100 YEARS

THE COMMITTEE ON TRAUMA

ACS AMERICAN COLLEGE OF SURGEONS

COMMITTEE ON TRAUMA CENTENNIAL

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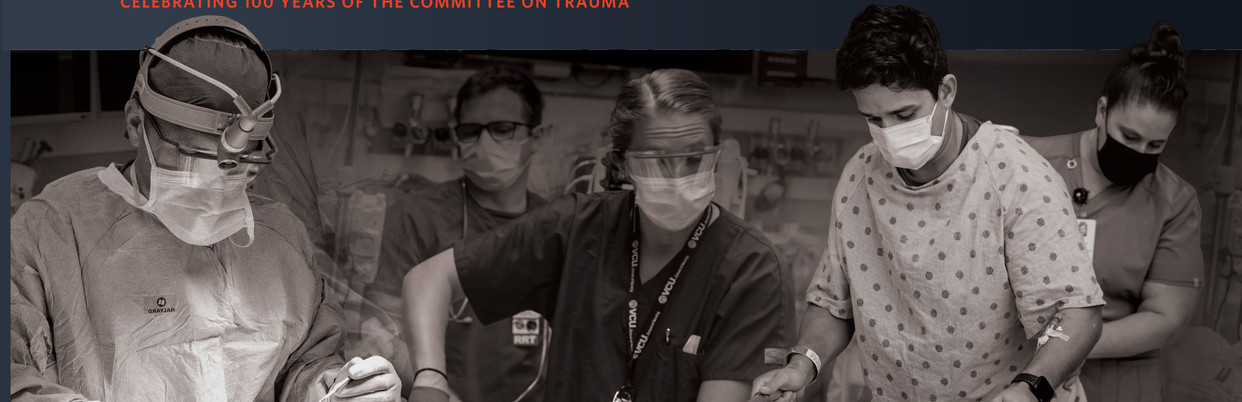
100 YEARS

Looking to the Future through the Lens of Legacy

THE COMMITTEE ON TRAUMA

ACS AMERICAN COLLEGE OF SURGEONS

CELEBRATING 100 YEARS OF THE COMMITTEE ON TRAUMA



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ISBN 978-1-7369212-8-9

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Looking to the Future through the Lens of Legacy

100TH ANNIVERSARY OF THE
AMERICAN COLLEGE OF SURGEONS **COMMITTEE ON TRAUMA**

THE COMMITTEE ON TRAUMA

ACS AMERICAN COLLEGE OF SURGEONS

The Committee on Trauma has always kept the injured patient at the center of our work. As such, this book is dedicated to all trauma patients and their families. A serious injury is often seen as a moment of crisis, but it has a lifetime of impact. While we celebrate 100 years of transformative advances in trauma care, we commit to continuing our mission to reduce the burden of traumatic injury through prevention efforts and a system of care that ensures optimal outcomes for all.

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To the communication teams and the health care professionals at University Health, San Antonio, STRAC, Harborview Medical Center, and Seattle Fire and EMS for their professionalism, commitment, and willingness to share images of their trauma teams in action working towards zero preventable death and disability (#ZPDD)—from preinjury to recovery and reintegration.

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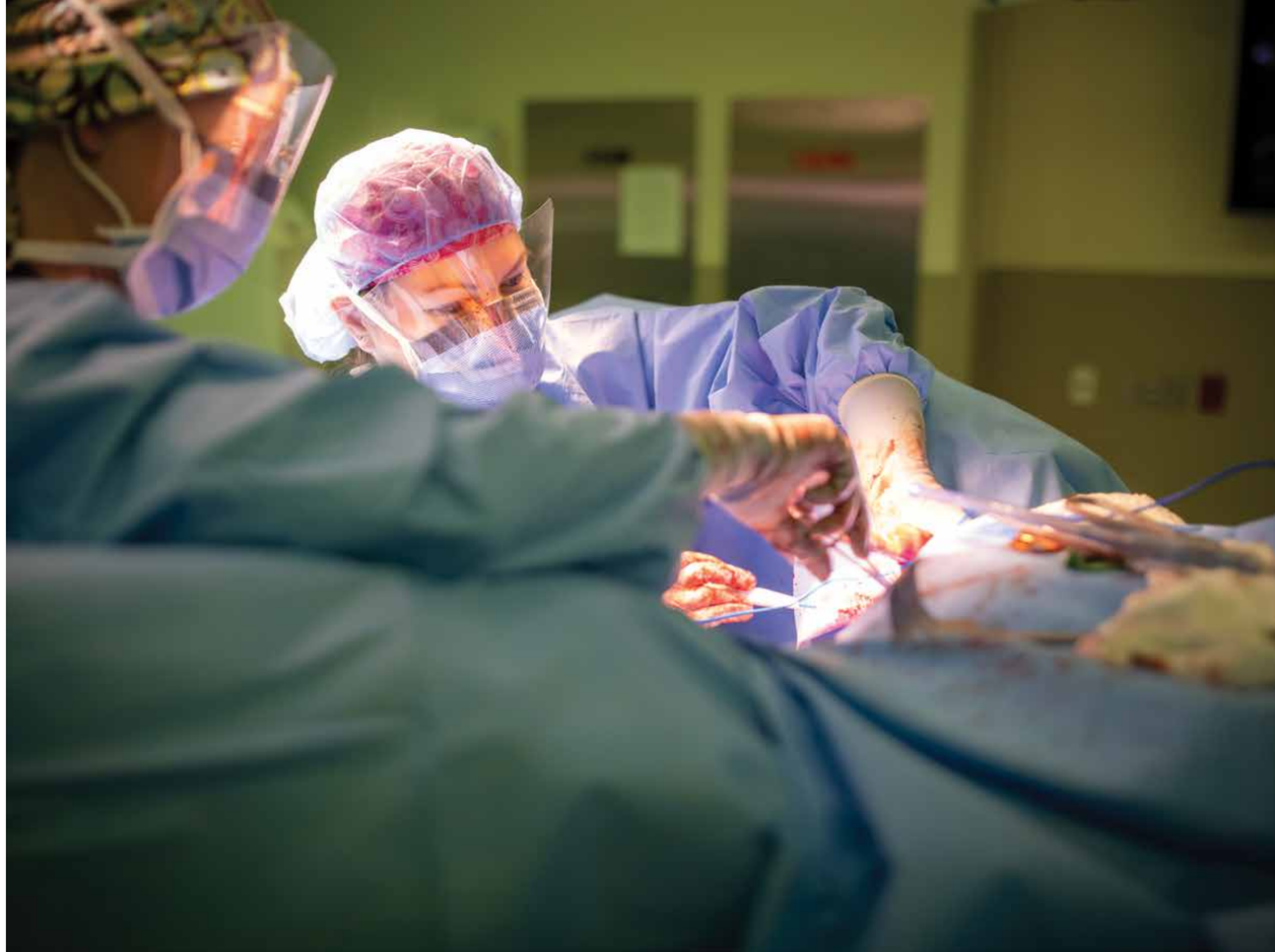
> The accomplishments of our committee acting through educational methods obviously must be gradual, but nevertheless sure. We stand as an authoritative group, taking our position in the country because of the individual accomplishment of each of our members, and because of the prestige of the American College of Surgeons itself, whose committee we are. Therefore, we should very carefully safeguard our moves. The importance of securing better fracture treatment with better results was never greater than at present. Fractures touch the individual and therefore the economic life of the community. This fact enhances the importance of the work of our committee.

—Charles L. Scudder, MD, FACS
Annual Meeting Minutes, 1930



01

Evolution of the Committee on Trauma

01

Evolution of the Committee on Trauma

On the 100th anniversary of the founding of the American College of Surgeons (ACS) Committee on Trauma (COT), it is impossible not to get nostalgic as we reflect on the incredible accomplishments of those who came before us.

Introduction

While the ACS was established in 1913, the focus on improving the care of injured patients really began with the founding of the Committee on Fractures in 1922. That original committee expanded and evolved into the COT, which we are honoring today. Basic elements of trauma care that we take for granted now did not exist in 1922. The subsequent injury prevention efforts of the COT, and many partner organizations such as the National Safety Council, also established in 1913, significantly reduced the risk of injury.

> From the early days of setting standards for industrial safety, to the prolonged and effective battle to improve automobile and traffic safety, to our current struggles with firearm injury and violence prevention, the COT has led with a comprehensive, multifaceted public health approach.

As we look back and tell the stories of this extraordinary legacy, we know there is still much more to be done. Our goal for this book is to focus not only on the past, but also to describe the current activities of the COT and project our vision for the future. It is truly on the shoulders of giants that we do this work. We have been taught by our mentors to never lose sight of the guiding principles of the COT, which ring true throughout our history, and are echoed in the words of our founders, past leaders, and Scudder Orators.

> These principles reflect the core values and approach that have made the COT so successful.

GUIDING PRINCIPLES OF THE COT

- What is best for the patient is the central focus of all programs and decisions.
- Trauma care begins at the point of injury and extends until recovery and reintegration into society, and the COT is responsible for optimizing every step in this continuum of care.
- Strive for optimal standards, not minimum standards, and ensure accountability to these standards.
- Trauma education is critical for all providers caring for injured patients including the nonmedical bystander, emergency medical services (EMS) provider, nurse, advanced practice provider, and physician.
- When possible, make data-driven or evidence-based decisions and if the data or evidence are lacking, devise a strategy to obtain it.
- Develop a culture of continuous quality improvement.
- Once the goal is identified, pursue it relentlessly and from every angle. Be tireless advocates on behalf of the injured patient.
- Take a comprehensive, multifaceted public health approach to system development and injury prevention.
- Seek to collaborate and partner with all organizations that will advance the mission of the COT.
- Develop practical programs and ensure wide dissemination, adoption, and implementation through the Regional Committees on Trauma.

BASIC ELEMENTS OF TRAUMA CARE

These elements of trauma care considered to be basics today did not exist in 1922:

- Professional EMS and aeromedical providers
- Skilled emergency physicians, trauma surgeons, and trauma program managers
- Well-equipped trauma centers
- Blood banks
- Comprehensive trauma registries and advanced quality improvement programs
- Organized trauma systems
- Rehabilitation specialists and centers to optimize functional recovery

C. Thomas (Tommy) Thompson, MD, FACS
COT Chair (1978–1982).

Erwin R. Thal, MD, FACS
COT Chair (1986–1990).

Donald D. Trunkey, MD, FACS
COT Chair (1982–1986).

These individuals epitomized the great friendships, talent, and devotion to the patient to whom Drs. Strauch and Eastman referred. The size of their individual influence on the Committee of Trauma has no relation to the size of their gavels, as they are all considered legends for the innovative work that they did!

> The men and women of the COT have held true to these principles throughout the last century and in the process have built a global community energized and renewed by the camaraderie and lasting friendships that come from working side by side with a common purpose.

In 1997, for the celebration of the 75th anniversary of the COT, Gerald O. Strauch, MD, FACS, Director of the ACS Trauma Department, wrote, "The single most impressive aspect of the Committee on Trauma, in my view, is the continuing well-spring of highly motivated, talented, dedicated, thoughtful, and innovative surgeons who elect to devote major portions of their professional lives to this work."

A. Brent Eastman, MD, FACS, COT Chair (1990–1994), spoke for all of us when he wrote, "I count the friendships that I have made through the COT as one of the single most important things in my life. These are men and women whom you can trust to do what is best for the patient, and, when all is said and done, that is what counts."

As you read this book, we hope you will be inspired to join us in this work.

The Beginning

The story of the origins of the COT has been told many times over the years, beginning with the historical notes and comments from James B. Mason, MD, FACS, Secretary of the COT, in 1955; followed by the Scudder Oration on Trauma delivered by James K. Stack, MD, FACS, in 1967; the writings of Oscar P. Hampton, Jr., MD, FACS, for the 50th anniversary of the COT in 1972; and most recently, the Scudder Orations by past COT Chairs, C. Thomas (Tommy) Thompson, MD, FACS, in 2005 and J. Wayne Meredith, MD, FACS, in 2015.

> In his Scudder Oration in 1967, Dr. Stack wrote that
>
> *"history must be rewritten at least every generation to review new information and to get the changing viewpoint."*
>
> The book you are now holding is our attempt to accomplish that goal.

The COT origins story dates back to the American Surgical Association (ASA) in 1912, one year before the founding of the ACS, when a resolution was passed to establish an ad hoc committee of five to "prepare a statement of the relative value of the operative and non-operative treatment of fractures of the long bones—to which shall be added an opinion as to the value of radiography in the determination of the choice of the method of treatment." This committee, first chaired by John B. Roberts, MD, followed by William L. Estes, Sr., MD, made its final recommendation in 1921, which concluded by stating, "The first step in the betterment of practice is the study of results achieved by present-day methods. An adequate study is impossible without complete records." Given that the ACS had begun its hospital standardization program, it was felt that this work should continue with the collection of data on the care of fractures along with the subsequent review and analysis of these data.

Committee on Fractures Formed

Charles L. Scudder, MD, FACS
Committee on Fractures Chair (1922-1933).

Charles L. Scudder, MD, FACS, was a general surgeon at Massachusetts General Hospital (MGH) and a prolific writer on a broad array of surgical topics. He took a special interest in the care of the injured patient and the management of fractures, and he became an authority on the topic with the publication of his magnum opus in 1900, *The Treatment of Fractures.* This work included a focus on the treatment of injuries associated with fractures in addition to the fractures themselves. In 1922, he published the ninth edition of this text with many updates from the lessons learned in World War I. He also established the first fracture service at MGH. Dr. Scudder was appointed to the ASA Committee on Fractures in 1914, and in 1922 he organized a conference of 26 prominent surgeons at MGH to develop a standardized approach to the treatment of fractures. Thus, when the ACS Board of Regents formed the Committee on Fractures (COF) in 1922, Dr. Scudder was the natural choice as the committee chair. John B. Walker, MD, FACS, was appointed as secretary along with 16 other surgeons from the U.S. and Canada.

In the first report of the COF in 1923, Dr. Scudder wrote, "Surgeons are today, as never before, interested in fractures of the bone. A well-grounded, latent enthusiasm exists, which may be advantageously utilized. There is no recognized authoritative standardization of principles governing the treatment of fractures....and the teaching of fractures in medical schools is at variance and most unsatisfactory....no argument is necessary to convince surgeons that the results of fracture treatment in the United States and Canada are deplorably bad...." Each of the original committee members was charged with establishing a local Committee on Fractures to promulgate the work of the COF, thus establishing the regional committee structure.

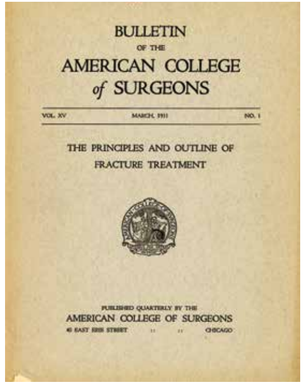
> The initial focus of the COF included: first-aid treatment and the transportation of the injured, the appropriate equipment for ambulances and hospital receiving wards, and the curriculum for medical students.

Original Members of the Committee on the Treatment of Fractures, 1922

- Charles L. Scudder, MD, FACS (Chair)
- John B. Walker, MD, FACS (Secretary)
- Nathaniel Allison, MD, FACS
- A.P.C. Ashurst, MD, FACS
- Joseph A. Blake, MD, FACS
- Frederick J. Cotton, MD, FACS
- William Darrach, MD, ScD, LLD, FACS
- William L. Estes, Sr., MD, FACS
- W. Edward Gallie, MD, FACS
- Fraser N. Gurd, MD, FACS
- George W. Hawley, MD, FACS
- A.J. Jones, MD, FACS
- Paul B. Magnuson, MD, FACS
- Lloyd Noland, MD, FACS
- Robert D. Osgood, MD, FACS
- William O'Neill Sherman, MD, FACS
- Ernst A. Sommer, MD, FACS
- Kellogg Speed, MD, FACS

In 1929, Dr. Scudder gave the first Fracture Oration at the ACS Clinical Congress, which became an annual tradition now formally known as the Scudder Oration on Trauma. "The Principles and Outline of Fracture Treatment" was first published by the COF in the March 1931 issue of the ACS *Bulletin.* The committee worked closely with the ACS Hospital Standardization Program, which continued until 1951 when The Joint Commission on the Accreditation of Hospitals was formed. Some of the early subcommittees of the COF included: Steel Bone Plates and Screws; The Use of the Fluoroscope; Motion Picture Film on the Treatment of Fractures; Editorial; Fracture Service Organization; Medical Education of Undergraduates; Ambulance Equipment; Physical Therapy; Rehabilitation; American Railway Association Liaisons; and the Regional Committee. Dr. Scudder served as the chair of the original Committee on Fractures until he retired in 1933, at which time Frederic W. Bancroft, MD, FACS, was appointed as chair. Dr. Scudder remained involved in the work of the Regional Committee (the committee charged with organizing the efforts of the different regional committees) through 1947.

In parallel to the work of the Committee on Fractures, the ACS also appointed a Board of Industrial Medicine and Traumatic Surgery in 1926, chaired by Frederick A. Besley, MD, FACS. This group was charged with improving the care of the ill and injured in industry and eliminating industrial health hazards. They partnered with insurance carriers and industrial organizations, such as the American Railway Association, to survey the problem and identify solutions. They developed a minimum standard for medical service in industry and surveyed industrial establishments, issuing certificates of approval to those meeting the standards. By 1937, at least 1,657 surveys had been completed with approximately 50 percent earning a certificate of approval. This work led to substantial improvements in the care of those injured in industry and supported injury prevention efforts in the workplace. In 1939, the Board on Industrial Medicine and Traumatic Surgery was merged with the Committee on Fractures to form the Committee on Fractures and Other Trauma with Robert H. Kennedy, MD, FACS, as its chairman.


BULLETIN
OF THE
AMERICAN COLLEGE
of SURGEONS
VOL. XV MARCH, 1931 NO. 1
THE PRINCIPLES AND OUTLINE OF FRACTURE TREATMENT
PUBLISHED QUARTERLY BY THE
AMERICAN COLLEGE OF SURGEONS
40 EAST ERIE STREET CHICAGO

March 1931 issue of the ACS *Bulletin.*

Robert H. Kennedy, MD, FACS
Chair of the Committee on Fractures and Other Trauma (1939–1952), recommended that the committee's name be changed to the Committee on Trauma in 1949.

In 1949, the Board of Regents voted to officially change the name of the Committee on Fractures and Other Trauma to the Committee on Trauma. Later that year, Dr. Scudder died at the age of 89. Dr. Kennedy honored him by saying,

> *"As chairman for the first 11 years of the Fracture Committee, Dr. Scudder was the spark plug of all our efforts. His interest was maintained in spite of advancing age, and for many years he had been the Honorary Chairman of the Committee. The regional committee idea represents a fitting memorial to his zeal for widespread education in fracture problems."*

Evolution of the Name

1922 — **Committee on Fractures** *also referred to as the* **General Fracture Committee**, *or the* **Committee on the Treatment of Fractures**

1939 — **Committee on Fractures and other Trauma**

1949 — **Committee on Trauma**

On our recommendation to the Board of Regents, they have changed the name of the Committee from the Committee on Fractures and Other Trauma to the Committee on Trauma. The former was an unwieldy term, particularly if applied to the regional committees. Most of these had kept the name "regional fracture committee" and many men hesitated to join because they were not handling fractures, although interested in other forms of trauma. We expect our regional committees to change their names to "regional committee on trauma." We hope through this change to approach more nearly the scope of the work which the Board of Regents asked us to cover.

We request the cooperation of every Fellow of the College in our efforts to improve education in trauma. You can scatter the seed of better care for the injured person in each of your communities. We can only suggest the kind of seed we think is worth scattering.

Respectfully submitted

Robert H. Kennedy.

Chairman

Excerpt from the 1949 COT Annual Report from Robert H. Kennedy, MD, FACS, COT Chair (1939–1952), announcing the change in committee name and sets out the expectations for the members and regional committees.

The Mission of the COT

The overarching mission of the COT, beginning with the Committee on Fractures, has been to improve the care of the injured patient. There was no mission statement per se, but in 1961, the "Organization and Objectives of the COT" (the original "Blue Book") was published noting the COT's objective: "Improvement in all phases of the management of the injured person. This includes improvement in the transportation of the injured, improvement in the teaching of the surgery of trauma, both undergraduate and postgraduate, in the United States and Canada, improvement in the practice of the surgery of trauma, and active cooperation with other national organizations having similar objectives." In 1965, an additional objective was added that stated, "The prevention of injuries in the home, in industry, on the highway, and during participation in all sports activities." In 1982, it was decided to include the objective, "Development of emergency medical services systems into which hospital categorizing and disaster planning are integrated."

In 2007, mission and vision statements were published in the Blue Book which stated: "The mission of the COT is to develop and implement meaningful programs for trauma care in local, regional, national, and international arenas. These meaningful programs must include education, professional development, standards of care, assessment of outcome, and financial accountability." The vision statement read: "The COT strives to be a resource for our profession and other entities, professional, public, and governmental, in topics concerning trauma prevention and care. The COT's major areas of activity should include education, standards of care, quality of patient care, and financial assessment of care. The scope of its activities will be national and international."

The most recent mission and vision statements for the COT were developed following a strategic planning process undertaken by the Executive Committee in 2018. These new statements were influenced by the 2016 report, *A National Trauma System: Integrating Military and Civilian Trauma System to Achieve Zero Preventable Deaths After Injury*, published by the National Academy of Sciences, Engineering, and Medicine (NASEM).

COT Strategic Planning Meeting in 2018, during which the mission and vision statements were updated.
Shown are COT Executive Committee Members, other key leaders, and staff partners.

The COT had committed work toward implementation of its recommendations; thus, during the strategic planning process in 2018, the COT adopted the vision to *"Eliminate preventable deaths and disabilities across the globe by preventing injury and improving the outcomes of trauma patients."*

To accomplish this vision the mission statement read,

"The mission of the Committee on Trauma (COT) is to develop and implement programs that support injury prevention and ensure optimal patient outcomes across the continuum of care. These programs incorporate advocacy, education, trauma center and trauma system resources, best practice creation, outcome assessment, and continuous quality improvement."

The Structure and Growth of the COT

The Central/National Committee

Both the terms 'central' and 'national' have been interchangeably used over the years to distinguish the original, appointed committee from the regional committee structure. By 1972, there were 41 active members of the central/national committee along with a variable number of senior members who, based on their contributions, were granted an extended period of service. In 2002, the Board of Regents eliminated the senior member category and as a result the membership continued to expand to manage the increasing activities of the COT and to embrace additional specialties.

The arbitrary use of the 'central' and 'national' designations for the main committee was resolved in 2020 when the Executive Committee formally adopted the use of 'central' to clearly depict the centrality of the COT's role and relationship to the regional committees, other trauma organizations, liaison organizations, and so forth, as well as to acknowledge the global nature of the membership beyond the U.S. and Canada. There is a nice symmetry to the fact that there are 100 members of the central COT as we celebrate this anniversary year. These members have been ably led and inspired by 20 chairs over the past 100 years. Additional details on these leaders are provided in Chapter 2.

Specialty Representation

The original members of the Committee on Fractures included 17 general surgeons and one orthopaedic surgeon. General surgeons remained the primary surgeons focused on the treatment of fractures through the 1920s and 1930s. As orthopaedic surgery became more engaged, particularly following World War II, the COF membership was expanded. Specialty surgeons were welcomed to the committee; however, there was no formal plan for engaging with specialty surgeons.

As the modern COT has grown, and medicine has further specialized, the leadership sought to embrace surgeons from all specialties that support the care of injured patients. In 2002, specialty committees were established for neurosurgery, orthopaedics, and pediatric surgery. In 2006, the membership included 69 members of whom 49 were general surgeons, 7 neurosurgeons, 5 orthopaedists, 5 pediatric surgeons, and 3 plastic surgeons. In 2007, burn and urology representatives were added to the committee. Specialty surgeons were integrated into all aspects of the COT and played a major role in updates to the Advanced Trauma Life Support® (ATLS®) Course and other educational programs, and the development of verification criteria and quality metrics relevant to the specialty. As of 2020, there were 100 central COT members including: 61 general surgeons, 8 burn surgeons, 8 neurosurgeons, 8 orthopaedic surgeons, 7 pediatric surgeons, 3 plastic surgeons, 1 urologist, 1 oral maxillofacial surgeon, 1 ophthalmologist, 1 vascular surgeon, and 1 gynecologist.

The Regional Committees

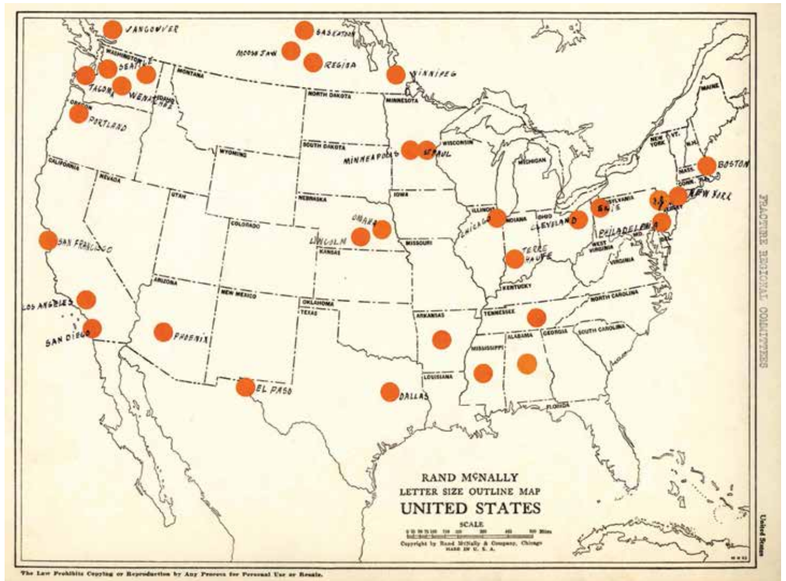
As noted, the original COF included 18 members who were all given the charge by Dr. Scudder to form a local committee in their home area. The number of local committees continued to grow over time. By 1947, there were 87 local committees with more than 1,800 members. To manage this growth, the COT divided the U.S. and Canada into 13 sections and established new Section Chief roles. Recommendations for the subcommittees to be created within the local committees included the following topic areas: clinical meetings, relations with other organizations, ambulance equipment, medical school instruction, hospital care and equipment, and rehabilitation. By 1960, there were 242 state, provincial, and local committees with more than 3,000 members. In 1972, there were 66 state/provincial committees and 341 local committees with an estimate of 3,400 total participants. The 58 state committees included two states with northern and southern committees (California and Florida) and six metropolitan areas were also designated status on par with the state committees given their activity. Notably, the Chicago COT was one of the most productive "state" committees.

The regional committees have been critical to the dissemination and implementation of the programs developed by the COT. In the early days of the COF, regional committees were focused on: establishing fracture services and implementing standards for fracture care; implementing standards for ambulance equipment and developing training programs for ambulance attendants and first responders; and enhancing trauma education through changes in medical school curriculum and the development of postgraduate courses for nurses and physicians.

In his review of the history of the COT to mark its 50th anniversary, Oscar P. Hampton, Jr., MD, FACS, wrote,

"Until about 1960, trauma committees constituted the only physician groups striving to improve emergency ambulance service. They were essentially voices in the wilderness and their volunteer efforts were often scorned by local government officials. Regardless, regional committees worked diligently and undoubtably achieved improvement in their respective localities."

In the 1950s and 1960s, the regional committees worked with the Committee on Trauma Field Program to survey and implement standards for emergency departments; they supported mass casualty training and civil defense preparations and began to focus on injury prevention by supporting efforts to improve motor vehicle safety and advocate for the use of seat belts. In partnership with the National Safety Council, the regional committees were instrumental in executing the States Program for Motor Vehicle Safety. In the 1970s and 1980s, the regional committees played a significant role in the implementation and growth of trauma center verification, collecting data for the Major Trauma Outcome Study (MTOS), and in the widespread adoption of the ATLS and Prehospital Trauma Life Support (PHTLS) Courses. In the 1990s, the regional committees advanced the development of trauma systems that required new state legislation.



Early/undated map of local fracture committees. Initially, the local committees were formed in proximity to the current COF members.

United States / Canada Regions

1
- Connecticut
- Maine
- Massachusetts
- New Hampshire
- Rhode Island
- Vermont

2
- New York
- New Jersey
- Puerto Rico

3
- Delaware
- District of Columbia
- Maryland
- Pennsylvania
- Virginia
- West Virginia
- Virgin Islands

4
- Alabama
- Florida
- Georgia
- Kentucky
- Mississippi
- North Carolina
- South Carolina
- Tennessee

5
- Illinois
- Indiana
- Michigan
- Minnesota
- Ohio
- Wisconsin

6
- Arkansas
- Louisiana
- Oklahoma
- New Mexico
- Texas

7
- Iowa
- Kansas
- Missouri
- Nebraska

8
- Colorado
- Montana
- North Dakota
- South Dakota
- Utah
- Wyoming

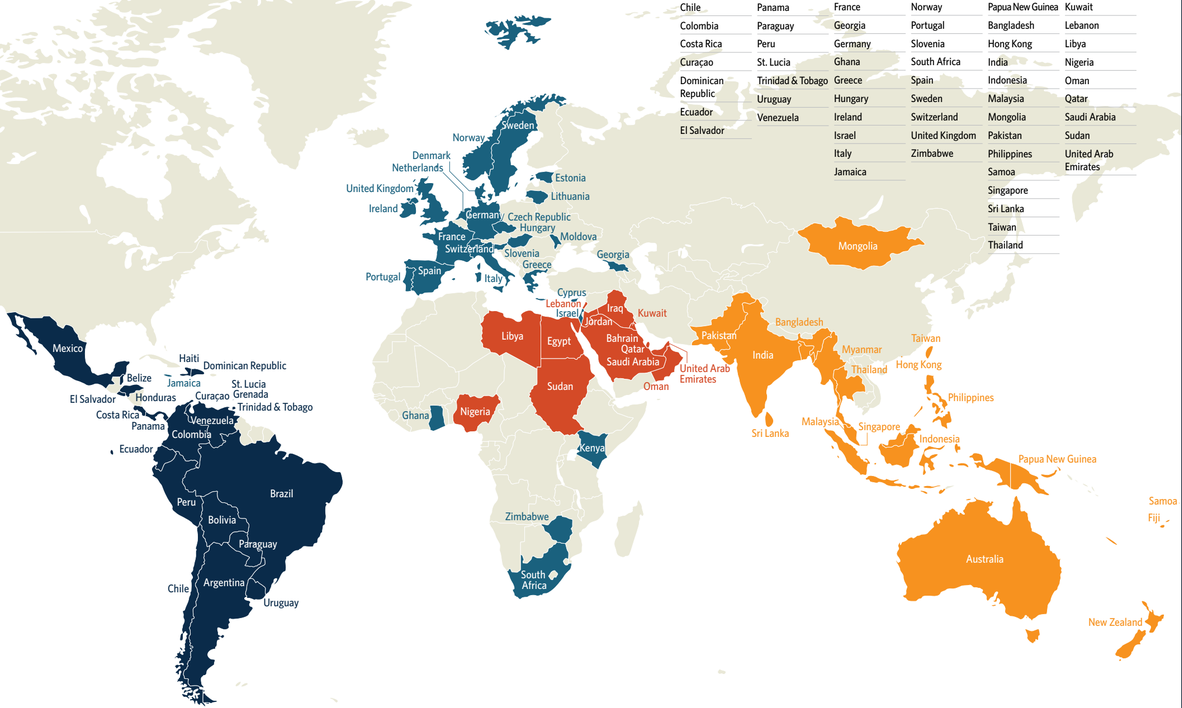
9
- Arizona
- California
- Hawaii
- Nevada

10
- Alaska
- Idaho
- Oregon
- Washington State

11 Western Canada
- Manitoba
- Saskatchewan
- Alberta
- Northwest Territories
- British Columbia

12 Eastern Canada
- Prince Edward Island
- Nova Scotia
- New Brunswick
- Newfoundland
- Quebec
- Ontario
- Nunavut

13 Military
*Includes all U.S. regions.



14
- Argentina
- Belize
- Bolivia
- Brazil
- Chile
- Colombia
- Costa Rica
- Curaçao
- Dominican Republic
- Ecuador
- El Salvador
- Grenada
- Haiti
- Honduras
- Mexico
- Panama
- Paraguay
- Peru
- St. Lucia
- Trinidad & Tobago
- Uruguay
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- Bahrain
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- Kuwait
- Lebanon
- Libya
- Nigeria
- Oman
- Qatar
- Saudi Arabia
- Sudan
- United Arab Emirates

World Regions

Three chairs of the regional committees who presided over changes in name or structure:
Frederic W. Bancroft, MD, FACS, Chair of the Subcommittee of Regional Fracture Groups (1932–1933); Preston A. Wade, MD, FACS, Chair of the Subcommittee on Regional Committees (1949–1955); and Charles F. Rinker II, MD, FACS, first to hold dual role of COT Vice Chair, and Chair of the Regional Committees (1994–1998).

From the early 1930s until 1944, the state, provincial, and local committees were organized under the Subcommittee of Regional Fracture Groups and led by Dr. Scudder. He was succeeded by Frederic W. Bancroft, MD, FACS, until 1951 when the committee was renamed the Subcommittee on Regional Committees, led by the Regional Committee Chair, Preston A. Wade, MD, FACS. This was a high-profile position that often led to the role of COT Chair. This position evolved into the current position of Vice Chair of the COT and Chair of the Regional Committees in 1994; this dual position, first held by Charles F. Rinker II, MD, FACS, then mirrored the term of the COT Chair. This name and structure continued until 2010 with the formation of the legal entity known as the ACS COT Regional Committees on Trauma. The same structure using the dual role for the Vice Chair of the COT and Chair of the ACS COT Regional Committees on Trauma exists today. Each new Chair of the COT now selects their Vice Chair as a key partner in supporting the expanding responsibilities of leading the COT.

Patrick M. Reilly, MD, FACS, FCCP (2018–2022)
COT Vice Chair, Chair of the Regional Committees on Trauma.

The most recent COT Vice Chair and Chair of the Regional Committees is Patrick M. Reilly, MD, FACS, FCCP; he has been instrumental in implementing our strategic plan to enhance regional member engagement and support the expansion of regional activities. He and Jeffrey D. Kerby, MD, PhD, FACS, Membership Committee Chair (2018–2022), have established a very effective paradigm for member engagement initiatives both in the regional and central committees. The partnership they established over the last several years will be a model for the chairs that follow in their respective positions (see Chapter 2 for a list of the Chairs of the Regional Committees/COT Regional Committees).

A Generous Tradition Begins
With the beginning of the Resident Award Program, came a new tradition of generous support from regional committees and COT members. John W. Batdorf, MD, FACS, Nevada State Chair, presents a check to Henry C. Cleveland, MD, FACS, Chief, Region 8; and Robert W. Gillespie, MD, FACS, outgoing COT Chair (1974–1978); to help fund the program. This tradition carries forth today, with regions, state COTs, and individual COT members contributing to support the Resident Trauma Papers Competition. Many a check has been proudly delivered during the COT banquets since that first donation.

Global interest in the activities of the COT was evident in 1955 with the request to translate *The Management of Fractures and Soft Tissue Injuries* manual into Spanish. The discussion of forming regional committees outside of the U.S. and Canada began in 1970 and was supported by the subsequent widespread promulgation of the ATLS program. In 1987, Latin America became the 14th Region of the COT and committees were formed in Argentina, Mexico, Colombia, Brazil, and Chile. Region 14 was briefly renamed the International Committee on Trauma in 1995. By 2007, three international regions were established including Region 14 encompassing all Latin/South America; Region 15 including Europe, the Middle East, and Africa; and Region 16 for Australasia. In 2012, Region 17 was formed for the growing programs in the Middle East and North Africa (see Chapters 4 and 16).

The regional committee members became more integrated with the work of the central COT committee in the late 1970s with the launch of the Regional Resident Award Program in 1978

FIRST RESIDENT PAPER COMPETITION

Robert W. Gillespie, MD, FACS, COT Chair (1974–1978) congratulates John Weigelt, MD, first winner of the competition.

Dr. Gillespie with Mary H. McGrath, MD, first runner-up, and Henry C. Cleveland, MD, FACS, COT Vice Chair (1976).

and the invitation by Dr. Thompson, the new chair of the COT, encouraging regional leaders to attend the central committee meetings. Charles F. Frey, MD, FACS, brought the idea of hosting a national resident trauma papers competition to the COT based on his experience with a similar program in Michigan, and Henry C. Cleveland, MD, FACS, was charged with organizing the event. The inaugural COT Resident Award Program (later to become known as the Resident Trauma Paper Competition) was a tremendous success, with John A. Weigelt, MD, DVM, FACS, who would later go on to become the COT Chair, as the first winner of this competition. Mary H. McGrath, MD, FACS, was the runner-up.

Today, competition is open to all general surgery residents, surgical specialty residents, and trauma fellows; medical students are not eligible. To be qualified for presentation at the national level, abstracts submitted may have been previously presented but not published as full papers in any peer-reviewed journal. Original research on any aspect of trauma care can be used with the topics categorized as either: basic laboratory research or clinical investigation. Participants first compete at the regional levels. Winners from each region are then submitted to the central COT for consideration. Finalists are selected from this group and invited to the COT Annual Meeting where they present their papers, and a first- and second-place winner in both the basic laboratory research and clinical investigation categories are selected.

> Many winners of the Resident Trauma Papers Competition have gone on to become leaders in the field of trauma and in the COT.

The Capital Program was developed by Dr. Strauch, Chair of the Regional Committees, in response to a request from the U.S. Secret Service following the attempted assassination of President Reagan in 1981. This program engaged the regional committees to provide the White House medical team with a list of trauma centers endorsed by the state chairs for the care of visiting dignitaries as needed.

Committee on Trauma Resident Trauma Papers Competition—Past Winners

	Basic Laboratory Science	Clinical Research
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	
1987	**Nicholas B. Vedder** B. Timothy Baxter	**Eric DeMaria** John D.S. Reid
1988	**Gary Fantini** David H. Livingston	**Christoph Kaufmann** Tomasso Bochicchio
1989	**David K. Magnuson** Matthew L. Cooper	**Bradley Reeves** Danielle Desloges
1990	**William J. Mileski** Gary A. Gelfand Jon C. Walsh	**Miguel Lopez Viego**
1991	**Roy W. Hong** Benjamin O. Anderson	**Karl Illig** Carson Agee
1992	**Michael O'Reilly** David Bensard	**William S. Hoff** Juan Manuel Sarmiento-Martinez
1993	**Thomas T. Sato** Paul A. Taheri Alastair C.J. Windsor	**Patricia Yugueros**
1994	**James T. Wilson** Robert F. Noel, Jr.	**Stefan J. Konasiewicz** Paul J. Gagne
1995	**Donald W. Pate** Carol J. Cornejo	**Russell R. Lonser** John J. Keleman
1996	**Kenneth E. Drazan** Carlton C. Barnett, Jr.	**Peter D. Wearden** Nicholas Namias
1997	**Randy J. Irwin** Nicholas Namias	**Preston R. Miller** Katharina Pellegrin
1998	**Geoffrey Manley** Gregory J. McKenna	**E. Lynne Henderson** Juan P. Carbonell
1999	**Andrew Kramer** D. Kirk Lawlor	**Garret Zallen** Avery B. Nathens
2000	**Philip P. Narini** George D. Oreopoulos	**Joseph T. Rabban** Avery B. Nathens
2001	**Deepa Soni** Daron C. Hitt	**John-Paul Veri** Moishe Lieberman
2002	**Jonas Gopez** Steven Casha	**Ram Nirula** Seong K. Lee
2003	**Eve C. Tsai** Katherine Barsness	**Steven Fox** David J. Schultz
2004	**Rachel G. Khadaroo** Manuel B. Torres	**Matthew Rosengart** Carlos V. R. Brown
2005	**John M. Hwang** Aaron M. Cheng	**Felicia Ivascu** Stephanie P. Acierno
2006	**Preya Ananthakrishnan** Jessica Deree	**Alexander L. Eastman** David O. Francis
2007	**Alexander Q. Ereso** Sagar S. Damle	**Alexandra Mihailovic** Heather F. Pidcoke
2008	**Jason M. Seery** Elizabeth A. Sailhamer	**Joseph F. Golob, Jr.** Sherene Shalhub
2009	**Elizabeth A. Sailhamer** Reed B. Kuehn	**Alexios A. Adamides** Joseph DuBose
2010	**Angela L. F. Gibson [Reg 5]** Arash Farahvar [Reg 2]	**Barbara Haas [Reg 12]** Thomas M. Schmelzer [Reg 4]
2011	**Laura E. White [Reg 6]** Marlene Mathews [Reg 2]	**Levi D. Procter [Reg 4]** Matthew D. Neal [Reg 5]
2012	**Laura E. White [Reg 6]** Alex Cuenca [Reg 4]	**Kristin Cook [Reg 2]** Jennifer Roberts [Reg 5]
2013	**Abubaker A. Ali [Reg 5]** Isaiah R. Turnbull [Reg 7] Kristin L. Long [Reg 4]	**Eiman Zargaran [Reg 11]** David A. Hampton [Reg 10]
2014	**Michaela C. Kollisch -Singule [Reg 2]** Vanessa J. Fawcett [Reg 10]	**Hunter B. Moore [Reg 8]** Matthew W. Ralls [Reg 5]
2015	**Simone M. Langness [Reg 9]** Michaela C. Kollisch -Singule [Reg 2]	**Deepika Nehra [Reg 10]** Cherisse Berry [Reg 3]
2016	**Rachel M. Russo [Reg 13]** Sarah Ogle [Reg 9]	**James P. Byrne [Reg 12]** Lynn Hutchings [Reg 15]
2017	**Teresa C. Rice [Reg 5]** Theresa Chan [Reg 9]	**Stephanie A. Mason [Reg 12]** Sabrina Balakrishnan [Reg 16]
2018	**Michael Valliere [Reg 7]** Theresa Chan [Reg 9]	**Luke R. Johnson [Reg 13]** Jarred R. Gallaher [Reg 4]
2019	**Elliott Williams [Reg 9]** Patricia Martinez-Quinones [Reg 4]	**Hope Villiard [Reg 7]** Parin Boonthum [Reg 16]
2020	**Julia R. Coleman [Reg 8]** Amanda M. Chipman [Reg 3]	**Alexandra Dixon [Reg 10]** Jetan H. Badhiwala [Reg 12]
2021	**Julia R. Coleman [Reg 8]** Zachary A. Matthay [Reg 9]	**Max Marsden [Reg 15]** Eric Walser [Reg 12]

Bold—First Place
Regular—Runner-Up

ACS Staff Partners

Bowman C. Crowell, MD, FACS
The first Medical Director from (1926–1949), concurrently serving as Secretary for the Committee on Fractures and Other Trauma (1939–1949).

The full-time staff management of the COT programs has been essential to their success. The Committee on Fractures and the Board of Industrial Medicine and Traumatic Surgery were supported by the ACS Department of Clinical Research beginning in 1926, managed by Bowman C. Crowell, MD, FACS, who served as the medical director until his retirement in 1949. In 1952, the ACS was reorganized, and the COT became part of the Department of Professional Services and Accreditation. Subsequent key staff members included Walter E. Batchelder, MD; Robert S. Myers, MD, FACS; James B. Mason, MD, FACS; James H. Spencer, MD, FACS; and Robert H. Kamish, MD, FACS. In 1968 Dr. Hampton was appointed as an Assistant Director for the ACS and was responsible for the trauma program. He continued to serve as a consultant to the ACS until his death in 1977. In 1974, Alexander C. Hering, MD, FACS, joined the staff to succeed Dr. Hampton as the Assistant Director of the Trauma Program. Dr. Strauch served as the director from 1987–2001.

Beginning in 2002, the function of the Trauma Medical Director evolved to a rotating position filled by the outgoing COT Chair, to facilitate the work of the COT by managing the COT staff and integrating the COT activities with the larger College. David B. Hoyt, MD, FACS, was the first to serve in this role. In 2010, with the development of the Trauma Quality Improvement Program (TQIP) an additional medical director role was developed and was filled by Avery B. Nathens, MD, MPH, PhD, FACS, FRCSC, to manage the growing quality programs of the COT.

Over the years, the medical directors have worked in concert with a growing number of expert staff at the ACS who partner with them to manage the education courses, quality programs, and day-to-day operations of the COT. Kay Hough (1971–1988), and Carol Williams (1980–2013), were the executive administrators who deftly supported the growing committee work and helped conceive and nurture what would become the COT's flagship programs. Irvene Hughes was also instrumental in the development of the ATLS Program and became the first program manager in 1982. In 2003, Melanie Neal joined as the manager of the National Trauma Data Bank® (NTDB®) and subsequently all the quality programs of the COT. (See subsequent chapters for recognition of more key staff.) Carol's retirement after 33 years of dedicated service was well-celebrated and is illustrative of the strong connection that the staff team has with the mission and the work of the COT.

With Carol's retirement, Dr. Hoyt, then current ACS Executive Director (2010–2022), saw an opportunity to recognize the tremendous growth and future capacity of the trauma programs, and the need for a new structure to manage what had become a rapidly growing staff team and several multimillion-dollar programs that had progressed beyond mere committee work. He brought in an administrative director, Jean Clemency (2013–), to organize and manage the staff and structure to meet the business needs of the growing programs. Many organizational and member engagement initiatives have been implemented as a result. Regular strategic planning meetings, coupled with effective project management principles and processes have enabled the surgeon leaders and their staff partners to make important advances in the existing programs, and to launch broad new initiatives. To achieve this, the staff team has nearly doubled, and as of late 2021, we now have almost 50 full-time staff partners in the ACS Trauma Department. We are indebted to all of them for keeping the COT on the track with its engine running, and for constantly imagining the next program improvement to help further the mission.

Trauma Staff
Executive Administrators Carol Williams (1980–2013) with Kay Hough (1971–1988).

Carol Williams
Recognized in 2010 with a COT Distinguished Service Award for 30 years of dedicated service to the COT.

Jean Clemency
Trauma Administrative Director (2013–).

Committee Structure

The committees and subcommittees of the COT have evolved over time to support the expanding work of the committee. In 2009, a series of strategic planning sessions led by John Fildes, MD, FACS, and Michael F. Rotondo, MD, FACS, reorganized the COT committees into the pillars of Education, Quality Programs, and Advocacy to better integrate the work of the committees and course directors. To enhance engagement with the global community, the International Injury Care Committee was established in 2010. In 2018, the Quality Programs Pillar was further divided into the Trauma Systems Pillar and Trauma Center Quality Pillar to better reflect the focused growth of the quality programs at both the trauma center and systems level. Advocacy, Injury Prevention, and STOP THE BLEED® are grouped together within a fourth pillar.

> The success of the COT is due in large part to the active engagement of its members and their passion for this work.

