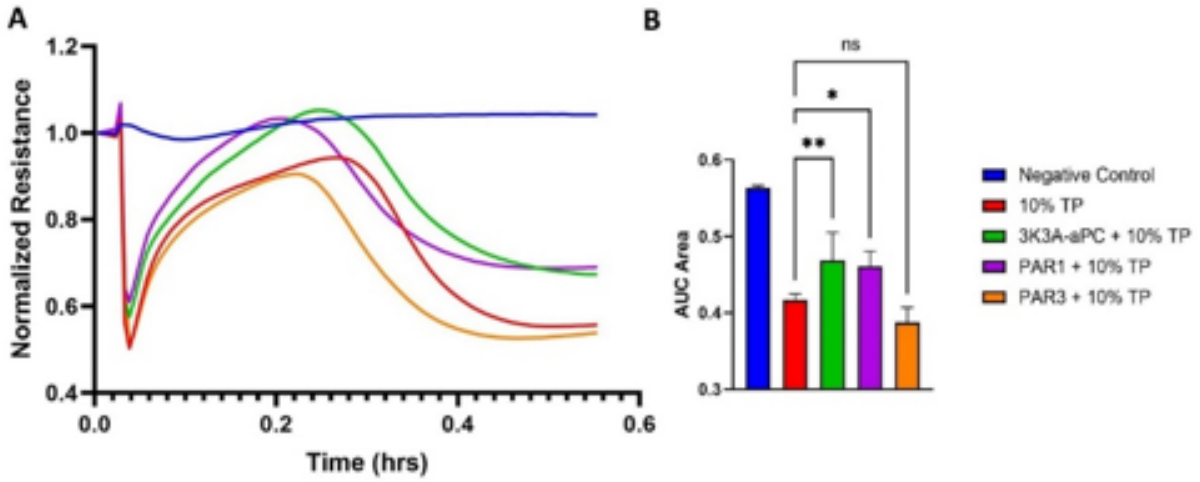


Figure 1: A) ECIS permeability curves after trauma plasma (TP) stimulation with or without pretreatment. B) AUC of permeability curves.

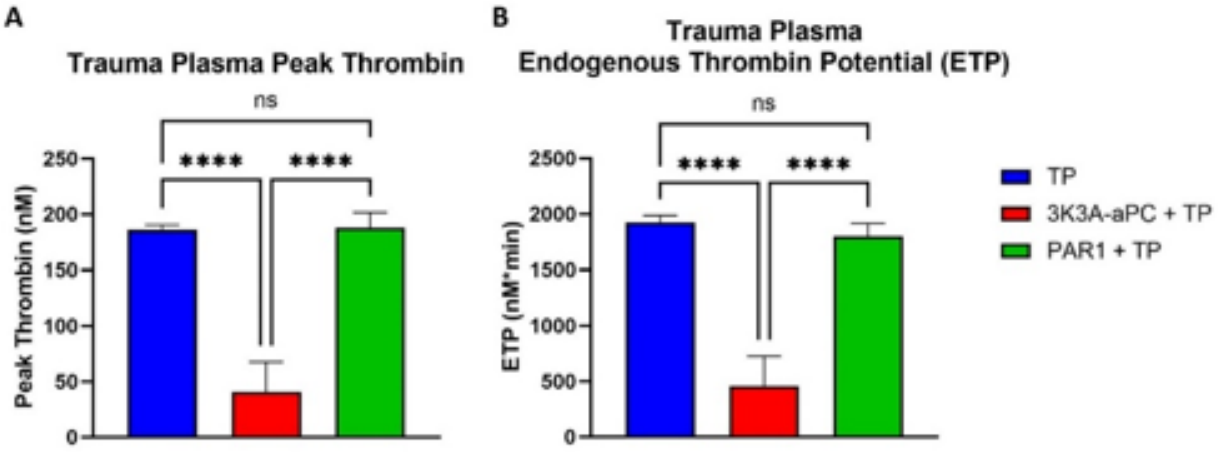


Figure 2: Calibrated automated thrombogram (CAT) measurement of peak thrombin production (A) and total endogenous thrombin potential (B) of trauma plasma (TP) with or without pretreatment.