The number and composition of the COT membership, the different categories, and their respective terms, have changed throughout the years, primarily directed by the ACS Board of Regents, for consistency across all College committees. Since 1973, membership positions on the COT are limited to two, three-year terms to provide regular opportunities for new members to be engaged. From time to time, a limited two-year special member term may be granted to allow for the completion of a critical project. The selection for membership on the central COT is expertly managed by the COT Membership Committee which seeks to identify the best candidates from each specialty for the open positions every year. The role of the Membership Committee Chair has expanded in recent years to support our growing mentorship efforts and to develop strategies to support member engagement.

Eileen M. Bulger, MD, FACS, Membership Chair (2014–2018), conceived of and initiated the highly successful Future Trauma Leaders (FTL) Program, as part of the larger Mentoring for Excellence in Trauma Surgery (METS) Program in 2015. She was succeeded by Jeffrey D. Kerby, MD, PhD, FACS, Membership Chair (2018–2022), who has worked to further develop the mentoring opportunities within the METS Program; has brought rigor and depth to the selection process for the different membership categories and awards programs such as the annual Scudder Orator; and has provided guidance to the development of the Diversity, Equity, and Inclusion (DEI) Work Group that was established in 2020.

Putting a Focus on Mentoring and Member Engagement
Jeffrey D. Kerby, MD, PhD, FACS, Membership Chair (2018–2022) and incoming COT Chair; Eileen M. Bulger, MD, FACS, Membership Chair (2014–2018), COT Chair (2018–2022).

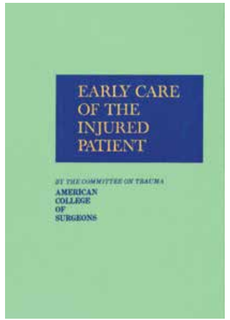
2021 COT pillar structure with selected work groups, committees, and courses.

The Contributions of the COT

Previous historians have described the activities of the COT over a series of eras that vary by author, based on the tenure of the chairs, major events of the time, or by decade. We have chosen to summarize the major contributions of the COT to trauma care by pillar area, many of which evolved in parallel over the past 100 years. More detail on the evolution and development of these programs will be provided in subsequent chapters.

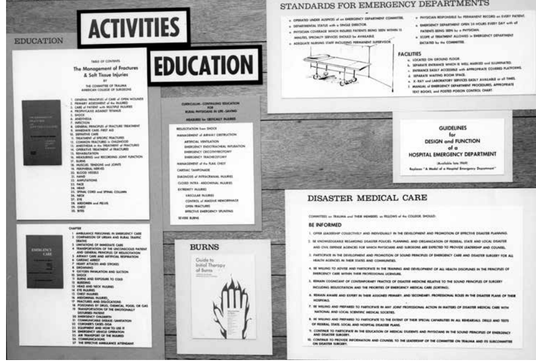
Trauma Education

The COT has set the benchmark for education in the initial care of the injured patient across the world. From the very beginning, the Committee on Fractures focused on improving education for the treatment of fracture and published the first edition of the "Principles and Outline of Fracture Treatment" in the ACS *Bulletin* in 1931. The third edition, published in 1939, was vigorously used by armed forces surgeons in World War II. In 1954, the fifth edition of this guide was titled *The Manual on the Treatment of Fractures*; the first edition of the *Early Care of Acute Soft Tissue Injuries* also was published—both of which sold more than 22,000 copies for $1.00 each. In the 1960s these manuals were published separately and in a combined, bound manual, *The Management of Fractures and Soft Tissue Injuries*. In the 1970s the combined manual was renamed, Early Care of the Injured Patient, which set the stage for the Advanced Trauma Life Support® (ATLS®) Course that launched in 1980.



The manual, *Early Care of the Injured Patient*, combined the earlier fracture and soft tissue manuals and heralded the eventual ATLS Course.

Now in its 10th edition, ATLS has become the standard for educating physicians and advanced practice providers in the early care of the injured patient. ATLS is truly a global program with more ATLS courses now taught outside the U.S. and Canada than within each year, bringing together health care providers committed to the care of injured patients as a global community. In the early days of the COT, the importance of providing education across the continuum of care was emphasized, and led by, the regional committee members who partnered with the Red Cross in teaching first aid to the public and developed courses for the training of both nurses and ambulance attendants. This commitment has persisted with the development of the Advanced Trauma Course for Nurses (ATCN) in collaboration with the Society of Trauma Nurses (STN), and the Prehospital Trauma Life Support (PHTLS) Course in collaboration with the National Association of Emergency Medical Technicians (NAEMT).



An exhibit panel circa 1969, illustrating educational activities of the COT.

Building on the strength and educational expertise of the ATLS program, the COT has continued to develop courses to meet the needs of trauma systems including the Rural Trauma Team Development Course (RTTDC) and the Disaster Management and Emergency Preparedness Course (DMEP); as well as training in advanced surgical skills for trauma, including the Advanced Trauma Operative Management (ATOM®), the Advanced Surgical Skills for Exposure in Trauma (ASSET), and the Basic Endovascular Skills for Trauma (BEST) Courses. The postgraduate courses we also now enjoy (including the Las Vegas trauma course, the Kansas City trauma course, and the Eastern states point/counterpoint course) arose from the work of the regional COTs, which hosted postgraduate courses across the U.S. that ultimately consolidated into these regional programs. These courses provide high-quality continuing education in trauma care. Additionally, the continued generosity of the leaders of these programs helps provide financial support for the COT Resident Trauma Paper Competition, donated from the proceeds of their courses.

> Taken together, the educational programs of the COT have ensured that all providers caring for the injured patient speak a common language and are working from a standard framework of priorities and principles to optimize patient care.

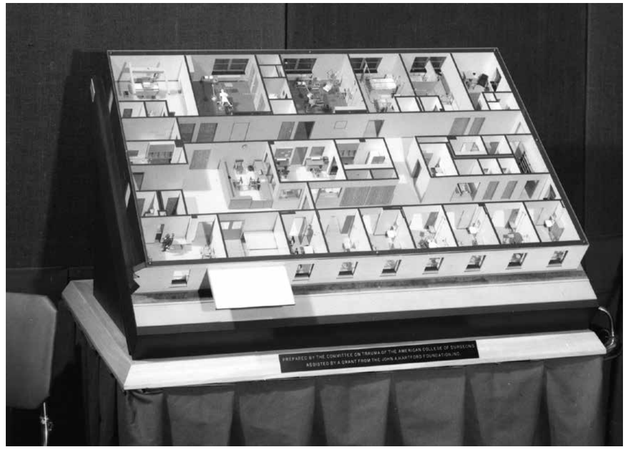
Quality of Care

The ACS was founded with the motto "To serve all with skill and fidelity," and seeks to improve the quality of care for the surgical patient by setting high standards for surgical education and practice.

> The approach pioneered by the COT is to establish high standards, ensure the right infrastructure, collect high-quality data, and verify performance.

This approach has subsequently been adopted across all the ACS Quality Programs. From the beginning, the Committee on Fractures sought to standardize the care of fracture patients by developing fracture services in hospitals and improving the care in emergency departments that, at the time, were poorly resourced and staffed by the most inexperienced providers. In 1960, the ACS received a grant from the John A. Hartford Foundation that led to the development of the Field Program of the Committee on Trauma, led by Robert H. Kennedy, MD, FACS (1960–1968). This survey program was used to evaluate the quality of care in emergency departments through the regional committees. This led to the publication of the *Guide to the Organization and Management of Hospital Emergency Departments* and a scale model was produced to illustrate the optimal layout of an emergency department.

This work was the precursor to the development of the original *Optimal Hospital Resources for Care of the Seriously Injured*, first published in 1976, now known as the *Resources for Optimal Care of the Injured Patient*, which extended standards into the hospital and established the concept of a trauma center as we know it today. The development of what is now known as the Verification, Review, and Consultation (VRC) Program, which was quite controversial in the ACS at the time, was advanced by the persistence of COT Chairs, C. Thomas (Tommy) Thompson, MD, FACS (1978–1982), and Donald D. Trunkey, MD, FACS (1982–1986). The first Verification Review Ad Hoc Committee, under the leadership of Frank L. Mitchell, Jr., MD, FACS, was established in 1987. In parallel to the work to establish the standards, the COT led the development of trauma registries by establishing the National Trauma Data Standards



Scale model produced to illustrate the optimal layout of an emergency department, which was used in exhibits in the late 1960s and early 1970s.

and the National Trauma Data Bank under the leadership of former COT Chairs David B. Hoyt, MD, FACS (1998–2002), J. Wayne Meredith, MD, FACS (2002–2006), and John Fildes, MD, FACS (2006–2010). The COT also supported the collection of data for the Major Trauma Outcome Study (MTOS) led by Howard R. Champion, MD, FACS, which laid the groundwork for the development of the Trauma Quality Improvement Program (TQIP) that now provides risk-adjusted benchmarking of outcomes across trauma centers and generates evidence-based best practices for trauma care. The growth of TQIP collaboratives also has supported efforts to improve trauma care within regional and state trauma systems.

The COT takes great pride in having established both landmark programs to enhance the quality of trauma care and a model for quality improvement; these programs and model have influenced similar quality programs across the ACS and throughout the U.S. health care system.

Central COT Members
2019 COT Annual Meeting.

Trauma Systems

The concept of trauma systems was championed by A. Brent Eastman, MD, FACS, COT Chair (1990–1994), who was instrumental in forming a multidisciplinary Working Group for Trauma System Evaluation in 1994. This led to the development of the COT Trauma System Consultation Program, which now has visited nearly every state in the U.S. and has spurred growing global interest in the development of trauma systems. The initial framework for trauma systems as described in the book, *Consultation for Trauma Systems* (known internally as the "Gray Book"), was developed by Dr. Eastman's working group in 1996, based on the *Model Trauma Care System Plan* published in 1992 by the U.S. Health Resources & Services Administration (HRSA). In 2007, Dr. Rotondo, then Chair of the Trauma System Evaluation and Planning Committee (TSEPC), along with Dr. Nathens, revised the *Consultation for Trauma Systems* book to incorporate more of a public health approach.

> Studies led by members of the COT have demonstrated that the implementation of trauma systems leads to significant reductions in the rates of preventable death following severe injury.

With the support of the COT leadership, the lessons learned in the development of civilian trauma systems were adopted by the U.S. military in the development of the Joint Theater Trauma System in the recent conflicts in Iraq and Afghanistan; a military trauma system manual also was developed. The ongoing mission of trauma system development continues in response to the 2016 National Academies of Sciences, Engineering, and Medicine (NASEM) report, which underscored the need for a National Trauma Care System.

> The model of regionalization of care, established by the development of trauma systems, is now being extended to a host of other time-sensitive emergencies, including complex surgical care and treatment for cardiac and stroke emergencies.

Once again, the approach of the COT has served as a model to optimize health care delivery across the entire health care system.

100-year historical summary *of COT high-level accomplishments*

Comprehensive, high-quality educational programs to support care providers across the continuum of trauma care.

The development of professional emergency medical services as we know them today.

The development of quality programs that improve patient care throughout trauma centers and trauma systems in the U.S. and Canada.

Injury prevention efforts that have dramatically reduced death and disability.

Improved coordination of the response to mass casualty events and training of more than 1.8 million people in the lifesaving skills of external hemorrhage control.

Development of TQIP as a robust quality improvement program that engages nearly all trauma registries supporting Level I and II trauma centers in the U.S.

The convening of a global community of trauma care providers devoted to advancing the care of the injured patient.

The development of a model for quality improvement and regionalization of care that can be applied across the entire health care system.

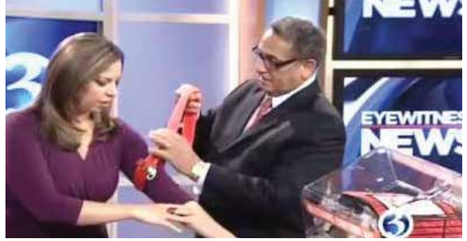
Injury Prevention, Advocacy, and STOP THE BLEED®

Widespread engagement of the COT in injury prevention efforts began in earnest in the 1950s based on the growing rates of morbidity and mortality associated with motor vehicle collisions. The first COT Subcommittee on Traffic Injury Prevention was appointed in 1955, and in 1956 R. Arnold Griswold, MD, FACS, COT Chair (1952–1957), testified before the U.S. Congress to advocate for increased safety features in automobiles and the mandatory use of seatbelts. The COT partnered with the American Association for the Surgery of Trauma (AAST) and the National Safety Council to form the Joint Action Program that continued these advocacy efforts along with a widespread public education campaign on automobile safety implemented by the regional committees. The result of these efforts has been a dramatic reduction in motor vehicle fatalities despite the continuing growth in vehicle miles traveled.

Ronald M. Stewart, MD, FACS
COT Chair (2014–2018), promotes a public health approach to tackle difficult political health-related issues such as firearm violence.

The COT Injury Prevention and Control Committee has never shied away from controversial topics and the first statement on firearm injury prevention was crafted in the early 1990s and has been revised over the years with no shortage of disagreement within the ACS membership. Under the leadership of Ronald M. Stewart, MD, FACS, COT Chair (2014–2018), the COT framed a public health approach to the problem of firearm injury and established a common narrative that supports our ability to move forward with injury prevention efforts. This approach has been very productive and led to a Medical Summit on Firearm Injury Prevention in 2019, which has continued to build consensus and collaboration within the medical community on the development of programs supporting this public health approach strategy.

Following the tragic Sandy Hook Elementary School shooting in 2012, under the leadership of Lenworth M. Jacobs, Jr., MD, MPH, FACS, an ACS Regent at the time, and Michael F. Rotondo, MD, FACS, COT Chair (2010–2014), the ACS supported a series of conferences in Hartford, CT, that became known as The Hartford Consensus conferences. This work has led to enhanced preparedness for mass shooting events, including greater integration of law enforcement and emergency medical services, and the widespread training and provision of necessary equipment to law enforcement providers for bleeding control at the scene. These efforts also led directly to the development of the national STOP THE BLEED® program that seeks to train everyone in the basic skills of bleeding control and provide equipment to support bleeding control in public places. In collaboration with NAEMT, the COT has developed a training program, made recommendations for equipment standards, and established a public-facing website, *www.stopthebleed.org*. Implementation of the STOP THE BLEED® program through the regional committees has been outstanding. As of 2021, there is documentation of more than 1.8 million people trained in at least 120 countries. This work harkens back to the initial first aid training emphasized by the Committee on Fractures.



STOP THE BLEED® Lenworth M. Jacobs, Jr., MD, MPH, FACS, was the key driver of the STOP THE BLEED® program and continues to actively promote training. Shown here in a media spot demonstrating the appropriate placement of a tourniquet.

Brian J. Eastridge, MD, FACS, and Donald H. Jenkins, MD, FACS, demonstrate their support of the STOP THE BLEED® program, along with some of their San Antonio colleagues during the 2017 TQIP Annual Scientific Meeting.

STOP THE BLEED®

> The ACS COT is supported by an outstanding advocacy team at both the state and federal levels that continues to work actively to promote legislation that supports injury prevention and trauma research funding, and policy that supports trauma system development and implementation of the STOP THE BLEED® program.

Current Challenges & Opportunities

The COVID-19 Pandemic

Despite all our accomplishments, there is no shortage of work to be done. As the landscape of health care has evolved, so too have the challenges related to injury prevention and ensuring optimal care of the injured patient. The worldwide spread of the COVID-19 pandemic in 2020 has challenged all of health care. As of November 2021, there had been an estimated 257 million cases worldwide with more than 5 million deaths and those numbers continue to grow. No corner of the world has been spared by the effects of this pandemic, and intermittent surges of cases have severely stressed the health care response, even in high-resource countries. Public health restrictions implemented to reduce viral transmission have had a major impact on the economy with record rates of unemployment.

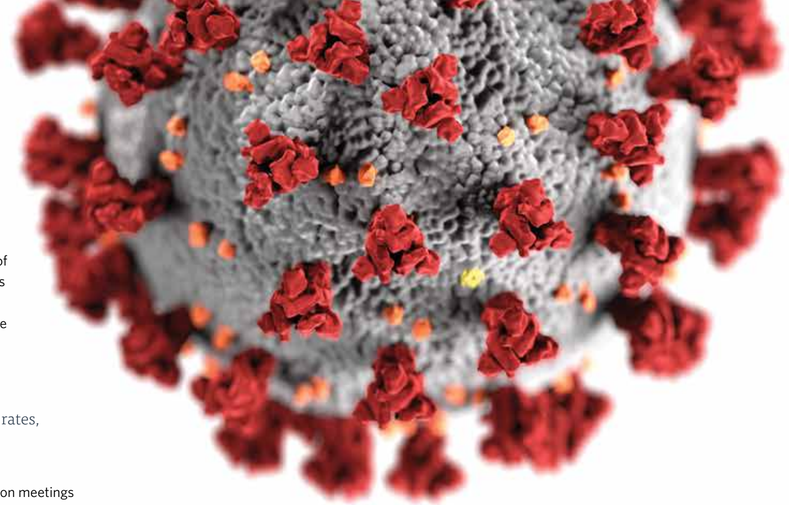
> While the full impact of the pandemic has yet to be realized, increasing interpersonal violence, reflected by penetrating trauma rates, is already evident in many U.S. cities.

Travel continues to be severely restricted in some areas, and the need for in-person meetings constantly is weighed with the safety and benefits of virtual platforms. The COT has joined the broader ACS efforts to support its members and has worked to adapt our programs to this new reality.

Early in the pandemic, all educational programs were suspended and the ATLS certification period was extended. The development of the hybrid ATLS Course has served us well in adapting to the challenges of physical distancing associated with the COVID-19 pandemic, but the impact of the pandemic has pushed us to consider the need for more advanced simulation and virtual reality opportunities to support skills training. In parallel, we must develop educational programs that can meet the need for trauma education in places with limited resources and lack of access to the latest technology.

> The pandemic has highlighted the many inequities in health care with a disproportionate impact in the U.S. on racial and ethnic minorities. This reality challenges us to understand and address disparities that impact both the risk of injury and outcomes following injury.

Pivotal events in the U.S., such as the 2020 deaths of George Floyd and Breonna Taylor at the hands of police, have highlighted the long-standing inequities in the treatment of Black and Brown Americans and renewed our focus on addressing structural racism.



The novel coronavirus, named Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2), caused an illness named coronavirus disease 2019 (COVID-19), identified in late 2019. *Photo credit: Centers for Disease Control and Prevention (CDC).*

Firearm Injury Prevention

Amid the overwhelming toll of COVID-19 in 2020 and beyond, we must remember that traumatic injury continues to be the leading cause of death in young people and accounts for more than 5.8 million deaths per year worldwide.

> Over the history of the COT, the predominant mechanisms of injury have changed but the mission remains the same.

In high-resource countries, falls in the elderly now represent the most common mechanism of injury presenting in our trauma centers. This reality has pushed the development of comprehensive care teams to optimize the management of these patients, enhance training in palliative care, and develop new injury prevention efforts to address recurrent fall risk. In addition, in 2017, the number of Americans dying in motor vehicle crashes was surpassed by the number dying from firearm injury. Sadly, most of these patients die before ever reaching our trauma centers and, thus, we must expand our injury prevention efforts for this challenging problem. Our approach has been to change the conversation from the political issue of gun control to the public health issue of firearm injury. By creating a common narrative and promoting a comprehensive public health approach we believe we can make an impact on this problem.

Consistent with the history of the COT, we have sought to be maximally inclusive in these efforts including engaging firearm-owning surgeons as members of our Firearm Strategy Team (FAST) and by welcoming a diverse, multidisciplinary group of physicians and community workers in our Improving the Social Determinants of Health to Attenuate Violence (ISAVE) Team.

> We still are in the early days of this work and COT leadership recognizes the need to tackle the challenging issues that lead to a cycle of violence in our communities such as structural racism, poverty, and unemployment, as well as inequities in education and access to health care. These are large problems, but the COT has never been afraid to tackle big problems.

By building partnerships across the medical profession and with community organizations, we are hopeful that our trauma centers will support this work by ensuring they are providing informed trauma care and supporting victims of violence through hospital-based violence intervention programs.

Trauma System Development

When it comes to the challenges facing trauma systems, we recognize that there are many rural areas in the U.S. that lack timely access to trauma care and urban areas with, perhaps, too many trauma centers that can drive up costs and reduce the learning experience for physicians in residency training at Level I trauma centers. There also is concern that reduced volumes of seriously injured patients can be associated with impaired outcomes. The COT continues to work on a strategy to promote trauma center distribution based on population need and to encourage an inclusive trauma system model that will engage the rural hospitals as Level III or IV centers capable of stabilizing a critical patient and moving them efficiently to the next level of care.

> In his Scudder Oration, Dr. Eastman urged us to *"Develop a system such that if you threw a dart at a map of the country, no matter where the dart landed, you could be assured of optimal trauma care."*

Driving the Military-Civilian Partnership
M. Margaret (Peggy) Knudson, MD, FACS, is the Medical Director of MHSSPACS.

The COT continues to work to optimize trauma system design and function and to advocate for the infrastructure that supports national coordination of care. Also included in the previously mentioned 2016 NASEM report was the recommendation to increase the development of military-civilian partnerships to support the training and readiness of our military medical teams. A strategic partnership between the ACS and the U.S. military led by M. Margaret (Peggy) Knudson, MD, FACS, Medical Director of the Military Health System Strategic Partnership American College of Surgeons (MHSSPACS), helps to augment these efforts. We also are exploring strategies to support the growing interest in trauma system development and ACS trauma center verification from our global ATLS and trauma colleagues in many countries.

Regional Coordination for Mass Casualty/ Pandemic Response

Another issue that has been highlighted by the COVID-19 pandemic is the lack of consistent regional coordination of the health care system response to disasters and mass casualty events in the U.S.

> With the variability of state trauma systems' potential to respond to fluid situations quickly and effectively, it is clear that large-scale disaster preparedness will continue to be hampered without a national structure.

We have observed that regions using the infrastructure and relationships built for their trauma and emergency care systems to rapidly establish Regional Medical Operations Centers (RMOCs) have been able to better manage the pandemic response by coordinating resources and supporting the interfacility transfer of patients, thereby reducing the risk of a hospital being overwhelmed by a COVID-19 outbreak. The COT is actively promoting this approach to our regional committees and has worked with the office of the Assistant Secretary for Preparedness and Response (ASPR) and the Federal Emergency Management Agency (FEMA) Healthcare Resilience Task Force to develop a toolkit and funding opportunities to establish this infrastructure. Our trauma systems consultation team is working on standards and a module to support consultation to states and regions interested in developing this approach while our advocacy team works toward legislation that will provide federal grant programs to support this infrastructure.

Optimizing Long-Term Functional Outcomes

The next challenge for TQIP is to develop an approach to incorporate long-term patient-reported outcomes in our trauma registries and benchmarks that represent not just in-hospital mortality and complications, but outcomes that reflect the long-term recovery and quality of life of our patients. There are many challenges to this endeavor, including defining the optimal metrics and achieving consistent data collection. Studies have shown that there are significant mental health and social consequences following injury, in addition to physical limitations. As trauma care providers, we need to develop strategies to not only identify these outcomes but also to provide support to patients after discharge. We also know that there is differential access to rehabilitation services, which is impacted by socioeconomic status and variability in health care insurance coverage. Ongoing advocacy is critical to addressing these issues.

Trauma Research

A final issue worth addressing, is the lack of a coordinated approach to, and insufficient funding for, trauma research. Trauma-related events are a public health problem and are the leading cause of death for individuals under the age of 44. This challenge was highlighted in the 1966 report from the National Research Council, *Accidental Death and Disability: The Neglected Disease of Modern Society*, and in every national report since then including the 2016 NASEM report, which stated, "Investment in trauma research is not commensurate with the burden of traumatic injury. To address critical gaps in knowledge of optimal care practices and delivery systems, the United States needs a coordinated trauma research program with defined objectives, a focus on high-priority needs, and adequate resources from both military and civilian sections."

A recent study which evaluated National Institutes of Health (NIH) funding revealed that only 3.7 percent of all NIH grants and 2.9 percent of all NIH funding was committed to trauma-related grants and these awards spanned 24 NIH institutes. Despite many efforts over the years, this is a problem that the COT has yet to solve. In 2014, the COT joined The American Association for the Surgery of Trauma (AAST), the Eastern Association for the Surgery of Trauma (EAST) , the Western Trauma Association (WTA), and the National Trauma Institute to form the Coalition for National Trauma Research (CNTR), whose mission is "To enhance trauma research in the U.S. by advocating for sustainable funding commensurate with the burden of disease; coordinating research efforts across professional organizations which span the continuum of injury care; and enhance the infrastructure for multicenter investigation."

> Trauma-related events are a public health problem and are the leading cause of death for individuals under the age of 44.
>
> *"Investment in trauma research is not commensurate with the burden of traumatic injury."*

This coalition continues to grow and has been successful in developing both a National Trauma Research Repository to house the data from clinical studies for subsequent analysis, and a National Trauma Research Action plan as called for in the 2016 NASEM report. CNTR investigators have achieved federal grant funding to support multicenter clinical projects and many more are in development. It will take the entire community of providers who care for injured patients and the patients and families who suffer the consequences to come together to advocate for sufficient funding.

A Vision for the Future

The theme of our 100th anniversary celebration is "Looking to the Future through the Lens of Legacy." In each chapter of this book, we intend to capture not only the lessons learned from the past, but also to summarize current activities and project a vision for the future. We look to our next generation of trauma surgeons to carry on this mission with the same passion and drive as their predecessors. One must only read the remarks recorded for the 75th anniversary of the COT (next page) to know that it is difficult to predict the future, so rather than make predictions, we will leave you with our hopes outlined below.

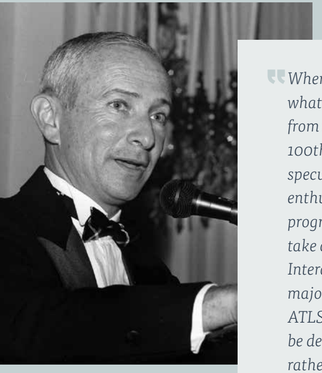
OUR HOPES FOR THE NEXT 100 YEARS

- Injury rates from all mechanisms will continue to decline with the implementation of evidence-based prevention programs enthusiastically supported by the public.
- Our communities will be structured to support the well-being and ability of all members of society to thrive and, as such, violence will be minimized.
- Disparities in both access to health care and outcomes following injury will be eliminated.
- Comprehensive education for the optimal care of the injured patient will be available in every country in the world.
- TQIP will encompass data from trauma centers around the world and will have comprehensive data on the long-term functional outcomes of patients.
- Social care will be integrated into medical care so that all injured patients will have access to comprehensive support to meet their needs during recovery.
- A comprehensive, efficient, and cost-effective trauma system will ensure access to optimal care for injured patients from anywhere in the world.
- The U.S. will have a network of Regional Medical Operations Centers that feed data to state and federal emergency operations centers and support a coordinated response of the health care system to any mass casualty event or health crisis regardless of the scale, thus minimizing the loss of life.
- Funding for trauma research will be commensurate with the burden of injury in society and we will have an NIH Institute for Trauma focused on injury prevention, acute care, and rehabilitation and recovery.
- The COT will continue to thrive as a collegial, diverse, and supportive community of surgeons working together for the common purpose of preventing injuries and improving outcomes for trauma patients.

For the 75th anniversary, C. Thomas (Tommy) Thompson, MD, FACS, wrote,

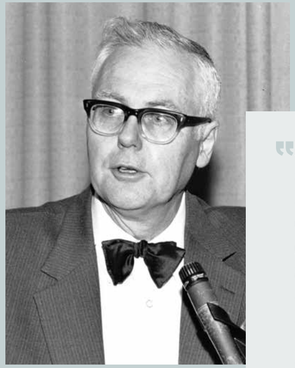
> *"The future of the COT will not depend on advancing technology; it will rely on the leadership skills of the next generation who can foster leadership in the states and communities of this country. Otherwise, other voices with other agendas will assume that leadership. Trauma is our surgical heritage. Let us keep it and continue to honor the ACS. I look forward to the meeting in 2022."*

Predictions for the Future from the 75th Anniversary



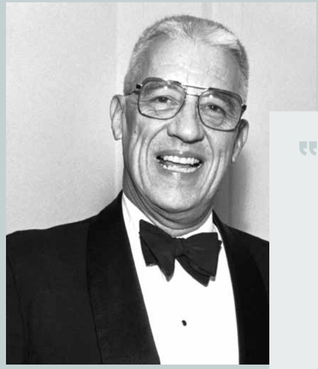
Where the committee will be and what it will be doing 25 years from now when it celebrates its 100th anniversary is interesting to speculate. I would predict the same enthusiasm will prevail. Innovative programs will be developed that will take advantage of new technology. Interactive learning will be a major teaching tool. An advanced ATLS Program for surgeons will be developed, and mechanical rather than animal models will be used. The national database will be well-established and a source of invaluable information. Prevention activities will be more prevalent. Potential threats to the care of the injured patient will come from nonoperative specialties. Trauma will ultimately get the recognition it deserves and relief from litigation and, yes, even compensation for care will be better.

—Erwin R. Thal, MD, FACS



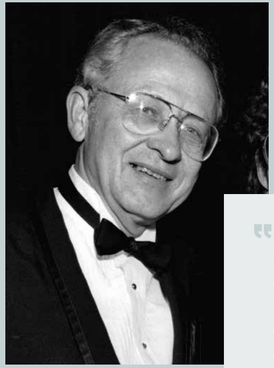
As regards to the future.... I would suspect that there will be much better organization of trauma centers which will be based on geographic need and economic factors. The prehospital system will be streamlined, and transportation both by air and by ambulances will be improved. Trauma care in the ER will be streamlined and turf battles will be a thing of the past. A trauma specialist will develop who has comprehensive training in orthopaedics and neurosurgery, as well as general surgery. I predict noninvasive techniques, such as MRI, which has the ability to survey the patient from head to toe and recognize all structural defects, might permit absolutely precise initial assessment.

—F. William Blaisdell, MD, FACS



The COT on its 100th anniversary will have the same basic mission , but its publications will be electronic, the ATLS Course will include virtual reality to enhance assessment of students' skills, and the development of mobile trauma centers will be focused on providing care for mass casualty and disaster scenarios on a global scale. The trauma registry will have been reformatted to accommodate direct transcription of voice entries, while observing the necessary security measures related to voice recognition and data access. The ethical problem of the day will center on the number of culture-derived organs which can be transplanted before the patient loses identity and becomes someone else.

—Basil A. Pruitt, Jr., MD, FACS



At our centennial, let's hope we have settled the debates over DPL vs. CT vs. ultrasound, resuscitation vs. no resuscitation, and interleukin-1 vs. TNF, and have developed effective programs of injury prevention marketed by our successors who will be, predictably, just as vigorous, enthusiastic, productive missionaries as we who passed before.

—H. David Root, MD, FACS

Legacy of Leaders
Past Chairs of the COF/COT

- 1922–1933 **Charles L Scudder, MD, FACS**
- 1933–1939 **Frederic W. Bancroft, MD, FACS**
- 1939–1952 **Robert H. Kennedy, MD, FACS**
- 1952–1957 **R. Arnold Griswold, MD, FACS**
- 1957–1959 **Preston A. Wade, MD, FACS**
- 1959–1964 **Harrison L. McLaughlin, MD, FACS**
- 1964–1968 **Oscar P. Hampton, Jr., MD, FACS**
- 1968–1974 **Curtis P. Artz, MD, FACS**
- 1974–1978 **Robert W. Gillespie, MD, FACS**
- 1978–1982 **C. Thomas Thompson, MD, FACS**
- 1982–1986 **Donald D. Trunkey, MD, FACS**
- 1986–1990 **Erwin R. Thal, MD, FACS**
- 1990–1994 **A. Brent Eastman, MD, FACS**
- 1994–1998 **John A. Weigelt, MD, FACS**
- 1998–2002 **David B. Hoyt, MD, FACS**
- 2002–2006 **J. Wayne Meredith, MD, FACS**
- 2006–2010 **John Fildes, MD, FACS**
- 2010–2014 **Michael F. Rotondo, MD, FACS**
- 2014–2018 **Ronald M. Stewart, MD, FACS**
- 2018–2022 **Eileen M. Bulger, MD, FACS**

Specialty Chairs

Orthopaedic Chairs since 2002

- 2002–2004 **Christopher T. Born, MD, FACS**
- 2004–2007 **Mark S. Vrahas, MD, FACS**
- 2007–2011 **David C. Teague, MD, FACS**
- 2011–2013 **Wade R. Smith, MD, FACS**
- 2013–2018 **Phillip R. Wolinsky, MD, FACS**
- 2018– **Anna N. Miller, MD, FACS**

Neurosurgery Chairs since 2002

- 2002–2004 **David W. Marion, MD, FACS**
- 2004–2008 **Alex B. Valadka, MD, FACS**
- 2008–2011 **P. David Adelson, MD, FACS**
- 2011–2013 **Shelly D. Timmons, MD, FACS**
- 2014–2016 **Jamie Ullman, MD, FACS**
- 2016–2018 **Daniel B. Michael, MD, FACS**
- 2018–2020 **Richard G. Ellenbogen, MD, FACS**
- 2020– **John Ragheb, MD, FACS**

Pediatric Surgery Chairs since 2002

- 2002–2010 **Arthur Cooper, MD, FACS, FAAP**
- 2011–2015 **Michael L. Nance, MD, FACS, FAAP**
- 2015–2018 **Kennith H. Sartorelli, MD, FACS**
- 2018–2021 **Barbara A. Gaines, MD, FACS**
- 2021– **Robert W. Letton, MD, FACS**

Burns Surgery Chairs since 2011

- 2011–2015 **David G. Greenhalgh, MD, FACS**
- 2015–2021 **David T. Harrington, MD, FACS**
- 2021– **Sharmila Dissanaike, MD, FACS, FCCM**

Plastic Surgery Chairs since 2014

- 2014–2018 **Nicholas B. Vedder, MD, FACS**
- 2018 **Kevin C. Chung, MD, FACS**
- 2019– **Jeffrey B. Friedrich, MD, FACS**

Urologic Surgery Chairs since 2014

- 2014–2020 **Michael Coburn, MD, FACS**
- 2020– **Hunter B. Wessells, MD, FACS**

Oral Maxillofacial Surgery since 2017

- **George M. Kushner, DMD, MD, FACS**

Ophthalmic Surgery since 2019

- **Robert A. Mazzoli, MD, FACS**

Vascular Surgery since 2019

- **Ashraf M. Mansour, MD, FACS**

Obstetrics/Gynecologic Surgery since 2021

- **Peter E. Nielsen, MD, FACS**

Membership Committee Chairs

- **Charles L Scudder, MD, FACS**
- **Henry C. Marble, MD, FACS**
- **James K. Stack, MD, FACS**
- 1954 **Moore Moore, Jr., MD, FACS** 1954–1967
- 1967 **John C. Ivins, MD, FACS** 1967–1970
- 1970 **John H. Davis, MD, FACS** 1970–1974
- 1974 **Andrew C. Ruoff, III, MD, FACS** 1974–1976
- 1976 **James A. O'Neill, MD, FACS** 1976–1977
- 1977 **William E. DeMuth, MD, FACS** 1977–1980
- 1980 **Charles F. Frey, MD, FACS** 1980–1984
- 1984 **James M. Salander, MD, FACS** 1984–1987
- 1987 **Gerald W. McCullough, MD, FACS** 1987–1990
- 1990 **C. James Carrico, MD, FACS** 1990–1993
- 1993 **Frank R. Lewis, Jr., MD, FACS** 1993–1998
- 1998 **John A. Weigelt, MD, FACS** 1998–2002
- 2002 **Michael Rhodes, MD, FACS** 2002–2005
- 2005 **Fred A. Luchette, MD, FACS** 2005–2008

- 2008 **Edward E. Cornwall, MD, FACS** 2008–2010

- 2010 **Mark A. Malangoni, MD, FACS** 2010–2014

- 2014 **Eileen M. Bulger, MD, FACS** 2014–2018

- 2018 **Jeffrey D. Kerby, MD, PhD, FACS** 2018–2022

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02

Leadership of the Committee on Trauma

02

Leadership of the Committee on Trauma

Throughout the 100-year history of the American College of Surgeons Committee on Trauma (COT), there has been a consistent legacy of visionary leadership. These leaders have guided the organization through its initial focus on the treatment of fractures to the expanded mission of the complete care for the traumatically injured patient, from point of injury through rehabilitation, with strong emphasis on injury prevention. This journey has been fueled by the underlying desire to decrease the burden of injury and to drive improvements in outcomes for our patients; that same impetus has been central to all the major programs introduced by the Committee during its 100 years of existence.

Charles L. Scudder (1922–1933)[2]

Charles L. Scudder, MD, FACS, (1860–1949) was appointed the first Chair of the Committee on the Treatment of Fractures in 1922, at the age of 62. Dr. Scudder, a general surgeon in practice at the Massachusetts General Hospital (MGH) organized the first fracture service in the U.S. in 1911. In 1900, he authored the first edition of an authoritative book titled *The Treatment of Fractures*. This text would go through several editions during Dr. Scudder's lifetime. In April of 1922, he organized a meeting at the MGH to address the wide variation in fracture care management. The results of this meeting were published in the *Archives of Surgery* as a syllabus in January 1923, titled "Outline of Treatment of Fractures." In May of 1922, Dr. Scudder petitioned to appear before the American College of Surgeons (ACS) Board of Regents to present the problem of traumatic surgery with a focus on fracture treatment. The result was the formation of the Committee on the Treatment of Fractures with Dr. Scudder named the first Chair.

The initial committee comprised eighteen members, twelve of whom were also appointed as area chairs who oversaw 66 local community chairs. The first report of the committee to the Regents in 1923 indicated regional committee participation from approximately 200 surgeons. Therefore, from the beginning, the committee was organized into a central and regional structure, with emphasis on participation and input from practitioners at a grassroots level. Dr. Scudder was well known for traveling extensively and engaging the regional and local communities in ongoing projects around fracture care, continuing this practice even after his time as Chair ended.

The committee, under Dr. Scudder's leadership, developed standards for the hospital care of fractures, which were first approved by the Regents in 1924. Hospitals approved by the ACS were asked to produce report forms on the way fractures were treated and their results. The committee also produced a manual titled *Outline of the Treatment of Fractures*. First published in 1931, this manual was a staple publication from the committee for several years. Dr. Scudder also oversaw production of the second edition of this manual in 1932.

1 Past President, American College of Surgeons
2 Scudder Oration on Trauma/Oration on Trauma/Oration on Fractures
3 Past President, American Association for the Surgery of Trauma
4 ACS Distinguished Service Award Recipient

In 1929, the Regents approved a Fracture Oration for the Clinical Congress under sponsorship by the committee. Dr. Scudder gave the first oration titled "Non-Operative Treatment of Fractures" at the 1929 Clinical Congress meeting, after which the ACS decided to make this oration an annual presentation. The name of the oration was officially changed to the Scudder Oration on Trauma in 1963. The Scudder Oration remains a highlight of the Clinical Congress meeting each year and an invitation to present the Scudder Oration is considered one of the highest honors in the field of trauma surgery.

The origins of the Committee on the Treatment of Fractures were derived from a recognized need to improve the care of the injured patient. Dr. Scudder's passion for fracture treatment and activism to address a critical deficiency in patient care has become the foundation upon which the committee, now known as the Committee on Trauma, has continued to function.

Dr. Scudder also recognized the need for continued engagement and active leadership of the committee, particularly from the Chair. In a 1947 letter to Robert H. Kennedy, MD, FACS, COT Chair (1939–1952), announcing his full retirement from committee activities, he stated,

> *"I believe that the committee accomplishes most which is presided over by an interested chairman... If the chairman is dilatory, the committee suffers. Therefore, my advice is to choose active, interested, and wide-awake officers."*

To this end, the committee has been very successful.

> "This Committee on Fractures has recently been formed and, with the Regional Committees, over 200 men are serving. The committee has already asked three questions of the Regional Committees:
>
> (1) What principles underlie first-aid treatment, including transportation?
>
> (2) What are the means by which these principles may be carried out?
>
> (3) What are your recommendations as to the equipment of ambulances, first-aid agencies, including hospital-receiving wards, in the effort to establish standardization of this phase of treatment?
>
> The Committee is alive to the grave situation in fracture treatment....Your Committee will spare no pains in its investigation and deliberations to help remedy these evils."
>
> —excerpt from the first Report of the Committee on the Treatment of Fractures to the Board of Regents (1923)

Frederic W. Bancroft (1933–1939)[2]

Frederick W. Bancroft, MD, FACS, (1880–1963) was named second Chair of the committee upon Dr. Scudder's resignation in 1933. Concurrently, the decision was made to change the name of the committee from Committee on the Treatment of Fractures to the Committee on Fractures. Dr. Bancroft was born and raised in Denver, CO, though he spent almost the entirety of his professional life in New York City. He served as director of surgery at the Lincoln Hospital (1924–1926) and at the Fifth Avenue Hospital (1926–1936) before becoming surgical director at New York City Hospital in 1936. During his time as Chair of the committee, he continued to move forward improvements in the care of fractures, adding surgeons with particular expertise to enhance the committee's work. Like his predecessor Dr. Scudder, he met regularly with the sectional committees at local meetings and Clinical Congresses for discussions around projects aimed at improving fracture care. Dr. Bancroft was a prolific author and editor-in-chief of five volumes of work titled "Surgical Treatment." During World War I, Dr. Bancroft served as a major in the U.S. Army Medical Corps in charge of a mobile operating unit in France. Following his death in 1963, he was buried in Arlington National Cemetery, VA.

Robert H. Kennedy (1939–1952)[2,3,4]

Robert H. Kennedy, MD, FACS, (1887–1978) was born in Massachusetts in 1887 and spent his entire professional career in New York City. He worked at both Bellevue and University hospitals prior to becoming surgical director of Beekman Downtown Hospital. While there, he developed a trauma service that would become the model for other hospitals across the country. In 1939, the Committee on Fractures combined with the Board on Industrial Medicine and Traumatic Surgery to become the Committee on Fractures and Other Traumas with Dr. Kennedy serving as Chair. This change gave the committee the additional responsibility for review and inspection of industrial clinics, with more than 1,400 facilities approved by 1951, when administration of this program was passed to the American Foundation of Occupational Health.

> The name of the committee was subsequently shortened to its current title Committee on Trauma in 1949.

Dr. Kennedy has the distinction of being the longest-serving Chair of the committee at thirteen years. He oversaw production of the third (1940) and fourth (1949) editions of the *Principles and Outline of Fracture Treatment* manual. Nearly 45,000 copies of the third edition were distributed at the request of the U.S. Armed Forces during World War II. A primary focus of Dr. Kennedy's long and distinguished career was in setting standards for improvements in prehospital and emergency room care of trauma patients. He was the Chair of the first Subcommittee on the Transportation of Fractures and was the first to identify the issues related to transportation of the injured based on a national survey conducted on fracture splinting in ambulances. He initiated surveys of emergency room and prehospital care during his time as Chair, reporting concerns on the state of current care of the injured in several major cities.

In his 1954 Scudder Oration titled "Our Fashionable Killer," he noted that morticians were responsible for most of the ambulances in the country and whether first aid was rendered during transport was largely left to the local community. He called for national standards for equipment on ambulances and for first-aid training for all personnel. He also identified the emergency room as the "weakest link" in the care of the injured, too often staffed by the most junior and inexperienced providers. In so doing, he provided a framework for emergency medical services (EMS) system development. In 1960, Dr. Kennedy was appointed the first full-time ACS staff member for trauma as Director of the Committee on Trauma Field Program, which was supported by funding provided by grants from the John A. Hartford Foundation. Notable achievements during this time were the production of videos detailing proper organization and operation of emergency ambulance services and emergency rooms; development of a brochure titled *Model of a Hospital Emergency Department*; development of a set of standards for hospital emergency departments and emergency ambulance services (both approved by the Committee on Trauma and the Board of Regents); and editing of a first-of-its-kind manual titled *Emergency Care* that was designed specifically for prehospital personnel. Dr. Kennedy was widely known and recognized for his major impact on trauma care during the era in which he was active. He has alternately been identified as "Mr. Trauma U.S.A.", "Father of Trauma Care", or the "King of Trauma" in various publications.

> "In the compartment of a frozen train, stalled overnight on a return trip from a Fracture Committee meeting in Toronto, with no food and drink – except for a bottle of Scotch – and no heat – except for the same – Fred Bancroft and Bob Kennedy outlined to us younger individuals what the future of trauma should be. I must say their ideas, even thirty-five years ago, have proved to be correct and no one has contributed more to the subject of trauma than Bob Kennedy."
>
> —Preston (Pep) A. Wade, MD, FACS, excerpt from "Profiles in Trauma" 1969

R. Arnold Griswold (1952–1957)[2,3]

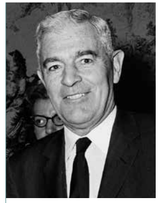
R. Arnold Griswold, MD, FACS, (1898–1972) grew up the son of a surgeon in Peru, IN. He graduated from Harvard University in Boston, MA, in 1921, though he took time away from college to enlist as an aviator during World War I, serving with distinction in both England and Italy. He finished his medical training at the University of Louisville in KY, in 1925, and undertook his surgical training in Cleveland, Boston, and New York City. He returned to Louisville in 1932 as an associate professor of surgery, becoming professor and chairman of the department of surgery there in 1938, a post he held until 1952.

Dr. Griswold established the precedent of a five-year term for committee chairs. His five-year term as Chair was extremely productive. Dr. Griswold oversaw the publication of the fifth edition of the *Principles and Outline of Fracture Treatment* and the publication of the first edition of the *Early Care of Acute Soft Tissue Injuries*. Other accomplishments of the Committee on Trauma during his tenure included the formulation and publication of *Operating Principles for a Modern Workmen's Compensation System by the Subcommittee on Industrial Relations* which was approved by the Board of Regents in 1954. This document helped form the basis for improved workmen's compensation laws in several states. In 1955, the Committee on Trauma, through the Board of Regents, successfully requested that the Joint Commission for the Accreditation of Hospitals include hospital emergency service evaluation in their assessment program. Additionally, the Committee on Trauma and the Board of Regents approved a resolution calling on automobile manufacturers to put more emphasis on occupant safety in automobile design. Their resolution calling for doors that do not open on impact, seats that do not displace, energy-absorbing interiors, and adequate seat belts was proposed nearly ten years prior to the requirements imposed by the Department of Transportation.

Preston A. (Pep) Wade (1957–1959)[1,2,3]

Preston A. (Pep) Wade, MD, FACS, (1901–1982) was born in Helena, MT, and eventually made his way to New York, where he received his undergraduate and medical education at Cornell University, Ithaca, NY, followed by surgical training at the New York Hospital. Dr. Wade stayed in New York, beginning his practice in 1927. He served with the New York-Cornell Unit as Chief of Surgical Service, 9th General Hospital, in the Pacific Theater from 1942–1945. In 1955, he became chief of the Combined Fracture Service of the New York Hospital and the Hospital for Special Surgery.

Dr. Wade had a long-term association with the Committee on Trauma, beginning service on the New York and Brooklyn Regional Committee in 1932. In 1947, he joined the central committee and served for several years (1949–1954) as the Chair of the Subcommittee on Regional Committees, authoring the first guide for regional committees. He was named Chairman of the central Committee on Trauma in 1957, however he had to resign his position in January of 1959 after he was named to the ACS Board of Regents in October of 1958, eventually becoming its Chair in 1963. He served as President of the ACS from 1968–1969. Dr. Wade remained intensely interested in trauma care and was a staunch supporter of COT activities during his leadership of the ACS. He is credited, along with John Paul North, MD, FACS, Executive Director of the ACS, with changing the name of the Oration on Trauma to the Scudder Oration on Trauma in 1963.



Harrison L. McLaughlin (1959–1964)[2,3]

Harrison L. McLaughlin, MD, FACS, (1906–1970) was born in Cumberland, Ontario, Canada. He graduated from Queen's University Medical College in Kingston, Ontario, in 1933 and made his way to Presbyterian Hospital in New York City to train on the fracture service under the mentorship of William Darrach, MD, ScD, LLD, FACS. In 1948, he became chief of the Fracture Service at Presbyterian Hospital and was a professor of clinical orthopaedic surgery at Columbia University. In 1948, Dr. McLaughlin directed a movie titled *Fractures: An Introduction* which was produced by the COT. In 1959, he published a textbook titled *Trauma*, which was recognized as a major contribution to the care of the trauma patient.

As Chair of the COT, he led efforts, in conjunction with Preston A. Wade, MD, FACS, and I.S. Ravdin, MD, FACS, of the ACS Board of Regents, to secure grant funding from the Hartford Foundation to establish the Committee on Trauma Field Program. This program was established to directly address the need to improve emergency departments and the transportation of the injured. The first "Minimum Equipment for Ambulances" was published in the ACS *Bulletin* during his term as COT Chair in 1959, and a set of Standards for Emergency Departments was approved by the COT and Regents in 1963. In addition, the seventh edition of *An Outline of Fracture Treatment* and second edition of the *Early Care of Acute Soft Tissue Injuries* were published in 1960.

Oscar P. Hampton, Jr.(1964–1968)[3,4]

Oscar P. Hampton, Jr., MD, FACS, (1905–1977) was born in Nashville, TN. He attended Vanderbilt University in Nashville, TN, and was a graduate from the Medical School of the University of Tennessee, Knoxville, in 1928. He then undertook surgical training in both Memphis, TN, and St. Louis, MO, before beginning his surgical practice in St. Louis in 1932, where he eventually focused primarily on orthopaedic surgery. He also had a clinical appointment at Washington University, St. Louis, Missouri, where he was a dedicated and active instructor of orthopaedics. During World War II, he became the chief of the orthopaedic section of the 21st General Hospital, Washington University Unit, stationed in North Africa. Dr. Hampton maintained an active engagement in the U.S. Army Reserve Medical Corps following the war, serving as a special assistant for reserve affairs to the Surgeon General of the Army from 1962, until his retirement, as a brigadier general, in 1965.

During his time on the Committee on Trauma, Dr. Hampton chaired the Subcommittee on Transportation where he pushed forward efforts to develop the minimum list of equipment for ambulances. As COT Chair, he continued efforts with the Committee on Trauma Field Program to make important contributions to prehospital and emergency department care of the injured. This included development of a set of Standards for Emergency Ambulance Service in 1967. In addition, the "Initial Therapy of Burns" was published in the ACS *Bulletin* in 1964, followed by "Prophylaxis of Tetanus in Wound Management" in 1965. Dr. Hampton resigned his position as COT Chair in 1968 to accept a position as Assistant Director of the ACS and Consultant in Trauma, COT Secretary, a position he held until shortly before his death in 1977.

Curtis P. Artz (1968–1974)[3]

Curtis P. Artz, MD, FACS, (1915–1977) was a dynamic surgical leader who accomplished a great deal during his professional career. He was born in a farming community in central Ohio and attended The Ohio State University in Columbus for undergraduate and medical school, graduating in 1939. Following four years of general practice in West Virginia during World War II, Dr. Artz returned to Columbus, OH, where he completed general surgical training under Robert M. Zollinger, MD, FACS. He joined the U.S. Army in 1948 and was assigned to the Surgical Research Unit of the Brooke Army Medical Center in 1950 where he was credited with founding the Army Burn Center. He also served as director of the Army Surgical Research team in Korea. He was discharged from military service in 1956, subsequently serving as the first Shrine Professor of Surgery at University of Texas at Galveston. During his time there, Dr. Artz worked with the Shriners Hospitals to establish the first three Shriners Burn Hospitals. He became chair of surgery at the Medical University of South Carolina in Charleston in 1965, a position he held until his death in 1977.

During Dr. Artz's tenure as Chair of the COT, there were several notable achievements. The COT developed a set of guidelines for the categorization of hospital emergency capabilities which were used as the basis for the guidelines published by the Commission on Emergency Medical Services of the American Medical Association. The COT published *Early Care of the Injured Patient* in 1972, the first publication designed as a compilation of both the fracture manual and soft tissue manual and disseminated a *Guide to Initial Treatment of Open Wounds*, as well as a *Guide to Evaluation of Serious Head Injuries*, in poster form. An updated version of the *Minimal Equipment for Ambulances* was produced, and the title was converted to *Essential Equipment for Ambulances* in 1970. A series of films aimed at emergency treatment of traumatic injuries was produced and made available for distribution. Regional section restructuring by the Subcommittee on Regional Committees was undertaken to match regions defined by the U.S. Department of Health, Education, and Welfare. In addition, the first international regional section, beyond the U.S. and Canada, was established in Mexico. Dr. Artz co-chaired the Airlie Conference on Emergency Medical Services in 1969 and hosted the 50th anniversary celebration of the COT at his home institution in Charleston, SC, in 1972, organizing a panel of presentations titled "Golden Anniversary Orations."

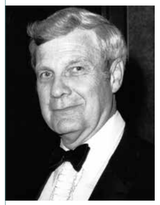
Robert W. Gillespie (1974–1978)

Robert W. Gillespie, MD, FACS, (1926–2013) was born in Sioux City, IA. He attended the University of South Dakota in Vermillion and completed his medical degree at the University of Nebraska School of Medicine, Omaha, in 1950. Following surgical training at Wayne County Hospital in Michigan, he served as a Captain in the U.S. Army Medical Corps in Fort Benning, GA, until 1957, when he moved to Lincoln, NE, to set up his surgical practice. He developed a strong interest in burn care and established one of the first private hospital burn units at St. Elizabeth's Hospital in 1974.

Dr. Gillespie played a key role in the development of the Advanced Burn Life Support Provider Course and the Pre-Hospital Burn Life Support Course. He served as Chair of the Subcommittee on Regional Committees for the COT prior to becoming Chair of the COT in 1974. During Dr. Gillespie's tenure as Chair, the "Optimal Hospital Resources for Care of the Seriously Injured" was published in the ACS *Bulletin* in September of 1976.

The "Optimal Hospital Resources for Care of the Seriously Injured" article was the first attempt to develop guidelines for hospital care of the injured and set in motion subsequent efforts around the verification process for trauma centers.

Following his tenure as COT Chair, Dr. Gillespie was subsequently appointed by C. Thomas Thompson, MD, FACS, then-COT Chair, to spearhead subsequent revisions to this initial document, which resulted in *Hospital Resources for the Optimal Care of the Injured Patient and Appendices A through J* published in August 1979. In addition, the Resident Award Program, precursor to the Resident Trauma Papers Competition, was established during Dr. Gillespie's time as COT Chair in 1978.



C. Thomas Thompson (1978–1982)[2,4]

C. Thomas (Tommy) Thompson, MD, FACS, (1925–) was born to a family of educators in Brookhaven, MS. He began college at the age of 16, enrolling at the Louisiana State Normal College (now Northwestern Louisiana State) in Natchitoches where he was a scholarship baseball player. World War II interrupted his education briefly as he enlisted in the U.S. Navy, subsequently training as a Navy corpsman. Eventually, he was sent to the two-year medical school at the University of Mississippi in Oxford. Upon completion of this training, he transferred to Harvard University, where he completed his medical degree in 1948. He completed his surgical training at Tulane Charity Hospital in New Orleans, LA, during which he was reactivated into active-duty military service as a battalion surgeon during the Korean War. Dr. Thompson began his general surgical practice in Tulsa, OK, in 1955.

His involvement on the COT began in earnest in 1966, when he became Chair of the Oklahoma State COT, building it into one of the most active and transformative state chapters of its time. He was a tireless advocate and quickly promulgated emergency medical service activities in Oklahoma. Dr. Thompson was chosen as one of two initial recipients of the Meritorious Achievement Award at the 50th Annual Meeting in 1972 for his work on the Regional COT Committees. He subsequently became Chair of the Subcommittee on Regional Committees in 1974, and Chair of the COT in 1978.

During his time as COT Chair, the Military COT Region was established in 1980 with Norman M. Rich, MD, FACS, COL, MC, USA(Ret), named as the initial Region Chief. Dr. Thompson also presided over initial phases of the development of the Capital Program, established following the assassination attempt on President Reagan, to provide lists of available trauma providers to offer care for high-profile members of the government. A seminal moment for the COT came when Dr. Thompson invited Paul E. (Skip) Collicott, MD, FACS, to the 1980 Annual COT Meeting in Houston, TX. At that meeting, Dr. Collicott presented the idea of an Advanced Trauma Life Support® (ATLS®) Program. The courses were to be expanded nationally in 1980 and adopted as an ACS-sponsored project by the Board of Regents, with Region Chiefs comprising the initial national faculty. From this point forward, ATLS courses grew exponentially, and were organized across the country by state COT chairs in the regional committees.

The first revision of the initial "Optimal Hospital Resources for the Care of the Seriously Injured" article was completed by Dr. Gillespie during Dr. Thompson's time as Chair. This revision changed the focus from "optimal resources" to "optimal care," thereby placing the emphasis on the trauma patient. This necessitated a title change to *Hospital Resources for the Optimal Care of the Injured Patient*. The updated publication was used to develop a verification program for hospitals with plans that included onsite visits to view the trauma programs. This plan was initially approved by the Board of Regents in 1980; however, they subsequently asked that the program be modified to one of informal and voluntary consultation.

Full approval of a true verification program as originally conceived by the COT would not be implemented for another six years.

Donald D. Trunkey (1982–1986)[2,3,4]

Donald D. Trunkey, MD, FACS, (1937–2019) was born in the rural farming community of Oakesdale, WA. He received his undergraduate education at Washington State University and completed medical school at the University of Washington, Seattle, in 1963. After his internship at the University of Oregon in Eugene, Dr. Trunkey joined the U.S. Army, serving in Germany for two years, before returning to join his mentor, J. Englebert Dunphy, MD, FACS, at the University of California-San Francisco (UCSF) for surgical training. It was here that Dr. Trunkey was introduced to the joys of trauma care while working on the trauma service established there by F. William Blaisdell, MD, FACS. Following residency, he spent a year at Parkland Memorial Hospital working on trauma research with G. Tom Shires, MD, FACS. Following this, he joined the surgical faculty at UCSF in 1972, where he was eventually named the chief of surgery in 1978. In 1986, he was recruited to the Oregon Health and Science University in Portland as the Mackenzie Professor and Chair of the department of surgery, a position he occupied for the next 15 years.

In his first year as COT Chair, Dr. Trunkey outlined a series of professional and systems-related problems in trauma that needed to be addressed as a guide to setting goals for the COT. He recognized the need for a regionalized concept of trauma care, stating "regionalized trauma care is in the best interest of the critically injured patient." He developed a position statement from the COT on the need for a regionalized system of care and the need for trauma center review and designation so that trauma patients (who cannot speak for themselves) receive the highest level of care.

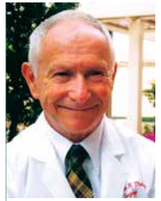
While a verification plan approved by the ACS Board of Regents eluded the COT for several years after it was conceived, during his last meeting as COT Chair in 1986, Dr. Trunkey pushed forward a motion to request the Board of Regents to permit the development of standards by the COT for accreditation of trauma centers and to allow the COT to participate in the implementation of those standards. This was in direct response to a recently formed group called the National Commission for Accreditation of Trauma Centers and their push to organize trauma center verification and accreditation. It was the COT's position that this activity should remain within the COT and not be deferred to an outside entity. On June 8, 1986, the Board of Regents approved the recommendations of the COT in principle, with the understanding that details of the proposed program would be submitted to them the following October for approval. In October 1986, the proposed verification program was approved, and a long-standing goal of the COT was realized. Through his steadfast advocacy for the process of verification of trauma centers, Dr. Trunkey ushered in the modern era of the COT. His dogged determination and unwillingness to stand down in the face of overwhelming opposition from the Board of Regents paved the way for the current era of quality-focused surgical care.

Dr. Trunkey also advocated strongly for ACS COT support for the "Major Trauma Outcome Study" (MTOS), which was a standard reference database of seriously injured patients in the U.S. developed by Howard R. Champion, MD, FACS, and Charles F. Frey, MD, FACS, in 1990. Given the workload associated with this project, there was interest in moving this to the ACS COT as a way to establish a true trauma registry. Initial funding support was obtained from the Robert Wood Johnson Foundation; however, the Board of Regents had misgivings about the study methodology that ultimately prevented this from being a COT-directed initiative. Regardless, the MTOS sparked the ACS COT interest in developing a trauma registry, which eventually led to the National Trauma Data Bank® (NTDB)® and subsequently the Trauma Quality Improvement Program

(TQIP), both of which have continued to promote quality standards to this day. Additionally, a Trauma Autopsy Project, spearheaded by Erwin R. Thal, MD, FACS, and the Subcommittee on Emergency Services–Hospital, developed a "Position Paper on Mandatory Autopsies for Victims of Trauma" along with model legislation for trauma autopsies.

Other areas of focus for Dr. Trunkey during his time as Chair included a focus on trauma prevention. An Ad Hoc Committee on Trauma Prevention was established for the first time by the COT in 1985. Dr. Trunkey also appointed an Ad Hoc Committee on Trauma Rehabilitation and added a major emphasis on trauma research, appointing an ad hoc committee led by Lewis M. Flint, Jr., MD, FACS, to develop a position paper for submission to the Board of Regents recommending a national institute of trauma.

> "...Don had a chronic problem – he refused to accept the unacceptable. He was driven to improve the prevailing standard of care of the injured patient. And, to rectify the inadequacies and inefficiencies he found in trauma care, he became a change agent despite...existing resistance and potential personal repercussions. On his own strength of character and conviction, he led numerous paradigm shifts and improved the care of thousands of injured patients."
>
> —from "In memoriam: Donald D. Trunkey, MD, FACS, a giant in trauma surgery" by Ronald V. Maier, MD, FACS, published in the *Bulletin of the American College of Surgeons*, August 1, 2019.



Erwin R. Thal (1986–1990)[2]

Erwin R. Thal, MD, FACS, (1936–2014) was a proud native of Ohio, having been born in Columbus and raised in the city of Toledo, where he graduated from high school. He attended The Ohio State University, receiving both his undergraduate degree and medical degree in 1958 and 1962, respectively. While there, he developed into a lifelong and committed fan of the university and, more specifically, of their football team, traveling back to Columbus for almost every home football game for the remainder of his life. Following medical school, he moved to Dallas, TX, to begin his surgical training at Parkland Memorial Hospital where he would spend the remainder of his career. His training was interrupted by a two-year term of service with the U.S. Air Force as a flight medical officer, during which he was awarded the U.S. Air Force Commendation Medal for Meritorious Service.

Dr. Thal returned to Dallas and completed his surgical training, joining the University of Texas Southwestern faculty as an instructor in 1969, and rising through the academic ranks to professor in 1982. From 1970 to 1994, he led the surgical emergency service at Parkland. He developed the basic emergency medical technician and advanced paramedic courses for the Dallas metropolitan area during his 21-year affiliation with the Dallas Fire Department. In fact, he received the title of "honorary fire chief" in 1985. Dr. Thal served as Chair of the North Texas Regional Committee beginning in 1974, prior to joining the central Committee in 1981. He became Chair of the COT in 1986.

Dr. Thal established three primary goals for his tenure as Chair. First, to bring to fruition the work begun by Drs. Thompson and Trunkey to establish a Trauma Verification Program. After the Board of Regents approved the verification plan in October 1986, Dr. Thal moved quickly to re-establish the Ad Hoc Verification Review Committee to be chaired by Frank L. Mitchell, Jr., MD, FACS. Verification guidelines were finalized and approved at the 1988 annual meeting and site visits began later that year.

Next, he elevated the Quality Assurance Committee from Ad Hoc Committee to Subcommittee and named Howard R. Champion, MD, FACS, as Chair, charging the group with developing a national trauma registry to be embedded within the ACS. In 1989, the Board of Regents approved the ACS Trauma Registry with the proposed name of National Quality Assurance Trauma Registry of the American College of Surgeons, later to be known as the National Trauma Registry of the American College of Surgeons (NTRACS).

Dr. Thal's third primary goal was to revise and strengthen the *Hospital and Prehospital Resources for Optimal Care of the Injured Patient and Appendices A through J* manual. At the 1988 COT Annual Meeting, he formed an ad hoc committee to begin revisions with the addition of new chapters focused on systems development, rural trauma, guidelines for an eye trauma center, musculoskeletal trauma, critical care, and rehabilitation.

Other notable accomplishments during Dr. Thals's tenure include Board of Regents' approval for promulgation of the ATLS Course outside of the COT organizational structure, with the first course held in London, U.K., in November 1988. The French and Spanish translations of the ATLS Course were finally approved in 1987, following multiple requests. Additionally, the fourth edition of the *Early Care of the Injured Patient* was published in 1989.

A. Brent Eastman (1990–1994)[1,2]

Born into a railroading Wyoming family, A. Brent Eastman, MD, FACS, (1940–) witnessed a legendary train wreck near his hometown of Evanston at the age of 11, and, thus, decided on a career in surgery. A natural leader, Dr. Eastman graduated from the University of Wyoming in Laramie and the University of California, San Francisco (UCSF) School of Medicine, and was student body president at both institutions. UCSF surgery chair, J. Englebert Dunphy, MD, FACS, was a great anglophile and sent Brent to England twice during his training: first to London and Guy's Hospital as a fourth-year medical student; and then to Norwich for a full year as surgical registrar at the Norfolk and Norwich University Hospital.

Back at UCSF, Dr. Eastman (and close friends Donald L. Trunkey, MD, FACS; George F. Sheldon, MD, FACS; and Frank R. Lewis, Jr., MD, FACS) came under the spell of the great F. William Blaisdell, MD, FACS, creator of one of the country's earliest trauma centers at San Francisco General Hospital. After his chief resident year in 1972, Dr. Eastman moved to La Jolla, California—his pediatrician-wife Sarita's hometown—to begin his surgical career with Scripps Memorial Hospital. There, Dr. Eastman pursued a full-time general and vascular surgical practice, while focusing on trauma care. He was co-founder of the San Diego County Trauma System in 1984, and in 1991 was named the inaugural N. Paul Whittier Endowed Chair of Trauma—the first such endowed chair in a community hospital in the U.S. Dr. Eastman served as 93rd President of the American College of Surgeons (ACS) from 2012 to 2013, having previously served as Chair of the ACS Board of Regents. He is an honorary fellow of multiple surgical colleges around the world and was honored as the 2016 UCSF Alumnus of the Year.

As Chair of the COT, Dr. Eastman's significant innovations included integration of the meetings of the central COT with State Chairmen and Region Chiefs. He served as the first Chair of the Ad Hoc Committee on Trauma System Consultation and has helped put trauma systems in place on six different continents. His work with this committee informed his 2009 Scudder Oration on Trauma titled "Wherever the Dart Lands". He also guided the COT during a critical time in the ongoing development of the National Trauma Registry of the American College of Surgeons (NTRACS). He established the COT Subcommittee on the Trauma Registry in 1990 and led a strategic planning retreat focused on addressing issues with an earlier version of NTRACS. From this retreat, a position paper was produced that outlined a clear path forward for continued development of the national trauma registry and national trauma data base. Additional accomplishments included the development of a revised version of the *Resources for Optimal Care of the Injured Patient*, the Blue Book, and hosting the first International ATLS Meeting at the ACS Clinical Congress, both in 1993.

> "I recall vividly being asked to join a meeting with Brent Eastman, then-Chair of the COT, and Alec Walt, President-Elect of the College, on the afterdeck of a Greek cruise ship off the coast of Crete. Brent presented the problems (trauma registry rollout) in great detail, and the three of us applied our attention to resolving the issues plaguing the project. From that point on, my personal interest in the project was established, having been thoroughly convinced by Brent Eastman and subsequently by John Weigelt that the effort was worth salvaging."
>
> Reflections of David G. Murray, MD, FACS, former Chair, Board of Regents and President, American College of Surgeons from *American College of Surgeons Committee on Trauma 75th Anniversary.*

John A. Weigelt (1994–1998)[2]

John A. Weigelt, MD, DVM, FACS, (1947–) currently is Professor of Surgery at the University of South Dakota (USD) Sanford School of Medicine. He received his veterinary degree from Michigan State University in East Lansing, and then completed his medical degree at the Medical College of Wisconsin, Milwaukee in 1974. He completed his general surgery residency at the University of Texas Southwestern Medical Center in 1979 and remained there until 1992, when he took a position at the University of Minnesota Medical School. Dr. Weigelt then moved to the Medical College of Wisconsin and is widely regarded as the architect of their trauma program. He recently retired from the department of surgery at the Medical College of Wisconsin and joined the faculty at USD in January 2019.

Dr. Weigelt has dedicated his career to his patients, his residents, and his students. He has won teaching awards at each of the institutions where he worked. At the University of Texas Southwestern, a Weigelt-Wallace Award was created to recognize his dedication to his patients. He is a recipient of the Wangensteen Award for Excellence in Teaching at the University of Minnesota. He recently was awarded the Smallwood Award from Froedtert Hospital, which also recognizes excellence in patient care and leadership. In October 2015, Dr. Weigelt was awarded the Distinguished Service Award from the ACS. He continues to lead the *Surgical Education and Self-Assessment Program (SESAP®)* and is Director of the Comprehensive General Surgical Review Course sponsored by the ACS. He recently served as First Vice-President of the ACS in 2020.

Dr. Weigelt holds the distinction as the first winner of the COT Resident Trauma Papers Competition in 1978. In 1982, he was named Chair of the North Texas Regional COT and subsequently served as Chief of COT Region 6 beginning in 1989. He was appointed to the COT central Committee in 1993, providing service on

the Subcommittee on Quality Assurance, Subcommittee on the Trauma Registry, and the Advanced Trauma Life Support® Subcommittee.

Dr. Weigelt became COT Chair in 1994 and outlined an aggressive list of goals for his tenure. He established an Ad Hoc Committee on Rural Trauma to bring more focus to the unique issues related to rural trauma care. In addition, he established the Working Group for Trauma System Evaluation chaired by Dr. Eastman, charged with developing guidelines to be used for the evaluation of a trauma system and a process for onsite evaluation. He elevated the Ad Hoc Committee on Prevention to a full Subcommittee on Prevention, and a chapter on "prevention" was drafted to be added to the next version of *Resources for Optimal Care of the Injured Patient*. He also established the Ad Hoc Committee on Outcome Assessment to identify meaningful measures for evaluation of trauma care delivery systems. A further reorganization of the Subcommittee on the Trauma Registry with successful developments to expand the use of National TRACS and further development of the National Trauma Data Bank to begin receiving and reporting data was initiated. Additionally, the COT welcomed its first international member, J. Octavio Ruiz, MD, FACS, from Mexico DF, Mexico to the central COT, in 1996.

David B. Hoyt (1998–2002)[2,3,4]

David B. Hoyt, MD, FACS, (1949–) obtained his medical degree from Case Western Reserve University, Cleveland, OH, in 1976. He received his surgical training at University of California-San Diego (UCSD), finishing as chief resident in 1984. During his training, he spent three years as a research fellow at UCSD and Scripps Clinic and Research Foundation. He subsequently served as director of the division of trauma, burns, and critical care at the UCSD Medical Center from 1989 to 2006, where he rose to the rank of professor of surgery in the UCSD School of Medicine in 1995. Dr. Hoyt was named the Monroe E. Trout Professor of Surgery at UCSD in 1996 and was named Vice Chair of the department of surgery at the university in 1997. In 2006, Dr. Hoyt was recruited to the University of California at Irvine as the John E. Connolly Professor and chair, department of surgery and executive vice-dean of the school of medicine.

In 2010, Dr. Hoyt succeeded Thomas R. Russell, MD, FACS, as Executive Director of the ACS and led the College in this capacity through the end of 2021. Dr. Hoyt has served as president of the Panamerican Trauma Society, the American Association for the Surgery of Trauma, the Shock Society, and the San Diego Society of General Surgeons. He has also served as Chair of the Trauma Advisory Committee for the State of California's Emergency Services Authority. Dr. Hoyt has received numerous recognition awards throughout his distinguished career, including the Trauma Service Award from the Society of Trauma Nurses and the Robert Danis Lifetime Research Award from the International Society of Surgery. In 2007, Dr. Hoyt was awarded the ACS Distinguished Service Award.

Dr. Hoyt became Chair of the San Diego-Imperial County Chapter of the COT in 1989 and began service as Chief of COT Region 9 in 1992. He joined the central COT and its Executive Committee in 1994, serving as Chair of the Subcommittee on the Trauma Registry where he was instrumental in the continued development of the National Trauma Data Bank and National Trauma Registry of the American College of Surgeons. Dr. Hoyt began his service as Chair of the COT in 1998. Major accomplishments during his time as Chair include a revision of the *Resources for Optimal Care of the Injured Patient* to the 1999 Gold Book, expansion of the Trauma Verification Program, initiation of the trauma system consultation process, expansion of ATLS globally, and codification of specialty engagement through the formation of specialty positions and committees. Under his direction, the COT implemented a focus on disaster preparedness and became a home for disaster management courses following the terrorist attacks on September 11, 2001. Dr. Hoyt also has the distinction for serving as the first Medical Director of Trauma Programs at the ACS beginning immediately after his term as COT Chair. This position was created after a reorganization effort at the ACS, with Dr. Hoyt serving the first four-year term. Due to the success of Dr. Hoyt's term as Medical Director, the COT Chair now traditionally transitions into this role following their term as Chair.

J. Wayne Meredith (2002–2006)[1,2,3,4]

J. Wayne Meredith, MD, FACS, (1952–) currently serves as the Richard T. Myers Professor and Chairman of the department of surgery at the Wake Forest School of Medicine, in Winston-Salem, NC, where he also serves as medical director of the Childress Institute for Pediatric Trauma. He earned his undergraduate degree in Physics from Emory University, Atlanta, GA, and his medical degree from Wake Forest University. Following medical school, he completed his general surgery and cardiothoracic surgery training at Wake Forest, as well as a trauma/critical care fellowship with Dr. Trunkey at the Oregon Health Sciences University Hospital in Portland, OR. He is a recognized leader in surgery, having served as president of the Eastern Association for the Surgery of Trauma, Southeastern Surgical Congress, The Halsted Society, the Southern Surgical Association, and the American Association for the Surgery of Trauma. He also has served as a director of the American Board of Surgery and the American Board of Thoracic Surgery. In 2020, Dr. Meredith was installed as President of the American College of Surgeons.

Dr. Meredith has a long history of service to the COT. This service has included serving as Chair of the North Carolina State Regional COT, Chair of the Ad Hoc Committee on the National Trauma Data Bank® (NTDB®), and Chair of the Subcommittee on the Trauma Registry, prior to becoming Chair of the central COT in 2002.

Dr. Meredith was instrumental in the early growth of the NTDB, and the development of the ACS trauma registry software known as NTRACS. Dr. Meredith also was critical to the development of trauma systems and the growth of the Trauma System Evaluation and Consultation Program. During his tenure as COT Chair, Dr. Meredith successfully spearheaded several important initiatives. He enhanced the COT focus on disaster management by reinstituting the Ad Hoc Committee on Disaster and Mass Casualty Management. This committee developed a position statement on disaster management that was approved by the ACS Board of Regents and subsequently published; organized dedicated symposia on disaster management presented at the ACS Clinical Congress; and developed early versions of a disaster management course, now known as Disaster Management and Emergency Preparedness (DMEP).

In addition, the Rural Trauma Team Development Course (RTTDC) was established with more than one hundred courses completed in the first four years. Also, in the area of trauma education, an operative skills and exposure course, now known as Advanced Surgical Skills for Exposure in Trauma (ASSET) was developed and the Advanced Trauma Operative Management (ATOM®) Course, first developed by Lenworth M. Jacobs, Jr., MD, MPH, FACS, became an official ACS COT trauma education course. Dr. Meredith also oversaw further revisions to the *Resources for Optimal Care of the Injured Patient* with the addition of the requirement for alcohol screening and brief intervention for trauma patients, and refined volume criteria and requirements for trauma attending presence in the emergency department published in the Green Book in 2006.

Dr. Meredith also reorganized efforts around the NTDB which flourished under the committee leadership of John Fildes, MD, FACS. Following a change to the Longmire Rules that eliminated senior membership status, Dr. Meredith successfully led efforts to increase the number of active members on the central COT to maintain the number of working members and began intentional efforts to create a more diverse and inclusive environment throughout the COT.

> "Dr. Meredith was the Chair of the COT when I first started attending the meetings as a member of the regional committees and has been an inspirational role model and mentor. When I learned that I had been selected as the next Chair, his advice to me was, 'It's just painting with people, find the right person for each role and let them run.' I continue to strive to live up to his legacy."
>
> —Eileen M. Bulger, MD, FACS, COT Chair (2018–2022)

John Fildes (2006–2010)

John Fildes, MD, FACS, (1955–) grew up in New York state and received his undergraduate degree in biomedical engineering from Union College in Schenectady, NY. He then completed medical training at the University of Santo Tomas in Manila, Philippines, followed by surgical training at the Bronx-Lebanon Hospital in New York. This was followed by a fellowship in surgical critical care, burns, and trauma at Chicago's Cook County Hospital.

Dr. Fildes has practiced in Nevada since 1996, and currently serves as the associate dean for external affairs, professor, and inaugural chair of surgery at the University of Nevada, Las Vegas. He has served as medical director of the trauma center and chief of the department of trauma and burns at University Medical Center in Las Vegas, Nevada's only Level I Trauma Center. Dr. Fildes has made significant contributions to the growth and development of acute care surgery as a new surgical specialty, and he established the first American Association for the Surgery of Trauma-approved fellowship in acute care surgery in the U.S. and served as its program director for more than 10 years. He also developed one of the first military-civilian partnerships with the U.S. Air Force at the University Medical Center in Las Vegas.

As a member of the COT, Dr. Fildes made significant contributions to the creation of the NTDB and the Trauma Quality Improvement Project (TQIP). He led the effort to standardize data collection by establishing the National Trauma Data Standards and created the initial NTDB reports. Under his leadership, the NTDB reached over 1 million record submissions. During his tenure as Chair of the COT, the systems consultation guide, *Regional Trauma Systems: Optimal Elements, Integration, and Assessment – System Consultation Guide*, also known as the White Book, was published in 2008, which continued the growth and development of the Trauma System Consultation Program. In addition, the TQIP program was formally launched in 2010, and the COT expanded delivery of the DMEP Course. Dr. Fildes also oversaw the transition to the ninth edition of ATLS and supported the rapid global growth of the COT.

Michael F. Rotondo (2010–2014)[3]

Michael F. Rotondo, MD, FACS, (1956–) grew up in Irondequoit, NY, a major suburb of Rochester where he currently resides and works as chief executive officer (CEO) of the University of Rochester Medical Center Medical Faculty Group. He moved to Washington, DC, for college, completing a Bachelor of Science degree in chemistry and a Master of Science degree in cardiovascular physiology at Georgetown University, followed by medical school at the same institution. He then completed his general surgical training at Thomas Jefferson University Hospital before becoming the first Fellow in Traumatology and Surgical Critical Care at the University of Pennsylvania (Penn). He accepted his first academic post at Penn, rising to direct its Level I trauma center and serve as vice-chief of traumatology and surgical critical care.

In 1999, Dr. Rotondo was recruited by the Brody School of Medicine at East Carolina University, Greenville, NC, where he rose to the rank of professor of surgery, built a Level I trauma center for eastern North Carolina, and became chair

of the department of surgery in 2007. In 2013, Dr. Rotondo was recruited back to Rochester in his current position as CEO. At the same time, he holds two appointments at the University of Rochester's School of Medicine—vice-dean of clinical affairs and professor of surgery—and serves as associate vice-president for administration at Strong Memorial Hospital, the university's 830-bed flagship teaching hospital. Dr. Rotondo is recognized for his pioneering research and education focused on "damage control surgery." Since the U.S. Department of Defense adopted it as a core treatment method, damage control practices have helped the U.S. Army achieve some of its all-time highest battlefield survival rates in the war in Iraq and Afghanistan. Dr. Rotondo has served as president of the Eastern Association of the Surgery of Trauma, president of The Halsted Society, and President of the American Association for the Surgery of Trauma.

Dr. Rotondo began serving as Chair of the North Carolina Regional COT Committee in 2003. He was appointed to the central Committee of the COT in 2006, serving as Chair of the Trauma System Evaluation and Planning Committee, where he played a key role in supporting the development of the U.S. Military Joint Theater Trauma System during the conflicts in Iraq and Afghanistan. As Chair of the COT beginning in 2010, Dr. Rotondo undertook a strategic planning process and reorganized the committees of the COT into the pillar structure that is the precursor to that used today. During his term, he oversaw the ongoing growth of the ACS core programs and the 2014 revision of the *Resources for Optimal Care of the Injured Patient*, the Orange Book.

Following the tragic Sandy Hook Elementary School shootings in 2012, Dr. Rotondo worked with Lenworth M. Jacobs, Jr., MD, MPH, FACS, in organizing the series of Hartford Consensus conferences that led to the enhanced integration of law enforcement and emergency medical service response to mass shootings and the development of the STOP THE BLEED® program. Dr. Rotondo continued the growth of TQIP and the development of the Pediatric TQIP initiative. A major focus of Dr. Rotondo's tenure as COT Chair was the global promulgation of COT programs. He established the International Injury Care Committee (I2C2) and developed a framework for expansion of global regions within the COT.

Ronald M. Stewart (2014–2018)

Ronald M. Stewart, MD, FACS, (1959–) completed medical school and surgical residency training at the University of Texas Health Science Center in San Antonio (UTHSCSA). Following residency, he completed a two-year trauma and surgical critical care fellowship at the University of Tennessee Health Science Center in Memphis before returning to San Antonio in 1993 as the director of their trauma service. Dr. Stewart has served as the Board Chair of the Southwest Texas Regional Advisory Council for Trauma and, in May 2000, was an appointee of Governor George W. Bush to the Governor's Emergency Medical Services and Trauma Advisory Council. Since 2008, Dr. Stewart has served as the chair of the department of surgery at UTHSCSA, holding the Witten B. Russ Chair in Surgery. He has served as president of the Southwestern Surgical Congress, president of the Texas Surgical Society, and Southern Surgical Association's representative to the American College of Surgeons (ACS) Board of Governors. Throughout his career, he has won numerous awards including the UT Health San Antonio Presidential Award for Clinical Excellence (2004); the Distinguished Alumnus of UT Health San Antonio School of Medicine (2005); the Leonard Tow Humanism in Medicine Award (2007); the ACS National Safety Council Award (2013); and the ACS Arthur Ellenberger Award for Excellence in State Advocacy. Dr. Stewart was a founding member of the National Trauma Institute which is now the Coalition for National Trauma Research (CNTR) and has led the development of trauma system and disaster response as chair of the South Texas Regional Advisory Council.

Dr. Stewart served as Chair of the South Texas Regional COT followed by six years of service as Chief of COT Region 6. Dr. Stewart joined the COT central committee in 2012 and was named COT Chair in 2014. During Dr. Stewart's tenure as Chair of the COT, he took on the challenge of establishing an effective approach to firearm injury prevention, a topic that was described as unassailable at the time. His philosophy was to start with a "common American narrative," which takes a nonpartisan public health approach to building consensus and implementing programs that focus on firearm safety for gun owners and identifies and treats the root causes of violence. He established the Firearm Strategy Team (FAST) Work Group that published a number of recommendations from the perspective of firearm-owning surgeons. He established a strong alliance with the American Foundation for Firearm Injury Reduction in Medicine (AFFIRM) and the Health Alliance for Violence Intervention (HAVI). He has testified before Congress several times in support of research funding for firearm injury prevention and has spoken in forums across the U.S. His approach is to always be maximally inclusive, keeping the best interests of the patients at the center of the discussion.

In 2016, Dr. Stewart led the COT in responding to the National Academies of Sciences, Engineering, and Medicine (NASEM) Report on the need for a national trauma system and improved military-civilian integration. He organized a multidisciplinary conference at the National Institutes of Health to develop strategies to support the implementation of the recommendations outlined in the report and made it the mission of the COT to advance this work. In addition, during his tenure as COT Chair, Dr. Stewart advanced the concept of trauma systems as the framework for disaster response and led the promulgation of the STOP THE BLEED® program, which has now trained more than 1.8 million people worldwide in the basic skills of bleeding control.

> "I have been blessed to work closely with Dr. Stewart over the last eight years as he served first as the Chair, then as Medical Director. I have been impressed by his quiet wisdom and thoughtfulness coupled with relentless advocacy. He has the gift of being able to truly listen to all points of view and make a compelling argument on behalf of our patients. His maximally inclusive, consensus-driven approach has allowed the COT to make considerable progress on many controversial issues."
>
> —Eileen M. Bulger, MD, FACS, COT Chair (2018-2022)

Eileen M. Bulger (2018–2022)

Eileen M. Bulger, MD, FACS, (1966–) was born in Warwick, RI. She completed an undergraduate degree at Johns Hopkins University, Baltimore, MD, and her medical degree at Cornell University. She then moved to Seattle, WA, for her general surgery training at the University of Washington (UW), completing a National Institutes of Health Trauma Research Fellowship and Surgical Critical Care Fellowship. She joined the UW faculty in 2000, and quickly rose through the academic ranks, becoming a full professor of surgery in 2009. She currently serves as the chief of trauma and trauma medical director at Harborview Medical Center.

Dr. Bulger is an established surgical leader, having served in several leadership roles to date, including President of the Washington Chapter of the ACS, secretary-treasurer, and president-elect of the American Association for the Surgery of Trauma, and chair of the Coalition for National Trauma Research (CNTR). She has served the COT in many capacities throughout her professional career. During her time on the Regional COT beginning in 2002, she served as Vice Chair and Chair of the Washington State COT and subsequently Chief of Region 10. She joined the central COT in 2012 and has served as Chair of the Emergency Medical Services Committee and Chair of the Membership Committee. During her time as Membership Committee Chair, she established the Mentoring for Excellence in Trauma Surgery Program and the Future Trauma Leaders (FTL) Program, both of which provide early career trauma surgeons exposure and engagement in central COT activities.

Dr. Bulger became Chair of the COT in 2018. She implemented a massive strategic planning process, updating the vision and mission statement and reorganizing the activities of the COT within a pillar structure similar to that established by Dr. Rotondo: Trauma Systems, Trauma Center Quality, Education, and Injury Prevention/Advocacy/STOP THE BLEED®. This restructuring improved alignment and development of cross-pillar projects, and effectively facilitated development of smaller work groups, thereby enhancing COT member engagement across the board. Dr. Bulger also recognized the need for broader representation in the COT, establishing a Diversity, Equity, and Inclusion Advisory Work Group to improve opportunities and COT engagement of underrepresented groups. She also orchestrated fundraising efforts known as the FTL100 and Centennial Campaigns, which successfully raised more than $1,000,000, allowing the Future Trauma Leaders mentoring program to expand and become self-sustaining.

Dr. Bulger renewed the COT's focus on research activities, supporting the development of a research infrastructure within TQIP, hosting a methodology conference to advance trauma research, and helping restructure the Coalition for National Trauma Research with the ACS COT as a core member. Dr. Bulger's long-standing interest in disaster response strengthened the collaboration between the COT and the office of the Assistant Secretary for Preparedness and Response (ASPR). During the COVID-19 pandemic, Dr. Bulger and Dr. Stewart have worked to promote the importance of enhanced regional coordination and advocate for an integrated national network of regional medical operations centers (RMOCs). She also has carried on the work begun by Dr. Stewart as a strong advocate for a public health approach to firearm injury prevention. During her term, the Improving Social Determinants to Attenuate Violence (ISAVE) Work Group was established, and the COT hosted a Medical Summit on Firearm Injury Prevention in 2019, which was attended by representatives from more than 45 major medical and injury prevention organizations to build consensus and share best practices on the public health approach to firearm injury prevention. Dr. Bulger also was successful in raising funds from the leading trauma organizations in the U.S. to establish a joint Firearm Injury Prevention Clinical Scholar program at the ACS.

Dr. Bulger has led the planning for the COT's 100th anniversary celebration and served as the primary editor for this book. In concert with the 100th anniversary celebration, the COT has launched a public messaging campaign, "Injury, a moment of crisis, a lifetime of impact," to raise awareness of the long-term impact of traumatic injury and the need to support a national trauma and emergency preparedness system infrastructure and research. An avid quilter in her spare time, Dr. Bulger created a centennial quilt to recognize all the accomplishments of the COT that was revealed at the 100th anniversary celebration.

Secretaries, Vice Chairs, and Medical Directors

Other leadership positions within the COT have been vitally important to the success of the organization and are therefore deserving of recognition. In the early days of the committee, the position of Secretary provided the Chair with the necessary support to move programs within the committee forward. Many of those who served as Secretary, such as Frederic W. Bancroft, MD, FACS; Robert H. Kennedy, MD, FACS; and Preston A. Wade, MD, FACS; subsequently ascended into the role as COT Chair. Oscar P. Hampton, Jr., MD, FACS, resigned as COT Chair in 1968 to assume the role as Assistant Director of the ACS, with additional duties as Consultant in Trauma and COT Secretary. He was succeeded by Alexander C. Hering, MD, FACS, who served in that role until 1986 when the position was restructured and changed to Director, Trauma Department. In 2001, this position was disbanded and a tradition of the outgoing COT Chair transitioning into a four-year role as Medical Director, Trauma Programs was begun following the term of David B. Hoyt, MD, FACS, who was the first named to his position in 2002.

Avery B. Nathens, MD, MPH, PhD, FACS, FRCSC
ACS COT Medical Director, Trauma Programs.

A major leadership role in quality for ACS COT has been held by Avery B. Nathens, MD, MPH, PhD, FACS, FRCSC, since 2010. He spearheaded the development of the Trauma Quality Improvement Program (TQIP®) which was eventually launched in 2010, at which time he was named Director of the Trauma Quality Improvement Program. He subsequently was named Medical Director of Trauma Quality Programs in 2016 to highlight his expanded role overseeing all quality programs in the Quality Pillar in 2016 (see full biography of Dr. Nathens in Chapter 6).

The COT Vice Chair position was developed in 1965 and rotated yearly until 1982 when longer terms became commonplace. Beginning in 1994, the position of COT Vice Chair became linked to the role as Chair of the Regional Committees on Trauma. Adding this responsibility to the Vice Chair position has given this role additional importance within the COT structure, particularly with the international expansion of the COT regions. The regional committees have been a part of the committee since its inception by Dr. Scudder in 1922 and account for the largest member group within the COT structure. In this capacity as Chair of the Regional Committees on Trauma, the Vice Chair is charged with maintaining Dr. Scudder's vision that participation and input of practitioners at the grassroots level remain an integral part of the COT mission.

Secretaries

- 1922 **John B. Walker, MD, FACS** 1922–1931
- 1931 **Frederic W. Bancroft, MD, FACS** 1931–1933
- 1933 **Robert H. Kennedy, MD, FACS** 1933–1939
- 1939 **Bowman C. Crowell, MD, FACS** 1939–1949
- 1949 **Preston A. Wade, MD, FACS** 1949–1955
- 1955 **James B. Mason, MD, FACS** 1955–1963
- 1963 **James H. Spencer, MD, FACS** 1963–1966
- 1966 **Robert H. Kamish, MD, FACS** 1966–1968
- 1968 **Oscar P. Hampton, Jr., MD, FACS** 1968–1976
- 1976 **Alexander C. Hering, MD, FACS** 1976–1986

Director, Trauma Department (ACS staff position)

- 1986 **Alexander C. Hering, MD, FACS** 1986–1987
- 1987 **Gerald O. Strauch, MD, FACS** 1987–2001

Medical Director, Trauma Programs (ACS staff position)

- 2002 **David B. Hoyt, MD, FACS** 2002–2006
- 2006 **J. Wayne Meredith, MD, FACS** 2006–2010
- 2010 **John Fildes, MD, FACS** 2010–2014
- 2014 **Michael F. Rotondo, MD, FACS** 2014–2018
- 2018 **Ronald M. Stewart, MD, FACS** 2018–2022

Director, Trauma Quality Improvement Program

- 2010 **Avery B. Nathens, MD, MPH, PhD, FACS** 2010–2016

Medical Director, Trauma Quality Programs

- 2016 **Avery B. Nathens, MD, MPH, PhD, FACS** 2016–

Vice Chairs, Committee on Trauma; and Chair, Regional Committees on Trauma (dual title as of 1994)

- 1965 **William T. Fitts, Jr., MD, FACS**
- 1966 **Curtis P. Artz, MD, FACS**
- 1967 **Moore Moore, Jr., MD, FACS**
- 1968 **Truman G. Blocker, Jr., MD, FACS**
- 1969 **Rudolf J. Noer, MD, FACS**
- 1970 **George O. Eaton, MD, FACS**
- 1971 **H. Thomas Ballantine, Jr., MD, FACS**
- 1972 **J. D. Farrington, MD, FACS**
- 1973 **Ormond S. Culp, MD, FACS**
- 1974 **John H. Davis, MD, FACS**
- 1975 **Andrew C. Ruoff, III, MD, FACS**
- 1976 **Henry C. Cleveland, MD, FACS**
- 1977 **Wiliam F. Bouzarth, MD, FACS**
- 1978 **Kenneth F. Kimball, MD, FACS**
- 1979 **William E. DeMuth, Jr., MD, FACS**
- 1980 **George Johnson, Jr., MD, FACS**
- 1981 **H. David D. Root, MD, FACS**

- 1982 **Gerald O. Strauch, MD, FACS** 1982–1986

- 1986 **C. James Carrico, MD, FACS** 1986–1989

- 1989 **Kimball I. Maull, MD, FACS** 1989–1990

- 1990 **Ernest E. Moore, Jr., MD, FACS** 1990–1992

- 1992 **Charles L. Rice, MD, FACS** 1992–1993

- 1993 **C. William Schwab, MD, FACS** 1993–1994

- 1994 **Charles F. Rinker, II, MD, FACS** 1994–1998

- 1998 **L.D. Britt, MD, MPH, FACS, FCCM** 1998–2002

- 2002 **Gregory J. Jurkovich, MD, FACS** 2002–2006

- 2006 **M. Margaret Knudson, MD, FACS** 2006–2010

- 2010 **Raul Coimbra, MD, PhD, FACS** 2010–2014

- 2014 **Leonard J. Weireter, Jr., MD, FACS** 2014–2018

- 2018 **Patrick M. Reilly, MD, FACS** 2018–2022

Scudder Oration on Trauma

03

Scudder Oration on Trauma

The Scudder Oration on Trauma is one of only a handful of Named Lectures given annually at the American College of Surgeons (ACS) Clinical Congress. The Scudder Orators demonstrate a sustained commitment to injury prevention and trauma care and are selected by their peers on the ACS Committee on Trauma (COT).The opportunity to give this lecture is recognized as one of the greatest honors in recognition of one's career and contributions to trauma surgery.