Region 4 – Clinical Research

Understanding the Community Experience of Firearm Violence in the Deep South: A Needs Assessment

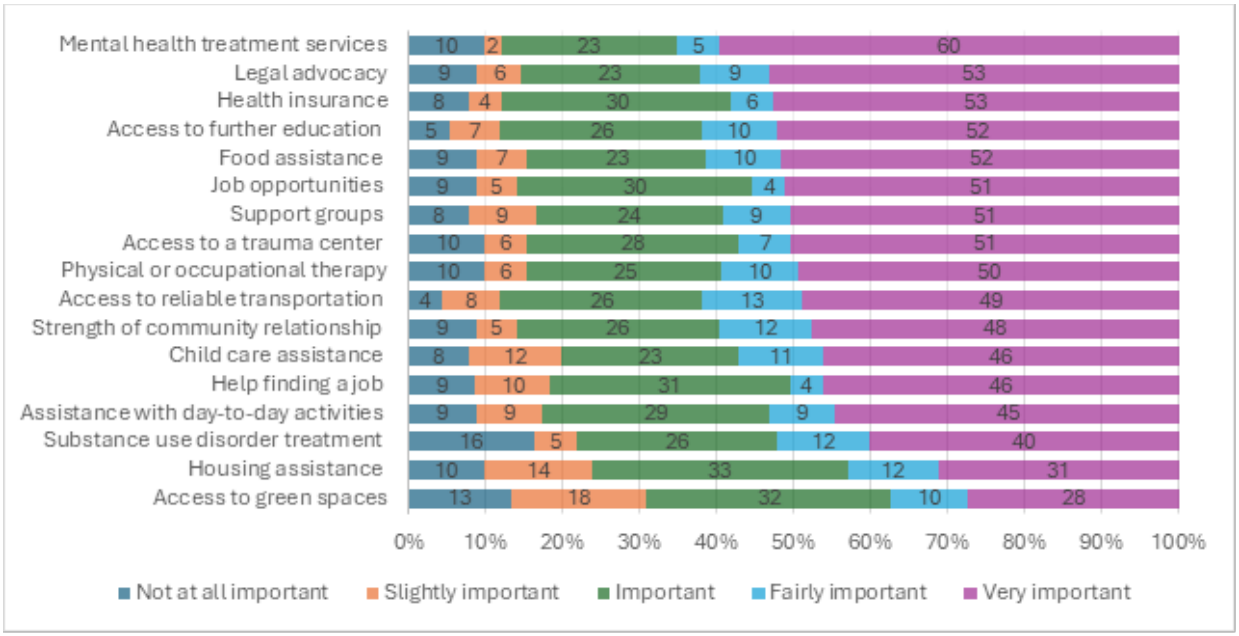
Alyscia C. Severance MD, M. Karimi, MPH, L. Seidfaraji, MPH, E. Dehon, PhD, L. Vearrier, MD, DB, F. Womack, L. Zhang, PhD, MBA, M. E. Kutcher, MD, MS, FACS, R. Lumumba, JD, M. C. Morris, PhD

Background:
Hospital-based violence intervention programs exist in an ecosystem including community-based organizations as well as individual members of the communities they serve. As part of a community participatory design process aimed at creating hospital-linked violence prevention and intervention initiatives, a survey was distributed to local community stakeholders to assess community exposure to guns and violence, as well as to elicit community perceptions of risk factors for, and recovery needs of, survivors from firearm injury.

Study Design:
A REDCap-based survey was distributed to known community stakeholder e-mail lists and advertised via direct communication with patients admitted after incidents of firearm violence between 1/2024 and 5/2024. Domains assessed include demographics, firearm exposure, needs of firearm survivors and their families, and risk factors for firearm violence in our community. Additionally, firearm injury survivors were asked to evaluate physical, mental, and emotional stress during recovery, as well as the quality of their medical care.

Results:
93 respondents were surveyed, including 22 who had recovered from a gunshot injury. Subjects were an average of 39 years old; 96% were Black, and 60% were women. 53% were college educated and 50% had an income below the state median. Exposure to firearms was common, with 36% reporting having a gun in the home, 88% reporting hearing gunshots within the last 3 months, and 87% reporting having a family member shot or killed by a gun. Respondents identified mental health treatment services, legal advocacy, and health insurance as the most important needs of firearm injury survivors. The strongest risk factors for firearm violence were reported as rates of community violence, gang activity, and the impact of other mental or physical health conditions. Of the 24% of subjects who had personally experienced a firearm injury, 43% reported that it changed their relationship with family and friends, and 50% reported their injuries were hard to deal with emotionally. Only 43% felt that the care they received in the hospital was good.

Conclusion:
This needs assessment survey highlights several key community needs that will shape the design of local hospital violence intervention and prevention strategies. Given the reported need for mental health services and the significant emotional component of difficulties encountered during injury recovery, integrating the provision of mental health services into violence prevention and intervention efforts will be key in maintaining responsiveness to community-articulated needs.