Charles L. Scudder, MD, FACS
1929.

This oration can be traced back to Charles L. Scudder's, MD, FACS, first Oration of Fractures in 1929, as the Chair of the ACS Committee on Fractures. The lecture was known as the Oration on Fractures from 1929–1951. The name was changed to the Oration on Trauma from 1952–1962, and then the presentation became known as the Scudder Oration on Trauma in 1963, as it is known today. It has been given every year at the Clinical Congress since 1929 except for the period of World War II, 1942–1945. In 2020, because of the COVID-19 pandemic, the Scudder Oration on Trauma was given virtually for the first time as part of the ACS Clinical Congress virtual meeting.

Evolution of the Name

1929–1951	1952–1962	1963–Present
Fracture Oration	Oration on Trauma	**Scudder Oration on Trauma**

Any individual who has made significant or sustained contributions to injury prevention or the care of the injured patient may be nominated to present the oration. (Nominees are not required to be members of the ACS.) The current criteria for selection as the Scudder Orator include demonstration of sustained commitment to trauma care, significant contributions to improving care, and a voice for ardent advocacy for high professional standards. The list of past orators and the titles of their talks are listed the table on page 84. Most of these lectures have been published and, in recent years, are available in a video-recording format—all of which can be found on the ACS website.

A review of the past orations reveals a vast array of insightful comments that not only captures the history of trauma care, but also highlights the challenges of the times and provides a roadmap for the future. Topics range from the clinical care of specific injuries and its evolution over time to the development of emergency medical services and trauma care systems, to the economic and political challenges facing health care more broadly.

Many speakers have offered a call to action to:

- Increase engagement in injury prevention activities
- Improve medical education for trauma care
- Enhance our understanding of the pathophysiology of injury through basic and translational research
- Support the development of organized emergency care systems
- Support training and readiness for military surgeons
- Provide leadership in the care of trauma patients across the continuum of care

Throughout the Scudder Orations, there is a recurring commitment to advancing the field with the best interests of the patient always at the forefront of every decision. It is not possible to fully represent the vast array of wisdom included in the past orations; however, we have attempted to highlight notable topics with a series of quotes taken from these lectures organized by common themes.

Past Scudder Orators
ACS Clinical Congress, New Orleans, 1995.[1]

On the Treatment of Fractures

> By treating a fracture instantly you treat the fracture. By treating a fracture after delay, you treat a fracture plus complications… Early treatment is easy. Delayed treatment is difficult. Late treatment is lamentable.

Charles L. Scudder, MD, FACS, 1929

> A broken bone deserves as much consideration of the time element as a ruptured ulcer or an acute appendicitis.

William Darrach, MD, ScD, LLD, FACS, 1931

The mission of the Fracture Committee is

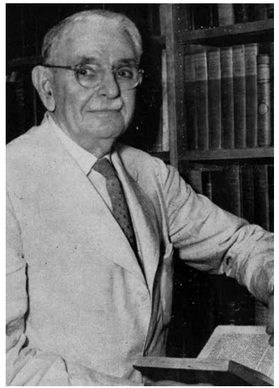
> to work for the enlightenment of the profession to the end that fractures would be treated more intelligently and that there would be improvement in results, established standards for equipment in hospitals, and supported [and] dedicated fracture services.

> Principles stand from generation to generation; gadgets come and go. Let us go and sin no more.

Paul B. Magnuson, MD, FACS, 1935

> There is no legitimate excuse for neglect in the reduction of fractures any more than there is a legitimate excuse for anyone starving to death in a time of plenty.

William O'Neill Sherman, MD, FACS, 1937



> Let us consider surgery as the application of one's knowledge of anatomy for the relief or cure of a pathological condition. Let us remember too that today's axioms were mysteries beyond the horizon of yesterday. The horizon had enshrouded the X ray, bacteriology, and anesthesia. Therefore, surgery could not progress.

> The evolution of the fracture problem depends on continued search for truth and the utilization of all of the aids that scientific achievements place at our disposal for the benefit of the suffering mass of the human family. Let it not be said of our generation that we stagnated, or that we were bound by the adamantine force of the authorities of yesterday.

Isidore Cohn, Jr., MD, FACS, 1938

On the importance of early mobilization,

> As a result of weight bearing during healing, adequacy of the blood supply to the injured limb is usually maintained; in consequence, atrophy of cartilage, ligament, and bone is minimized and loss of joint function due to this cause is avoided.

Fraser N. Gurd, MD, FACS, 1939

On the evolution of orthopaedics as a specialty,

> it is only in the older parts of our land, in regions where one finds the litter of antiques and traditions persisting, where the general surgeon still has the undisputed privilege of treating fractures.

On the importance of the debridement of open fractures within 6 hours,

> We must impress upon our colleagues that minutes spent in the hospital preparing for an operation are just as precious as those that were spent in transportation of the patient to the hospital.

Walter E. Lee, MD, FACS, 1941

On the management of hand injuries,

> The working man's hand is his greatest asset, with skillful and wisely directed care, and particularly in the hours immediately following injury, even seriously injured hands can be saved for useful function.

Sumner L. Koch, MD, FACS, 1952

Past Scudder Orators
ACS Clinical Congress, San Francisco, 1996.[2]

On the Activities of the COT and Advocating for the Injured Patient

"Dr. Frederic Bancroft once described the activities of the Committee on Trauma, for which he did such a yeoman service, as the greatest project in postgraduate medical education in the world."

Dr. William Estes (ACS past-president) reported,

"It has been said that the successful activities of the Fracture Committee have constituted the greatest contribution made by the ACS to the American public and the medical profession."

Dr. Frederick Coller (ACS past-president) noted,

"The Fracture Committee, now the COT, has done as much to help the injured as any other influence in modern surgery has done."

Harrison L. McLaughlin, MD, FACS, 1957

"Perhaps as surgeons, we should on Scudder Day think of our civilian dead much as we think of our war dead on Memorial Day…As surgeons concerned about the welfare of injured patients, we should mobilize for peace as we mobilize for war."

"Ultimately, the optimal care of the sick or injured patient is our lodestar. Using this concept as our guide, we can and should be zealous without being zealots, stand strongly for what we think to be right without being self-righteous, face moral problems without being moralistic, promote sanity without sanctimony."

Alexander J. Walt, MD, FACS, 1978

"Your former committee, Dr. Scudder, has been blessed with men of vision who have been able to transform basic science into clinical practice and then make that practice the standard of all."

John H. Davis, MD, FACS, 1979

"The ACS COT has continued to cry out against the inequities and lack of concern with the problems of managing trauma but unfortunately in many instances has been a solo voice crying in the wilderness…What we need now is to quit talking to each other and address the public in general in order to secure the resources for funding of improvements and expansion of the existing service…it is time we quit talking and started acting…"

Jack Wickstromm, MD, FACS, 1974

"To forge ahead against the opposition of a reluctant or even outraged medical profession is in the great tradition of the advocates of accident hospitals throughout their history."

Robert J. Freeark, MD, FACS, 1985

Referencing the 1985 Injury in America report,

"That report noted that the two great causes of premature death throughout history have been infection and injury. Infection has been conquered in developed countries, except in immunosuppressed individuals, but injury continues to take its toll. The committee recommended that a healthier view concerning the prevention of injury might result if the term "accident" were no longer used to describe an event that almost always has a clearly identifiable cause."

Donald S. Gann, MD, FACS, 1986

"We must appreciate that our potential is essentially unlimited, assuming that we can recognize and establish appropriate priorities while making changes when indicated. We can be justifiably proud of the accomplishments of our Committee on Trauma and the many outstanding individuals who have added to Dr. Scudder's legacy. Any success achieved to date however should serve only as a stimulus to solve remaining challenges."

Norman M. Rich, MD, FACS, COL, MC, USA(Ret), 1990

"The final decade of the 20th century hopefully will be remembered as a period of visionary planning for trauma manpower for the 21st century."

George F. Sheldon, MD, FACS, 1991

"To have been associated with the men and women of the ACS COT, both past and present, with their lofty goals, unified purpose, and unselfish motivation has been pure pleasure."

Frank L. Mitchell, Jr., MD, FACS, 1995

"Through the auspices of the COT, we have organized trauma care, verified centers for provision of care to the most critically injured, and provided a wealth of educational opportunities since the founding of the College, for all surgeons who care for the injured. The improvement made in the treatment of solid intraperitoneal organs should stand as one of our best achievements."

J. David Richardson, MD, FACS, 2004

"Committees are made up of people, and it is these people who set the agenda for action. In my experience with the COT, there were surgeons with great minds, great leadership abilities, and surgeons who could make things happen."

C. Thomas Thompson, MD, FACS, 2005

On Our Profession

"The association of fundamental knowledge and manual dexterity constitutes not only the attributes of a surgeon of today, but the greatest hope for the surgery of days to come."

Joseph Trueta, FRCS(E), FACS(HON), 1960

"Our patients are not scientific problems, they are human beings in distress and those called upon to diagnose and treat their disabilities must have been brought up in the tradition of the doctor—judgement, compassion, and understanding."

Sir Frank W. Holdsworth, FRCS, FACS(HON), 1969

"Where else save in the romance in the field of trauma is there such an example of man's humanity to man?"

G. Tom Shires, MD, FACS, 1972 *(quoting Isidore Cohn, Jr., MD, FACS)*

"Specialists are necessary and can improve the care of many patients, but someone must continue to captain the team. We might visualize 45 different physicians on the team 50 years from now. No one expects to develop a man for all seasons, but my plea is to keep general surgery broadly based and thoroughly grounded in basic and clinical sciences."

John H. Davis, MD, FACS, 1979

"Those with unitary vision seek to integrate facts and concepts in contrast to those who explore and observe separate facts of a problem and are content to leave them unrelated."

"The injured patient propelled past a stellar array of super-specialists without the services of a galactic surgical pilot may be needlessly lost in eternal darkness."

"If surgeons surrender their hedgehog qualities and become dependent on squadrons of imported medical foxes, long domesticated in the quiet fields of elective disease and strangers to the turbulent world of trauma, we shall be guilty of a great disservice to our patients."

"As we review our role, we also need to examine a further dimension without which no one can qualify as the truly complete surgeon—a societal dimension."

"Let it be remembered that governments come and go, financing mechanisms change, and ideologies crumble, but surgeons and their patients remain locked in what is essentially a holy relationship that transcends everything and has its roots in the very meaning of civilization."

Alexander J. Walt, MD, FACS, 1978

"We need to extend the list of the duties of the trauma surgeon to include political action and public education. I have no doubt that we have the capacity to rise to the occasion, given the fact that we have chosen to be involved in the surgery of the injured in the first place. Let me echo Aldous Huxley who said in his poem, Orion, 'The choice is always ours. Then let me choose the longest art, the hard Promethean way."

Donald S. Gann, MD, FACS, 1986

"It is essential that the care of the trauma patient remain within the confines of general surgery and that trauma surgeons not be viewed as second-class citizens or be restricted from performing non-trauma procedures if they so choose."

"Prehistoric man left pictures of himself pierced by arrows. Thousands of years later, trauma is just as inevitable; coping with this reality is one of our chores. And myriads of wounds have become stepping stones to one of man's greatest creations—the art of healing."

Erwin R. Thal, MD, FACS, 1992

"The trauma surgeon needs to coordinate all aspects of care like a conductor of a symphony orchestra. He or she should continue to be the 'captain of the ship', supervise patient care, and communicate with family members."

Anna M. Ledgerwood, MD, FACS, 1996

"The trauma patient is unique because he cannot speak for himself, has little choice in where he goes, and is dependent on the system itself to be his advocate. What an enormous responsibility to put on trauma surgeons and institutions committed to the care of the trauma patients."

C. Thomas Thompson, MD, FACS, 2005

"What if we, the trauma and acute care surgeons of now and tomorrow started saying, 'I am not comfortable with this' as we encountered a new patient in the ED, and began asking for someone else to take on this responsibility of care? … We must find a way to train acute care surgery fellows so that they are comfortable with the broad array of surgical diseases that populate their consult list. We must make this happen if we are to remain the galactical pilots, or the complete surgeon, or even the one, last group of surgeons who will not say, 'I am not comfortable with that'."

Gregory J. Jurkovich, MD, FACS, 2020

"In the context of today (in this century), there is little doubt that Dr. Halsted was referring to an acute care surgeon when he stated, 'Every important hospital should have on its resident staff of surgeons at least one who is well and able to deal with any emergency that may arise'."

"As trauma was depicted by the National Research Council of the National Academy of Science in 1966, as 'the neglected disease of modern society,' acute care surgery is the neglected disease syndrome of modern society."

"Dr. Martin Luther King stated that, 'The arc of the moral universe is long, but it bends towards justice.' What Dr. King did not say explicitly is that the arc does not bend by itself. Such bending requires commitment, effort, and sacrifice. I strongly believe that the arc of health care is long, but it bends towards optimal care and inclusion. It too does not bend on its own… Establishing acute care surgery as a defined specialty, is part of this bending process to achieve optimal care and inclusion for those surgical patients who are injured and critically ill."

L.D. Britt, MD, MPH, FACS, FCCM, 2017

On the Importance of Public Education of First Aid

"Proper first aid treatment should be taught in medical school, but of still greater importance is the education of the public. Most of the additional and quite unnecessary trauma occurs before the patient reaches medical aid. The surgeon may disclaim responsibility, but it is his duty to try to teach the public."

William Darrach, MD, ScD, LLD, FACS, 1931

"Surely the public can appreciate the basic principles of open wound care as well as the Boy and Girl Scouts understand the principles of first aid. It has been assumed that they could understand the use of the tourniquet which has only recently been demoted from its position in first aid manuals, the indications for its use providing too puzzling even for the experts to standardize. Surely the much simpler principles of first aid and possibly even the first stage of the care of small open wounds could be taught to young adults."

"We are faced with the threat of nuclear war and, certainly, if an atomic war comes, we would find ourselves in very much stronger position if our youngsters, under supervision, could possibly take initial care—cleanse and splint—of the thousands of less serious casualties which would be seen."

Michael L. Mason, MD, FACS, 1956

On Injury Management and Resuscitation

On the management of abdominal trauma,

"To avoid mortality in multiple injuries, therefore, certain requisites are essential. They are (1) sound judgement capable of establishing priority or definitive treatment for the injuries observed, and (2) constant vigilance to ensure that an abdominal emergency demanding immediate operation is recognized."

William L. Estes, Jr., MD, FACS, 1953

"Lives can be saved which are lost unnecessarily, the period of hospital and off-the-job morbidity can be markedly shortened, the number and extent of permanent disabilities, with loss of or change in job, can be materially diminished, if we will all make use of present-day knowledge in our own communities."

Robert H. Kennedy, MD, FACS, 1954

"The key factor in eliminating morbidity from traumatic shock is prompt, definitive resuscitation to the endpoint of dynamic circulation. Vascular permeability alterations that have already developed must be accepted and treatment continued nonetheless."

F. William Blaisdell, MD, FACS, 1982

"A surgical Rip Van Winkle who awoke in 2000 after 25 years of slumber, would never have believed the radical changes that occurred in the treatment of injuries to these solid organs, whose diagnosis and management had once seemed so straightforward."

"Splenic preservation has been granted a position of 'political correctness' that must be balanced against the fact that occasionally a shattered spleen must be removed."

J. David Richardson, MD, FACS, 2004

"Current practice with incremental coagulopathy component correction is probably out of date and out of fashion. Reconstitution of blood and the use of adjuvant therapy are likely to save lives, and research and evaluation of protocols are needed so this is done correctly."

David B. Hoyt, MD, FACS, 2008

"Can we fulfill the challenge to find the right patient for the right treatment at the right time?"

Ronald V. Maier, MD, FACS, 2013

Past Scudder Orators
ACS Clinical Congress
Top: Chicago, 1997;[3] Bottom: Chicago, 2003.[4]

On Medical Education

"The average medical student, on receiving his degree, knows less about first aid than a first-class Boy Scout."

"We must take seriously the education of interns and residents in trauma since the life you save thereby may be your own. In the future, as in the past, the surgery of trauma will always be with us."

Robert H. Kennedy, MD, FACS, 1954

"The treatment of trauma is not a course to be taught; rather it is a way of thinking based on a solid grounding in basic science and clinical medicine."

John H. Davis, MD, FACS, 1979

"The important thing is that we become trauma conscious; that we recognize the need for more and better training in the handling of injuries. If some of the diseases for which special campaigns have been set up caused one-tenth the mortality, misery, financial loss, and disability that trauma does, or if we were threatened with an epidemic one-thousandth as serious as nuclear warfare, the country would go hysterical in campaigns to eradicate the disease and to train doctors in its management. Those of us in the profession who appreciate the problem must do all we can to acquaint the public with its magnitude."

Michael L. Mason, MD, FACS, 1956

Past Scudder Orators
ACS Clinical Congress
New Orleans, 2007.[2]

On Disaster Preparedness/Mass Casualty Management

"There must be a sound plan for sorting, rapid evacuation, and dispersion. The greater the dispersal the more prompt and better will be the care…As soon as field communications are established with a regulating officer in charge, he will keep in touch with an emergency regulating center to control the distribution of patients."

Frank B. Berry, MD, FACS, Assistant Secretary of Defense, 1955

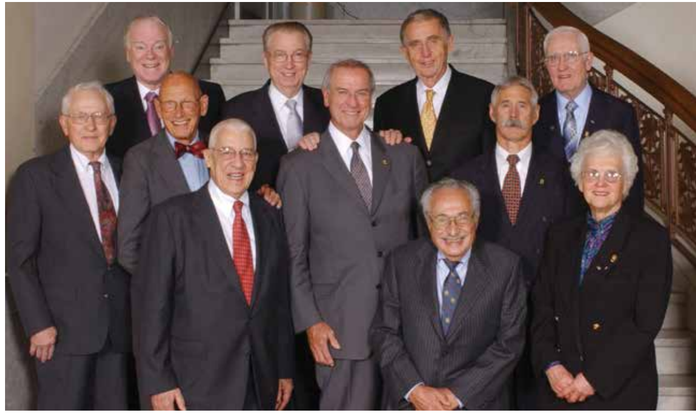
"Sharing our surgical expertise with the world's most vulnerable populations during a humanitarian crisis is a responsibility as well as a privilege. During the past century, surgeons have played a significant and ever-expanding role in responding to complex disasters throughout the world. Multidisciplinary surgeons are uniquely qualified to participate in all aspects of disaster medical response, not just operative management."

"In a disaster, everyone is our neighbor regardless of political, cultural, or geographic constraints. Today's multidisciplinary surgeons are continuing a century-old tradition of excellence in responding to humanitarian crises, both at home and in remote regions of the world."

Susan M. Briggs, MD, MPH, FACS, 2016

"Complex problems which affect the public's health, require well-thought-out solutions which can be scaled and positively affect large populations, regionally, nationally, and internationally. It requires clear vision, a well-thought-out plan, the recruitment of multiple partners, communication of the goals of the plan, and strong advocacy. It is through initiatives like these (STOP THE BLEED®) that the Committee on Trauma can continue to serve and enhance the best interests of injured patients."

Lenworth M. Jacobs, Jr., MD, MPH, FACS, 2021



Past Scudder Orators
ACS Clinical Congress
Chicago, 2009.[2]

On Injury Prevention

On injuries from motor vehicle crashes,

> More stringent traffic regulations of all kinds are needed to stop this terrible waste. It is without question the responsibility of the medical profession, and surgeons in particular, to see that this evil is corrected.

On the burden of motor vehicle crashes in rural towns,

> A large billboard was found at the entrance to the town which read, 'This town does not maintain a hospital and motorists are warned that they should take every precaution when driving through, for we are not equipped to take care of them'.

Walter E. Lee, MD, FACS, 1941

> The automobile is the civilian 'weapon.' Like the atom bomb, the automobile must be controlled. In the U.S., the automobile in 58 years has killed more than twice as many as have bullets and shells in the last two centuries.

George J. Curry, MD, FACS, 1958

> Many of us die in the automobile; some live in it; a few are even conceived in it. The fact is that we have lost more young men in the past decade on the roads than we lost in Vietnam and Korea combined.

Alexander J. Walt, MD, FACS, 1978

> In the area of prevention, apathy abounds…We cannot continue to fund and care for the increasing violence in our country; something has to give…It is a common misperception that injuries are unavoidable accidents, acts of God, or behavioral problems rather than public health problems. The fact is most injuries can be prevented.

Erwin R. Thal, MD, FACS, 1992

> The treatment of injured patients who arrive alive at the emergency department has greatly improved over the past several decades. The ideal management of the injured is to identify means for prevention or minimizing the magnitude of the injuries. This requires the coordinated efforts of engineers and manufacturers of vehicles and educational programs for the public to gain their understanding and cooperation in eliminating identified risk factors.

H. David Root, MD, PhD, FACS, 1997

> Dr. Haddon gave us 12 possible ways to approach a public health problem. Try to modify the host, agent, and physical and social environments. Direct interventions at the pre-event phase, during the event itself, and at the post-event phase. When we add up the potential intervention mechanisms of automation, legislation, and education, we have 36 ways to address a public health problem. In addressing automobile injuries, we've used nearly all of those 36 boxes…Gun control focuses on only one of the 36 boxes. We cannot depend on any single approach. We must address firearm injuries on a much broader front. To do that, we need the collective wisdom of a large number of participants, including members of the National Rifle Association.

C. James Carrico, MD, FACS, 1998

While we celebrate the survivors,

> The size of the pool from which we rescue our patient has the greatest impact on our results. It is in the unglamorous, undramatic, and frequently contentious area of prevention that the surgeon who makes part of his living from trauma might well return something to society… The wilderness from which we wish to rescue our patients is full of political quicksand, economic whirlpools, and predatory lobbies, but I have never viewed surgeons as lacking courage or stamina or common sense.

Alexander J. Walt, MD, FACS, 1978

On Transportation of the Injured and Prehospital Care

> Whether effective, life-saving first aid care and transportation are rendered depends largely on how much responsibility is accepted by the public, particularly the medical profession, to demand them in each local community.

Robert H. Kennedy, MD, FACS, 1954

> Are you satisfied with the way you would be transported in your town, if injured? If not, whose fault is it?

George J. Curry, MD, FACS, 1957

> Physicians are morally, ethically, and legally responsible for all aspects of emergency medical care. We must not delegate this task to or allow it to be assumed by anyone else if we are to bring about the improvement in EMS systems that every citizen of this country deserves.

J.D. Farrington, MD, FACS, 1973

> Trauma is a surgical disease from beginning to end. Trauma begins when the incident occurs. Trauma care begins when the first emergency medical technician or first responder arrives on the scene, not when the patient arrives at the hospital.

> At least half of the care provided in the golden hour is in the hands of the EMTs. Trauma is a team effort. EMS is part of that team. Surgeons should be captains and coaches of these teams. The EMTs are the eyes, ears, and hands of the surgeons.

> Prehospital care cannot be improved if we stay on the sidelines and in the operating room and criticize. We must get into the game. Involvement also means understanding the world in which the EMTs practice. It is rain, snow, cold, hot, life-threatening situations when someone has a gun in your face, a dog charging at you when you are starting an IV, intubating a patient while lying flat on your belly in a mud puddle. I have been in all those situations, but any EMT can tell you much, much more.

Norman E. McSwain, Jr., MD, FACS, 2003

On Hospital Care and Trauma Center Verification

"It would be difficult to overestimate the value to any hospital of a service for the care of trauma, backed by a competent staff and supervised, not in spirit but in the flesh, by mature residents from every surgical department, as a reward for the knowledge and judgement they have acquired, and not merely as an opportunity to wet their fingers in small procedures; a service where, in every branch of surgery, knowledge does not trickle uncertainly down a ladder, but is transmitted directly from those who have it to those who need it; where residents from every division of surgery are exposed to all the problems of trauma; and where decisions are made, rationalized, and implemented with dispatch."

Harrison L. McLaughlin, MD, FACS, 1957

"The great attraction to the College's new document on hospital resources lies in the bold reference to the optimal as the principal objective. For too long, we have been content to expound minimal standards in our documents and guidelines for specialty training programs."

Fraser N. Gurd, MD, FACS, 1976

"Injured patients should not be the flotsam and jetsam of surgical practice, randomly picked up by someone wandering through the ED."

Alexander J. Walt, MD, FACS, 1978

On the Verification program,

"No other medical specialty in all of medicine has developed performance guidelines to the depth of the COT. No other medical specialty has ever mounted such an in-depth peer review process to assist in implementing this performance. No other medical specialties have been willing to objectively evaluate themselves in such an organized process in the interest of improving their patients' care."

Frank L. Mitchell, Jr., MD, FACS, 1995

"I hope I have shown you that the premise of the COT's work will pave the way for the next generation of trauma surgeons and care for our patients. It will prepare us to meet new challenges in health care and health care reform. The premise is grounded in providing the right infrastructure, including people, equipment, and training, in setting high standards through verification and trauma system consultation, and in using data verified by external sources to develop best practices and trauma management guidelines."

J. Wayne Meredith, MD, FACS, 2015

On Trauma Systems

"Conventional delivery of trauma care is associated with a preventable mortality rate of greater than 40 percent. The institution of regionalized trauma care in both European and North American settings has lowered the preventable death rate below 10 percent."

David S. Mulder, MD, FRCS(C), FACS, 1987

"We must reestablish our values, insist on fairness, give more attention to purpose, and choose a life, not a lifestyle. We must set up a system of trauma care that is designated for the benefit of the patient—not for the hospital and not for the surgeon."

Donald D. Trunkey, MD, FACS, 1989

"Trauma centers and trauma systems here and around the world are successful only because of the volunteerism, commitment, and passion of trauma surgeons such as those sitting in this room…Our challenge as trauma surgeons of the U.S. and Canada is to persuade the powers that be to support the development of inclusive trauma systems for every citizen and traveler, in every state and province, wherever the dart lands, and, to share our knowledge around the globe."

A. Brent Eastman, MD, FACS, 2009

Past Scudder Orators
ACS Clinical Congress
San Francisco, 2011.[7]

On Trauma Research

On a multidisciplinary approach to research,

> Surgeons cannot go it alone in this matter even though the central clinical problems are surgical. Wishful thinking and telling each other how important our work is will not make support appear. Only a dogged and clever multiple approach campaign for funds reinforced by more requests for research by well-trained people will stimulate the support.

G. Tom Shires, MD, FACS, 1972 (quoting L. Edgar Lee, Jr., MD)

> Objective data serve as the guiding stars on which we may fix our clinical sextants.

Alexander J. Walt, MD, FACS, 1978

> The trauma patient is an experiment of man designed to see what stresses human biology can withstand. Disease on the other hand is an experiment of nature. Nature responds to an injury almost instantly by deploying all of her forces to insure survival.

John H. Davis, MD, FACS, 1979

> Injury is the most costly of all major national health problems, and yet the National Institutes of Health injury-related research accounts for less than 2 percent of its budget.

Erwin R. Thal, MD, FACS, 1992

> The presentation of any new theory that challenges long-held beliefs will be attacked with great energy. I look forward to these attacks, especially when they are reinforced by data.

Charles E. Lucas, MD, FACS, 2000

On predicting trauma research advances in the year 2038,

> Basic science research will have advanced the 'physiology of survival'. Specific agents, viruses, or antibodies will be used to counteract infectious organisms that will have eliminated the general use of antibiotics. Monoclonal reagents or exchange transfusion will bolster host defense and will be used in conjunction with a narrow range of antibiotic substances. There will be improved ability to manipulate or moderate the immunologic response with T-cell upregulators and macrophage/neutrophil enhancers. We will probably use monokine inhibitors to control the deleterious effects of inflammation and inject other agents to control postinjury hypermetabolism. Growth factors or specific enzymes will be given to stimulate healing and organ regeneration, and there will be improved injury-specific nutritional support substances to speed restoration of the anabolic process.

Gerald W. Shaftan, MD, FACS, 1988

> As academic trauma surgeons, my colleagues and I have had the unique opportunity to participate in translation of basic science to saving lives; that is the ultimate reward of academic medicine.

Ernest E. Moore, MD, FACS, 2002

> In order to accomplish any of this, it falls on all of our backs within the American College of Surgeons COT, the American Association for the Surgery of Trauma (AAST), and other organizations such as the National Trauma Institute (NTI), to secure established funding streams in order to do sophisticated clinical research. Effective research does not come cheaply, and we must establish a solid financial foundation.

Timothy C. Fabian, MD, FACS, 2012

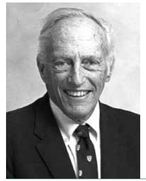
On the Need to Focus on Long-term Recovery

> Granted that the unassailable priority in any system of health care is first and foremost save a life, there must be equal priority in the concept of complete care, to send the man whose life we have saved back to his way of life, no less perfect than we are able to make him.

Sawnie R. Gaston, MD, FACS, 1975

> To save a life after severe trauma is important but not in itself sufficient to represent excellence in care. Immediate care may determine not simply death or survival, but the quality of survival.

Sawnie R. Gaston, MD, FACS, 1975 (quoting Robert A. Chase, MD, FACS)



> Trauma surgeons must emulate specialists in rehabilitation medicine in reporting functions measured in months and years following injury.

Ben Eiseman, MD, FACS, 1993

Past Scudder Orators
ACS Clinical Congress, San Francisco, 2014.[8]

On Health Care Economics and Health Care Reform

"The economic issue today requires the same dedication, devotion of energy, and imagination toward its resolution that Dr. Scudder summoned so successfully to attack the problem of better care for the injured patient."

William R. Drucker, MD, FACS, 1983

"As masters of our own professional destiny, we should not await the interminable political process—which currently appears to provide uncertain trumpet—to dictate to us how best to use the limited resources that society will allocate for the management of the injured."

Ben Eiseman, MD, FACS, 1993

"For more than 8,000 years, care of trauma patients has been the weathervane of all medicine, forecasting new life-saving modalities, and predicting impending problems. As has happened throughout all of history, the evaluation and treatment of trauma have been sentinel catalysts and harbingers of the evolution of medicine in general."

"A systems problem in trauma care delivery is a predictor of health system breakdown in general. The delicate ecosystem of health care, including education, research, public health, hospitalization, funding, and infrastructure,can be modeled and predicted as accurately as other biologic ecosystems.When the various aspects of injury, including prevention, prehospital transportation, emergency center evaluation, operative and critical care, and rehabilitation are healthy, the entire health system tends to thrive."

"Many adverse outcomes have occurred because surgeons have been passive observers instead of prepared change agents. We have been underrepresented, unprepared, and unwilling agents during the major external economic, political, and social changes of the last 40 years."

Kenneth L. Mattox, MD, FACS, 1999

Past Scudder Orators
ACS Clinical Congress
Boston, 2018.[9]

On Military Training/Readiness

"One would hope that the next two decades and the century to follow will somehow witness a diminution in national conflict as a cause of human injury and suffering. However, to rely on any such hope would be an illusion of false expectations hardly fostered by the headlines of today and every day."

Francis D. Moore, MD, FACS, FRCS, FRCPS, 1980

"As the hope for peace suffuses our hearts, the media's interest in war fades, and the public turns back to daily life, the need for readiness fades from our priorities. This loss of focus is not new. Surgeons and soldiers back to antiquity have commented on the abrupt postwar shifts away from the lessons of the battlefield. From a medical perspective this translates into reduced readiness and potential loss of life when the winds of war return."

C. William Schwab, MD, FACS, 2014

"In his 1991 Fitts lecture for the AAST, Dr. Don Trunkey said: 'The bottom line is that military medicine is not being supported by the surgical community. This lack of support is of particular concern to me since support from academic centers is almost nonexistent.' Let us honor Dr. Trunkey's considerable legacy by fully embracing military-civilian partnerships in order to: (1) ensure a constant state of readiness; (2) advance trauma knowledge and skills for both military and civilian surgeons; (3) encourage collaborative trauma research; (4) enhance responses to mass casualty and disaster events; and (5) expand trauma coverage to all who reside in the U.S."

M. Margaret Knudson, MD, FACS, 2019

Group Photos References

[1] **Scudders, 1995.** Back row: Donald D. Trunkey; J. Alex Haller; David S. Mulder; Basil A. Pruitt; George F. Sheldon; Erwin R. Thal; Frank L. Mitchell
Front row: Norman M. Rich; Alexander J. Walt; Robert J. Freeark; G. Tom Shires

[2] **Scudders, 1996.** Back row: David S. Mulder; J. Alex Haller; Donald D. Trunkey; Basil A. Pruitt; George F. Sheldon; Frank L. Mitchell
Front row: G. Tom Shires; Robert J. Freeark; William R. Drucker; Anna M. Ledgerwood; Gerald W. Shaftan; Erwin R. Thal

[3] **Scudders, 1997.** Back row: Ben Eiseman; Donald D. Trunkey; David S. Mulder; Basil A. Pruitt; Erwin R. Thal; George F. Sheldon; F. William Blaisdell; Gerald W. Shaftan; J. Alex Haller
Front row: Robert J. Freeark; Donald S. Gann; G. Tom Shires; H. David Root; Anna M. Ledgerwood; Frank L. Mitchell

[4] **Scudders, 2003.** Back row: Ernest E. Moore; Norman M. Rich; Basil A. Pruitt; Donald D. Trunkey; Erwin R. Thal; H. David Root; Anna M. Ledgerwood; Charles E. Lucas
Front row: Kenneth L. Mattox; Frank L. Mitchell; Gerald W. Shaftan; Norman E. McSwain; Robert J. Freeark; J. Alex Haller

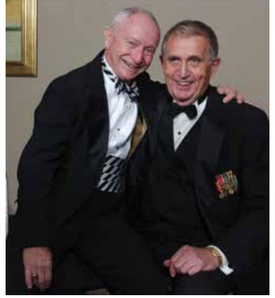
[5] **Scudders, 2007.** Back Row: C. Thomas Thompson; Donald D. Trunkey; Erwin R. Thal; Gerald W. Shaftan; Anna M. Ledgerwood; J. David Richardson; Charles E. Lucas; Kenneth L. Mattox; Basil A. Pruitt; David S. Mulder; Ernest E. Moore
Sitting: Norman M. Rich; Norman E. McSwain; Dario Birolini; Frank L. Mitchell

[6] **Scudders, 2009.** Back row: David S. Mulder; Kenneth L. Mattox; Donald D. Trunkey; Charles E. Lucas
Middle row: H. David Root; J. Alex Haller; A. Brent Eastman; Ernest E. Moore
Front row: Basil A. Pruitt; Gerald W. Shaftan; Anna M. Ledgerwood

[7] **Scudders, 2011.** Back row: F. William Blaisdell; Anna M. Ledgerwood; Donald D. Trunkey; A. Brent Eastman; Kenneth L. Mattox; David V. Feliciano; Ernest E. Moore; J. David Richardson
Front row: Dario Birolini; Charles E. Lucas; George F. Sheldon; Demetrios Demetriades; Basil A. Pruitt; Norman E. McSwain; Gerald W. Shaftan; Erwin R. Thal

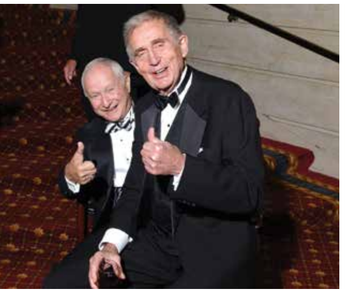
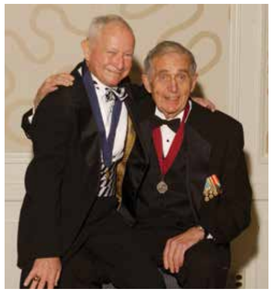
[8] **Scudders, 2014.** Back row: Erwin R. Thal; Anna M. Ledgerwood; C. Thomas Thompson; Kenneth L. Mattox; Norman M. Rich; Donald D. Trunkey; A. Brent Eastman; Dario Birolini
Front row: Basil A. Pruitt; H. David Root; Timothy C. Fabian; C. William Schwab; Demetrios Demetriades; David V. Feliciano; Charles E. Lucas

[9] **Scudders, 2018.** Back row: A. Brent Eastman; Frank R. Lewis; J. Wayne Meredith; David B. Hoyt; C. William Schwab; David S. Mulder; David V. Feliciano; Kenneth L. Mattox; Ernest E. Moore
Sitting: Charles E. Lucas; Anna M. Ledgerwood; Thomas M. Scalea; Susan M. Briggs; C. Thomas Thompson; Basil A. Pruitt; Demetrios Demetriades





Dr. Trunkey and Dr. Thal
A beloved tradition was the special picture of Dr. Trunkey and Dr. Thal on each other's laps each year.
From left: 2003, 2006, 2007, 2008, 2010, 2010, 2011, 2012, and 2014.

Past Orators

1929 **Charles L. Scudder** *"Problems in the Treatment of Fractures"*
1930 **Dallas B. Phemister** *"Bone Grafts for Nonunion of Fractures"*
1931 **William Darrach** *"Some Old Truths about Fractures"*
1932 **Philip D. Wilson** *"Fractures and Dislocations of the Elbow"*
1933 **W. Edward Gallie** *"Treatment of Fracture Involving Joints"*
1934 **Kellogg Speed** *"Femoral Neck Fractures: The Unsolved Fracture"*
1935 **Paul B. Magnuson** *"Fundamentals versus Gadgets"*
1936 **George E. Wilson** *"Fractures of the Shoulder"*
1937 **William O'Neill Sherman** *"Present-State Operative Treatment Fractures"*
1938 **Isidore Cohn, Jr.** *"Evolution of Fracture Treatment"*
1939 **Fraser N. Gurd** *"Ambulatory Treatment of Fractures of the Lower Extremity"*
1940 **Frederic W. Bancroft** *"Treatment of Traumas of Skin and Subcutaneous Tissue"*
1941 **Walter E. Lee** *"The General Surgeon's Approach to the Problems Presented by Fractures and Other Traumas"*
1942-5 **World War II — no speakers**
1946 **Edwin W. Ryerson** *"Modern Methods in the Treatment of Fractures"*
1947 **Frank D. Dickson** *"Fractures of the Upper End of the Radius and Ulna"*
1948 **Henry C. Marble** *"Colles' Fracture"*
1949 **Otto J. Hermann** *"Fracture Hazard"*
1950 **J. Huber Wagner** *"Thoughts on Fractures and Other Trauma"*
1951 **Sir Reginald Watson-Jones** *"Criticisms of Fracture Treatment"*
1952 **Sumner L. Koch** *"The Working Man's Hand"*
1953 **William L. Estes** *"Present-Day Problems in Nonpenetrating Abdominal Trauma"*
1954 **Robert H. Kennedy** *"Our Fashionable Killer"*
1955 **Frank B. Berry** *"The Medical Management of Mass Casualties"*
1956 **Michael L. Mason** *"Treatment of Open Wounds"*
1957 **Harrison L. McLaughlin** *"Education in Trauma"*
1958 **George J. Curry** *"The Immediate Care and Transportation of the Injured"*
1959 **R. Arnold Griswold** *"Wounds of the Abdomen and Pelvis"*
1960 **John Trueta** *"Trauma and the Living Cell"*
1961 **Preston A. Wade** *"The Injured Patient and the Specialist"*
1962 **Jörg Böhler** *"Organization and Management of Trauma Surgery in Austria"*
1963 **Edwin F. Cave** *"Trauma, Specialism, and the College"*
1964 **Truman G. Blocker** *"Organization and Management of Trauma Surgery"*
1965 **Frank H. Mayfield** *"Cervical Spondylosis, a Source of Pain, Paresthesias, Paralysis, and Plaintiffs: Is it Traumatic?"*
1966 **Tord Skoog** *"Tissue Repair in Burns"*
1967 **James K. Stack** *"The College and the Accident Victim: The Story of the Committee on Trauma"*
1968 **Rudolf J. Noer** *"Acute Injuries of the Liver"*
1969 **Sir Frank W. Holdsworth** *"Achievements and Problems in the Treatment of Trauma"*
1970 **William T. Fitts** *"Men for the Care of the Injured: A Crisis Facing the '70s"*
1971 **Willian A. Altemeier** *"The Significance of Infection in Trauma"*
1972 **G. Tom Shires** *"Care of the Injured—The Surgeon's Responsibility"*
1973 **J.D. Farrington** *"The Seven Years' War"*
1974 **Jack Wickstromm** *"Education in Trauma: The Surgeon's Responsibility"*
1975 **Sawnie R. Gaston** *"The Role of Leadership in the Quality of Fracture Care"*
1976 **Fraser N. Gurd** *"Optimal Care for the Injured Patient: The Role of the Specialty Training Programs"*
1977 **John A. Moncrief** *"Unlocking the Mysteries of the Burn Wound"*
1978 **Alexander J. Walt** *"In Praise of Surgical Hedgehogs: Trauma and the Complete Surgeon"*
1979 **John H. Davis** *"We've Come a Long Way, Baby, in Improving Trauma Care"*
1980 **Francis D. Moore** *"War and Peace"*
1981 **Harold E. Kleinert** *"Microsurgery in Trauma: Its Evolution and Future"*
1982 **F. William Blaisdell** *"Traumatic Shock: The Search for a Toxic Factor"*
1983 **William R. Drucker** *"The Management of Trauma: Imperatives for Hospital Cost Containment"*
1984 **Basil A. Pruitt, Jr.** *"The Universal Trauma Model"*
1985 **Robert J. Freeark** *"The Accident Hospital"*
1986 **Donald S. Gann** *"Injury in America"*
1987 **David S. Mulder** *"Specialization in Surgery— Implications for Trauma-Related Disciplines"*
1988 **Gerald W. Shaftan** *"Abdominal Trauma Management in America"*
1989 **Donald D. Trunkey** *"What's Wrong with Trauma Care?"*
1990 **Norman M. Rich** *"Trauma: Responsibility, Resources, and Responsiveness"*
1991 **George F. Sheldon** *"Trauma Manpower in the Decade of Aftershock"*
1992 **Erwin R. Thal** *"Out of Apathy"*
1993 **Ben Eiseman** *"Our Second Responsibility in Trauma Care: A New Cause in the Social Contract"*
1994 **J. Alex Haller** *"The Surgical Management of Life-Threatening Injuries in Children: What Have We Learned and What are the Challenges?"*
1995 **Frank L. Mitchell** *"Verification—The Pursuit of Optimal Trauma Care"*
1996 **Anna M. Ledgerwood** *"With Liberty and Justice for All"*
1997 **H. David Root** *"Trauma: The Next Frontier"*
1998 **C. James Carrico** *"In Search of a Voice"*
1999 **Kenneth L. Mattox** *"Trauma Line 2000"*
2000 **Charles E. Lucas** *"The Water of Life"*
2001 **H. Harlan Stone** *"Management of Colon Wounds"*
2002 **Ernest E. Moore** *"Blood Substitutes: The Future is Now"*
2003 **Norman E. Mc Swain, Jr.** *"Prehospital Care from Napoleon to Mars: The Surgeon's Role"*
2004 **J. David Richardson** *"Changes and Management Strategies for Injuries to the Liver and Spleen"*
2005 **C. Thomas Thompson** *"Trauma in Transition"*
2006 **Frank R. Lewis** *"Physiology for the 21st Century: An Iconoclastic Analysis of Cardiopulmonary Function in Sepsis and Critical Illness"*
2007 **Dario Birolini** *"Trauma: A Social and Medical Challenge"*
2008 **David B. Hoyt** *"Blood and War—Lest We Forget"*
2009 **A. Brent Eastman** *"Wherever the Dart Lands: Toward the Trauma System"*
2010 **David V. Feliciano** *"Vascular Trauma Revisited"*
2011 **Demetrios Demetriades** *"Blunt Thoracic Aortic Injuries: Crossing the Rubicon"*
2012 **Timothy C. Fabian** *"Blunt Cerebrovascular Injuries: Anatomic and Pathologic Heterogeneity Create Management Enigmas"*
2013 **Ronald V. Maier** *"A Century of Evolution in Trauma Resuscitation"*
2014 **C. William Schwab** *"Winds of War: Enhancing Military and Civilian Partnerships to Assure Readiness"*
2015 **J. Wayne Meredith** *"If Charles Scudder Could See Us Now"*
2016 **Susan M. Briggs** *"Responding to Crisis: Surgeons as Leaders in Disaster Response"*
2017 **L.D. Britt** *"Trauma: Still the Cornerstone of Acute Care Surgery"*
2018 **Thomas M. Scalea** *"Homeward Bound"*
2019 **M. Margaret Knudson** *"The Perfect Storm"*
2020 **Gregory J. Jurkovich** *"I'm Not Comfortable with This"*
2021 **Lenworth M. Jacobs** *"Trauma, Education, Communication, and Implementing Change"*

Advanced Trauma Life Support®

04

Advanced Trauma Life Support®

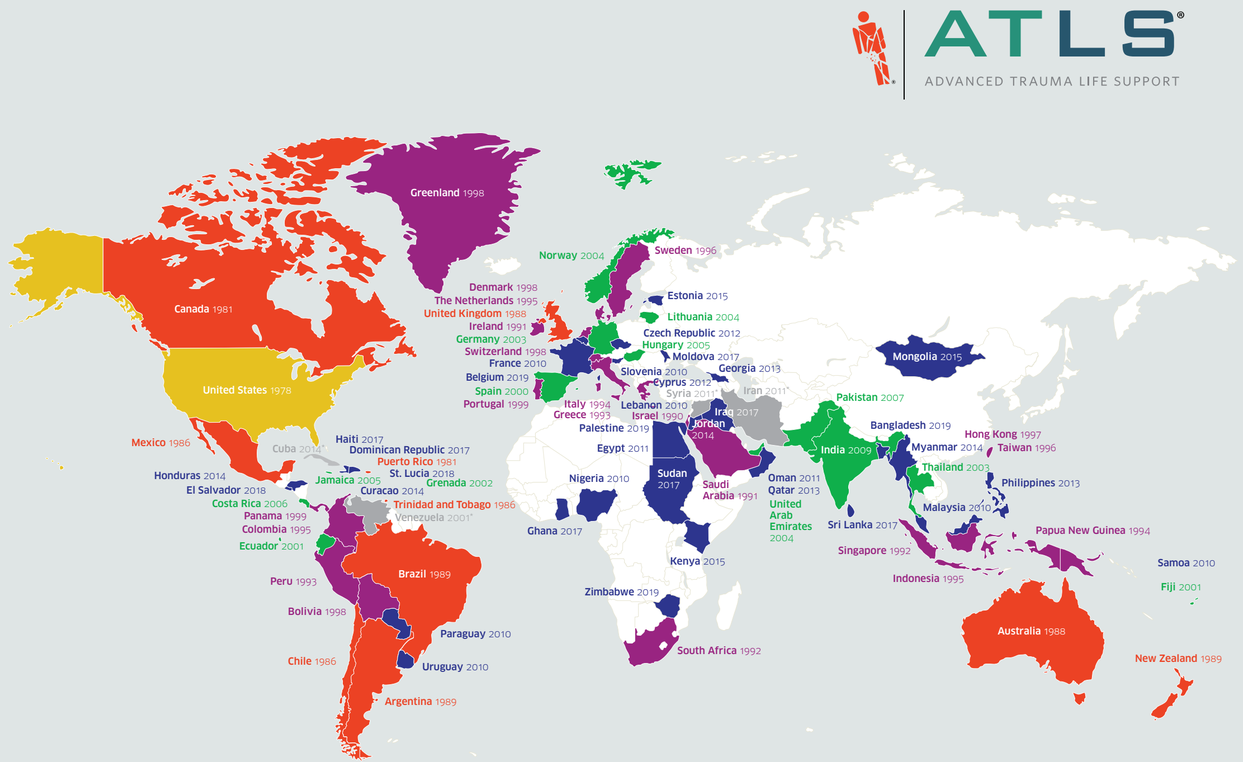
The Advanced Trauma Life Support® (ATLS®) Course—which provides physicians and other health care professionals with a concise and structured approach to assessing and managing patients with multiple injuries—celebrated its 40th anniversary in 2018.

While the course was originally designed to support the early management of injury by both practitioners in rural areas and those that did not routinely care for injured patients, it was quickly adapted to most practice environments. The focus on early intervention was justified by the realization that one-third of injury-related deaths occur in the first hour following injury, and that three-quarters of in hospital postinjury deaths occur within 48 hours. At the time that ATLS was conceived, standards for the evaluation and management of injured patients were nonexistent, only a few cities had organized trauma centers, and state trauma systems did not exist.

While care of the injured patient has evolved during the life span of the course, the basic tenets of ATLS continue to be relevant. These include: prompt identification of injury; prioritizing and addressing immediate life threats; the performance of an efficient secondary survey when possible; arranging for access to definitive care; and communicating in a standardized fashion.

It also has become the model for trauma education for all levels of providers and has inspired the development of the Prehospital Trauma Life Support (PHTLS) Course for emergency medical services (EMS) professionals that was created in collaboration with the National Association of Emergency Medical Technicians (NAEMT), and the Advanced Trauma Care for Nurses (ATCN) Course that was created in collaboration with the Society of Trauma Nurses (STN). ATLS has set the standard as the premiere educational offering of the American College of Surgeons (ACS).

> ATLS has been adopted worldwide with programs active in 84 countries, providing a common "language" among multidisciplinary trauma providers.



ATLS Promulgation Map 2021
To honor the efforts of those who worked to bring ATLS to areas around the world we are depicting in gray tones areas where we have promulgated ATLS at one time in the past but where, due to State Department guidance, we are not currently allowed to conduct business, so there is no authorized ATLS activity in those countries currently.

The History of ATLS

The Crash

On February 17, 1976, James K. Styner, MD, FACS, and his family, including his wife Charlene and their four children Christopher, Kimberly, Randal (Randy), and Richard, left Los Angeles, CA, in their small plane for their home in Lincoln, NE. Dr. Styner was not an instrument-rated pilot. As they approached home, he flew below some low, thin clouds, became disoriented, and struck a row of trees. His wife was struck in the head by a piece of the left engine propeller; she was ejected, landing more than 300 feet from the area of impact, and died at the scene. Despite his own injuries, after ensuring that his children were extricated from the aircraft, he left them to get help. After a couple of failed attempts, he was able to stop a car that drove him back to the crash site and took them all to the local rural hospital. When they arrived at the facility, they found the door was locked. The covering general practitioners were called in, but it was clear those physicians had little experience in managing patients with multiple injuries. They prioritized obtaining skull X-rays and suturing lacerations over a comprehensive assessment of the children.

Randy, 7 years old at the time of the crash, suffered an open skull fracture and an impalement injury at the popliteal fossa. Christopher, age 10, suffered a forearm fracture; Kimberly, age 3, suffered an orbital fracture, facial laceration, and traumatic brain injury; and Rick, age 8, suffered a supraorbital laceration with nerve injury. Dr. Styner suffered an open zygomatic fracture and rib fractures in the crash. Dr. Styner facilitated the transfer of his family 110 miles to Lincoln, NE, with the help of the Lincoln Air National Guard.


d Over Charge

Recreation Area Likely At Brainard

WRECKAGE OF PLANE

Lincoln Woman Killed In Crash

FINAL 4 DAYS - HURRY TO CHRISTENSEN'S SALE $150

The local newspaper reported the crash and death of Charlene Styner.

James K. Styner, MD, FACS.

Charlene Styner was 33 years old when she was killed in the plane crash.

Dr. Styner's children: Randy, age 7 years; Christopher, age 10; Rick, age 8; and Kimberly, age 3.

> The covering general practitioners were called in, but it was clear those physicians had little experience in managing patients with multiple injuries.

ATLS Is Born

After taking time to recover from his loss and from the physical and mental injuries suffered by his children, Dr. Styner repeatedly questioned the state of early injury care. He is quoted as saying:

> *"When I can provide better care in the field with limited resources than my children and I received at the primary facility there is something wrong with the system and the system has to change."*

Ronald Craig, MD—the family medicine physician that cared for the Styner family after their transfer to Lincoln, NE, and a friend of Dr. Styner's—became his sounding board, noting that "you have to train them before you can blame them." This experience and Dr. Craig's advice became the impetus for the development of a course to teach the basics of trauma care. Nurses from the Lincoln Mobile Heart Team, including Irvene Collicott, RN, (née Hughes), who in 1982 became the Program Manager for ATLS, were essential to the development of the course. ATLS was modeled after the Advanced Cardiac Life Support (ACLS) Course which was also in development during this period.

The ABC (Airway, Breathing, Circulation) algorithm was developed by the consensus of content experts. Also essential to the development of the program was the concept of simultaneous identification and treatment of injuries. This differed radically from the usual approach that treated the evaluation and management of the injured the same as a patient with undiagnosed medical illness. ATLS focused on trauma as a surgical disease, aimed at identifying and treating the greatest life threat first. It was presumed this approach would result in vastly improved patient outcomes.

Airway with restriction of cervical spine motion
Breathing
Circulation, stop the bleeding
Disability or neurologic status
Exposure (undress) and **E**nviroment (temperature contol)

The First ATLS Course
Sponsored by the ACS for the Region chiefs in Nebraska in 1979. Norman E. McSwain, Jr., MD, FACS, though not a region chief at the time, was invited because of his well-established EMS connections. Dr. McSwain subsequently established the Prehospital Trauma Life Support (PHTLS) Course utilizing ATLS principles applied to the prehospital environment.

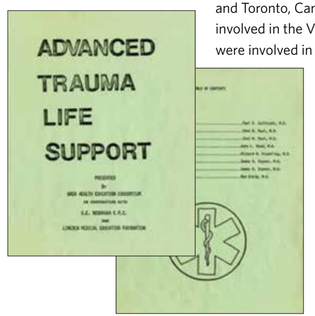
Ronald Craig, MD
A family physician and colleague of Dr. Styner, who provided sage advice and encouragement during the development of the initial course concepts.

Irvene Collicott, RN
A critical care nurse and member of the Lincoln Area Mobile Heart Team, Ms. Collicott was instrumental in the development of the course in Nebraska. In 1982, she became the ATLS Program Manager. Her dedication to quality, standardization, and adherence to policy, influenced by her nursing background, training, and heritage allowed the program to grow while maintaining quality and remaining consistent and recognizable. It was not easy and was continuously challenged by physicians whose training and rewards came from a tradition of independence and individualism. Ms. Collicott held this position for a quarter century until she retired and was replaced by Will Chapleau in 2007.

Paul E. "Skip" Collicott, MD, FACS
A vascular surgeon in Lincoln, NE, and member of the ACS COT, Dr. Collicott was instrumental in the adoption of the ATLS Course by the ACS COT. He reflected during the ATLS 40-year anniversary celebration that development of the ATLS Course required "passion, patience, and persistence." He also credited the success of ATLS with the involvement of educators in the evolution of the course.

With the help of the Lincoln Medical Education Foundation and the Southeast Nebraska Emergency Medical Services, a pilot ATLS Course was developed and presented to a group of family physicians in Auburn, NE, in 1978. Several coincidences helped to simplify the development of the course and its presentation to the American College of Surgeons Committee on Trauma (ACS COT). Both the president of the American College of Emergency Physicians, Harris B. Graves, MD, FACEP, and the immediate past-Chair of the ACS COT, Robert W. Gillespie, MD, FACS, were from Nebraska and the new Chair of the COT, C. Thomas (Tommy) Thompson, MD, FACS (1978–1982), was from Oklahoma. The famous Nebraska versus Oklahoma football game was set to occur in November and these leaders were easily enticed to observe a course being held during that exciting football weekend. Paul E. "Skip" Collicott, MD, FACS, subsequently presented the course to the leadership at the annual COT meeting in the spring of 1979. Later, in 1979, the inaugural course for the COT region chiefs was held in Lincoln, NE.

The course was adopted by the ACS Regents in 1980, and they agreed to invest $80,000 to develop course materials. The course was disseminated nationally through the infrastructure of the regional COT committees with the first eight courses held in Denver, San Diego, Philadelphia, Milwaukee, Dallas, Washington, DC, Newark, and Auburn. The ATLS Subcommittee was formed to provide oversight and support enhancement and advancement of the new course. In 1981, courses were held in Vancouver and Toronto, Canada. Some of the faculty involved in the Vancouver promulgation were involved in a motor vehicle crash and gained firsthand experience with the local trauma care system. In a mere two years, ATLS became the standard for the initial evaluation and management of patients with multiple traumas in the U.S. and Canada.



Advanced Trauma Life Support
First ATLS manual cover with course schedule.

Worldwide Growth

Growth of the ATLS Course within North America continued in the early and mid-1980s. As the course became more popular, expansion beyond these boundaries was increasingly requested. This global expansion did not occur immediately or effortlessly. Policies were established that required instructor candidates from outside North America to attend courses in the U.S. Led by these new instructors, with the support of U.S. faculty, further student and instructor courses were then held in the requesting country. This process ensured compliance with specific policies regarding faculty specialty requirements and use of standardized equipment for training as well as standardization of the material presented. These sometimes daunting requirements were established to ensure uniformity of the course regardless of location.

> Expansion of the ATLS Course in North America continued with the addition of Mexico to the ATLS family in 1986. Several countries in South America soon expressed interest, which led to the addition of Latin America and the Caribbean as the new COT Region 14 in 1987.

After volunteering in Peru following the promulgation of the course, Dr. Styner noted that, despite the fact the physicians caring for a traumatically injured Peruvian marine spoke different languages, ATLS provided a common thread enabling efficient and effective stabilization that varied so essentially from the care provided to his family in 1976.

ATLS expanded to Europe through the Royal College of Surgeons and to Australia through the Royal College of Australasia in 1988. Members of the Royal College of Australasia attended a course in San Diego, CA, in 1987. This group and others developed the infrastructure to manage the course which they named the Emergency Management of Severe Trauma (EMST) Course. Courses were held in Melbourne and Sydney in 1988, supported by both Australian and U.S. faculty.

A multitude of growing pains were experienced during global expansion. The cost associated with ensuring uniformity and quality made the course prohibitively expensive in many regions. Many countries waited as long as 10 years to launch the course! In fact, after a course was established, it was determined that maintaining equipment and resources was often unmanageable. It became apparent that the North American model of health care provision did not align with that of some countries. Physician specialties initially caring for injured patients did not necessarily mirror those in the U.S. Cultural and linguistic differences made transference difficult in some cases. To address some of these concerns, the ATLS European Association (formerly ATLS Europe) was established in 2005. These pressures led to several evolutionary steps over the next two decades. A global ATLS committee was formed and met jointly with the Committee on Trauma at the American College of Surgeons annual Clinical Congress.

REGION 14—LATIN AMERICA AND THE CARIBBEAN

> With the growing interest in ATLS outside of North America, the COT recognized that to have a more significant impact on trauma worldwide, global regional leadership was necessary.

Latin America was the first area to formalize a structure of regional committees with oversight provided by Ricardo G. Sonneborn, MD, FACS, from 1987 to 1995. In 2007, the COT officially identified new international regions of interest, and the first region chiefs were appointed. Renato S. Poggetti, MD, FACS; Claus Falck-Larsen, MD; and Michael J. Hollands, MBBS, FACS, served as the Region Chiefs of Regions 14, 15, and 16, respectively. At the time, Region 14 included Latin American countries and the Caribbean; Region 15 comprised Europe, the Middle East, and Africa; and Region 16 was composed of Australia, Asia, and North Africa.

In 2011, Saud Al Turki, MBBS, FACS, ODTS, FRCS, became the first Region Chief of the newly established Region 17, which serves the Middle East and North Africa. Dr. Al Turki reminisced about the political challenges of expanding in this region. He noted, "We were fortunate to start ATLS in Syria before the war, but when I was there for the second course to supervise a course director candidate, he came to my room in the middle of the night terrified because a bomb exploded next to his house, and his wife had called him to ask that he return home immediately. We were in Hama, and his family was in Damascus, which is a three-and-a-half-hour drive. From then on, the students were distracted by the war that was literally in their backyards.

Fortunately, ATLS instruction continued despite these challenges, and its principles have been applied during the war, resulting in many saved lives. The Syrian group is like no other I have met. Their bravery and determination to continue their involvement with the ATLS family, despite the danger they place themselves in during their travel through hostile areas, is inspiring." *(Note: Due to U.S. sanctions regarding conduction of business in Syria, the Syrian program was indefinitely suspended.)*







Counterclockwise from top left:
ATLS Colombia in 2021; inaugural course in Colombia 1995; inaugural course in Ecuador 2001; ATLS training in 2017; inaugural course in Brazil 1989; inaugural course in Chile 1986; and inaugural course in Mexico 1986.

The promulgation process was adapted under ATLS International Chair John B. Kortbeek, MD, FACS (2009–2014). Dr. Kortbeek proposed heavily relying on the regional structure to decrease the cost of local course-site development. This approach decreased the number of faculty traveling from the U.S. and the need for stakeholders to travel to the U.S. to participate in training. It was expanded upon by subsequent ATLS International Chairs Karen J. Brasel, MD, FACS (2014–2018), and Sharon M. Henry, MD, FACS (2018–2022). The establishment of a strong global regional structure has also given a voice to the global ATLS family in matters of policy and content updates.

> This structure enables the ATLS community to address some of its many challenges: safety, political alignment, and language barriers, to name a few.

Consider the example of Mongolia—English is not spoken by most of the citizens in this country. Some terms commonly used in ATLS do not even exist in the Mongol language such as: stable, unstable, and resuscitation. Even more "common" languages like Spanish, Portuguese, and French have regional nuances that make translation challenging. Initially, translations required an interested stakeholder or group of stakeholders to perform the work, and native-speaker volunteers saw the process through from beginning to end. Although this is still the model for some smaller programs, ATLS now secures translation services for the larger programs and will continue to expand those efforts in the future. ATLS has now been translated into ten languages: Spanish, Portuguese, French, German, Greek, Indonesian, Italian, Mandarin, Mongolian, and Romanian.

REGION 15—EUROPE AND SOUTHERN AFRICA

Top down:
Promulgation in the Czech Republic; meeting of the ATLS a European Association; Joakim Jørgensen, MD, FACS, Region 15 Chief providing instruction at the ATLS Europe meeting in Cyprus, 2018; promulgation of Kenya in 2015.

An innovative partnership program was created to bring ATLS to areas with economic hardships. A partnership could be established between a region or other entities and the requesting country to defray the cost of the initial promulgation. The goal, in most cases, was to have the country ultimately sustain the program independently. This model has been used quite successfully in several places.

Currently, courses held outside the U.S. and Canada represent more than half the courses held annually and the global community participates in all aspects of course design, revision, and oversight. The combined efforts of committed leaders from around the world have been successful in advancing the quality of the course by ensuring that course content is relevant in all countries and systems that possess at least a minimal degree of infrastructure to support trauma care. The collaborative efforts also created the good will necessary to encourage and promote further global expansion and trauma system development.

REGION 16—AUSTRALIA AND ASIA

Clockwise from top left:
Moulage fun in Mongolia; inaugural course in Mongolia 2015; ATLS instruction in the Philippines 2013; inaugural course in Australia 1988; Region 16 meeting and training; MOU signing in Sri Lanka 2016; inaugural course in Pakistan 2011.

REGION 17—MIDDLE EAST AND NORTH AFRICA

Counterclockwise from top right:
Representatives from Region 17 at the 2019 ATLS Global Symposium; members welcome Ronald M. Stewart, MD, FACS, at the Region 17 meeting in 2017; Qatar Health and Region 17 meeting 2020; inaugural course in Saudi Arabia 1991; promulgation team in Sudan 2017.

The Present

Course Updates and New Technology

The first version of ATLS was developed by expert consensus. As scientific evidence has evolved to influence practice, evidence and consensus-based updates are added to the content through revision processes that occur approximately every four years. The format of the ATLS Program also has progressed from its origins of didactic lectures and azure Kodak slides. The program has embraced and adapted to changes in technology accompanying the introduction of personal computers and the Internet as well as developments in educational theory and simulation. Applying new science to an educational product is not without risk. In the early 2000s, ATLS incorporated psychometric testing to improve the performance and discrimination of the ATLS tests. This did, in fact, occur with the unintended consequence of a significant increase in test difficulty and a reduction in the percentage of students passing the examination. Solving the challenges this created across the globe and acknowledging that some countries used successful completion of ATLS for credentialing and privileging required a degree of flexibility and global cooperation that have become hallmarks of the modern ATLS Program.

The influence of educators in minimizing distractors to enhance the learning experience, as well as promoting more open and adult learner-oriented feedback, has enhanced and refined delivery of the course and elevated the educational experience. Although involved in ATLS since its inception, the role of the educators in program oversight was formalized with the development of the Senior Educator Advisory Board (SEAB) in 2010. The development of the ATLS app through the efforts of George Brighton, then a surgical registrar in the United Kingdom, and Wesam T. Abuznadah, MBChB, FRCSC, FACS, a vascular surgeon and educator in Saudi Arabia, has also allowed the program to embrace new platforms.

ATLS APP—Released in 2012

The ATLS app was developed through the efforts of George Brighton, surgical registrar, United Kingdom; and Wesam T. Abuznadah, MBChB, FRCSC, FACS, vascular surgeon and educator, Saudi Arabia.

> *Released in 2012, the ATLS app has extended the reach of ATLS well beyond its local courses with downloads in more than 204 countries and territories that number into the hundreds of thousands.*

Region Chiefs at the 2019 COT Annual Meeting (left)
Top row: John P. Hunt, MD, FACS (6); Charles A. Adams, Jr., MD, FACS (1).
Middle row: James W. Davis, MD, FACS (9); Julie A. Dunn, MD, FACS (8); Richard A. Sidwell, MD, FACS (7); Richard J. Fantus, MD, FACS (5).
Bottom row: George S. Abi-Saad, MD, FACS (17); Patrick M. Reilly, MD, FACS, FCCP, Chair of the Regional Committees on Trauma; Saman Arbabi, MD, FACS (10).

Key Trauma Education Staff Partners (right)
Julie Cwik, Instructional Design Manager, is transforming our approach to trauma education; and Katie Strong, Senior Manager, is leading the entire Trauma Education Team as they strategically incorporate technology and adult learning principles for the learner of tomorrow.

The 10th edition of the ATLS Course was launched in 2017–2018 and was accompanied by the release of a mobile-learning ATLS alternative platform. This release accommodated not only changing tastes in medical education among a new generation of adult learners but also provided access for many new physicians and advanced practice providers. Several years ago, we wrote about the need to use emerging technology to reach learners in areas that could not easily be accessed in person. Specifically, we said that:

> *"One may envision not only the interactive discussions, but possibly the teaching of skills and initial assessment testing using this ever-improving technology."*

The COVID-19 pandemic necessitated that we take advantage of technology to reach not only places that are geographically remote, but also sites that, pre-COVID, could train large numbers of learners in person but now were limited due to public health concerns.

While the technology for virtual meetings existed prior to the pandemic, our current reality has required that we look at these platforms in new, creative ways, not only to simply have basic meetings, but to also provide effective and interactive education. The use of the mobile mATLS® online modules has dramatically increased during the pandemic as more sites are employing the mATLS Course (or "hybrid" course as it is sometimes called) as their primary course. Other sites are taking advantage of access to the online modules to begin to train learners until they can resume in-person courses. The ATLS Committee, led by Kimberly T. Joseph, MD, FACS, also is in discussions with groups working on virtual reality platforms to see if these can be used effectively to teach Initial Assessment Patient Scenarios. While the use of virtual platforms to teach psychomotor skills are still in the future, there is little doubt they will become an important tool at some point soon. As always, the goal is to invest in new technology that will enhance the accessibility of the educational content by the variety of sites that use ATLS for trauma education.

A Legacy of Leadership
These three women leave a substantial legacy of leadership, ingenuity, creativity, and dedication to the next ATLS generation. Sharon M. Henry, MD, FACS, ATLS Chair (2014-2018), Global ATLS Course Director (2018-2022); Karen J. Brasel, MD, FACS, ATLS Chair (2009-2014), Global ATLS Course Director (2014-2018); and Kimberly T. Joseph, MD, FACS, (ATLS Chair (2018-2022).

ATLS Influence

The ATLS Course also influenced the development of similar courses for prehospital, allied health, and nursing professionals. The Advanced Trauma Course for Nurses (ATCN) was developed in 1984 in collaboration with the Society of Trauma Nurses (STN), as a complimentary course to ATLS and subsequently was adopted by many centers to facilitate and promote team training. The Prehospital Trauma Life Support (PHTLS) Course was developed in the late 1980s, in collaboration with the National Association of Emergency Medical Technicians (NAEMT), with strong leadership by Norman E. McSwain, Jr., MD, FACS; and Will Chapleau, EMT-P, RN, TNS, also achieving similar expansion and influence. The Trauma Early Assessment and Management (TEAM®) Course was introduced for medical students in North America in 1999. Together these courses empowered the ABCDE (Airway, Breathing, Circulation, Disability, Exposure) approach to trauma care introduced by ATLS.

TEAM™ TRAUMA EVALUATION & MANAGEMENT

rttdc™ RURAL TRAUMA TEAM DEVELOPMENT COURSE

ATOM™ ADVANCED TRAUMA OPERATIVE MANAGEMENT

ASSET™ ADVANCED SURGICAL SKILLS FOR EXPOSURE IN TRAUMA

BEST™ BASIC ENDOVASCULAR SKILLS FOR TRAUMA

The Rural Trauma Team Development Course (RTTDC) also utilizes the concepts of the ATLS management focusing more on organizational and institutional factors critical to managing severely injured patients in the rural environment. The ACS also has used the model of ATLS standardization and promulgation to support and enhance other courses such as the Advanced Trauma Operative Management Course (ATOM®) and the Advanced Surgical Skills for Exposure in Trauma Course (ASSET) and Basic Endovascular Skills Training (BEST) Course.

The Future

ATLS—Looking beyond Physical Trauma

In the future, ATLS must more fully embrace the global issues that impact our patients but are not part of the traditional "core" content of the course, including injury and violence prevention; the need to employ concepts of trauma-informed care in the emergency setting; the need to recognize issues around trauma recovery, including post-traumatic stress and postintensive care syndrome; the acknowledgement that principles of palliative care are important in the emergency setting; and the need to recognize how social determinants of health influence outcomes in all aspects of medical care, including trauma. The COVID-19 pandemic, which has disproportionately affected elderly patients, Black, and Latinx populations in the U.S., and economically disadvantaged populations around the world, has graphically illustrated the gaps that exist in our current health care systems.

Emerging reports from trauma centers in the U.S. suggest that many are seeing increases in the incidence of penetrating trauma and other intentional injuries, including intimate partner violence, concurrent to the pandemic. Although ATLS was developed to address life-threatening physical injuries in the emergency setting, it cannot exist in a vacuum—nor can our practitioners. ATLS, as the COT's prototype educational offering, must provide learners the tools to be effective advocates for policies that help our patients survive not just physical trauma but all of the antecedents and sequalae of that trauma so that it meets the goal of our new Global Trauma Education Fund: "Trauma Knowledge for All."

ATLS - Next Up
The next surgeon leads
John P. Sutyak, MD, FACS, ATLS Chair, and Dany Westerband, MD, FACS (International) Global ATLS Course Director.

The ATLS Family

The backbone of any thriving ATLS program is the coordinator who understands the conduct of the course and ensures that it runs smoothly. Coordinators are now involved in ATLS revisions, implementation decisions, and are formally part of the ATLS revision work groups. ATLS educators and the Senior Educator Advisory Board have provided invaluable leadership and input in the evolution of the ATLS student and instructor courses. They will be even more necessary and valuable as we navigate the "new normal" following the COVID-19 pandemic. The ATLS effect has been preserved for more than 40 years and, hopefully, when ATLS celebrates its centennial will still be a significant part of the success of the program.

> Effective ATLS Program development requires not only the vision and drive of a physician leader but the involvement and commitment of others that support and manage the course.

ACS COT staff-partner, senior leads that made ATLS Program successful:
Irvene Collicott, RN; Will Chapleau, EMT-P, RN, TNS; Monique Drago, MA, EdD; and Kathryn (Katie) Strong, MSEd, MA.

The success of the ATLS Program has been largely dependent on the incredible support and dedication of the ACS COT staff. Notably, Ms. Collicott, went to every course and every promulgation; Will Chapleau, EMT-P, RN, TNS, guided ATLS through standardization and global growth; and Monique Drago, MA, EdD, brought ATLS into the electronic era. The program is now supported by nine full-time staff partners led by Kathryn (Katie) Strong, MSEd, MA. Beyond these incredible individuals, the dedicated staff that consistently supports the same regions provides coordinators, course directors, and state chairs with a personal point of contact. These individuals are the backbone of the success of ATLS, and whatever the question is, whatever the crazy idea has been, they always respond "Yes. How can I help?"

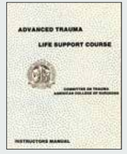
ATLS Leadership

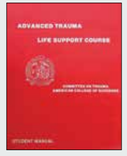
1978

James K. Styner, MD, FACS
Author, developer, pioneer (although never Chair)

1978–1987

Paul E. Collicott, MD, FACS
ATLS Chair

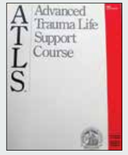
*ATLS 1st Edition, 1980**


ATLS 2nd Edition, 1981


ATLS 3rd Edition, 1984

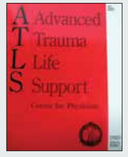

1987–1992

Max L. Ramenofsky, MD, FACS
ATLS Chair

ATLS 4th Edition, 1988


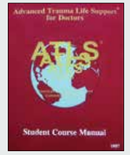
1992–1996

Brent E. Krantz, MD, FACS
ATLS Chair

ATLS 5th Edition, 1993


1996–1999

Richard M. Bell, MD, FACS
ATLS Chair

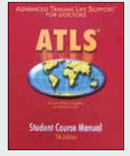
ATLS 6th Edition, 1997


1999–2003

Steven N. Parks, MD, FACS
ATLS Chair

2003–2007

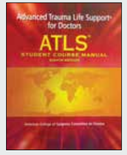
Christoph R. Kaufmann, MD, FACS
ATLS Chair

ATLS 7th Edition, 2004


2007–2009

John B. Kortbeek, MD, FACS
ATLS Chair

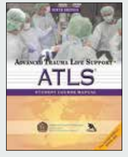

Christoph R. Kaufmann, MD, FACS
International ATLS Course Director

ATLS 8th Edition, 2008


2009–2014

Karen J. Brasel, MD, FACS
ATLS Chair

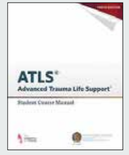

John B. Kortbeek, MD, FACS
International ATLS Course Director

ATLS 9th Edition, 2012


2014–2018

Sharon M. Henry, MD, FACS
ATLS Chair


Karen J. Brasel, MD, FACS
Global ATLS Course Director

*ATLS 10th Edition, 2018***


2018–2022

Kimberly T. Joseph, MD, FACS
ATLS Chair


Sharon M. Henry, MD, FACS
Global ATLS Course Director

2022–

John P. Sutyak, MD, FACS
ATLS Chair


Dany Westerband, MD, FACS
Global ATLS Course Director

* ATLS leadership was initially tracked by the ATLS edition that they produced; over time, to align with other major COT committees, position terms were introduced that did not always coincide with a new ATLS edition.

** Due to major changes in the dynamics of the course and the underlying course management system, the 10th edition took longer than usual to launch. The COVID-19 pandemic also was a factor in the delays; many other changes and enhancements to the ATLS catalogue were worked on during this time, prior to the launch of the 11th edition that is scheduled to begin in 2022.

WORDS OF APPRECIATION

"Compared to what happened in the recent tsunami in Asia, 9/11 in the U.S., the disaster on the Gulf of Mexico from Hurricane Katrina, and the other natural and manmade disasters that have occurred in the past twenty years, my family's experience out in that field was just child's play. Hopefully, what we have done, all of us who have become a part of the ATLS family, have played a part in saving some of those souls."

—Dr. James K. Styner

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Radvinsky DS, Yoon RS, Schmitt PJ, et al. Evolution and development of the Advanced Trauma Life Support protocol: A historical perspective. *Orthopedics*. 2012;35(4):305-311.

Styner JK. The birth of Advanced Trauma Life Support. *Surgeon*. 2006;4(3):163-165.

Talbott H. When passion and curiosity collide: The beginnings of the ATLS program. *Bull Am Coll Surg*. March 1, 2018. Available at: https://bulletin.facs.org/2018/03/when-passion-and-curiosity-collide-the-beginnings-of-the-atls-program/. Accessed July 8, 2021.

05

Establishing Standards for Trauma Center Quality

05

Establishing Standards for Trauma Center Quality

The development and implementation of the standards for the optimal care of the injured patient has been a seminal contribution of the Committee on Trauma. This approach has revolutionized the care of severely injured patients and become the model for comprehensive quality improvement across the House of Surgery.

Frederick A. Besley, MD, FACS
Chair, Board on Industrial Medicine and Traumatic Surgery (1926–1939).

The Past

The first discussions between members of the Committee on Fractures centered on their deep desire to improve the quality of patient care, and their conviction that the best way to do so was by setting standards for care delivery. This effort began with the creation of initial standards for fracture management and the establishment of standardized fracture services as promoted by Charles L. Scudder, MD, FACS, and early members of the Committee on Fractures. This was followed in 1926 by the work of the Board on Industrial Medicine and Traumatic Surgery that set standards for industrial medicine, led by Frederick A. Besley, MD, FACS, Chairman (1926–1939).

The Board on Industrial Medicine and Traumatic Surgery was charged with improving the care of the ill and injured in industry and eliminating industrial health hazards. They partnered with insurance carriers, and industrial organizations such as the American Railway Association and the U.S. Bureau of Mines, to investigate the problem and identify solutions. They developed a minimum standard for medical service in industry and surveyed industrial establishments, issuing certificates of approval to those meeting the standards.

By 1937, 1,657 surveys had been completed with approximately 50 percent earning a certificate of approval. This work led to substantial improvements in the care of those injured in industry and supported injury prevention efforts in the workplace.

To up-date the concept of the surveys, the committee, with the advice of Drs. Kennedy and Brown of the Field Program, has two minor innovations to recommend for the survey teams:

1. A list of topics to guide the survey and discussion, as follows:

   a. Organization for trauma (How is Emergency Department covered?)
   b. Trauma conferences?
   c. Transportation of the Injured (Ambulances?)
   d. Cardiopulmonary Resuscitation; Training program
   e. Tetanus prophylaxis program
   f. Burn program
   g. Disaster Rehearsals
   h. Visit to Emergency Department

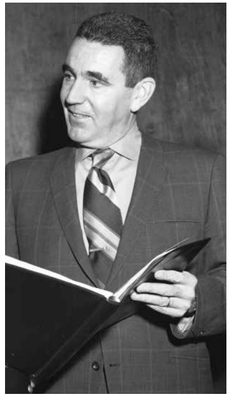
2. A package of survey equipment consisting of the following items to be left with the host hospital

   a. Emergency Department Survey Check Guide
   b. Manual on early care of fractures and soft tissue injuries
   c. Guide to initial therapy of burns
   d. Resuscitation charts - pamphlets (excellent ones available from Smith Kline and French)
   e. TAT pamphlet
   f. Sample brochure on Emergency Department (from some other hospital)
   g. Minimal equipment list for ambulances

An excerpt from the 1965 COT annual report detailing the standard topics to be covered during the site survey of an emergency department, and the informational items that should be left for the department's reference.

In 1939, the Board on Industrial Medicine and Traumatic Surgery was assimilated into the Committee on Fractures, whose name was amended to the Committee on Fractures and other Traumas, under the leadership of Robert H. Kennedy, MD, FACS, Chair (1939–1952). These initiatives were in concert with the American College of Surgeons (ACS) Hospital Standardization Program. Begun in 1918, the hospital standardization movement was inaugurated to raise the standards of surgery by establishing minimum quality standards for hospitals. The ACS Hospital Standardization Program evolved into the Joint Commission on the Accreditation of Hospitals in 1951.

In 1960, the ACS received a grant from the John A. Hartford Foundation, which was used to develop the Committee on Trauma Field Program (see sidebar on page 105) with the goal to improve the initial care provided to injured patients in the U.S. and Canada. In 1965, the Committee on Trauma (COT) established a Subcommittee on Emergency Room Standards to advance the work to optimize the processes of care in an emergency department. Spencer T. Snedecor, MD, FACS, Chair, Subcommittee on Emergency Department Standards (late 1960s), reported that "The foundation which makes this project worthwhile rests on two aphorisms. First, 'The emergency department of the community hospital is the heart of Trauma in America.' Second, 'The best approach to review the facilities, organization, and function of a trauma service of a hospital, is through an invitation survey of an emergency department.'" The committee felt that surveys done through a joint effort of the state COT and the state hospital association should be aided by a standard list of topics to guide the survey and discussion, supported by a package of survey equipment that would then be left with the hospital for their reference.



Andrew C. Ruoff, III, MD, FACS
Chair, Ad Hoc Committee on the Categorization of Emergency Facilities (1969–1972).

The landmark white paper *Accidental Death and Disability: The Neglected Disease of Modern Society* was published by the National Academy of Sciences/National Research Council in 1966. This white paper called for a categorization of facilities based on their institutional capacity to manage the broad spectrum of emergency conditions. In 1969, the COT established an Ad Hoc Committee on the Categorization of Emergency Facilities, chaired by Andrew C. Ruoff, III, MD, FACS (1969–1972), which opened the debate regarding whether it was advisable for the COT to establish standards and categorization of facilities for emergency care.

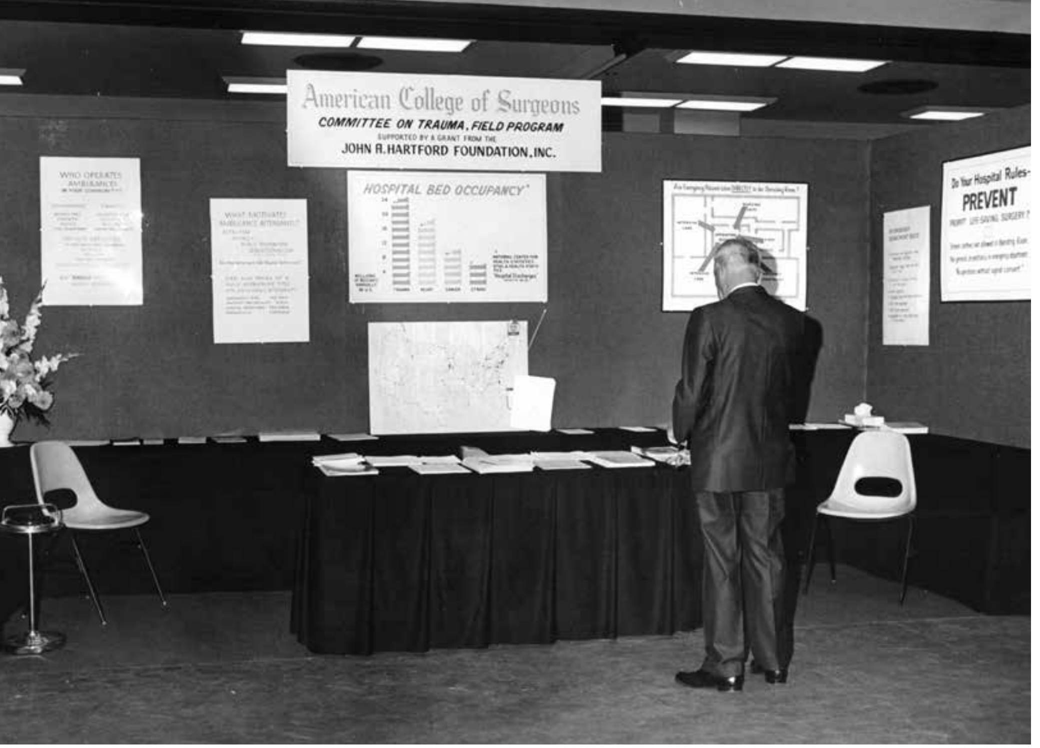
In 1971, this committee recommended five categories for emergency medical facilities:

- **Category I** Comprehensive Emergency Treatment Center
- **Category II** Major Emergency Treatment Hospital
- **Category III** Limited Emergency Treatment Hospital
- **Category IV** Resuscitation and Minor Treatment Hospital
- **Category V** Resuscitation and Referral Hospital

Initial standards were proposed for services provided and resources required for each level. In February 1971, the COT presented this proposal at the Conference on the Guidelines for Categorization of Hospital Emergency Services hosted by the America Medical Association. They concluded that these standards would serve as a guideline for the development of regional plans for the delivery of emergency medical services, and that further enhancement of the standards should await input from the various areas of the country following the creation of their own systems.

Classification Scheme

The classification scheme (Level I, Level II, Level III, and so on) is not a ranking of medical care, but rather a ranking of resource depth. The commitment to quality care must be the same regardless of resources.



Top two images: The COT Field Program exhibit at the 1968 American College of Surgeons Clinical Congress, and a press conference regarding the work of the COT Field Program during the meeting. Shown are Robert H. Kennedy, MD, FACS, Director of the COT Field Program (1960–1969); Oscar P. Hampton, Jr., MD, FACS, Director of the COT Field Program (1969–1970); James C. Drye, MD, FACS; Major James Hyde, MD, FACS; Robert J. Wilder, MD, FACS; J.D. Farrington, MD, FACS, Chair of the Subcommittee on Transportation of the Injured (1965–1974); and in the rear, John Keeley, MD, FACS.

Bottom: This scale model was produced to illustrate the optimal layout of an emergency department, and was carefully brought to meetings for many years to further discussion on this topic.

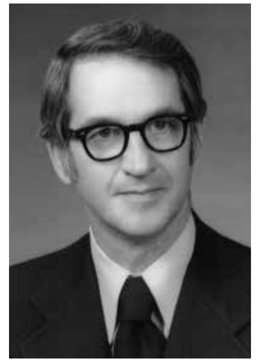
THE COMMITTEE ON TRAUMA FIELD PROGRAM

The Committee on Trauma Field Program was led by Dr. Kennedy, Director of the Field Program (1960–1969), who in collaboration with the regional committees, surveyed emergency departments across the country to evaluate the quality of care for injured patients with an emphasis on immediate care and transportation of the injured. Dr. Kennedy and the associate director, Roswell K. Brown, MD, FACS (1964–1969), made visits to the "field" resulting in contact and survey completion with states and regions across the nation. Oscar P. Hampton, Jr., MD, FACS, who became director for the final year of the program in 1969, and Mr. Paul F. Paetow, assistant to the director, were also critical to the success of the program in creating educational documents and conducting visits. Using information gleaned from the surveys and visits, educational materials were created, including a manual for the training of ambulance attendants, and the publication of the *Guide to the Organization and Management of Hospital Emergency Departments*. A scale model was produced to illustrate the optimal layout of an emergency department. The Field Program also was successful in educating the public about the importance of emergency care, from the site of the injury to treatment in the emergency department, through the dissemination of video productions and articles. When the Field Program concluded in 1970 with the end of the grant, it left the legacy of having advanced knowledge of emergency care across the nation.

Concurrently, in 1970, the COT had also endorsed a resolution on Specialized Trauma Treatment Centers that was proposed by Dr. Hampton. In the resolution, they began tackling the concept of strategic placement of regional trauma treatment centers—a topic that is still a hotly debated problem today. This was forwarded to the Board of Regents for approval, however there was no notice of action taken. The importance of these issues led to the establishment of the Subcommittee on Emergency Services-Hospital, with Roger T. Sherman, MD, FACS, appointed as the first chair of this committee (1968–1974). The initial focus of this committee was to develop educational posters for emergency care, but they also continued the discussion of categorization of hospitals and emergency departments.

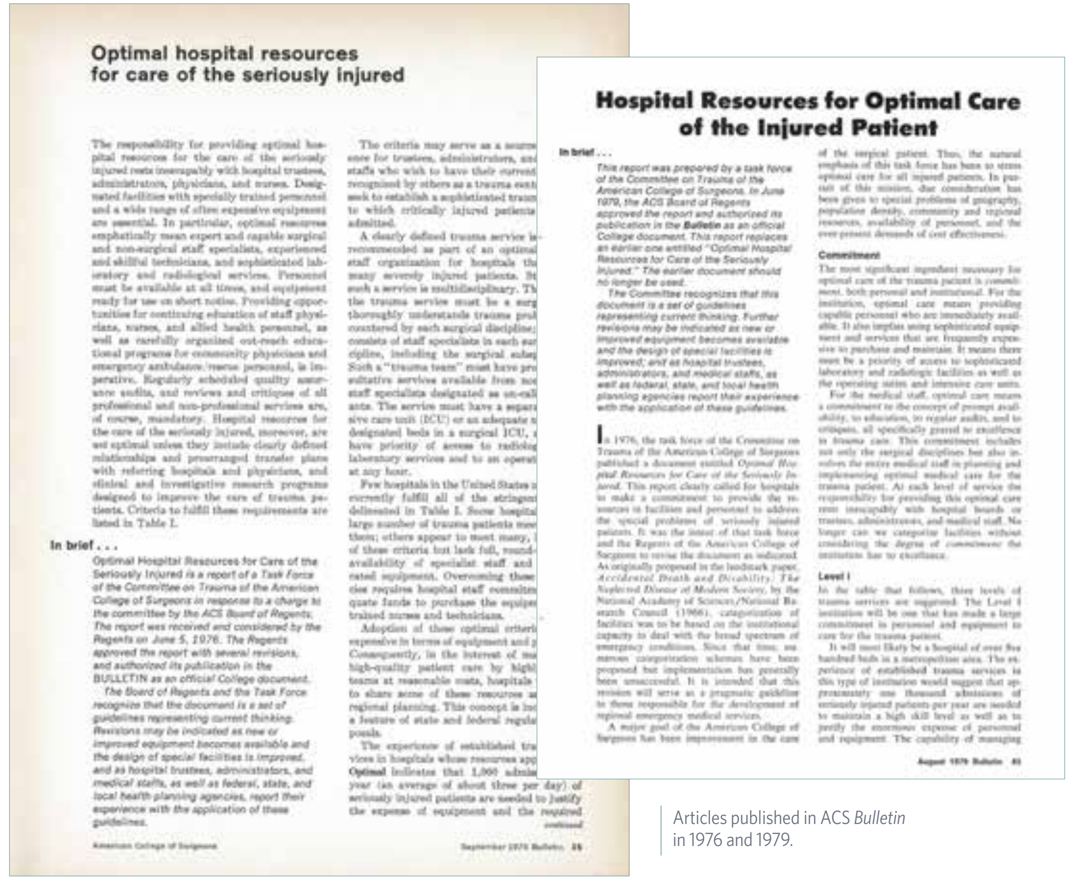
Thomas W. Morgan, MD, FACS
Chair, Subcommittee on Emergency Services-Hospital (1974–1977).

In the 1975 report given by Thomas W. Morgan, MD, FACS, Chair, Subcommittee on Emergency Services-Hospital (1974–1977), a call to action was made for the further development of a joint accreditation program with standards for emergency departments and categorization of hospitals. Dr. Morgan said, "While high-quality professional care is available to the trauma patient when rendered by the appropriate specialist, and acceptable levels of care are now rapidly becoming available during the prehospital period, the lack of uniformly acceptable professional care inside the emergency department has evolved as the most serious deficiency in emergency medical services today. This professional deficiency cannot be attributed to public apathy nor to political inattention. Full responsibility for its existence must be accepted by the medical profession in general and the Committee on Trauma in particular." To address these concerns, members of the COT sought to develop a liaison relationship with the newly established American College of Emergency Physicians that was seeking to define the specialty and establish residency training programs.



Robert W. Gillespie, MD, FACS
COT Chair (1974–1978).

In 1976, a COT task force published an article in the *Bulletin of the American College of Surgeons* (now known as the ACS *Bulletin*) titled, "Optimal Hospital Resources for Care of the Seriously Injured." This article called for hospitals to make a commitment to provide the resources, facilities, and personnel to address the needs of seriously injured patients. Along with requirements for personnel and equipment, it called for regularly scheduled mandatory quality assurance audits and reviews of all professional and nonprofessional services. In 1978, a 14-person task force was appointed by then COT Chair Robert W. Gillespie, MD, FACS (1974–1978), with the following charge from the Board of Regents: "The Board of Regents asks the Committee on Trauma to act to establish standards of care for the surgical patient in the emergency department. These should include consideration of the fact that technology has extended the potential for management of the injured patient before his admission. Liaison between the Committee on Trauma and other appropriate organizations in this field is encouraged to accomplish this task."



Optimal hospital resources for care of the seriously injured

In brief . . .

Optimal Hospital Resources for Care of the Seriously Injured is a report of a Task Force of the Committee on Trauma of the American College of Surgeons in response to a charge to the committee by the ACS Board of Regents. The report was received and considered by the Regents on June 5, 1976. The Regents approved the report with several revisions, and authorized its publication in the BULLETIN as an official College document.

The Board of Regents and the Task Force recognize that the document is a set of guidelines representing current thinking. Revisions may be indicated as new or improved equipment becomes available and the design of special facilities is improved, and as hospital trustees, administrators, and medical staffs, as well as federal, state, and local health planning agencies, report their experience with the application of these guidelines.

Hospital Resources for Optimal Care of the Injured Patient

In brief . . .

*This report was prepared by a task force of the Committee on Trauma of the American College of Surgeons. In June 1979, the ACS Board of Regents approved the report and authorized its publication in the **Bulletin** as an official College document. This report replaces an earlier one entitled "Optimal Hospital Resources for Care of the Seriously Injured." The earlier document should no longer be used.*

The Committee recognizes that this document is a set of guidelines representing current thinking. Further revisions may be indicated as new or improved equipment becomes available and the design of special facilities is improved; and as hospital trustees, administrators, and medical staffs, as well as federal, state, and local health planning agencies report their experience with the application of these guidelines.