Mental health treatment services 10 2 23 5 60
Legal advocacy 9 6 23 9 53
Health insurance 8 4 30 6 53
Access to further education 5 7 26 10 52
Food assistance 9 7 23 10 52
Job opportunities 9 5 30 4 51
Support groups 8 9 24 9 51
Access to a trauma center 10 6 28 7 51
Physical or occupational therapy 10 6 25 10 50
Access to reliable transportation 4 8 26 13 49
Strength of community relationship 9 5 26 12 48
Child care assistance 8 12 23 11 46
Help finding a job 9 10 31 4 46
Assistance with day-to-day activities 9 9 29 9 45
Substance use disorder treatment 16 5 26 12 40
Housing assistance 10 14 33 12 31
Access to green spaces 13 18 32 10 28
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Not at all important
Slightly important
Important
Fairly important
Very important

Region 1 – Clinical Research

Cellular Telephone Activity as a Predictor of Trauma Patient Volume in New England: A Study from the Research Consortium of New England Centers for Trauma (ReCONECT)

Pawan Mathew, MD, Reginald Alouidor, MD, FACS, Alia Aunchman, MD, FACS, Haytham Kaafarani, MD, MPH, FACS, Jane Keating, MD, Stephanie Lueckel, MD, FACS, Manuel Moutinho, MD, FACS, Kevin Schuster, MD, MPH, FACS

Background:
We sought to understand whether cellular telephone activity in commercial spaces as a marker for population mobility would be associated with trauma admission volumes. We took advantage of cellular telephone data made available during the COVID pandemic along with the large swings in population activity to investigate this possibility.

Study Design:
Trauma registry data from six level I trauma centers (TC) in New England were used to identify the number and nature of daily trauma admissions (TA) from January 20, 2020, to August 24, 2021. Center setting ranged from rural to urban. The Device Exposure Index (DEX) is a standardized measure of daily cellular telephone interactions with other cellular telephones within a county. Median, standard deviation and range for daily values of the DEX and number of TA were calculated. Spearman's rank correlation was calculated for the first wave of Covid-19 from March 2020 to May 2020 and for June 2020 to December 2020. Center-specific Poisson models were created to control seasonality.

Results:
During the study period, daily TA ranged from 13 to 77 (median 42) across all participating TC and substantial between center differences in daily TA volumes were observed (TC 1 median 4 vs. TC 2 median 10, $p<0.001$). After declaration of a public health emergency (PHE) on March 10, 2020, both the county DEX and overall number of TA's declined sharply (80.5% and 70.5% respectively), both reaching their lowest levels at the end of March. Daily TA recovered to PHE levels by July 2020, whereas the DEX recovered more slowly, reaching pre-PHE levels in Spring of 2021. The daily DEX index was moderately correlated with TA from March to May of 2020 for five centers serving unique catchment areas, Spearman's rho: ranging from 0.22 to 0.47 ($p<0.05$) (Table 1). The sixth center where the catchment area overlaps with those of multiple level I centers had much lower correlation $\rho = 0.06$ ($p=0.59$) (Table 1). After controlling seasonality, DEX vs. TA relationships remained significant across the same five centers (Table 2).

Conclusion:
County-level daily DEX scores correlated significantly with TC-specific numbers of daily TA at 5 of 6 TC during the first three months after the PHE declaration. From June 2020 onward, TA quickly recovered to pre-PHE levels while DEX scores recovered more slowly. Similarity in these larger and longer-term trends may allow for trauma system planning. Additional research is needed; however, use of cellular telephone activity and interactions may be a valuable adjunct for trauma system planning.

Table 1. Spearman's rho correlation coefficient

	3/1/20-5/31/20		6/1-12/31/20		1/1/21-8/24/21	
Center	**Spearman's rho**	**p-value**	**Spearman's rho**	**p-value**	**Spearman's rho**	**p-value**
1	**0.22**	**0.041**	**-0.01**	**0.843**	**0.29**	**<0.001**
2	**0.44**	**<0.001**	**0.02**	**0.782**	**0.23**	**<0.001**
3	**0.06**	**0.594**	**0.16**	**0.016**	**0.14**	**0.035**
4	**0.36**	**<0.001**	**0.19**	**0.004**	**0.27**	**<0.001**
5	**0.27**	**0.001**	**0.11**	**0.119**	**0.29**	**<0.001**
6	**0.47**	**<0.001**	**0.12**	**0.072**	**0.24**	**<0.001**

Table 2. Center specific Poisson regression adjusted for season, high Dex as reference level

Center	Incidence Rate Ratio (IRR)	95 % Confidence Interval IRR		p-value
1				
Dex				
low	0.80	0.70	0.90	<0.001
medium	0.82	0.72	0.93	0.003
2				
Dex				
low	0.88	0.80	0.96	0.004
medium	0.94	0.87	1.03	0.177
3				
Dex				
low	0.94	0.86	1.03	0.172
medium	1.01	0.92	1.11	0.774
4				
Dex				
low	0.82	0.75	0.88	<0.001
medium	0.89	0.83	0.97	0.006
5				
Dex				
low	0.79	0.71	0.89	<0.001
medium	0.95	0.85	1.06	0.384
6				
Dex				
low	0.84	0.78	0.90	<0.001
medium	0.90	0.84	0.97	0.005

American College of Surgeons
Committee on Trauma

633 N. Saint Clair St.
Chicago, IL 60611-3211

facs.org/quality-programs/trauma