Articles published in ACS *Bulletin* in 1976 and 1979.

This task force developed an implementation plan based on the hospital resources article. A reporting format was created to ensure the standards were applied appropriately, and discretionary interpretation was minimized. The ACS Board of Regents approved the format. In a 1979 follow-up article in the ACS *Bulletin*, additional standards were added to include outreach, public education, and qualified personnel (registrars) to support quality assurance.

The evolution of the standards document corresponded with the evolution of the philosophy of care by the COT and the Verification, Review, and Consultation (VRC) Committee. The initial title, *Optimal Hospital Resources for Care of the Injured Patient* (1976), has evolved to *Resources for Optimal Care of the Injured Patient*.

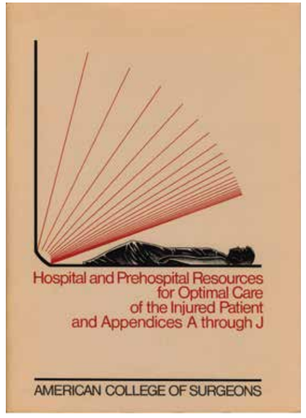
> This subtle title change underscores a shift in emphasis from "optimal hospital resources" to "optimal care given the available resources," and reflects an important and abiding principle that the needs of injured patients should be addressed both at the point of injury and wherever they receive care.

The committee further acknowledged that few individual facilities would be able to provide all resources to all patients in all situations.

On April 16, 1980, the Task Force for the Implementation of the Hospital Resources Document developed a Verification/Consultation Program for Level I and II hospitals for approval by the COT. This was subsequently approved by the ACS Board of Regents and "Verification Program for Hospitals", developed by the COT, was published in the October 1980 issue of the ACS *Bulletin*. This initial approval was followed by several additional years of turmoil and debate regarding the details of how site visits were to be conducted and what the report should or could not contain, as well as addressing medical and legal concerns. These contentious efforts to establish a verification program continued for several years through the tenures of COT Chairs C. Thomas Thompson, MD, FACS (1978–1982), and Donald D. Trunkey, MD, FACS (1982–1986), halted the program shortly after it began. Dr. Trunkey went to the mat arguing the importance of the program. There was considerable debate and concern from the ACS leadership that this program was too regulatory in nature and would be cost-prohibitive to manage.

COT Chairs C. Thomas Thompson, MD, FACS (1978–1982), and Donald D. Trunkey, MD, FACS (1982–1986), were tireless crusaders working to establish the COT verification program.

C. Rollins Hanlon, MD, FACS
ACS Executive Director (1969–1986).



Hospital and Prehospital Resources for Optimal Care of the Injured Patient and Appendices A through J, 1986.

Frank L. Mitchell, Jr., MD, FACS
First Chair of the then Ad Hoc Committee on Verification/Consultation (1987–1995).

Erwin R. Thal, MD, FACS
COT Chair (1986–1990).

Charles E. Lucas, MD, FACS
Chair, Ad Hoc Committee on Verification/Consultation (1995–2000).

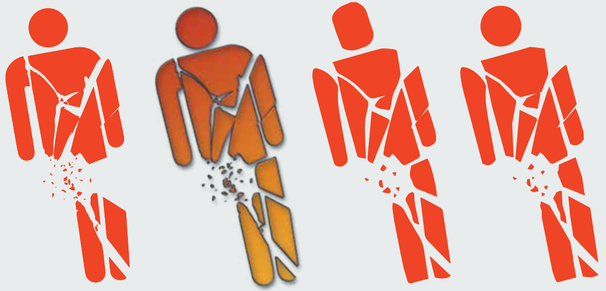
While the COT was allowed to proceed with a consultation process for trauma centers, the ACS Board of Regents were clear in their desire for this to remain a voluntary, consultative process only, despite the urging of COT leadership to allow this to evolve into a verification process. Then, at the annual COT meeting in the spring of 1986, it was reported that a recently established commission, external to the ACS, called the National Commission for the Accreditation of Trauma Centers, had been formed, with bylaws, advisors, and faculty with the intent of carrying out review and formal accreditation of trauma centers. The COT, under Dr. Trunkey's leadership, agreed that while the idea put forward by the National Commission was a good one, the consensus of the COT Executive Committee was that this activity should remain within the COT and certainly within the ACS. A motion that the COT request the ACS Board of Regents to permit development of standards by the COT for accreditation of trauma centers, and active COT participation in the implementation of those standards was unanimously approved by the COT. On June 8, 1986, the Board of Regents approved the recommendations of the COT in principle, with the understanding that details of the proposed program would be submitted to the Board of Regents in October 1986 for approval. After several long years of advocacy for such a program, it was finally approved by the Board of Regents in October 1986 and implementation began in earnest for a true trauma verification process at the direction of the COT.

The Verification, Review, and Consultation (VRC) Program of the COT was eventually formally established in 1987. Frank L. Mitchell, Jr., MD, FACS, was appointed as the first Chair of the then Ad Hoc Committee on Verification/Consultation (1987–1995) to lead the new program. Dr. Mitchell was a dedicated zealot for the verification process. Erwin R. Thal, MD, FACS, the COT Chair (1986–1990), along with Dr. Mitchell led the fledgling committee through several challenges in the early years of the VRC Program. Through their leadership, the VRC Program grew. The first Level I trauma center, Detroit Receiving Hospital, Detroit, MI, was verified in 1987, followed in 1988 by the verification of the first Level II trauma center, Ascension Via Christi, Wichita, KS. Pediatric trauma center criteria were then developed, and the first pediatric trauma center consultation was performed in 1989 at Norton Children's Hospital in Louisville, KY. The first publication of the *Resources for Optimal Care of the Injured Patient* book was released in 1990. Based on the red color of the cover it became known as the "Red Book," which started the tradition of referring to subsequent updates to the standards by the color of the book. The first Level III trauma center, Exeter Hospital, Exeter, NH, was verified in 1990. The program continued to grow, and Dr. Mitchell was succeeded by Charles E. Lucas, MD, FACS, Chair, Ad Hoc Committee on Verification/Consultation (1995–2000). Dr. Lucas sought to improve the consistency and content of the site visit with the introduction of a formatted report.

DON'T MESS WITH THE BROKEN MAN!

Since its introduction in 1990 on the cover of the Red Book, the COT Broken Man has become a very beloved icon, not just a recognizable symbol or brand. The Broken Man represents our injured patient. Everything we do as the COT, every decision the COT leaders make is weighed against the questions, "Is this the right thing to do for the patient?" and "Is this the best thing to do for the patient?" These principles truly guide the decisions of the COT, over business imperatives, preferences, or any other considerations. Discussions have stopped and been redirected because the answer to one of those questions was 'no'. Our Broken Man reminds us why we act as a group, and why individually we chose trauma as our calling. The patient (Broken Man) is the reason for our being.

Over the years, designers of our Broken Man have experimented with a few tweaks, like the 'gel man' of 2014. In 2016, it was felt that he needed a stylistic refresh and a cleaner line so he would reproduce better. The first recommendation was soundly rejected! Ronald M. Stewart, MD, FACS, COT Chair (2014-2018), presided over that refresh and had very definite thoughts about the suggested changes to its appearance, eventually agreeing on a cleaner line but with the recognizable round head. Suffice it to say that all future designers will be cautioned, "Don't mess with the Broken Man!" Going forward, our Broken (hu)MAN may be refined gently, but it will continue to stand as an enduring reminder of our patients, and why we have dedicated ourselves to doing what we do so well.



1990 2014 2016 (Very briefly!) 2016

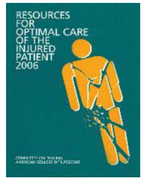
Evolution of the Standards

With the 1990 publication of the Red Book came the introduction of the "Broken Man" image on the manual's cover, which has become the universally recognized "brand" of the ACS COT *Resources for the Optimal Care of the Injured Patient* manual and now represents the COT as a whole. The 1990 edition represented a complete overhaul of the organization of the manual and was the first edition to include a chapter on the unique challenges in providing rural trauma care, and the role of physician assistants was introduced. The Red Book was the last version to include a Critical Care Air Ambulance chapter as originally outlined by Henry C. Cleveland, MD, FACS; this chapter was eliminated in the following Blue Book edition of 1993, as the focus became more facility based and expanded further on the role of allied health professionals.

The Gold Book, 1999

The 1999, Gold Book edition expanded and replaced the previous Quality of Trauma Care Personnel chapter with separate, more detailed Clinical Functions chapters for general surgery, emergency medicine, neurosurgery, and orthopaedic surgery. The requirements for personnel were more clearly outlined, but specific requirements for advanced practice providers were not delineated again until the 2014 Orange Book edition.

With the Gold Book came a change in the nomenclature from quality assurance to performance improvement (PI), providing trauma providers with a new lexicon of key terms such as "opportunities for improvement" and "loop closure." The "Continuous Process of Performance Improvement" concept of an ongoing cycle of monitoring, assessment, and management also was introduced. Recognizing that the PI process must have reliable and valid data collection as well as objective information necessary to identify opportunities for improvement, additional trauma registry and registrar requirements were introduced. The importance of accurate documentation of the PI activity was emphasized.



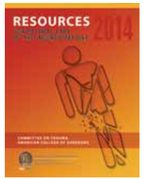
The Green Book, 2006

A notable change in the 2006 Green Book was the incorporation of patient safety into PI. Safety had once been considered a given in medicine but following the Institute of Medicine's (now known as the National Academy of Medicine) report, *To Err Is Human: Building a Safer Health System*, published in 1999, patient safety was recognized as an important component requiring dedicated attention. Patient safety efforts focused on the environment in which care was provided. The new acronym, PIPS, for Performance Improvement and Patient Safety, was coined to embody the goal of reducing inappropriate variations in care and therefore improving patient safety and outcomes (see Chapter 8). National Patient Safety Initiatives laid the framework for aligning an organization's patient safety department and quality department, so they were no longer working in their individual silos, and thus better able to achieve the PI goal. Regular data submission to the National Trauma Data Bank® (NTDB®) became a requirement, and today, the NTDB houses the largest aggregation of trauma registry data ever assembled and is used extensively in trauma research.

Max L. Ramenofsky, MD, FACS
A pediatric trauma surgeon, Dr. Ramenofsky was instrumental in the development of the pediatric trauma center verification process.

The Green Book also was the first to introduce verification of pediatric trauma centers, and in 2006, the ACS began the process of verifying pediatric-specific trauma centers. Multiple studies have demonstrated an improved outcome for injured children managed at pediatric trauma centers when compared to adult trauma centers. Max L. Ramenofsky, MD, FACS, and other pediatric surgeons were instrumental in the development of the pediatric trauma center verification process.

The approach to each edition and its subsequent revision process has evolved as the changing landscape of trauma care manifests new opportunities and needs. Each edition has required numerous stakeholders volunteering significant time, energy, experience, and knowledge to provide constructive feedback and to draft each new manual. These individuals are primarily members of the ACS COT, but broad stakeholder input, including insights from representatives of the American Burn Association (ABA), the Orthopaedic Trauma Association (OTA), the American College of Emergency Physicians (ACEP), the National Association of State EMS Officials (NASEMSO), the American College of Radiology (ACR), the Society of Trauma Nurses (STN), as well as Neurosurgery and Pediatric Surgery COT liaisons, and others is solicited and highly valued. In recent years, the COT has implemented a standard process for revision of the *Resources for Optimal Care of the Injured Patient* manual, including the routine solicitation of input from the committed stakeholders via an online comment process for each chapter.



The Orange Book, 2014

The Orange Book, published in 2014, was the sixth edition of *Resources for Optimal Care of the Injured Patient* and represented a Herculean effort due to the extent of the changes. Many leaders were involved in this revision process championed by Michael F. Rotondo, MD, FACS, COT Chair (2010–2014); Chris Cribari, MD, FACS, VRC Chair (2010–2014); and Rosemary A. Kozar, MD, FACS, VRC Chair (2014–2017). In this revision, the principles for developing an inclusive trauma system were further refined. Level I and II trauma centers were expected to be clinically equivalent except for complex, specialized injury management. The clinical care criteria for Level II centers were reviewed and revised to largely match those of Level I trauma centers to ensure that they can provide timely definitive care of severely injured patients. Depending on geographic location, patient volume, personnel, and resources, the Level II trauma center may be unable to provide the same extended comprehensive care or complex subspecialty care as a Level I trauma center. Therefore, patients with more complex injuries may benefit from a transfer to a Level I center. Level I centers have additional requirements to develop the next generation of trauma providers through educational programs and to advance injury care through research. Level I trauma centers are critical to the future of our trauma system with a need to remain as high-volume centers to support these education and research missions.

The Orange Book PIPS section was more than twice the size of the same section in the Red Book. Many of the concepts introduced in the Green Book remained in this edition, including the PIPS naming convention, the "Continuous Process of Performance Improvement" model, the importance of event identification, and the documentation of the formulated corrective action plan, and loop closure. The operational concepts of the PIPS process were now required to be in a written plan, commonly referred to as a PI plan, outlining in a formal document the configuration and details of the center's PI program. The new PI chapter also formally introduced the four levels of PIPS review, emphasized the importance of monitoring the quality and validity of registry data, and cataloged all structure and process measures to be measured, tracked, and reported on through the PIPS process.

Michael F. Rotondo, MD, FACS, COT Chair (2010–2014); Chris Cribari, MD, FACS, VRC Chair (2010–2014); and Rosemary A. Kozar, MD, FACS, VRC Chair (2014–2017), all contributed to the success of the 2014 Orange Book, featuring principles for developing an inclusive trauma system.

The four levels of PIPS review:

- Primary review by the trauma program manager (TPM)
- Secondary review by the TPM and trauma medical director (TMD)
- Tertiary review by the trauma multidisciplinary committee
- Quaternary review by the hospital quality committee or external peer review

The goal of previous editions followed Donabedian theory by setting appropriate standards for the required structural and process components, but those versions did not provide guidance on assessing outcomes. The Orange Book introduced a new criterion requiring participation in national risk-adjusted benchmarking allowing trauma centers to begin comparing their outcomes with other similar centers. The Orange Book also reintroduced requirements of Advanced Practice Providers (APPs), including both PAs (physician assistants) and nurse practitioners (NPs) whose roles had increased significantly following the institution of resident work-hour restrictions.

The PI and patient safety processes have continued to be further defined and clarified with the aim of standardizing and providing guidance for optimal PI programs. The Society of Trauma Nurses (STN) developed the Trauma Outcomes and Performance Improvement Course (TOPIC) to support implementation of the PIPS program. A collaborative effort has been made to keep the intent of the COT PIPS principles and the TOPIC Course aligned.

Future editions of the *Resources for Optimal Care of the Injured Patient* manual will continue to build on the ongoing integration of the VRC, PIPS, Trauma Quality Improvement Program (TQIP), and trauma systems concepts into one seamless program leading to a Trauma Quality Program (TQP) that is easier and more effective to implement.

The primary goal for the revision process continues to be the provision of better definitions of what resources are truly needed to provide optimal care of injured patients within an appropriately designed and funded system of care. Each edition of the *Resources for Optimal Care of the Injured Patient* manuals goes through a process of continuous review resulting in the set of standards by which trauma centers are verified during VRC site visits. As the reality of implementing new standards are better understood and new information becomes available, clarifications and changes to the current manual are collected and then are made readily available in an online clarification document.

Another goal of the revision process is to use an evidence-based scientific method when data are available. This is done not only to identify and support new potential criteria, but also to apply new research to existing standards, and to recommend the elimination of criteria proven not to be of value.

Prior to releasing the Orange Book, a table of evidence supporting each criterion was created, and in the process of doing so, it became clear that high-quality clinical and system evidence was lacking for many of the criteria, emphasizing the need for an increase in high-quality trauma clinical and system research. From a practical point of view, this means that consensus expert opinion is still the cornerstone for most of the criteria that have been established. This need for high-quality outcomes research emphasizes the value in preserving and enhancing those high-volume, academic Level I trauma centers accomplishing the work of managing studies and publishing research.

With each new edition, emphasis is made to clearly identify all the essential criteria for each level of trauma center that are required for successful evaluation at the time of their verification review.

With the Orange Book edition, the verbiage for all criteria was changed from a negative form of a deficiency to a positive term defining the required criteria. The Orange Book revision included efforts to clearly define the terms used in the criteria, such as promptly (within 30 minutes) and immediately (within 15 minutes). This allowed for time-sensitive response expectations expressed in these terms to become measurable.

The use of the term "should" prior to becoming a "must" has been a method to introduce new concepts, methods, processes, and technologies that may evolve into new criterion.

This approach allows further study on the new recommendation prior to it becoming a mandate. An abundance of information is then learned regarding the feasibility and cost of implementation, the different implementation strategies used by various trauma centers, the degree of effectiveness in improving the care and outcomes of patients, and all unintended consequences. This information is then used to make further refinements before creating a new standard ("a must"). The concept of the value proposition (quality/cost) remains an important consideration for all proposed new standards.

Growth of the Verification, Review, and Consultation (VRC) Program

Related subspecialty areas have indicated interest in specialty verification. In 1993, the American Burn Association (ABA) requested that the ACS verify burn centers and in October 1994, the first burn center in the U.S. was verified. After initial collaboration to develop the program, it was decided that the continuing burn center verification program would be run independently by the ABA. For several years, there have been ongoing discussions around the concept of verification for hand surgery. A set of initial standards have been drafted and discussion continues.

The COT VRC has also supported the U.S. military's mission of providing excellent, appropriate battlefield care. The first military medical center verified was Brooke Army Medical Center in San Antonio, TX, in 1997. In another first, the VRC conducted its first official site visit outside of the U.S. at the request of the U.S. Army. The first combat-related Army medical center (staffed with active and reserve military personnel from the U.S. Army, Navy, and Air Force) was verified as a Level III trauma center in Germany, at Landstuhl Regional Medical Center (LRMC). The verification review coincided with the collaborative work being done by leaders of the military's Joint Trauma System (JTS) and the COT to review the systems of care established in Iraq and Afghanistan (see Chapter 15). The Senior Visiting Surgeons Program also was a part of these efforts, concentrated at LRMC, and enabling civilian surgeons to support military surgeons in the care of the critically injured, while providing a valuable exchange of information and performance improvement concepts. Colonel Warren C. Dorlac, MD, FACS, USAF, was the LRMC Trauma Medical Director at the time, and the 2007 ACS VRC review team included: Frank L. (Tres) Mitchell, III, MD, FACS, Chair, COT Ad Hoc Committee on Verification/Consultation (2006–2010); M. Margaret Knudson, MD, FACS, COT Vice Chair (2006–2010); Dr. Trunkey; and Jorie Klein, MSN, MHA, BSN, RN. This was an important milestone in the military-COT partnership. In 2021, LRMC was reverified as a Level II trauma center, and the sharing of experiences and lessons learned continues.

Key Participants in the 2007 Verification Site Review of LRMC
Back row: Michael Glenn, RN, LRMC Data and Quality Specialist; Donald D. Trunkey, MD, FACS, ACS Reviewer, and COT Chair (1982–1986); Frank L. (Tres) Mitchell, III, MD, FACS, Chair, COT Ad Hoc Committee on Verification/Consultation (2006–2010); Col. Warren C. Dorlac, MD, FACS, USAF, LRMC Trauma Medical Director. Front row: Kathleen D. Martin, MSN, RN, LRMC Trauma Nurse Director; M. Margaret Knudson, MD, FACS, COT Vice Chair (2006–2010); and Jorie Klein, MSN, MHA, BSN, RN, ACS Reviewer.
Photo courtesy of Ms. Martin.

The VRC Program is one of the largest ACS Quality Programs, and the model for the development of ACS programs across a number of surgical specialties. As of 2021, there were approximately 570 verified trauma centers in the U.S. The work of the COT, particularly Trauma's VRC Program, provided key lessons for the Children's Surgery Verification (CSV) Program as it was conceived and implemented.

> The process of developing optimal resource standards based on evidence where possible and expert consensus when not, and then using these as a basis for external verification was demonstrably successful and impactful.

The experience COT acquired with their VRC Program allowed the CSV Program to compress its timeline for the development of standards and the various processes (site visit, pre-site visit activities and questionnaire) needed for verification. These lessons learned were extraordinarily helpful in the launch of the new program. Furthermore, because the COT VRC Program is widely known around North America, broad and early acceptance by many institutions followed for the CSV Program when it was offered. In addition to ensuring that the right care team is at the bedside, the shared emphasis of the CSV and Trauma VRC Programs on continuous, data-driven quality improvement is a legacy.

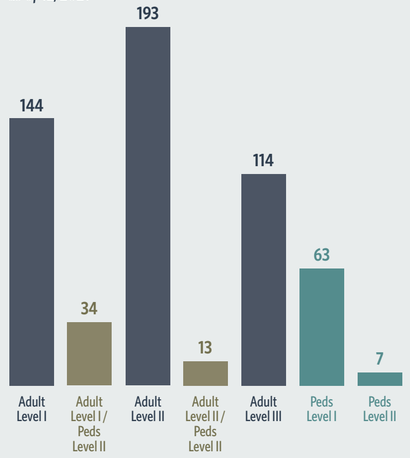
The development of the VRC Program would not have been possible without the amazing support of the staff of the ACS COT Chicago office. Initially this was the sole responsibility of Carol Williams. The VRC Program is now housed within the Trauma Quality Pillar of the COT which is led by Melanie Neal, MS. Tammy Morgan, Molly Lozada, and Julia McMurray have been key partners as members of the staff team. Long-term staffers Megan Hudgins and Rachel Tanchez have played critical roles in the processing of reports and scheduling of reviews.

2007 LRMC Verification (left)
Frank L. (Tres) Mitchell, III, MD, FACS, ACS Reviewer, presents the verification certificate to Col. Stephen F. Flaherty, MD, FACS, USA, LRMC Trauma Program Director; Kathleen D. Martin, MSN, RN, LRMC Trauma Nurse Director.

Keys to Verification Success (right)
Megan Hudgins and Rachel Tanchez have played critical roles in the processing of reports and scheduling of reviews.

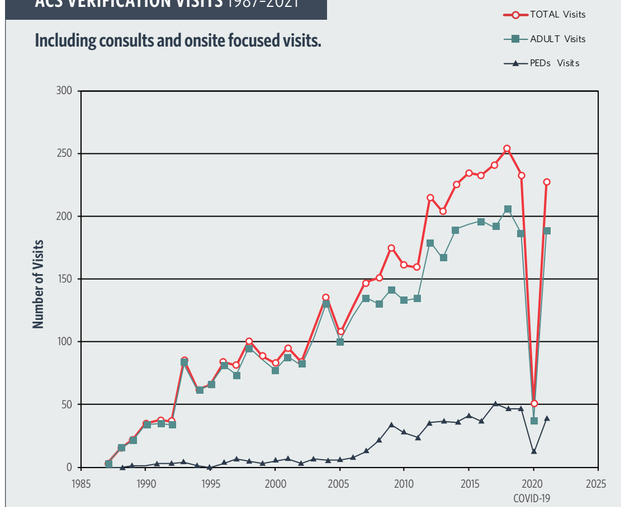
NUMBER OF VERIFIED CENTERS BY LEVEL

as of 12/2021



ACS VERIFICATION VISITS 1987–2021

Including consults and onsite focused visits.









The Present

Current Revision Cycle

The current revision cycle of the *Resources for the Optimal Care of the Injured Patient* manual is well on its way under the leadership of R. Todd Maxson, MD, FACS, VRC Chair (2017–2018); Daniel R. Margulies, MD, FACS, VRC Chair (2018–2020); William H. Marx, DO, FACS, VRC Chair (2020–2022); incoming VRC Chair, Nilda M. Garcia, MD, FACS (2022–); Ronald M. Stewart, MD, FACS, COT Chair (2014–2018), Trauma Medical Director (2018–2022); Eileen Bulger, MD, FACS, COT Chair (2018–2022); and Avery B. Nathens, MD, PhD, FACS, FRCSC, Trauma Medical Director, along with COT staff including Melanie Neal, MS, Tammy Morgan, Molly Lozada, Yaping Wang, Julia McMurray, Claire Dooms, and Bhumi Parikh. Each revision process has become more inclusive, with the current process including the use of web-based surveys made available to all stakeholders to provide their input. This survey tool solicited input on all chapters and garnered more than 2,100 responses. These responses have been reviewed and used to guide the revision process for this edition. Fourteen work groups were assembled and assigned to each chapter with representatives from the ACS COT, STN, specialty groups, Quality Program staff, and other organizations.

> The goal remains to continue to strive for consistent and clear standards that are value-based and patient-centric (and that benefit all patients rather than a single institution or program). This revision has focused on developing standards that are easier to understand and implement, and that are more objectively verified during the verification visit. The standards have also been consolidated to eliminate redundancy.

The next edition also will represent a greater alignment with and standardization of all the ACS Quality Programs. Cross-divisional work has occurred for the last two years to achieve this greater alignment and will mean that quality leaders across programs will be able to discuss their programs with greater ease within their institutions, with resource manuals and verification/accreditation (depending on the program) visits operating with a similar construction. One of the biggest changes in the new edition is the manual's format. A concerted effort is under way to align the new edition with a standard format that will be used across all ACS Quality Programs. This restructuring will change how the chapters are organized compared to previous editions by featuring the content in nine categories as shown in the list at right.

Standardized categories for ACS Trauma Quality Programs Optimal Resources manuals are as follows:

- Institutional Administrative Commitment
- Program Scope and Governance
- Facilities and Equipment Resources
- Personnel and Services Resources
- Patient Care: Expectations and Protocols
- Data Surveillance and Systems
- Quality Improvement
- Education: Professional and Community Outreach
- Research

The new *Resources for the Optimal Care of the Injured Patient* is expected to be released in 2022. And while its new cover is a charcoal gray, we are hoping to begin using the actual name of the book as it more accurately describes to the uninitiated the importance of its contents!

Key Surgeon Leaders and Staff Partners for the 2022 Revision Project

From the left:

William H. Marx, DO, FACS, VRC Chair (2020–2022).

Yaping Wang, Manager, Program and Process Development (staff).

Tammy Morgan, Manager, Trauma Center Programs (staff); Daniel R. Margulies, MD, FACS, VRC Chair (2018–2020); Molly Lozada, Senior Program Manager/Standards Specialist (staff).

R. Todd Maxson, MD, FACS, VRC Chair (2017–2018); Nilda M. Garcia, MD, FACS, VRC Chair (2022–).

Avery B. Nathens, MD, PhD, FACS, FRCSC, Trauma Medical Director; Eileen M. Bulger, MD, FACS, COT Chair (2018–2022); and Ronald M. Stewart, MD, FACS, COT Chair (2014–2018), Trauma Medical Director (2018–2022).

Claire Dooms, Program Manager, TQP Operations (staff); and Bhumi Parikh, Program Manager, PIPS (staff).

Julia McMurray, Manager, Trauma Quality Programs Operations (staff); Melanie Neal, MS, Assistant Director, Trauma Quality Programs (staff).

Integration of Trauma Quality Programs

As the individual quality-focused programs have grown and evolved, the COT strove to develop a truly comprehensive quality improvement program. The path to achieving this goal is to integrate the programs to address the structure, process, and outcomes of trauma care in an efficient and streamlined fashion. Organized efforts began in 2014 to deliberately forge connections across the trauma quality programs and lay the foundation for an integrated approach to trauma quality improvement. The Trauma Quality Programs (TQP) now include the VRC Program, TQIP, Trauma System Consultation (TSC) Program, and PIPS.

ACS-verified trauma centers are required to submit registry data to quality programs, and to participate in a risk-adjusted benchmarking program, like TQIP. New standards will require centers to present their benchmark reports at verification site visits, showing how they have used their results to identify and act on areas for improvement. The new verification process seeks to maximize use of data submitted by centers to represent adherence to standards. This will help to make the new pre-review questionnaire (PRQ) more streamlined and will eliminate the need for centers to provide the same information to ACS twice.

COT Quality Program leadership and staff are working to ensure that standards consider recommendations put forth by Best Practices Guidelines. In addition, all quality programs are making the effort to align on important definitions that are used in verification and TQIP.

> The goal of integration is to provide a comprehensive approach to quality improvement that gives centers the tools they need to track and improve care for injured patients.

Current Challenge

Going Virtual

The COVID-19 pandemic required the immediate suspension of all in-person site visits and, as a result, the ACS provided a one-year extension to all verified trauma centers in March 2020. Over the next few months, the team worked in earnest to develop and pilot a virtual site visit option. This processed was refined over the summer of 2020 and was an option for currently verified centers in 2021. Feedback about the virtual site visits has been very positive and this virtual structure reduces both the cost to the center and the travel time for the VRC reviewers. While this probably will not replace the need for some in-person visits, it likely will be an option for many visits moving forward. We continue to seek stakeholder input as this approach develops.

Our Vision for the Future

The VRC Program represents a standard process for trauma center verification that has resulted in improved outcomes, as reported in numerous publications over the years. TQIP has added a new dimension for trauma center quality. Verified trauma centers must now demonstrate their use of risk-adjusted outcomes, like those provided by TQIP, in their PI program. The continued emphasis on quality outcomes will only grow in the years ahead. Although the goal of zero preventable deaths after injury may never be achieved, continuous quality improvement can reduce the mortality rates for injured patients. Recent revisions to the *Resources for Optimal Care of the Injured Patient* manual were made to simplify and clarify the verification criteria, and the manual has been aligned with all the College's Quality Programs. Verification provides a means to ensure that hospitals can demonstrate their improvement in risk-adjusted outcomes, such as morbidity and mortality.

It has been a long-standing goal of the integrated Trauma Quality Programs to develop a strategy that incorporates patient outcomes into the verification process. We need to move beyond measuring only mortality as the primary outcome to ensure that we are optimizing all dimensions of care for the injured patient. As TQIP has matured and data quality improves, we seek to incorporate a more formal assessment of the risk-adjusted benchmarking data into the verification process. As we strive to continue to strengthen our trauma systems with highly functional trauma centers, the VRC will continue to support evidence-based standards to optimize patient outcomes.

Trauma Center Resuscitation At the end of the day, our entire focus is on quality care for our trauma patients.

Evolution of the Resources Manuals

- 1976 — *Optimal Hospital Resources for Care of the Seriously Injured*
- 1979 — *Hospital Resources for Optimal Care of the Injured Patient and Appendices A through J*
- 1983 — *Hospital and Prehospital Resources for Optimal Care of the Injured Patient and Appendices A through J*
- 1986/1987 — *Hospital and Prehospital Resources for Optimal Care of the Injured Patient and Appendices A through J*
- 1990 — *Resources for Optimal Care of the Injured Patient* (The "Red Book")
- 1993 — *Resources for Optimal Care of the Injured Patient* (The "Blue Book")
- 1999 — *Resources for Optimal Care of the Injured Patient* (The "Gold Book")
- 2006 — *Resources for Optimal Care of the Injured Patient* (The "Green Book")
- 2014 — *Resources for Optimal Care of the Injured Patient* (The "Orange Book")
- 2022 — *Resources for Optimal Care of the Injured Patient* (The "Gray Book")

Evolution of the Name

- 1960–1969 — Subcommittee on Emergency Department Standards
- 1969–1972 — Ad Hoc Committee on Categorization of Emergency Facilities
- 1970–1989 — Subcommittee on Emergency Services – Hospital
- 1990–1994 — Subcommittee on Hospital Services
- 1988–1990 and 1994–2003 — Ad Hoc Committee on Resources (responsible for revisions of the Resources Guide)
- 1986–2010 — Ad Hoc Committee on Verification/ Consultation
- 2011 — Verification Review Committee (VRC)

PAST CHAIRS

1960

Preston A. Wade, MD, FACS
1960–**
Subcommittee on Emergency Department Standards

**

Spencer T. Snedecor, MD, FACS
**?–1968
Subcommittee on Emergency Department Standards

1968

Roger T. Sherman, MD, FACS
1968–1974
Subcommittee on Emergency Department Standards

1969

Andrew C. Ruoff, III, MD, FACS
1969–1972
Ad Hoc Committee on Categorization of Emergency Facilities

1974

Thomas W. Morgan, MD, FACS
1974–1977
Subcommittee on Emergency Services – Hospital

1977

George Johnson, Jr., MD, FACS
1977–1981
Subcommittee on Emergency Services – Hospital

1981

Joseph C. Darin, MD, FACS
1981–1982
Subcommittee on Emergency Services – Hospital

1982

Erwin R. Thal, MD, FACS
1982–1986
Subcommittee on Emergency Services – Hospital

1986

Kenneth L. Mattox, MD, FACS
1986–1990
Subcommittee on Emergency Services – Hospital

1987

Frank L. Mitchell, Jr., MD, FACS
1987–1995
Ad Hoc Committee on Verification/Consultation

1988

Erwin R. Thal, MD, FACS
1988–1990
Ad Hoc Committee on Resources

1990

Frank R. Lewis, Jr., MD, FACS
1990–1992
Subcommittee on Hospital Services

1992

J. David Richardson, MD, FACS
1992–1994
Subcommittee on Hospital Services

1995

Edward J. Quebbeman, MD, FACS
1995–1999
Ad Hoc Committee on Resources

1995

Charles E. Lucas, MD, FACS
1995–2000
Ad Hoc Committee on Verification/Consultation

1999

William F. Fallon, MD, FACS
1999–2002
Ad Hoc Committee on Resources

2000

Robert L. Coscia, MD, FACS
2000–2006
Ad Hoc Committee on Verification/Consultation

2002

J. Wayne Meredith, MD, FACS
2002–2003
Ad Hoc Committee on Resources

2006

Frank L. Mitchell, III, MD, FACS
2006–2010
Ad Hoc Committee on Verification/Consultation

2010

Chris Cribari, MD, FACS
2010–2014
Trauma Center Consultation/ Verification Committee

2014

Rosemary A. Kozar, MD, FACS
2014–2017
Trauma Center Consultation/ Verification Committee

2017

R. Todd Maxson, MD, FACS
2017–2018
Trauma Center Consultation/ Verification Committee

2018

Daniel R. Margulies, MD, FACS
2018–2020
Trauma Center Consultation/ Verification Committee

2020

William H. Marx, DO, FACS
2020–2022
Trauma Center Consultation/ Verification Committee

**No written record of the term changes could be found.

06

Data-Driven Quality Improvement

06

Data-Driven Quality Improvement

Quality improvement relies on high-quality data to access patient outcome and trauma center performance. The Committee on Trauma has led this effort through the development of trauma registries, resulting in the National Trauma Data Bank® (NTDB®), and ultimately, the American College of Surgeons Trauma Quality Improvement Program (ACS TQIP®, commonly referred to as just TQIP)

The Past

For nearly 100 years, the American College of Surgeons (ACS) has led national and global initiatives to improve the quality of patient care in multiple areas, including trauma, cancer, and general surgery. Initially, quality improvement in trauma centers focused on developing and supporting adequate structures and processes to ensure care for the injured patient. The ACS Committee on Trauma (COT) first published *Optimal Hospital Resources for Care of the Seriously Injured* (now *Resources for Optimal Care of the Injured Patient*) in 1976. Since its initial publication, this document has outlined the equipment, personnel, and infrastructure needed for centers to provide high-quality trauma care. Standardization of trauma care was then expanded in 1987, with the establishment of the Verification, Review, and Consultation (VRC) Program by the ACS COT (see Chapter 5). The VRC Program was designed so expert reviewers could evaluate whether a trauma center met the criteria outlined in *Resources for the Optimal Care of the Injured Patient* based on the level of care they were expected to deliver. The underlying assumption for the review of structure is that given the proper resources, good medical care will follow.

In the early 1970s, David R. Boyd, MD, FACS, and colleagues described the first hospital trauma registry that was developed to enable research and patient monitoring. In 1975, Howard R. Champion, MD, FACS, received federal funding to develop strategies to define injury severity and assess injury outcomes. In 1982, a COT Ad Hoc Task Force on Injury Severity Scoring led by Charles F. Frey, MD, FACS, reported on efforts to work with the American Association for Automotive Medicine (AAAM) to suggest revisions to the AIS-80 coding for injury severity

David R. Boyd, MD, FACS
A pioneer in trauma registries in the early 1970s. *(Photo Credit: Own work. Creative Commons license CC BY SA-04.)*

Howard R. Champion, MD, FACS
Developed the "Major Trauma Outcomes Study" in 1982.

Charles F. Frey, MD, FACS
Chair, COT Ad Hoc Task Force on Injury Severity Scoring (1982).

and proposed that the ACS develop a mechanism for hospitals to submit data for analysis. This work led to the "Major Trauma Outcomes Study," developed by Dr. Champion, and coordinated by the ACS COT, which collected data from trauma centers across the U.S. from 1982 to 1989. This pioneering work developed the Trauma and Injury Severity Score (TRISS) methodology, which combined the Revised Trauma Score (RTS) and the Injury Severity Score (ISS) and established national norms to provide a predicted risk of mortality that could be used to identify patient cases, that when reviewed, would identify opportunities for quality improvement.

Performance Improvement
is done at the program level keyed to a specific patient event.

vs.

Quality Improvement
is a broader issue that spans the Donabedian model for measuring aspects of quality in health care by looking at structure, process, and outcomes.

In 1986, *Hospital and Prehospital Resources for Optimal Care of the Injured Patient* identified the trauma registry as an essential element for verification.

> Registries allowed individual centers to measure processes of care and outcomes that then facilitated the development of institution-specific performance improvement initiatives that led to a decrease in morbidity and mortality.

Registries allowed individual centers to measure processes of care and outcomes that then facilitated the development of institution-specific performance improvement initiatives that led to a decrease in morbidity and mortality.

This chapter outlines the evolution of the ACS Quality Programs through the development of the NTDB, which was created as a national repository for data collected from trauma registries across the country. In turn, review and use of the data eventually resulted in the development of the National Trauma Data Standard (NTDS), the standard set of definitions and formats for data collection, and ultimately to the development of TQIP, which, through the reports provided to participating centers, allows the centers to compare their processes and outcomes to their peer centers.

Avery B. Nathens, MD, MPH, PhD, FACS, FRCSC
Trauma Quality Program Medical Director (2016–), became involved with the TQIP Registry Advisory Committee in 2006, when it was still part of the Subcommittee on Trauma Registry Programs, which he chaired from 2008–2011. From 2012–2016, Dr. Nathens chaired the TQIP Advisory Committee as a separate group.

According to Avery B. Nathens, MD, MPH, PhD, FACS, FRCSC,

> *"Using external benchmarking to compare performance between organizations provides more appropriate information about whether or how much of a performance issue an organization might have and offers information about realistic goals for improving performance."*

This evolution from data aggregation to risk-adjusted, outcome-focused benchmarking, all with an emphasis on high-quality data, supports research and performance improvement to advance trauma care.

The National Trauma Data Bank (NTDB)

The Ad Hoc Committee on Quality Assurance was appointed by Donald D. Trunkey, MD, FACS, COT Chair (1982–1986), in 1985, with Frank L. Mitchell, Jr., MD, FACS, as the first Chair (1985–1987), followed by Dr. Champion, Chair (1987–1990). In 1990, an additional committee was established to focus on the development of a national trauma registry with Charles L. Rice, MD, FACS, as the first Chair of the Subcommittee on the Trauma Registry (1990–1993). The ACS developed a software program to support these efforts, which was known as the National Trauma Registry of the American College of Surgeons (NTRACS); it was piloted in several centers and version 2.5 was released in 1995. Also in 1995, David B. Hoyt, MD, FACS, Chair, Subcommittee on the Trauma Registry (1994–1997), established a work group to develop the NTDB. This group sought broad stakeholder input, reviewed all relevant existing data sets, and incorporated quality indicators as established by the COT Quality Improvement Subcommittee (formerly the Ad Hoc Committee on Quality Assurance). The initial data dictionary contained 86 data points, and the software was developed in 1997 to begin to accept data. In 1997, an Ad Hoc Committee on the NTDB was appointed with J. Wayne Meredith, MD, FACS, as its first Chair (1997–2000). By 1998, 40,000 patient records had been entered into the database, and the regional committee leaders were asked to support even greater participation through the submission of data.

The first NTDB annual report was published in 2001, based on 181,000 records. Subsequently, to increase data submission, the original $500 participation fee was eliminated. In 2002, version 3.0 of NTRACS was released and John Fildes, MD, FACS, became Chair of the Ad Hoc Committee on the NTDB (2000–2006). Melanie Neal, MS, was hired as the manager for this growing program in 2003. The first pediatric report was published in 2003. In 2004, the NTDB reached a milestone by accruing a cumulative total of 1.1 million records, meeting a challenge from the ACS Board of Regents to significantly expand participation through the submission of data. In 2005, the NTDS project was initiated with support from the federal government, specifically the Health Resources and Services Administration, and trauma registry vendors agreed to integrate this standard into their products. NTRACS was sold by the ACS in 2005, yielding the management of registry software to the private sector. The NTDS was launched in 2008.

Charles L. Rice, MD, FACS
The first Chair of the Subcommittee on the Trauma Registry (1990–1993).

David B. Hoyt, MD, FACS
Chair, Subcommittee on the Trauma Registry (1994–1997), COT Chair (1998–2002), ACS Executive Director (2010–2022).

J. Wayne Meredith, MD, FACS First Chair of the Ad Hoc Committee on the NTDB, also COT Chair (2002–2006), Trauma Medical Director (2006–2010), and ACS President (2020–2021).

John Fildes, MD, FACS Chair, Ad Hoc Committee on the NTDB (2000–2006), also COT Chair (2006–2010), and Trauma Medical Director (2010–2014).

Melanie Neal
Manager, NTDB in 2003; now Assistant Director, Trauma Quality Programs.

H. Gill Cryer, MD, FACS
Led (2006–2008) an initial TQIP Project Team to develop, and launch a pilot program providing risk-adjusted outcomes to participating trauma centers.

The Initial Development of TQIP

> Although significant progress was made at the individual trauma center level through the aforementioned efforts, the need for a national risk-adjusted benchmarking program in trauma was evident from the NTDB data published.

In the article "Trauma Quality Improvement Using Risk-Adjusted Outcomes," published in the *Journal of Trauma* in 2008, Shahid Shafi, MBBS, MPH, FACS, and colleagues compared risk-adjusted outcomes among 58 ACS COT-verified Level I trauma centers. As previously mentioned, COT verification ensured that each center had the optimal structure and processes in place as defined in *Resources for the Optimal Care of the Injured Patient*. Despite this standardization, mortality outcomes varied substantially. Adjusted for severity of illness, almost 25 percent of centers had a higher-than-expected mortality rate, and 19 percent of centers had mortality rates that were lower than expected. These findings supported the need for additional programs and measures beyond structures and processes of care to improve the outcomes of injured patients.

The development and implementation of TQIP began with the creation within the Subcommittee on Trauma Registry Programs of a TQIP Project Team in 2006, led by H. Gill Cryer, MD, FACS, under the direction of Dr. Fildes, incoming Chair of the COT (2006–2010) at that time. The project team was charged to pilot and launch a program to provide risk-adjusted outcomes to participating trauma centers. Such information would provide guidance to centers on where to direct their quality improvement resources and efforts. Additionally, it would allow for the identification of high-performing centers that could share best practices and guidelines with the broader community, thus elevating the care of injured patients across the nation and the world. The Subcommittee on Trauma Registry Programs was evolving over this time and encompassed the NTDS, NTDB, and the emerging TQIP work. Dr. Nathens succeeded David E. Clark, MD, FACS, Chair Subcommittee on Trauma Registry Programs (2006–2008), taking over Dr. Cryer's responsibilities for the fledgling TQIP in 2008, and provided foundational leadership to the development of the program. In recognition of the importance of his leadership, Dr. Nathens served as a special consultant to the COT in the role of Director of the Trauma Quality Improvement Program beginning in 2010, overlapping until completion of his committee chair term in 2011. Dr. Nathens was formally hired as the Medical Director for Trauma Quality Programs in 2016, a position in which he continues to serve.

The founders of TQIP looked to other Quality Programs within the ACS, particularly the ACS National Surgical Quality Improvement Program (NSQIP®), to learn about its development. From the beginning, ACS NSQIP was structured as an external benchmarking program through standardized data collection within a single registry. Conversely, trauma centers had established their own registries designed with their own local needs in mind, using different inclusion criteria, nonstandardized definitions for data fields, and varied approaches to injury severity coding. In addition, there was no standardized training for registrars on data abstraction.

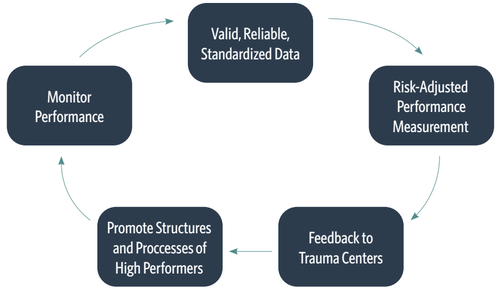
Despite these differences, the common theme among trauma registries was that each submitted data nationally to the ACS through the NTDB. Many of these differences were addressed through the adoption of the NTDS and a new data collection process with strict technical specifications. The NTDS established the list of required data elements, standardized the structure and content of those elements, and defined the meaning for each element. Additionally, the NTDS provided registrars with guidance on where in the medical record they should be looking for the information to populate those elements. Through the NTDS, the NTDB evolved into the core data source for TQIP.

Making Meaningful Comparisons: Patient Inclusion, Risk Adjustment, and Pilot Testing

While the ACS NSQIP could serve as a guide for the development of TQIP, the unique qualities of trauma patients as compared to general surgical patients required that statistical analytic methodologies be developed that are specific to trauma patients. This need was described by the work of Mark R. Hemmila, MD, FACS, and colleagues in their paper, "Detecting the blind spot: complications in the trauma registry and trauma quality improvement," published in the October 2007 issue of *Surgery*. They analyzed outcomes from a cohort of 525 trauma patients using the principles of ACS NSQIP data analysis. In his work with the Michigan COT, Dr. Hemmila found that trauma patients had fewer comorbid conditions than general surgery patients and that these comorbid conditions as well as laboratory values were not as important for risk adjustment. In terms of outcomes, complication rates were higher among trauma patients as compared to general surgical patients. Thus, both the data collected, and the outcomes reported by the ACS TQIP needed to be specific to the trauma population.

In addition, TQIP needed to consider which patients would be eligible for inclusion. Historically, NTDB included any patient who died, or was admitted, or was transferred to the center with at least one injury (excluding late effects of injury, foreign bodies, and superficial injuries). Thus, between centers, there was substantial variation due to their own case mix, as well as broad NTDB inclusion criteria, particularly as it related to the duration of time that constituted an "admission," the inclusion of patients who were dead on arrival, and the inclusion of isolated hip fractures among the elderly. To ensure that equitable comparisons were made between centers, TQIP based analysis on consistent patient cohorts across hospitals.

Fortunately, the NTDS contained most of the data elements required for risk adjustment. Data elements already collected through the NTDS included patient demographics, comorbid conditions, initial physiologic measures (for example, blood pressure and heart rate) upon presentation to the emergency department, transfer status, and mechanism of injury. Importantly, measures of severity of injury were also being collected, including abbreviated injury scale scores and other measures of injury severity derived from these scores. These elements are included in statistical models in order to risk-adjust for factors that affect outcomes but are not components of care, so that centers can accurately compare their performance to national norms. The feasibility of TQIP as a quality improvement program was tested in a TQIP pilot study conducted between 2008–2009 by Dr. Nathens and the COT staff. In this study, risk-adjusted data were used to benchmark 23 Level I and II trauma centers. Participants in the pilot study reported that they found the data reports provided the results in a clear, useful, and actionable manner.



The conceptual framework of continuous quality improvement underlying ACS TQIP wherein high-quality data provide the opportunity to give valid risk-adjusted performance measures back to centers. These institutions then review their performance in the context of their environment and seek areas to improve. Performance is monitored and the loop continues.

In 2014, Pediatric TQIP was launched to provide a similar approach to quality improvement for pediatric trauma patients and risk-adjusted benchmarking for pediatric trauma centers (see Chapter 7). In the same year, TQIP Collaboratives debuted. Florida and Georgia were the first states to join the TQIP Collaborative Program.

> The goal of collaboratives is to provide a self-identified group of trauma centers, typically defined by state, assistance in identifying opportunities for improvement across the group that may not otherwise be apparent for each individual center, and to help facilitate performance improvements efforts across the collaborative participants.

In 2016, the program was expanded to Level III trauma centers.

TQIP COLLABORATIVES

- Florida TQIP Collaborative
- Arkansas TQIP Collaborative
- Central Ohio Trauma System TQIP Collaborative
- COT Region III Adult TQIP Collaborative
- Georgia TQIP Collaborative
- HCA TQIP Collaborative
- Indiana TQIP Collaborative
- LA County TQIP Collaborative
- Louisiana TQIP Collaborative
- Michigan TQIP Collaborative
- Nebraska TQIP Collaborative
- New York TQIP Collaborative
- Northern Ohio Trauma System TQIP Collaborative
- Ohio TQIP Collaborative
- Pennsylvania TQIP Collaborative
- Tennessee TQIP Collaborative
- Texas TQIP Collaborative
- UC Health TQIP Collaborative
- Washington TQIP Collaborative
- Wisconsin TQIP Collaborative
- New York Pediatric TQIP Collaborative

Performance Improvement and Patient Safety (PIPS) Committee

The modern-day Performance Improvement and Patient Safety (PIPS) Committee evolved from the original Ad Hoc Committee on Quality Assurance appointed by Dr. Trunkey in 1985 (see Chapter 8). The PIPS Committee supports the implementation of performance improvement activities within trauma centers and provides tools to centers to support these programs. Led by the Society of Trauma Nurses (STN), in close collaboration with the PIPS Committee, the Optimal Trauma Center Organization and Management Course (OPTIMAL) and Trauma Outcomes and Performance Improvement Course (TOPIC) were developed to support trauma program managers and trauma medical directors in this effort. The PIPS Committee also supports the development of the Trauma Quality Programs Best Practices Guidelines (see Chapter 8) and has devoted considerable effort to the development of a model performance improvement (PI) plan for trauma centers, which has been incorporated into the next version of the trauma verification standards. The PIPS Committee and its predecessors have been integral to operationalizing these programs.

An Early Focus on Long-Term Outcomes and Outcomes Research

John A. Weigelt, MD, DVM, FACS, COT Chair (1994–1998), and Erwin A. Thal, MD, FACS, COT Chair (1986–1990).

The COT has always recognized the importance of supporting the long-term outcomes of injured patients. The Ad Hoc Committee on Rehabilitation and Outcome was established in 1944, under the direction of A. William Reggio, MD, FACS, who served as chair in the latter part of the 1940s. That committee's focus was to publicize the need for physical medicine, such as physical therapy, occupational therapy, and the avoidance of deconditioning and reconditioning for the benefit of traumatic cases. Interest in this committee waned until 1985 when incoming COT Chair Erwin A. Thal, MD, FACS (1986–1990), asked John E. McDermott, MD, FACS, to serve as Chair of the Ad Hoc Committee on Rehabilitation to recommend how best to incorporate rehabilitation issues into COT activities. Dr. McDermott advocated for the development of a resource document that would describe the follow-up referrals and further information needed for instruction of the patient; he felt there was ongoing need for input to the surgical community as to advances in the rehabilitation field. That committee too faltered after 1988, until it was reconstituted in 1994 as the Ad Hoc Committee on Rehabilitation and Outcome, with Andrew R. Burgess, MD, FACS, as chair, to develop rehabilitation aspects of trauma care and coordinate efforts with other interested organizations. In 1995, under the leadership of John A. Weigelt, MD, DVM, FACS, COT Chair (1994–1998), this committee was replaced with the Ad Hoc Committee on Outcomes and charged with evaluating the care given to trauma patients in relationship to the eventual health status of the patient after a course of treatment was completed, and to initiate an effort toward outcome evaluation that then used evidence-based medicine to develop clinical management guidelines and multi-institutional clinical trials.

Present

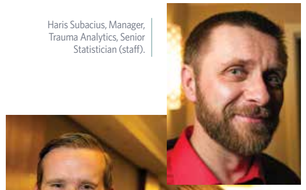
Current Participation: ACS TQIP Impacts Trauma Patients through High-Quality Data

TQIP has grown exponentially since its inception. At the end of 2021, around 875 hospitals were enrolled, and program participants include more than 520 Level I and II centers, almost 160 Pediatric centers, and close to 200 Level III centers from all 50 states as well as Washington, DC, and three countries. Additionally, there are approximately 6 regional and 15 state collaboratives registered. TQIP-participating centers are diverse in their bed size, teaching status, and geographical region. Quality improvement efforts rely on accurate and complete data. TQIP employs several measures to ensure reliable, accurate data collection. TQIP offers ongoing training and continuing education opportunities for trauma registrars through a variety of mechanisms including webinars, interactive question-and-answer sessions, and annual course modules. Registrars receive feedback on the data they collect through automated data validation checks, assessments of outlying values, regular data quality feedback integrated with benchmark reports, and dedicated data quality reports highlighting issues integral to accurate benchmarking.

In July 2017, all ACS Quality Programs, including trauma, transitioned to a new data collection platform. The new platform advanced data collection and validation processes and provided additional business intelligence tools. The platform also afforded TQIP opportunities to collect data beyond the NTDS to support sponsored research projects and to leverage technology for collecting data on patient-reported outcomes.

TQIP PROGRAM GROWTH 2010–2021

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Adult Level I & II	60	117	160	187	252	356	451	484	503	505	511	522
Peds					44	83	121	131	142	151	154	158
Level III							77	137	168	185	192	198



Haris Subacius, Manager, Trauma Analytics, Senior Statistician (staff).

Christopher Hoeft, Senior Manager, Data and Report Operations, Trauma Quality Programs (staff); and Julia McMurray, Operations Manager, Trauma Quality Programs (staff).

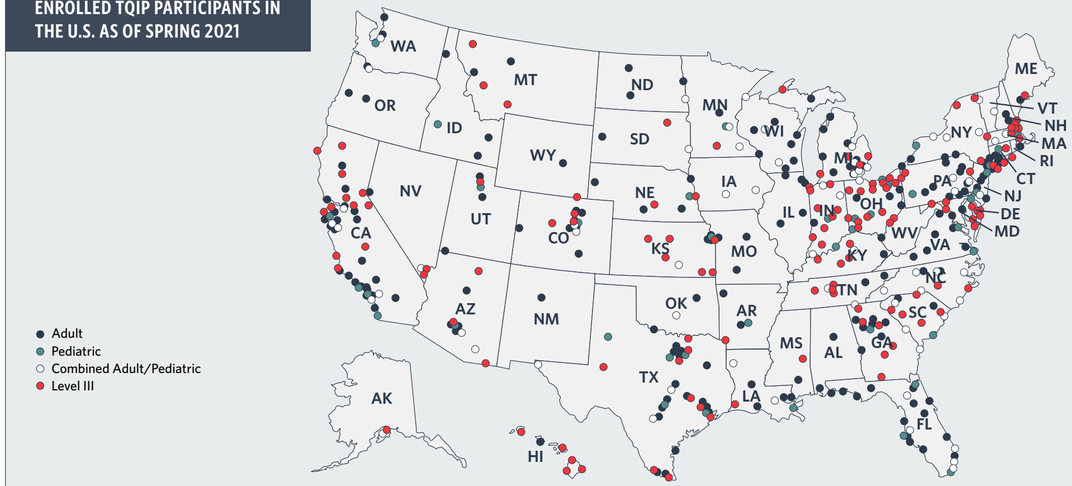
The Trauma Quality Programs' (TQP) success is the result of a solid partnership between surgeon leaders and staff partners. Michael C. Chang, MD, FACS, Chair, Trauma Quality Pillar, Chair TQIP (2016–2022); Tammy Morgan, Manager, Trauma Center Programs (staff); Avery B. Nathens, MD, PhD, FACS, Trauma Quality Program Medical Director (2016–); Melanie Neal, Assistant Director, Trauma Quality Programs (staff).

Current Patient Outcomes, Center-Level Processes of Care, Risk-Adjustment, and Center Reports

Outcomes that currently are measured by TQIP include mortality and complications. These outcomes, as all aspects of TQIP benchmark reports, have evolved over time and remain a work in progress as TQIP adapts to changing needs and priorities of participants, and the trauma community at large. As the structures and processes of care directly affect the outcomes experienced by patients, TQIP also provides reports on several processes of care that are specific to the trauma population. Some of these metrics include the timely administration of venous thromboembolism prophylaxis, intracranial pressure monitoring of patients with traumatic brain injury, timing of tracheostomy, timing of hemorrhage control, and time to operative fixation in patients with extremity fractures.

TQIP uses hierarchical linear models to create the risk-adjusted outcomes used in TQIP benchmark reports. These models produce odds ratios, or in some cases risk-adjusted time-to metrics, as measures of hospital performance. Providing this granular data allows centers to target performance improvement efforts effectively and efficiently, such as resource utilization, resuscitation strategies, multidisciplinary care coordination, and timing to definitive care for specific patient populations.

ENROLLED TQIP PARTICIPANTS IN THE U.S. AS OF SPRING 2021



Database v.S21

TQIP Participants are also enrolled in Canada, Germany, Qatar, and the Republic of Korea.

TQIP ANNUAL SCIENTIFIC MEETING AND TRAINING

The TQIP planning team of surgeons and staff work to create new and impactful presentations each year. The 2019 TQIP Annual Scientific Meeting and Training was the last in-person meeting before the COVID-19 pandemic forced us to go virtual.

Michael C. Chang, MD, FACS Chair, Trauma Quality Pillar, Chair TQIP (2016–2022), welcomes participants to the 2019 ACS TQIP Annual Scientific Meeting and Training.

R. Todd Maxson, MD, FACS VRC Chair (2017–2018), provided the keynote address, sharing a powerful story about his experience as a trauma patient within Arkansas' trauma system, which he helped build from the ground up.

Illustrating the conference theme of high-performing teams, TQIP presented its first live trauma simulation, performed by Parkland Hospital Trauma staff and EMS. This innovative session focused on the importance of team communication.

Transforming Data into Performance Improvement Efforts: Education, Collaboration, and Networking

TQIP recognizes that providing centers with data is not sufficient to support meaningful changes in patient care. Thus, TQIP offers resources on how to develop and execute performance improvement initiatives.

> TQIP ensures that trauma medical directors and program managers understand how to glean the most information from their benchmarking reports, specifically how to "drill down" on areas for improvement and identify specific processes or structures that can facilitate change.

Collaboration between centers is a key means by which TQIP facilitates quality improvement efforts. Currently, there are more than 20 TQIP collaborative programs (based on states, hospital systems, or COT regions). Centers within a collaborative have banded together to collectively accelerate quality improvement efforts. For example, centers engage in projects to improve quality in selected areas (for example, a specific patient population or process of care). Additionally, centers within a collaborative share best practices so that high-outlier centers can benefit from the lessons learned by low-outlier centers. TQIP collaborative reports provide a snapshot of the group in comparison to the TQIP national average. Trauma centers enrolled in the Michigan TQIP collaborative demonstrated a 40 percent decline in their serious complication rate from 2008 to 2013 (14.9 percent versus 9.1 percent; $P < 0.001$) and decreased mortality rates from 4.9 percent in 2010 to 4.1 percent in 2015.

The ACS TQIP Annual Scientific Meeting and Training plays a key role in educating and supporting centers to help them provide quality care. Under the leadership of Michael C. Chang, MD, FACS, Trauma Quality Pillar Chair and TQIP Conference Program Chair (2016-2022), the meeting has drawn a wide variety of attendees including but not limited to trauma medical directors, program managers, program coordinators, and registrars from both participating and prospective TQIP centers. Dr. Chang has been instrumental in solidifying hospitals' focus on quality improvement through his development of the ACS TQIP Annual Scientific Meeting and Training (in 2021 its name was shorted to the ACS TQIP Annual Conference). Through a thoughtful selection of breakout sessions, keynote presentations, and innovations such as the TQIP Academy, which identifies high-performing centers and showcases their stories on how to go from low to average, how to maintain performance, and how to go from good to great, he has made this the premiere meeting for trauma teams who want to excel at quality improvement.

Heidi A. Hotz, RN, and Robbie Dumond, BSN, MHA, have collaborated with Drs. Nathens and Chang to develop and pilot a peer coaching program for TQIP participants.

> The 2019 ACS TQIP Annual Scientific Meeting and Training drew nearly 2,000 individuals from more than 730 institutions across the U.S. and the world. The 2020 program, held virtually due to the pandemic, had more than 6,300 participants.

The conference agenda has sessions that are directed to individual roles as well as opportunities for collaborative learning across roles. Programming at the conference focuses on empowering centers to enable them to optimally engage in the program to improve care. Sessions include how to ensure high-quality data are being collected, how to interpret benchmarked reports and translate the results into an actionable target, and how to implement change at the participant's center.

While TQIP has always provided feedback regarding what aspects of data quality or care could benefit from improvement, the task of identifying, designing, and implementing an intervention has always been dependent on the participating site itself. To address this gap, TQIP is now piloting a coaching program to provide peer coaching for participants under the leadership of Drs. Nathens and Chang, and Heidi A. Hotz, RN, and Robbie Dumond, BSN, MHA. TQIP will match a participating site struggling to improve in their benchmark report with a coaching site that has demonstrated expertise in performance improvement.

Over the course of this relationship, TQIP will collect generalized feedback, best practices, and lessons learned to determine feasibility and scalability of an ongoing program. If the pilot is successful, TQIP expects that this type of relationship building could help struggling sites to bridge their ongoing performance gaps.

Consistent with the aim of helping to identify and implement interventions, TQIP also launched the TQIP Mortality Reporting System in 2019, led by Samuel P. Mandell, MD, FACS, Future Trauma Leader (FTL) Class of 2016. This system is aimed at collecting structured mortality reviews to be used in multi-institutional retrospective analyses. The results of such analyses will be used to develop best practices and guidelines of care that could mitigate future adverse events and develop an improved atmosphere of patient safety and care. An initial analysis of the first 395 cases was presented at the American Association for the Surgery of Trauma meeting in 2021. The authors concluded that most strategies to reduce errors in trauma centers focus on changing the performance of providers rather than system-level interventions, and that higher-level interventions may help reduce variability in clinical care. They postulated that centers require additional support to develop more effective mitigation strategies that will prevent recurrent errors and patient harm. Aaron R. Jensen, MD, FACS, FTL Class of 2017, is the current lead for this work group.

Samuel P. Mandell, MD, FACS
Future Trauma Leader (FTL) Class of 2016, launched the TQIP Mortality Reporting System in 2019.

Aaron R. Jensen, MD, FACS
FTL Class of 2017, is the current lead for this work group.

ADVANCING LEADERSHIP IN TRAUMA CENTER MANAGEMENT COURSE

In addition to the ACS TQIP Annual Conference, Dr. Chang oversaw the adoption and development of the Advancing Leadership in Trauma Center Management (ALTCM) Course. Jorie Klein, MSN, MHA, BSN, RN, Founder and Course Director, partnered with Leonard J. Weireter, Jr., MD, FACS, ALTCM Medical Director (2018–2020), to develop a leadership course based on her previous experience with an earlier course she had directed. The ALTCM features a multidisciplinary approach to leading a trauma program to excellence and embraces both surgeon and nurse leaders of trauma programs. The inaugural course was offered at the 2019 ACS TQIP Annual Scientific Meeting and Training before the COVID-19 pandemic hit, canceling subsequently scheduled courses in spring 2020. Dr. Chang assumed the role of ALTCM Medical Director in 2020 and is working with Ms. Klein to develop a remote-learning version of the course.

Advancing Leadership™
in Trauma Center Management

Jorie Klein, MSN, MHA, BSN, RN, Founder and Course Director, Advancing Leadership in Trauma Center Management (ALTCM) Course, partnered with Leonard J. Weireter, Jr., MD, FACS, ALTCM Medical Director (2018–2020), to develop a leadership course that first debuted in 2019.

The Future

TQIP continually evolves to respond to the needs of its participating centers and to "push the envelope" on advancing care for the injured patient. As in-hospital mortality rates continue to decline, we recognize the need to focus on strategies to optimize long-term functional outcomes. To address this, TQIP is developing a pilot program to incorporate patient-reported outcome measures (PROMs) into the data collection process. In 2019, the ACS COT brought together a group of key stakeholders in trauma care for a consensus conference on the collection of PROMs after injury. Stakeholders included representatives from major medical organizations, trauma survivors, and experts in PROMs. The group made suggestions regarding patient inclusion criteria, time points and means for data collection, and potential PROMs to collect. The current PROMs Work Group, led by Angela M. Ingraham, MD, FACS, FTL Class of 2020, COT-RAS (2013–2014); Joseph V. Sakran, MD, MPH, MPA, FACS, FTL Class of 2016; and Sarah F. Parker, BSN, RN, TCRN, Trauma Program Director, Grady Memorial Hospital, is exploring the collection of PROMs from trauma survivors and confronting the unique challenges faced in accomplishing this goal. They have found that it is not easy to get trauma survivors to respond to the outcome measure surveys.

Angela M. Ingraham, MD, FACS
FTL Class of 2020, COT-RAS (2013–2014)

Joseph V. Sakran, MD, MPH, MPA, FACS
FTL Class of 2016, are leading the current PROMs Work Group.

TQIP seeks to support data linkage across the continuum of care. Outcomes for severely injured patients are impacted by initial emergency medical services (EMS) care, initial hospital care, interfacility transport, definitive hospital care, and rehabilitation. To identify all opportunities for performance improvement, linkage of these disparate data sources is needed. With the support of National Highway Traffic Safety Administration (NHTSA), the COT has collaborated with the National EMS Information System to develop a global uniform identifier that can be generated by the first responding EMS agency and carry forward into trauma registries to support this data linkage. We continue to work on the implementation of this program and seek opportunities to create a similar strategy for post discharge care as well.

TQIP supports advances in care through research, and TQIP data have been used to support many studies exploring variations in care and factors associated with improved outcomes. As a core member of the Coalition for National Trauma Research (CNTR), the COT has recently invested in creating a platform to support incremental data collection, which when combined with TQIP data, can serve as infrastructure to support prospective observational and interventional trials. The first study to use this approach is a national study of nonfatal firearm injury supported by a grant from the National Collaborative on Gun Violence Research (NCGVR), which has engaged more than 100 TQIP centers in data collection.

In 2019, the ACS COT convened a consensus conference on the collection of patient-reported outcome measures (PROMs) after injury. Participants included representatives from major medical organizations, trauma survivors, and experts in PROMs.

TQIP has revolutionized the care of the injured patient through risk-adjusted benchmarking of outcomes between trauma centers. TQIP translates data into action through the critical examination of individual center and collaborative reports as well as the distribution of best practices and lessons learned through the program's annual meeting and other forums. Through TQIP, centers have identified areas for improvement and implemented changes to reduce variability and complications in trauma care and to improve resource use and patient survival.

LEADERSHIP PROFILE

"ACS TQIP offers the potential to further advance trauma care and offers participating centers the opportunity to better understand their strengths and areas for improvement…Continuous quality improvement is an integral component of trauma center care. This striving for high-quality care is complex, given the nuances in defining quality."

Avery B. Nathens, MD, MPH, PhD, FACS, FRCSC

Director, Trauma Quality Improvement Program (2010–); Medical Director, Trauma Quality Programs (2016–)

Dr. Nathens currently serves as Professor of Surgery at the University of Toronto and Surgeon-in-Chief at Sunnybrook Health Sciences Centre in Toronto where he also holds the de Souza Chair in Trauma Research. He earned his medical degree from Queen's University in Kingston, Ontario, after which he served an internship at St Michael's Hospital followed by a general surgery residency at the University of Toronto. During his time in residency, he earned a PhD from the Institute of Medical Science at the University of Toronto. Following residency training, he completed a fellowship in Trauma and Critical Care at Harborview Medical Center in Seattle, Washington. During this time, he also served as a Research Fellow in the Harborview Injury Prevention and Research Center, earning a Master of Public Health degree from the School of Public Health at the University of Washington. Following his fellowship training, he joined the trauma faculty at Harborview Medical Center where he served as the Director of Surgical Critical Care Services and subsequently Associate Director of the Surgical Critical Care Fellowship. In 2006, he moved back to Toronto as Division Head of General Surgery and Director of Trauma at St. Michael's Hospital. In 2012, he was named to his current position as Surgeon-in-Chief at Sunnybrook Health Science Center in Toronto, where he also currently serves as the Medical Director of the Trauma Program.

Dr. Nathens joined the Central COT in 2005 where he quickly became involved in multiple committees including the Trauma Systems Evaluation and Planning Committee, Outcomes Committee, and the National Trauma Databank Subcommittee. He assumed the position as Chair of the National Trauma Databank Subcommittee and became a member of the COT Executive Committee in 2008. He was the driving force behind the development of the Trauma Quality Improvement Program (TQIP). TQIP allowed, for the first time, trauma programs to have risk-adjusted benchmarking for national comparisons with other trauma programs. A major part of the vision for TQIP was the establishment of a yearly TQIP Annual Scientific Meeting and Training which was first held in 2010. TQIP is now one of the most highly attended conferences sponsored by the American College of Surgeons with more than 6,300 registrants participating in the 2020 Annual Meeting (virtual).

Dr. Nathens was named Director of the Trauma Quality Improvement Program with the introduction of TQIP in 2010. He was subsequently named Medical Director of Trauma Quality Programs in 2016, acknowledging his expanded role and commitment to all Quality Programs with the ACS COT.

PAST CHAIRS

Subcommittee on the Trauma Registry (Programs)

1990

Charles L. Rice, MD, FACS
1990–1993

1994

David B. Hoyt, MD, FACS
1994–1997

1997

Ronald G. Tompkins, MD, FACS
1997–2004

Trauma Registry Advisory Ad Hoc Committee

2006

Richard J. Fantus, MD, FACS
2006–2011

Ad Hoc Committee on the National Trauma Data Bank (NTDB)/ Quality and Data Resources Committee (QDRC)/TQIP Committee

1997

J. Wayne Meredith, MD, FACS
1997–2000

2000

John Fildes, MD, FACS
2000–2006

2006

David E. Clark, MD, FACS
2006–2008

2008

Avery B. Nathens, MD, PhD, FACS, FRCSC
2008–2011

2011

Michael L. Nance, MD, FACS
2011–2016

2016

Michael C. Chang, MD, FACS
2016–2022

Evolution of the Name

1932–1937 Scientific Subcommittee

1990–2009 Subcommittee on the Trauma Registry (Programs) combined with Ad Hoc Committee on the National Trauma Data Bank in 2009

1993 Ad Hoc Committee on Health and Finance

1994–1996 Ad Hoc Committee on Health and Economics

1998–2011 Ad Hoc Committee on the National Trauma Data Bank between 2004–2009 this merged under Subcommittee on the Trauma Registry Programs, then in 2009 the committee's name reverted to the combined committee

2006–2011 Trauma Registry Advisory Ad Hoc Committee

2010–2012 TQIP Advisory Committee

2012–2014 Quality and Data Resources Committee (QDRC) formerly the Ad Hoc Committee on the National Trauma Data Bank

2015–*Present* TQIP Committee formerly the QDRC

2015–*Present* Performance Measures/Quality Measures Work Group

2015–*Present* TQIP Pediatrics Work Group

2015–2018 TQIP Collaboratives Work Group

2016–2018 Coding and Reimbursement Work Group

2017–2018 TQIP Level III Work Group

2017–*Present* National Trauma Data Standard Work Group

2019–*Present* TQIP Program Work Group

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Advancing Pediatric Trauma Care

07

Advancing Pediatric Trauma Care

Adult and pediatric surgeons focused on the unique needs of severely injured children actively strive to ensure that Committee on Trauma (COT) programs are inclusive of pediatric trauma patients.

A Focus on Pediatric Trauma

Pediatricians and pediatric surgeons, in collaboration with the Committee on Trauma Injury Prevention and Control Committee, are strong advocates for the development of injury prevention programs that specifically address the most common injuries suffered by pediatric patients (see Chapter 9 for more on the COT's injury prevention advocacy). The first chapter in the Advanced Trauma Life Support® (ATLS®) book dedicated to pediatric trauma was added in 1983. Like adult trauma centers, pediatric trauma centers were developed in some U.S. cities in the early 1970s, and studies emerging from their experience were the first to support nonoperative management for solid organ injuries. In 1983, Max L. Ramenofsky, MD, FACS, was the lead author of an appendix to the *Hospital and Prehospital Resources for Optimal Care of the Injured Patient* manual, which are considered the first standards for pediatric trauma centers. The first consultation for a pediatric center was conducted in 1989; however, the formal American College of Surgeons (ACS) verification of pediatric trauma centers did not begin until 2006.

The first Emergency Medical Services for Children (EMSC) legislation was passed in 1984, and the concepts of EMS services tailored for children's unique needs were more fully developed in 1988, based in part on discussions held at the Ross Conference on Pediatric Trauma. The conference participants described the vision of an integrated emergency care system that would provide support for children with life-threatening illness or injury. In the first Scudder Oration focused on pediatric trauma, presented by J. Alex Haller, MD, FACS, in 1994, he called on surgeons to lead the development of a comprehensive emergency care system for both adults and children.

Pediatric surgeons continue to be very active in the COT, and the COT has a liaison relationship with the national EMSC Program supporting global pediatric readiness for all hospitals and the ongoing development of pediatric trauma systems. While subspecialty surgeons had been a part of the COT for many years, in 2001, the representation of the pediatric, neurosurgery, and orthopaedic surgery groups was formalized and began to be tracked as official subcommittees. Several prominent pediatric surgeons have made major contributions to this work.

This chapter focuses on the development of the Pediatric Trauma Quality Improvement Program (TQIP) led by Michael L. Nance, MD, FACS, FAAP, who served as the Chair of the TQIP Committee (2011–2016).

Max L. Ramenofsky, MD, FACS
Lead author of the first standards for pediatric trauma in the form of an appendix to the 1983 *Hospital and Prehospital Resources for Optimal Care of the Injured Patient* manual.

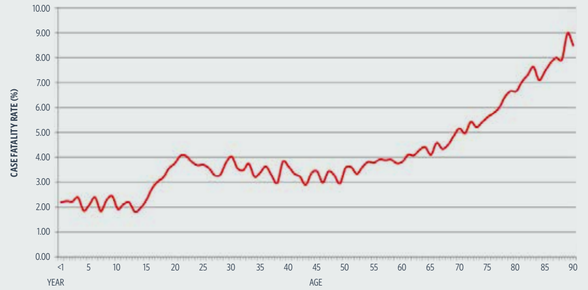
J. Alex Haller, MD, FACS
Gave the first Scudder Oration focused on pediatric trauma in 1994, titled "The Surgical Management of Life-Threatening Injuries in Children: What Have We Learned and What Are the Challenges?"

Michael L. Nance, MD, FACS, FAAP
Chair, TQIP Committee (2011–2016), Dr. Nance led the development of the Pediatric TQIP program.

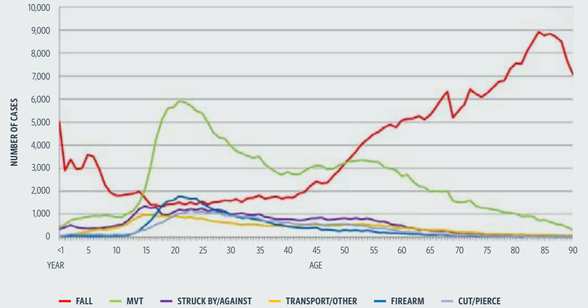
SAMPLE DATA FROM THE 2016 NATIONAL TRAUMA DATA BANK® (NTDB®) ANNUAL REPORT

Data collected by NTDB shows notable variability in outcomes and mechanisms of traumatic injury by patient age.

Variance in case fatality rates by patient age



Variance in injury mechanisms by patient age



Development of Pediatric TQIP

The American College of Surgeons (ACS) TQIP was conceptualized in 2006. This program established benchmarks for trauma centers to evaluate their outcomes using risk-adjusted outcome metrics from peer institutions. In the original design, children 16 years old and younger were purposely excluded from the program based on the recognition that centers maintained different definitions of "pediatric," and that variability was observed in the number of pediatric patients treated. These differences could confound the outcome comparisons for adults. Further, based on data accrued annually in the National Trauma Data Bank® (NTDB®), pediatric patients were known to have a case fatality rate generally lower for most injury mechanisms and a significantly different pattern of injury mechanisms. Pediatric patients represented 15 percent of the NTDB at that time.

> While the mortality rate was lower in pediatric than in adult trauma patients, trauma still represented the greatest threat to life of all causes in children. These factors strongly suggested the need for a pediatric version of TQIP.

In addition to lower mortality rates in the pediatric trauma population, disparities in care and outcomes were observed for children treated in different trauma center types (or non-trauma centers) and in different areas of the U.S. These studies usually focused on specific injuries, such as solid organ injuries or severe head injuries. As an example, pediatric trauma centers more often managed solid organ injuries nonoperatively and had higher rates of splenic salvage than nonpediatric trauma centers. In this context it would seem, pediatric trauma centers provided different care. Mortality was also lower for patients managed at pediatric trauma centers, compared to either non-trauma centers or adult trauma centers. Unfortunately, there was no risk adjustment in these studies, highlighting the need for a program like Pediatric TQIP, to better compare outcomes across centers. As the number of pediatric trauma centers is limited, most pediatric trauma care—even for children with higher injury severity—occurs in either adult trauma centers or

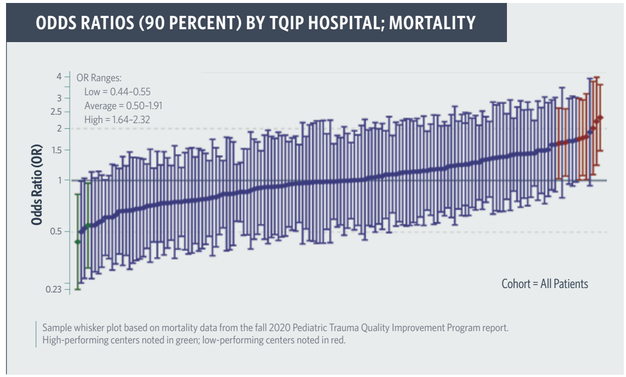
even non-trauma centers. Furthermore, because of differences in care and outcomes, the best metrics to evaluate care are likely to also differ. Since most children are not managed at pediatric-focused centers, creation of a unique TQIP program specific to the pediatric population would allow the benchmarking of pediatric trauma care in a range of settings across the country.

A work group comprising members of the COT Pediatric Subspecialty Committee and of the TQIP Advisory Committee was convened at the ACS COT meeting in September 2011 to begin designing a pediatric version of the TQIP program. An initial cohort of 13 trauma centers, including both freestanding pediatric trauma centers and hybrid centers (those providing both adult and pediatric care) agreed to allow their NTDB data to be used in preliminary analyses. The work group next met at the annual COT meeting in March of 2012, to continue the process of defining the inclusion/exclusion criteria and variables of interest. Development of a pediatric version of TQIP required risk-adjustment strategies that would need to be optimized for the pediatric population. For example, the impact of comorbid disease is far less relevant in the pediatric age groups as compared to adults. Comorbidities such as esophageal varices or congestive heart failure or disseminated cancer were rarely observed in children. Conversely, pediatric-specific comorbidities had to be selected for inclusion in the risk adjustment. Complications in the pediatric population were similarly less common and would not be good discriminators of quality. Physiological parameters (blood pressure, heart rate, respiratory rate) had to be appropriately age-corrected when used for risk adjustment. In addition, weight-based calculations were relevant for obtaining measurements such as cc/kg for transfusions rather than product units and they had to be incorporated in the data standard. A pilot report based on data from NTDB submissions from 38 centers was released in fall 2012. This early report identified challenges in the modeling process and the inclusion and exclusion criteria needed for the analyses. Because of lower pediatric patient volumes, lower mortality, and lower rates of morbidity in the pediatric cohort of patients, the inclusion criteria were modified from those used in the adult TQIP.

Any pediatric patient with at least one injury of abbreviated injury scale (AIS) severity ≥2 was included (adult TQIP includes AIS severity ≥3). A two-year rather than one-year (as used for adult TQIP) dataset was used to increase the number of cases for analyses. The adult benchmark reports included subpopulations such as penetrating injuries, blunt multisystem injuries, shock, and elderly. For the pediatric population, several additional patient cohorts relevant to pediatric trauma care were created for the benchmark reports. To address the differences in care for patients that might be treated at either an adult or pediatric center, two age cohorts were created, 0 to 13 years and 14 to 18 years. Most patients aged 0 to 13 years would likely be cared for in a pediatric center and this group would allow pediatric centers to compare their patient populations more appropriately. The cohort of 14- to 18-year-olds would allow comparisons of patients that might be cared for at either an adult-focused center or a pediatric-focused center and facilitate comparisons between centers and center types. In the pediatric age group, traumatic brain injury (TBI) is the most common injury resulting in death. A cohort of severe TBI patients (Glasgow Coma Scale [GCS]≤8 and Head AIS≥3) was reported to benchmark the performance of centers treating this population. Orthopaedic trauma is the most likely injury subset to require operative intervention. Orthopaedic subpopulations were also developed to discriminate quality and processes of care of this group. Two cohorts of orthopaedic injuries were reported, midshaft femur fractures and open/closed tibia/fibula fractures. The focus on these specific injury cohorts highlighted the need for data elements beyond the index hospitalization to understand longer-term outcomes. Finally, a cohort was also created to study splenic injuries, a common population used to compare care at the different trauma center types.

Cover from the first Pediatric Trauma Quality Improvement program report in the fall of 2014.

At the March 2014 COT Annual Meeting, five centers were enrolled in the Pediatric TQIP program including three freestanding pediatric hospitals and two combined adult/pediatric hospitals. At the same time, 208 centers were enrolled in the adult TQIP program. The first Pediatric TQIP report was issued in the fall of 2014, using data from 33 centers. By the fall of 2017, 128 centers had participated in Pediatric TQIP.



Sample whisker plot based on mortality data from the fall 2020 Pediatric Trauma Quality Improvement Program report. High-performing centers noted in green; low-performing centers noted in red.

Early reports suggested that several high-volume centers were low performers in the TBI cohort. These centers were large freestanding pediatric hospitals that frequently took care of very sick TBI infants. Review of the data suggested the issue was likely related to the number of patients sustaining nonaccidental trauma (NAT), a cohort with a known higher morbidity and mortality. Traumatic brain injuries due to NAT are frequently more severe than reflected by injury severity score or AIS alone. Inflicted brain injuries are frequently compounded by a delay in seeking care or a delay in diagnosis, worsening the secondary brain injury due to hypoxia or ischemia. The National Trauma Data Standard (NTDS) did not contain variables that accurately captured NAT. To address this issue, three additional variables were added to the NTDS: report of physical abuse; an investigation by law enforcement or protective services because of suspected physical abuse; and discharge of the patient to a caregiver different than the caregiver at the time of admission. The risk-adjustment modeling was amended to weight cases of suspected NAT.

The Present

Pediatric TQIP has grown considerably since 2014. The program currently has almost 160 centers providing data and includes about 112,000 patients in the rolling sampling frame. The population has a mean age of 8.4 years, a hospital mortality of 1.2 percent, and a major hospital event rate of 1.0 percent. Pediatric TQIP releases a spring and fall report to participating centers. Most centers use these reports to benchmark themselves to peer centers and identify opportunities for improvement.

> Current challenges with the program include the variable age cutoffs for pediatric patients that exist at different trauma centers.

While centers could compare their exact population of children to a similar cohort from the participating centers, this process is not yet possible. As the numbers of centers and patients increases, these customized comparisons will become feasible. The need for additional metrics must be balanced against the time and effort needed to collect these data. The benchmarking process is iterative. As additional data is collected and reports generated, these reports can be assessed and modified. In addition, the low numbers of certain injury types, even at busy centers, make it difficult to separate high- and low-performers, with large confidence intervals and a lack of statistical differences.

PEDIATRIC SURGEONS ADVANCING THE MISSION OF THE COT

Kennith H. Sartorelli, MD, FACS

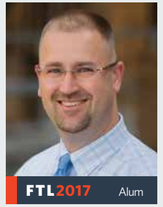
Chief of the Division of Pediatric Surgery at the University of Vermont and served as Chair, COT Pediatric Specialty Committee (2015–2018).

R. Todd Maxson, MD, FACS

Chief of the Trauma Program at Arkansas Children's Hospital. He serves as a site visit reviewer and is a past-Chair of the Verification, Review, and Consultation Program (VRC) (2017–2018). In addition, he has been active with the Pediatric Specialty Committee and has provided valuable pediatric perspectives for many COT initiatives. He has represented the COT to the Trauma Domain of the EMSC Information and Innovation Center project.

Randall S. Burd, MD, PhD, FACS

Chief of the Division of Trauma and Burn Surgery at Children's National Medical Center in Washington, DC. He has served on the TQIP Committee and provided valuable pediatric research perspectives for TQIP reports. His efforts resulted in major improvements to the Pediatric TQIP reports.



Aaron R. Jensen, MD, FACS

Began his work with the COT as a Future Trauma Leader (FTL) in 2017, and now serves as a state vice chair for Northern California. He serves as a liaison from the COT to the EMSC Information and Innovation Center project. He has worked with TQIP on research projects comparing pediatric care at pediatric versus non-pediatric centers and has provided valuable pediatric perspectives on the NTDS.

Barbara A. Barlow, MD, FACS, FAAP

Pediatric surgeon who was a pioneer in injury prevention. Working at the Harlem Hospital in New York City, she led campaigns that resulted in significant reductions in playground injuries and injuries from window falls. She is the Founder and Executive Director of the Injury Free Coalition for Kids.

Mary E. Fallat, MD, FACS, FAAP

Chief of Pediatric Surgery at the University of Louisville where she started the first pediatric trauma service. She has been a major leader in advancing the prehospital and emergency care of injured children and supporting the needs of children in disaster planning. She served as the Chair, Subcommittee on Emergency Services – Prehospital (2004–2007).

Nilda M. Garcia, MD, FACS

Director of Surgical Quality and Surgeon-in-Chief at the Dell Children's Medical Center of Central Texas. She has served as Vice Chair of the VRC and will assume the role as Chair in March of 2022.

Arthur Cooper, MD, FACS, FAAP

Served the COT in many capacities, from state chair (1997–2003) to the central COT as Chair of the Pediatric Specialty Committee (2002–2010). Dr. Cooper also participated in the NTDB Committee and provided valuable input on the development of the NTDB pediatric report.

Michael L. Nance, MD, FACS, FAAP

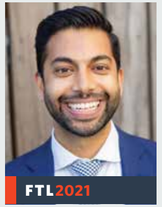
Director of the Pediatric Trauma Program at the Children's Hospital of Philadelphia. He served as Chair of the NTDB/TQIP (2011–2016) and Pediatric Specialty (2011–2015) Committees. He led the development of Pediatric TQIP and provided invaluable pediatric perspectives on the National Trauma Data Standard (NTDS).

Barbara A. Gaines, MD, FACS

Director of Pediatric Surgery at the Children's Hospital of Pittsburgh. She has been active across the COT, serving as a reviewer for Trauma Systems Consultations, past-Chair of the Pediatric Specialty Committee (2018–2021), and an active member of the the TQIP Committee.

Robert W. Letton, MD, FACS

Chair of the Department of Surgery for Wolfson Children's Hospital, Jacksonville, Florida. He is a pediatric reviewer for the VRC, and the current Chair of the Pediatric Specialty Committee (2021–). He has represented the COT to the EMSC Information and Innovation Center project.



Chethan Sathya, MD, FACS

Worked with the TQIP Committee and Pediatric Specialty Committee as an FTL. He led a Delphi project to determine what Pediatric TQIP centers need in their benchmark reports.

Jonathan Groner, MD, FACS

Trauma Medical Director of the Pediatric Trauma Program at Nationwide Children's Hospital, Columbus, OH. He led the development of a Pediatric Research Agenda for the National Trauma Research Action Plan.

Brendan T. Campbell, MD, FACS

Served the COT through involvement in the regional committees as the State Chair for Connecticut, and is the current Chair of the Injury Prevention and Control Committee (IPCC) (2020–). Under his leadership, the IPCC has published articles on the ACS firearm survey and produced Best Practices Guidelines on firearm safety.

The Future

The availability of data is a major impediment to a strong benchmarking program. For the pediatric trauma population, in-hospital mortality and morbidity are far lower than in adult counterparts, increasing the need for postdischarge outcome data. As the number of centers increase, patient volumes will increase in parallel. Quality outcome programs will also require postdischarge metrics. Preliminary studies have been developed to look at postdischarge functional outcome metrics for selected patient populations (for example, severe TBI, orthopaedic injuries) to understand center performance. With expansion of the program, improved ability to discriminate between the quality of care at differing center types will be possible. For instance, the care provided at pediatric trauma and adult trauma centers that include adolescent patients can be compared. When younger patients receive care in an adult setting due to necessity (for example, acuity of injury or distance to a pediatric center is prohibitive), their care can be compared to that provided at pediatric centers.

The variables collected need to be continually evaluated, retiring those variables no longer relevant to benchmarking or research and identifying new variables that are associated with quality care. Identifying additional cohorts of patients will also be necessary. Because of the challenges demonstrated with typical outcome measures (mortality, morbidity) in children, adding measures that evaluate the efficacy and timeliness of the processes of care (for example, appropriateness of testing such as computer tomography scanning) will be valuable. Pilots are also underway to collect long-term outcome metrics.

Like the goals of adult TQIP, the goals of Pediatric TQIP should be to identify high-performing centers, and to learn from them. Strategies that work at high-performing centers can be used at other centers to improve performance across all centers in our national system. Pediatric TQIP will continue to evolve to ensure optimal outcomes for injured children in all care settings.

Bibliography

Case Fatality Rate by Age, Committee on Trauma, American College of Surgeons. NTDB Annual Report 2016. Chicago, IL. The content reproduced from the NTDB remains the full and exclusive copyrighted property of the American College of Surgeons. The American College of Surgeons is not responsible for any claims arising from works based on the original data, text, tables, or figures.

Incidents by Selected Mechanism of Injury and Age, Case Fatality Rate by Age, Committee on Trauma, American College of Surgeons. NTDB Annual Report 2016. Chicago, IL. The content reproduced from the NTDB remains the full and exclusive copyrighted property of the American College of Surgeons. The American College of Surgeons is not responsible for any claims arising from works based on the original data, text, tables, or figures.

A Strong Quality Program, an Unwavering Focus on the Patient, and a Dedicated, Multidisciplinary Pediatric Trauma Team
These are the ingredients of modern pediatric trauma teams. We are grateful for the nonstop commitment and innovation of pediatric trauma teams, whose efforts have changed the face of trauma care and improved care for all trauma patients.

Promoting Best Practices in Trauma Care

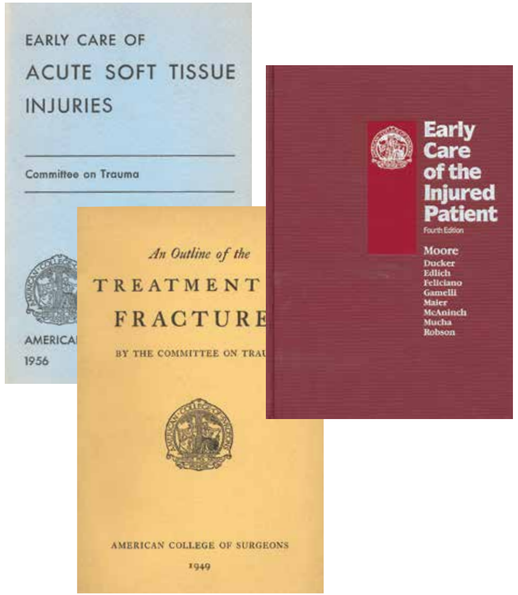
08

Promoting Best Practices in Trauma Care

The Committee on Trauma (COT) has a long history of providing educational materials for hospitals and clinicians to establish a standardized approach to injury care with the goal of supporting optimal outcomes.

The Past

Between 1930 and 1970, the COT published a series of manuals focused on the treatment of fractures and soft tissue injuries. These were managed by the Editorial Subcommittee in the 1930s and its successor, the Subcommittee on Publications, in the 1940s. By the 1950s and 1960s, there were separate subcommittees tasked with the management and revision of the manuals. In 1970, these two manuals were combined with the publication of the *Early Care of the Injured Patient* which set the stage for the development of the Advanced Trauma Life Support® (ATLS®) Course. With the consolidation of the manuals, these subcommittees also were combined to reform the Publications Committee which was then responsible for updating the *Early Care of the Injured Patient* manual and creating posters on a broad range of topics that could be placed in an emergency room to guide patient care. These were developed based on expert opinion and, at times, became quite controversial. (For example, there are many stories of long-standing debates regarding the management of snake bites.) In the 1980s, this group also created a collection of trauma motion pictures, many of which were shown at the American College of Surgeons (ACS) Clinical Congress. In 1990, this group also developed a trauma bibliography, titled *Trauma Systems, A Bibliography of Components and Issues,* which included publications in the literature that supported trauma system development.



Early Best Practice Manuals
Early Care of Acute Soft Tissue Injuries and *An Outline of the Treatment of Fractures*, were published separately for many years until the decision was made to combine them into a single manual in 1970. Pictured are covers of earlier versions of the separate manuals, and the cover of the final published version of the combined manual, *Early Care of the Injured Patient*, from 1990.

As early as 1964 and 1965, there are discussion notes about posters on "Burn Patients" and "Prophylaxis Against Tetanus in Wound Management," perhaps two of the earliest posters created by the COT for distribution to hospital emergency departments. These posters were intended to provide a quick summary of information for easy reference during patient treatment. Organizations such as the American Hospital Association and its Canadian counterpart were eager to receive and distribute these popular posters to their listed hospitals. In the early years, small task forces would be named to create posters on specific topics of significant interest.

C. Thomas Thompson, MD, FACS, COT Chair (1978–1982), recounted some of the lively discussions amongst the experts when it came to winnowing down the information for the poster on snake bites, saying,

> *"You would think it wouldn't be hard to find an expert on snake bites. Well, we had at least four folks who raised their hands; they were all from Arizona, and no one ever agreed with the other. These were some contentious discussions!"*

The poster on snake bites was revised several times over the course of the poster program, so it is imagined that the debate over who was right may have taken on a life of its own.

Christopher J. Dente, MD, FACS
Chair, Trauma Program Education Resources Committee (2016–2020).

Dennis W. Ashley, MD, FACS
Chair, Information Technology Committee (2011–2016).

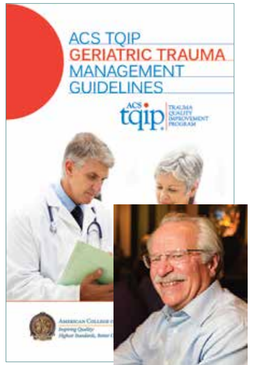
In 1996, the Publications Subcommittee was given the added responsibility for developing best practices guidelines and developing the website. The posters were ultimately transitioned to a page on the COT website in 2008 for electronic access, and eventually retired as they became out of date and the COT moved to the best practices guidelines model as outlined in this chapter. As trauma centers and trauma systems matured, it was clear that a standardized approach to care needed to extend beyond the emergency department to encompass the entire course of a patient's care. The best practices guidelines had a broader target audience to serve this need.

The Subcommittee on Publications became the Information Technology Committee in 2011 with Dennis W. Ashley, MD, FACS, as the Chair (2011–2016). This committee was charged with managing internal and external communications via the website, exploring mobile device applications, and managing social networking. In 2017 this committee changed its name to the Trauma Program Education Resources Committee (TPERC) under the leadership of Christopher J. Dente, MD, FACS (2016–2020). In 2020, TPERC was disbanded, and a new Trauma Guidelines Repository (TGR) Work Group was formed to work in collaboration with a similar work group of the American Association for the Surgery of Trauma (AAST) on a joint project. Dr. Dente is the lead representative from COT on this project, accompanied by several COT work group members. TGR and all of its predecessor committees and work groups align under what we know today as the Performance Improvement Patient Safety (PIPS) Committee.

American College of Surgeons Trauma Quality Improvement Program (ACS TQIP®)

In parallel with the development of the Trauma Center Verification, Review, and Consultation (VRC) Program (see Chapter 5), the COT encouraged trauma centers to develop guidelines to support their trauma care and quality improvement efforts. With the launch of the TQIP program in 2010 (see Chapter 6), there was now a forum for sharing best practices and disseminating guidelines through the ACS TQIP Annual Scientific Meeting and Training, and the growing network of participating centers. This exchange of best practices led to the decision by the TQIP Advisory Committee to create a formal process to develop the *American College of Surgeons (ACS) TQIP Best Practices Guidelines*. Initially, the guidelines were created as a collaboration between the TQIP Advisory Committee, the Quality and Data Resources Committee (QDRC), and the Performance Improvement and Patient Safety (PIPS) Committee.

> In true homage to the ACS COT's history of being a convening organization, it was recognized that multidisciplinary representation was critical to the development of these guidelines, and additional organizations have been engaged in the development of many of the different editions.



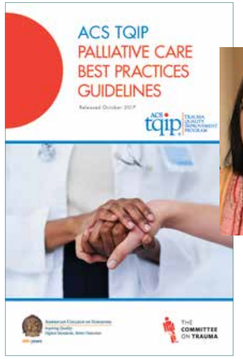
TQIP began to report on elderly trauma patients with 2010 admissions. Although several studies had suggested that geriatrician involvement reduced long-term functional decline after injury, quality of care as measured by Assessing Care of Vulnerable Elders (ACOVE)-validated measures did not include quality measures of high importance to trauma surgeons. Due to this interest, the first *Best Practices Guidelines* topic was geriatric trauma care, and that effort was led by H. Gill Cryer, MD, FACS, and resulted in the *ACS TQIP Geriatric Trauma Management Guidelines* published in October 2013.

H. Gill Cryer, MD, FACS
led the creation of the first *ACS TQIP Best Practices Guidelines*, focusing on geriatric trauma management, in 2013.

The project team continued under the leadership of Dr. Cryer and recruited experts from all over the country to work on the *ACS TQIP Massive Transfusion in Trauma Guidelines* which was presented at the 2013 ACS TQIP Annual Scientific Meeting and Training in November in Phoenix, AZ, and posted on the ACS website in 2014. The next topic that was tackled by the project team was traumatic brain injury (TBI). The *ACS TQIP Best Practices in the Management of Traumatic Brain Injury* involved the recruitment of neurosurgical specialists and a shared leadership model between Dr. Cryer and Geoffrey T. Manley, MD, PhD, FACS. The 2014 ACS TQIP Annual Scientific Meeting and Training in Chicago, IL, focused on traumatic brain injury with the TQIP Best Practices project team presenting their toolkit on the care of the TBI patient.

In 2015, the COT took another step in the development of *Best Practices Guidelines*. The COT Executive Committee gave its approval for a formal collaboration between TQIP and the Orthopaedic Trauma Association (OTA) to develop the *ACS TQIP Best Practices in the Management of Orthopaedic Trauma*. This joint effort included representation and review from both organizations on the finished guidelines as well as cobranding. The TQIP project team led by Matthew L. Davis, MD, FACS, and Gregory J. Della Rocca, MD, PhD, FACS, presented them, followed by an expert panel discussion at the 2015 ACS TQIP Annual Scientific Meeting and Training in Nashville, TN. This was also the first time that the Best Practices Guidelines (BPG) Work Group included a section on performance improvement indicators.

In October of 2015, there was a shift in oversight of the Best Practices projects from the TQIP Committee, where it had originated, to its current home under the PIPS Committee. Under the leadership of the PIPS Committee Chair Donald H. Jenkins, MD, FACS (2015–2019), their goal was to add performance improvement metrics and plans to the *Best Practices Guidelines* using lessons learned from TQIP. The project team also recognized that the previous guidelines would require regular review and revision that would fall under the responsibility of the PIPS Committee structure.



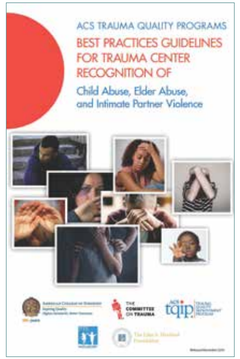
Gail T. Tominaga, MD, FACS, Ann C. Mosenthal, MD, FACS, and ACS nurse liaison Jorie Klein, MSN, MHA, BSN, RN, led the team to create the 2016 *ACS TQIP Palliative Care Best Practices Guidelines*.

Planning began on the 2016 *ACS TQIP Palliative Care Best Practices Guidelines*. Gail T. Tominaga, MD, FACS, Lead of the Best Practices Guidelines Working Group, was the co-chair of the guidelines with Ann C. Mosenthal, MD, FACS. The *ACS TQIP Palliative Care Best Practices Guidelines* was the first to include representatives from the Society of Trauma Nurses (STN) under the direction of the ACS nurse liaison Jorie Klein, MSN, MHA, BSN, RN, as part of the Palliative Care Best Practices Guidelines Working Group. Nursing input was essential in formulating a practice gap-analysis assessment tool and implementation guidelines. These *Best Practices Guidelines* were presented at the November 2016 ACS TQIP Annual Scientific Meeting and Training in Orlando, FL. Dr. Mosenthal said that the guidelines were based on national palliative care quality programs developed by the American Academy of Hospice and Palliative Medicine, the Hospice and Palliative Nurses Association, the National Quality Forum, and others. The written guideline was published on the ACS website in October of 2017.

> *"The key principle that governs all of these guidelines is that palliative care is delivered in parallel with life-sustaining trauma care throughout the continuum from injury to recovery,"* Dr. Mosenthal said. *"Best practice requires trauma physicians and nurses to have basic competencies in primary palliative care, pain and symptom management, and end-of-life care."*

The next topic selected for a Best Practices Guidelines was imaging in trauma in both adults and children. Chaired by Dr. Tominaga, these guidelines represented a collaboration between the COT, the American College of Radiology, and the American Society of Emergency Radiology, along with both adult and pediatric trauma surgeons. The *Best Practices Guidelines in Imaging* was introduced at the 2018 ACS TQIP Annual Scientific Meeting and Training in Anaheim, CA. The Society of Trauma Nurses (STN) representatives were once again active participants in the best practices working group and were instrumental in developing the performance improvement and implementation plans. Another key addition to the project was Jane Ball, PhD, a medical writer who reviewed sections for consistency in formatting and structure.

In 2019, with the move toward great integration of the different COT quality programs, the name was changed to the *ACS Trauma Quality Program (TQP) Best Practices Guidelines*. Another big change was the decision to focus the next *Best Practices Guidelines* on nonaccidental trauma that would include child abuse as well as elder abuse and intimate partner violence. Christine S. Cocanour, MD, FACS, FCCM, took over from Dr. Tominaga as Lead of the Best Practices Guidelines Work Group and each guidelines section had its own leads. Randall S. Burd, MD, PhD, FACS, and Mauricio A. (Tony) Escobar, Jr., MD, FACS, FAAP, co-chaired the section on child abuse; Anthony Rosen, MD, MPH, led the section on elder abuse; and James W. Davis, MD, FACS, led the section on intimate partner violence. As with previous *Best Practices Guidelines*, collaboration was essential in developing this document. This work group brought together experts from the Pediatric Trauma Society and the John A. Hartford Foundation to produce the *ACS Trauma Quality Programs Best Practices Guidelines for Trauma Center Recognition of Child Abuse, Elder Abuse, and Intimate Partner Violence*. The guidelines were presented at the 2019 ACS TQIP Annual Scientific Meeting and Training in Dallas, TX.



Christine S. Cocanour, MD, FACS, FCCM, took the lead to produce the *ACS Trauma Quality Programs Best Practices Guidelines for Trauma Center Recognition of Child Abuse, Elder Abuse, and Intimate Partner Violence* in 2019, bringing together experts from the Pediatric Trauma Society and the John A. Hartford Foundation.

The Present

Pain management for the acutely injured patient has long been a concern of trauma surgeons. The 2020 *Best Practices Guidelines* focuses on pain management in the acutely injured trauma patient and was led by Andrew C. Bernard, MD, FACS, and Douglas R. Oyler, PharmD. These guidelines were created in collaboration with the American Society of Anesthesiologists (ASA). Due to travel restrictions resulting from the COVID-19 pandemic, this *Best Practices Guidelines* was developed exclusively through virtual meetings, and it was introduced virtually at the 2020 ACS TQIP Annual Scientific Meeting and Training, which also was presented virtually in December.

In 2020, the BPG Work Group also began reviewing and updating previously released guidelines. Geriatric management, as the oldest guideline, was targeted as most likely in need of an update. Under the leadership of Alicia J. Mangram, MD, FACS, an expert panel was selected that included a partnership with the American Congress of Rehabilitation Medicine (ACRM) and the American Geriatrics Society. This *Best Practices Guidelines* manual is still under revision.

Spine injury management was the most recent topic for the *Best Practices Guidelines* team and was led by neurosurgeon, William C. Welch, MD, FACS, and orthopaedists, Gregory D. Schroeder, MD, and Alexander R. Vaccaro, MD, PhD, FACS. These guidelines were created through a joint effort that included representation from the American Association of Neurological Surgeons (AANS), American Congress of Rehabilitation Medicine (ACRM), and American Academy of Orthopaedic Surgeons (AAOS). Like the *ACS Trauma Quality Programs Best Practices Guidelines for Pain Management*, these guidelines were produced through virtual meetings and presented at the 2021 ACS TQIP Annual Conference in November, during which the name of the meeting was shortened to ACS TQIP Annual Conference.

The Future

While labor intensive to produce, there is no doubt that the *ACS TQP Best Practices Guidelines* have helped standardize care and support the implementation of care protocols and guidelines and performance improvement review in the TQIP centers. The multidisciplinary input and the endorsement by other relevant professional societies has been critical to their success. Moving forward, the BPG Work Group will continue to identify the topics with a demonstrated need for guidance and continue this labor of love in support of optimal care for the seriously injured patients. For 2022, the *Best Practices Guidelines* focus will be on "screening and management for mental health and substance abuse in the acute trauma patient," which will support centers as they begin to implement the new 2021 verification standards that have an enhanced focus on these topics. The *ACS TQP Best Practices Guidelines* are a great example of the value of the integration of the individual Trauma Quality Programs, the convening of affiliated organizations, and a committed group of individuals focused on what's best for the patient as the top priority.

PROCESS FOR GUIDELINE DEVELOPMENT

The *ACS TQP Best Practices Guidelines* aim to provide recommendations for managing patient populations or injury types. The Best Practices project team and a panel of guest experts from appropriate specialties, work together over the course of a year to create each guideline. The topics are selected through a needs assessment that includes querying the COT Quality Pillar leaders and selecting a topic where current practice may benefit from guideline recommendations. The guidelines are then created from evidence-based literature when available and consensus of the group when evidence is lacking.

Each *Best Practices Guidelines* manual starts with the identification of a lead or leads that are experts in the topic being reviewed. Along with the PIPS Chair, they identify appropriate panel experts and organizations to collaborate in the development of the BPG. Since the development of the Future Trauma Leaders (FTL) program, each group has included at least one FTL participant in the process. The outline is then created, and sections are assigned to members of the committee. Following a kick-off meeting, biweekly conference calls keep the project moving. Each section is reviewed by a medical editor for consistency in formatting and structure. The final product is reviewed and approved by the PIPS Chair and Vice Chair, the Medical Director of the COT's Trauma Quality Programs, Avery B. Nathens, MD, PhD, FACS, FRCSC, the COT Executive Committee, and all partner organizations.

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Min L, Cryer H, Chan CL, Roth C, Tillou A. quality of care delivered before vs after a quality-improvement intervention for acute geriatric trauma. *J Am Coll Surg.* 2015; 220(5):820-830.

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Southerland LT, Gure TR, Ruter DI, Li MM, Evans DC. Early geriatric consultation increases adherence to TQIP Geriatric Trauma Management Guidelines. *J Surg Res.* 2017;216:56-64.

Tillou A, Kelley-Quon L, Burruss S, et al. Long-term postinjury functional recovery: Outcomes of geriatric consultation. *JAMA Surg.* 2014;149(1):83-89.

NOTABLE GUIDELINE POSTERS, 1995–2002

Name Charts of *ACS Best Practices Guidelines*

- Oct 2013 — *ACS TQIP Geriatric Trauma Management Guidelines*
- Oct 2014 — *ACS TQIP Massive Transfusion in Trauma Guidelines*
- Jan 2015 — *ACS TQIP Best Practices in the Management of Traumatic Brain Injury*
- Nov 2015 — *ACS TQIP Best Practices in the Management of Orthopaedic Trauma*
- Oct 2017 — *ACS TQIP Palliative Care Best Practices Guidelines*
- Oct 2017 — *ACS TQIP Palliative Care Best Practices Guidelines*
- Oct 2018 — *ACS TQIP Best Practices Guidelines in Imaging*
- Nov 2019 — *ACS Trauma Quality Programs Best Practices Guidelines for Trauma Center Recognition of Child Abuse, Elder Abuse, and Intimate Partner Violence*
- Nov 2020 — *ACS Trauma Quality Programs Best Practices Guidelines for Acute Pain Management in Trauma Patients*
- Nov 2021 — *ACS Trauma Quality Programs Best Practices Guidelines for Spine Injury*

Committee Names

- mid-1920s — Editorial Subcommittee
- 1939 — Subcommittee on Publications
- 1950 — Subcommittee of the Manual on Trauma
- 1953 — Subcommittee of the Manual on the Treatment of Fractures
- mid-1960s — Subcommittee of the Manual on Soft Tissue Injuries *(simultaneously with Subcommittee of the Manual on the Treatment of Fractures)*
- 1970 — Subcommittee on the Manuals *(combined both manuals into one final publication and renamed Subcommittee on Publications)*
- 1970 — Subcommittee on Publications *(renamed in 2011 to Information Technology Committee)*
- 1985 — Ad Hoc Committee on Quality Assurance
- 1987 — Subcommittee on Quality Assurance
- 1993 — Subcommittee on Quality Improvement
- 1996 — Ad Hoc Committee on Outcome Assessment
- 1997 — Subcommittee on Performance Improvement
- 2004 — Subcommittee on Performance Improvement and Patient Safety
- 2010 — Performance Improvement and Patient Safety (PIPS) Committee *(continues today)*
- 2011 — Information Technology Committee *(sunset in 2017)*
- 2016 — Best Practices Guidelines Working Groups *(of the PIPS Committee)*
- 2017 — Trauma Program Education Resources (TPERC) Work Group *(sunset in 2019)*
- 2019 — Trauma Guidelines Repository (TGR) Work Group
- 2020 — Mortality Reporting Work Group *(of the PIPS Committee)*
- Advancing Leadership in Trauma Center Management (ALTCM) Course Work Group *(of the PIPS Committee)*

Note: Many committees and work groups with overlapping responsibilities were created over the years, some working concurrently, all focused on some aspect of the communication of treatment guidelines or quality improvement. Collectively, they have collaborated with the other major committees of the Quality Pillar, even before those committees were grouped together.

Subcommittee on Publications

- 1970 — **Merle M. Musselman, MD, FACS** 1970–1974
- 1974 — **John A. Boswick, Jr., MD, FACS** 1974–1977
- 1977 — **Alexander J. Walt, MD, FACS** 1977–1979
- 1979 — **H. David Root, MD, PhD, FACS** 1979–1983
- 1983 — **Lewis M. Flint, Jr., MD, FACS** 1983–1987
- 1987 — **Ernest E. Moore, MD, FACS** 1987–1990
- 1990 — **David V. Feliciano, MD, FACS** 1990–1993
- 1993 — **Christopher C. Baker, MD, FACS** 1993–1996
- 1996 — **Richard L. Gamelli, MD, FACS** 1996–1999
- 1999 — **Rao R. Ivatury, MD, FACS** 1999–2004
- 2004 — **Paul R.G. Cunningham, MBBS, FACS** 2004–2007
- 2007 — **Henri R. Ford, MD, FACS** 2007–2011

Information Technology Committee

- 2011 — **Dennis W. Ashley, MD, FACS** 2011–2016
- 2016 — **Christopher J. Dente, MD, FACS** 2016–2017

Ad Hoc/Subcommittee on Quality Assurance

- 1985 — **Frank L. Mitchell, Jr., MD, FACS** 1985–1987
- 1987 — **Howard R. Champion, MD, FACS** 1987–1990
- 1990 — **Steven R. Shackford, MD, FACS** 1990–1993
- 1993 — **Joseph J. Tepas, III, MD, FACS** 1993–1997

Ad Hoc Committee on Outcomes Assessment

- 1996 — **Timothy C. Fabian, MD, FACS** 1996–2004
- 2004 — **Howard R. Champion, MD, FACS** 2004–2008
- 2008 — **Steven R. Shackford, MD, FACS** 2008–2010

Subcommittee on Performance Improvement

- 1997 — **Michael Rhodes, MD, FACS** 1997–2002

(Subcommittee) on Performance Improvement and Patient Safety (PIPS)

- 2002 —  **Michael H. Metzler, MD, FACS** 2002–2005
- 2005 —  **H. Gill Cryer, MD, FACS** 2005–2008
- 2008 —  **Glen H. Tinkoff, MD, FACS** 2008–2011
- 2011 —  **Blaine L. Enderson, MD, FACS** 2011–2015
- 2015 —  **Donald H. Jenkins, MD, FACS** 2015–2019
- 2019 —  **Christine S. Cocanour, MD, FACS, FCCM** 2019–

Injury Prevention

09

Injury Prevention

The American College of Surgeons (ACS) Committee on Traumas (COT) has been an integral part of many injury prevention success stories that have led to lower injury rates in the U.S. and around the world. Yet, despite these advances, injury remains a leading cause of death and disability.

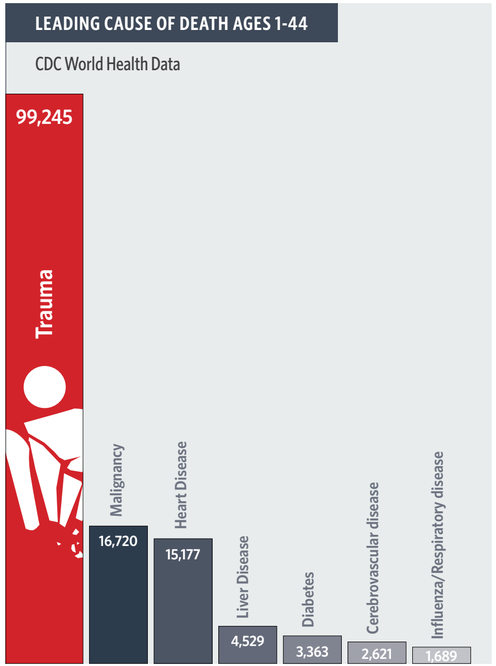
Facts and Figures

For Americans under the age of 65, injury accounts for more lost years of productive life than cardiovascular disease and cancer combined.

In 1922, the average life expectancy for Americans was 62 years. According to U.S. Census Bureau data, in 2022 the average life expectancy is now approaching 80 years. Much of this improvement in life expectancy is due to the implementation of public health measures rather than advancements in medical care. Lower rates of unintentional injury have contributed significantly to this reduction—the unintentional injury death rate was 116 per 100,000 individuals in 1930, and down to 52.7 per 100,000 individuals in 2019.

The decreasing incidence of injury-related deaths during the last century was the result of three distinct factors:

1. A general reduction in exposure to dangerous jobs (for example, mining, manufacturing, and farming), and enhancements to safety improvements in the areas of transportation and housing.
2. Improvements in the medical care provided to injured patients. Many such clinical advancements occurred during wartime and, subsequently, translated to better care for American civilians.
3. The development of a wide array of evidence-based injury control strategies, some of which we will describe as we tell the story of injury prevention within the COT during the last century.



Organized Injury Prevention Began with Concern Over Motor Vehicle Crash Injuries

Charles Scott Venable, MD
Photo Credit: University of Texas Health Science Center Libraries. Date unknown. Accessed August 26, 2021 via The Portal to Texas History (texashistory.unt.edu).

The application of the scientific method to the prevention of injuries has only been widespread during the last 50 years. For the first half century of the COT's history, injury prevention work was not particularly organized and there was no injury prevention committee per se. One of the first formal mentions of the opportunity for surgeons to take the lead in injury prevention appeared in 1939, in an article subtitled "The Inadequacy of Traumatic Surgery Today," written by Charles S. Venable, MD, FACS, and published in the January 1939 issue of *Southern Medical Journal* ("General Aspects of Automobile Injuries"). In the article, Dr. Venable proclaimed, with respect to motor vehicle-related injuries, "No comment is made other than to remark the untimely death by fruitful accident, and one more fatality is chalked up on the highway score; even the coroner records only death due to auto injury. This which seems everyone's business, is no one's business, but I say to you, as surgeons, that it is our business. So long as we feel it is not our business because, as individuals, we are not 'called in,' and only shrug and say 'too bad,' this fearful condition will continue... I say to you that the fault of this is ours as surgeons; the public is ready and anxious to be directed into proper channels, to be taught proper methods, to learn how impending disaster may be averted, but only through concerted action on our part may this be achieved."

Investigation into the protective effects of seat belts began in the U.S. in the mid-1940s, and the Cornell Crash Injury Research (CIR) Project got under way in 1951, as an outgrowth of aviation research. Other academic centers, law enforcement, and the U.S. military began accumulating scientific data demonstrating the benefits of seat belt restraint.

> *"I say to you that the fault of this is ours as surgeons; the public is ready and anxious to be directed into proper channels, to be taught proper methods, to learn how impending disaster may be averted, but only through concerted action on our part may this be achieved."*

Traffic Safety Exhibit circa 1955.

Traffic Safety Exhibit circa 1954.

CARS:

Big Three Fight Over How Safe to Make Your Car

by HAROLD MEHLING

The battle erupted over seat belts, which Ford and Chrysler are pushing and GM is opposing. But the controversy runs deeper—and its outcome could determine how badly you'll be hurt if you have an accident.

OUT IN DETROIT, where they're turning out 1956 cars like big rabbits turning out little rabbits, an historic battle is raging. For the first time the issue is neither snob-appeal styling nor throbbing horsepower.

It is safety.

In this war for your dollars, Ford is going to sell safety as loud as it can. So is Chrysler. But General Motors will be standing pat, refusing to break the tradition that insists safety is a dirty word (see BLUEBOOK, Dec. 1954).

Safety has suddenly become a hotly competitive and highly salable product. And 1956 is the year in which your choice of a car to buy will depend greatly on which firm convinces you it has built the most safety into its models.

That, at least, is the feeling you come away with from the Ford and Chrysler plants, where they've started the safety ball rolling by offering seat belts for use in their cars. At General Motors, though, you get the impression not only that today's autos are as safe as they can be for now, but that many people who offer safety suggestions are either axe-grinders or well-meaning but ignorant tinkerers.

This safety rhubarb has been simmering for a long time. What boiled it over this year was the relatively mild subject of safety belts, or seat belts, as auto men delicately call them. The belt wrangle is all that has leaked out to the public so far, but the behind-scenes controversy runs much, much deeper—so deep, in fact, that in the cubicled engineering offices of one of the Big Three motor-makers, every centimeter of the interior and exterior of our cars is getting a thorough reexamination.

The outcome will change your way of living, because while it's tough to live with some cars, it has become almost impossible to live without them. One way to prolong life with the existing models, an imposing number of authorities feel, is to use safety belts.

That's where the argument begins.

In February 1955, the ACS Board of Regents approved a resolution proposed by the COT acknowledging that motor vehicle crash injury prevention was both a civic and professional obligation of the College. Several COT members visited research facilities at the "Big Three" auto manufacturers to try and better understand car safety and develop collaborative relationships with these manufacturers; these efforts were not always warmly received. In May 1955, the engineer in charge of General Motors' vehicle safety section, Mr. Howard Gandelot, wrote a letter to then-ACS Director Paul R. Hawley, MD, FACS, which stated,

> *"Well, Dr. Hawley, we're just not that good and until we find out how to overcome such natural physical laws that apply to kinetic energy forces in crash decelerations, it will not be possible to build automobiles that can be crashed without the likelihood of some injury to the occupants...in helping to engender the idea that persons involved in accidents caused by their own negligence and unsafe driving practices can be greatly protected against possible injury, I personally believe that the ACS is doing a great disservice to the motoring public."*

Big Three Fight Over How Safe to Make Your Car
Article in October 1955 *Bluebook* magazine *(Copyright Hearst).*

The mainstream press was more receptive than the auto manufacturers and willing to endorse the production of safer cars. An article published in the *Saturday Evening Post* in July 1955, stated,

> *"The most insistent demands for seat belts and built-in safety devices have come from the American College of Surgeons, whose members almost daily face the task of patching up the gashed and broken bodies hauled in from the highways. The College is taking a firm grip on the safety issue and intends to keep plugging away until something is accomplished."*

To this end, a subcommittee on Traffic Injury Prevention was appointed by COT Chair R. Arnold Griswold, MD, FACS (1952–1957), in 1955, with instructions to explore ways and means whereby the influence of the ACS, through the COT, could be brought to bear most effectively on the problem of motor vehicle injuries.

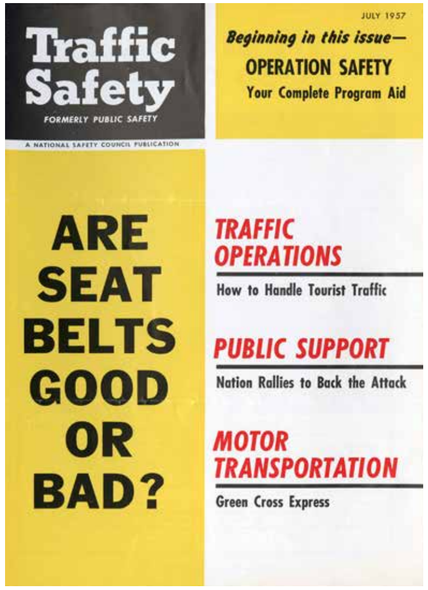
R. Arnold Griswold, MD, FACS, COT Chair (1952–1957) providing testimony on behalf of the ACS at a hearing in the U.S. House of Representatives in August 1956 on effectively managing motor vehicle-related injuries.

The subcommittee concluded that the mission of the ACS could be most effectively accomplished by the following:

- Stimulating competition between the automobile manufacturers for the development and sale of safety features in their vehicles
- Cooperating with all agencies—law enforcement, safety councils, research agencies, and manufacturers—to develop a comprehensive understanding of the cause and effect of injury
- Promoting research funding for basic investigation into safety engineering

Providing testimony on behalf of the ACS at a hearing in the U.S. House of Representatives in August 1956, Dr. Griswold, offered additional suggestions for effectively managing motor vehicle-related injuries and recommended the following:

- Motorists should obtain the "full safety package" made available by motor manufacturers when buying a new car
- Owners of older automobiles should install safety belts as a minimum
- All motorists should use safety belts on every occasion that the automobile is driven



"Are Seatbelts Good or Bad?"
National Safety Council publication from 1957.

Dr. Griswold concluded his remarks by saying,

> *"It is to be noted that headlights, brakes, windshield wipers, and directional lights are required safety measures to reduce and prevent accidents. In the same vein it seems but proper that devices to ameliorate injury or death of the driver and passengers, such as the safety belt, be made minimal mandatory equipment. I urge that the subcommittee give most thoughtful consideration to these recommendations."*

In 1966, the National Research Council published *Accidental Death and Disability: The Neglected Disease of Modern Society*, which focused on trauma care and research and underscored the fact that traumatic injury should be considered a major public health problem. Concurrently, William Haddon, Jr., MD, a public health physician, who is referred to as the father of injury epidemiology, argued for a more scientifically driven approach to injury control in the public health framework, where health problems are conceptualized to result from interactions between the host, the agent, and the environment, or in trauma terms, the individual, the mechanism of injury, and the situation or setting in which the injury could potentially occur. Development of appropriate, practical, and effective public health measures to control or prevent injury would benefit from assessment of all three components and their interactions. This approach became known as the Haddon Matrix and was adopted by the COT in their efforts at a multifaceted effort to prevent injuries in motor vehicle collisions.

Horace E. Campbell, MD, FACS
A Denver surgeon and safety expert.

Horace E. Campbell, MD, FACS, was a Denver surgeon and safety expert who recognized that motor vehicle crash injuries could be prevented by eliminating auto design hazards like the Corvair steering shaft that was routinely driven backward toward the driver in minor front-end collisions, or the placement of instrument panels in front of the passenger seat, both of which often produced devastating injuries. Dr. Campbell worked collaboratively with the ACS COT to advocate for safety innovations such as shatterproof glass and doors that did not open on impact. These issues were also highlighted in the book *Unsafe at Any Speed: The Designed-in Dangers of the American Automobile*, which was published in 1965 by Ralph Nader. The publication of this book prompted U.S. Senate hearings in 1966, at which Mr. Nader was called to testify. These hearings eventually led to legislation (the National Traffic and Motor Vehicle Safety Act of 1966) that made the installation of seat belts mandatory and established the U.S. Department of Transportation comprising several travel safety administrations including what would ultimately become the National Highway Traffic Safety Administration (also known as NHTSA) with the passage of the Highway Safety Act in 1970.

Automobile Safety on the National Stage
Ralph Nader testified before the U.S. Senate on automobile safety standards on March 22, 1966.
(Photo Credit: Bettmann/Getty Images)

The COT Expands its Focus and Formalizes its Efforts by Establishing a Committee

The COT was not singularly focused on traffic-related injury. In 1961, during a Joint Action Program meeting of the ACS, the American Association for the Surgery of Trauma (AAST), and the National Safety Council (NSC), pediatric burns were identified as an important area in accident (injury) prevention. C. Everett Koop, MD, FACS, who at the time was an American Academy of Pediatrics (AAP) liaison representative to the ACS, helped make plans for a burn prevention session at the 1961 Clinical Congress. At that same meeting, the joint policy group unanimously endorsed lowering the level of presumptive ethanol intoxication from a blood alcohol concentration of 0.15 percent to 0.10 percent.

Barbara A. Barlow, MD, FACS, FAAP
Pictured at the 1996 ACS Clinical Congress in San Francisco, receiving the Surgeons Award for Service to Safety presented by the National Safety Council in recognition of her work for injury prevention activities.

Another contributor to early injury prevention activities was Barbara A. Barlow, MD, FACS, FAAP. Dr. Barlow was one of the first women to train in pediatric surgery and worked at Harlem Hospital in New York City. In the 1970s, she led an educational campaign known as, "Children Can't Fly" and was instrumental in the passage of a New York City ordinance that required landlords to install window guards to reduced pediatric window falls. Injuries due to children falling out of windows in the Washington Heights neighborhood decreased by 96 percent by 1981. Dr. Barlow also worked to improve the safety of playgrounds and to ensure children have appropriate supervision. (With the support of the Robert Wood Johnson Foundation in the early 1990s, her model for injury prevention was replicated in hospitals across the U.S. and developed into the Injury Free Coalition for Kids.)

As the concept of trauma centers began to flourish, the need to develop injury prevention research and programs as a regional resource began to take hold. The challenge was that injury prevention as a public health domain was still poorly defined. Injury prevention was recognized as a foundational component of trauma center resources as early as the first iteration of *Optimal Hospital Resources for Care of the Injured Patient* that was first published in 1976. Early injury prevention activity by the COT was largely directed toward motor vehicle crashes and firearm injury, but had continued to evolve, and eventually led Donald D. Trunkey, MD, FACS, COT Chair (1982–1986) to create the Ad Hoc Trauma Prevention Committee in 1985, naming John G. West, MD, FACS, as its first Chair (1985–1992).

Dr. West had worked with Dr. Trunkey on a provocative study that demonstrated improved clinical outcomes and survival for patients injured in motor vehicle crashes when they were brought to a regional trauma center rather than the closest hospital. The paper titled "Systems of Trauma Care: A Study of Two Counties" was published in the April 1979 *Archives of Surgery*. The work on trauma system improvement conducted by Dr. West stimulated forward-thinking COT leaders to consider how implementing injury prevention programs through trauma centers might lower injury rates. Dr. West and his colleagues in Southern California had begun work in four specific areas: childhood passenger restraint, alcohol misuse in younger drivers, drowning prevention, and advocacy for implementation of motorcycle helmet laws. The program on teenage alcohol misuse and motor vehicle crashes was called "Drinking, Driving, and Teenage Death" and was developed by two teens with the help of a schoolteacher and included a prevention video titled "Staying Alive," featuring that track by the Bee Gees. The program was very successful, and when presented at a COT meeting it received a standing ovation.

C. James Carrico, MD, FACS
COT Vice Chair (1986-1989).

Ronald V. Maier, MD, FACS
Chair, Trauma Prevention Subcommittee (1992-1999).

During the late 1980s, the COT Publications Subcommittee was a hotbed of discussion and debate regarding the potential role of trauma centers in injury prevention in their communities. It is in large part through the work and debate in the Publications Subcommittee that the need for a dedicated subcommittee focused on injury prevention arose. C. James Carrico, MD, FACS, COT Vice Chair (1986-1989), and an early advocate for injury prevention, asked Ronald V. Maier, MD, FACS, to join the Trauma Prevention Subcommittee. Dr. Maier was shortly thereafter selected to succeed Dr. West as chair of the committee and served from 1992 to 1999. He notes,

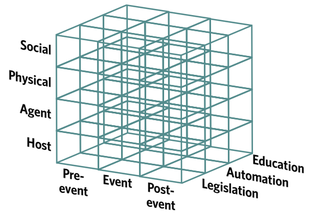
> *"I believe that a major part of the decision for me to chair the committee at the time was based on my reputation of not shrinking from a challenge and my persistence in developing resolution of conflicts."*

Despite the advancements arising from the development of trauma centers, growth in this field was neither assured nor rapid. These lively discussions were the catalyst for changing the ad hoc committee to a permanent Prevention Subcommittee in 1994. Dr. Maier remembers that it was an active and emotional committee from the outset, "Not that actual punches were thrown, but many heated debates helped the committee and, ultimately, the overall COT to face and address some of the serious public health challenges impacting our patients and hospitals."

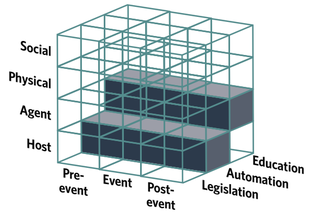
In the 1993 edition of *Resources for the Optimal Care of the Injured Patient,* injury prevention moved from being an afterthought to having a dedicated chapter. Those who were there at the time viewed this as an important evolution within the COT leading to the recognition that addressing controversial issues in trauma care was a moral and ethical obligation within the COT's mission. The early successes of the committee involved research and approaches to mitigate the damage of social issues through lengthy debates, such as the concept of personal liberty versus the recommendation for mandatory helmet use, mandatory alcohol and substance abuse testing, and intervention following injury.

> By 1998, the Trauma Prevention Committee was renamed the Injury Prevention and Control Committee (IPCC) and led the way for the COT to recognize injury as a public health issue and one that needed to be addressed using science and the public health approach.

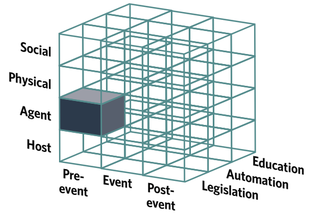
36 Ways to Address Public Health Problems



36 Ways to Address Automobile Injuries



36 Ways to Address Firearm Injuries



The Caricco Cubes
"In Dr. James Carrico's Scudder Oration in 1998, he described the importance of a multifaceted approach to injury prevention, and described a three-dimensional version of the original Haddon's Matrix with 36 ways to address a public health problem. He pointed out that while we have used this strategy to reduce automobile injuries, we have failed to take a similar approach to firearm injury. It took more than 15 years for the COT to fully embrace this approach."—Eileen M. Bulger, MD, FACS, COT Chair (2018-2022).

This early group, described by Dr. Maier as "unruly hot heads and troublemakers" helped the Injury Prevention and Control Committee establish itself within the COT and positioned the COT as national leaders in injury prevention.

In his Scudder Oration in 1998, "In Search of a Voice," Dr. Carrico further challenged the COT to take a multifaceted approach to injury prevention by expanding the Haddon Matrix to a cube which not only considers the phases of the event and the modifiable factors including the agent, host, physical and social environment, but also added the dimensions of intervention including legislation, automation, and education. The "Carrico Cube" thus offers 36 potential approaches to injury prevention. Furthermore, he noted that while the COT had been successful in using most of these strategies in the effort to reduce injuries from motor vehicle accidents, we had only focused on one approach to firearm injury, which involved focusing on control of the agent, in this case, the gun.

> Dr. Carrico challenged the COT to take a broader approach,
>
> *"We cannot depend on any single approach. We must address firearm injuries on a much broader front. To do that we need the collective wisdom of a large number of participants, including members of the National Rifle Association."*

Sylvia D. Campbell, MD, FACS, first became involved with the regional COT as the Florida State Chair, and she recognized the importance of injury prevention as the field developed. Dr. Campbell was thrilled when David B. Hoyt, MD, FACS, COT Chair (1998–2002), asked her to be Chair of the Injury Prevention and Control Subcommittee (IPCC) in 1999. The concept of prevention of injury, rather than merely treating the result of the injury, was taking hold during this time with the united efforts for seat belt use, bike/motorcycle helmet usage, and other such measures. Dr. Campbell stated what made her most proud during her time as IPCC Chair was the development of the ACS Statements on both Firearm Injury and Domestic Violence. Both statements raised awareness of the importance of these issues as well as the COT's potential to make a difference through education, awareness, and action.

M. Margaret (Peggy) Knudson, MD, FACS, and Dr. Campbell, working through the IPCC, conducted a study to test the knowledge of injury prevention principles among practicing surgeons at the ACS Clinical Congress in 1999 and 2000. Meeting participants used touch-screen computers to answer questions about trauma epidemiology, bicycle helmet effectiveness, child safety seat usage, suicide, and domestic violence. The title of their resulting paper tells the story, "Surgeons and injury prevention: what you don't know can hurt you!" They identified knowledge deficits in the proper use of child safety seats, airbag effectiveness, and the prevalence of suicide. As evidenced by the study, the majority of practicing surgeons and nurses, including those working at trauma centers, were unaware of many of the basic concepts of injury prevention, so they advocated for renewed efforts in this regard.

M. Margaret (Peggy) Knudson, MD, FACS
IPCC Chair (2003–2007).

Dr. Knudson, IPCC Chair (2003–2007), noted that one of the most frustrating things with her work in this area was that many of the same surgeons who were not identifying injury prevention principles as part of their trauma center responsibilities were doing prevention work at different organizations such as the Eastern Society for the Surgery of Trauma (EAST), the American Association for the Surgery of Trauma (AAST), and the COT. She focused on centralizing these efforts by organizing annual meetings of these groups to prevent duplication of initiatives. The centralization of injury prevention activities culminated in 2012, with the creation of the Trauma Prevention Coalition (TPC) to coordinate injury prevention efforts of 15 (as of 2021) member organizations including the COT. The TPC is now part of the American Trauma Society (ATS).

Under the leadership of J. Wayne Meredith, MD, FACS, COT Chair (2002–2006), there was interest in making injury prevention activities a requirement for trauma center verification. As is typical of Dr. Meredith, he wisely advised using the "boil the frog" analogy: "Don't put the frog in already boiling water as it will just jump out and you will lose it entirely. Instead put the frog in cool water and slowly turn up the heat." The Trauma Verification, Review, and Consultation (VRC) Committee started boiling the proverbial injury prevention frog by requiring that Level I and II trauma centers screen for alcohol abuse disorders during hospitalization in the 2014 *Resources for Optimal Care of the Injured Patient* "Orange Book" as a first step toward requiring trauma centers to perform specific injury prevention activities.

Carol R. Schermer, MD, FACS, IPCC Chair (2007–2008), oversaw the discussion of many areas of injury prevention, resulting in toolkits, fact sheets, and position statements. Alcohol screening, suicide, intimate partner violence (IPV), and falls in the elderly were all topics that received in-depth review during her tenure.

The Present

A Multifaceted Approach to Firearm Injury Prevention

The present focus on the issue of firearm injury prevention was ushered in unofficially during an IPCC meeting at a COT annual meeting while Michael J. Sise, MD, FACS, was IPCC Chair (2008 to 2012). Issues were being prioritized for IPCC work, and after several topics unrelated to firearm injury were discussed, James W. Davis, MD, FACS, strongly suggested that firearm violence should be a priority based on the sheer toll it takes on American lives, and the lack of action by the government on the issue. The COT had addressed gun violence previously producing a brief "Statement on Gun Control" in 1991, and a slightly longer, but equally vague "Statement on Firearm Injuries." Dr. Sise quelled Dr. Davis' request to make firearm injury an IPCC priority on the grounds that there was both a lack of consensus among COT leadership and a lack of enthusiasm from the ACS Board of Regents for the IPCC to invest significant effort on firearm injury prevention work.

Current and Past Chairs of the IPCC
Brendan T. Campbell, MD, FACS (2020–), and Deborah A. Kuhls, MD, FACS (2012–2020).

Deborah A. Kuhls, MD, FACS, was appointed the Chair of IPCC in October 2012, and two months later in December 2012, a tragic shooting at Sandy Hook Elementary School in Newtown, CT, where 20 children and six educators were killed, provided the impetus for the ACS and COT to change course and redouble their efforts on firearm injury prevention. Then-COT Chair Michael F. Rotundo, MD, FACS (2010–2014), and Dr. Kuhls went to work and within a month of this event, the ACS produced a bold new "Statement on Firearm Injuries" (2013) with specific recommendations supporting legislation banning civilian access to assault weapons and large-capacity ammunition clips, enhancing mandatory background checks for all firearm purchases, ensuring that health care professionals can provide guidance on safe firearm ownership, developing programs directed at improving safe gun storage and teaching nonviolent conflict resolution, and promoting evidence-based research on firearm injury. This statement was controversial with ACS members and the then-ACS President A. Brent Eastman, MD, FACS, indicated that he received "bushel baskets" of mail about this statement, yet he and the ACS Board of Regents remained steadfast in their support of this position statement. When Ronald M. Stewart, MD, FACS, took over as COT Chair (2014–2018), he made firearm injury prevention a priority and promoted a strategy aimed at reducing death and disability from firearm injury using the public health model.

What was unique and important about Dr. Stewart's approach was that he described the two widely disparate views on gun ownership in the U.S., and openly worked within the membership to build bridges across this perceived chasm. This consensus-based ACS COT public health approach was later published in the *Journal of the American College of Surgeons*, and town halls were conducted to begin the dialogue with COT and ACS members. The ACS Board of Regents were engaged and supportive, and several Regents worked with the COT and IPCC to develop an action plan to guide this work as it moved forward.

An important step toward developing a firearm injury prevention strategy was to survey the COT membership to understand their varying perspectives. The survey started with assessing the views of the COT membership and was then extended to the ACS Board of Governors and members of the AAST and EAST. Ultimately, the decision was made to survey the entire ACS membership. Survey questions queried members about their experience with firearms, attitudes toward firearm ownership, and degree of support for ACS COT firearm injury prevention programs and for a range of firearm injury prevention policies. This survey also included questions regarding members' prevalence of firearm ownership, type of firearm(s) in the home, personal reasons for firearm ownership, and storage practices.

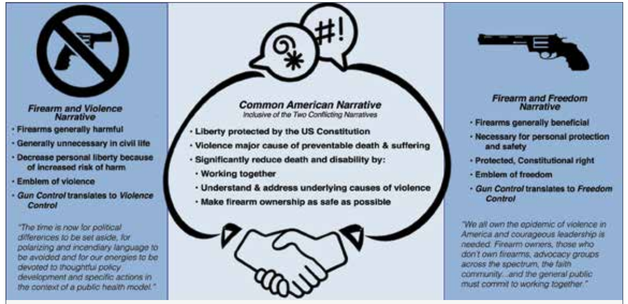
Ronald M. Stewart, MD, FACS
COT Chair (2014–2018). Image of the bridge was used by Ronald M. Stewart, MD, FACS, to represent the COT approach to firearm injury prevention which seeks to bridge the political divide through a public health approach using a common narrative.

> Dr. Stewart promoted a strategy aimed at reducing death and disability from firearm injury using the public health model; he described the two widely disparate views on gun ownership in the U.S., and openly worked within the membership to build bridges across this perceived chasm.

Freedom with Responsibility: A Consensus Strategy for Preventing Injury, Death, and Disability from Firearm Violence

Ultimately, the survey results revealed broad support among ACS members and leaders, including those who own guns, to pursue evidence-based firearm injury prevention programs, and to advocate for mandatory background checks, making federal funding available for firearm injury research, and preserving the rights of health care providers to counsel their patients on safe firearm ownership. Based on this consensus, the COT IPCC moved forward with a comprehensive strategy aimed at reducing firearm injury by making firearm ownership as safe as reasonably possible and by treating the root causes of violence.

Epidemiologic studies have shown that many firearms in the U.S. are not stored safely. Numerous studies have demonstrated that secure firearm storage lowers risk of suicide, homicide, and accidental injuries. There are noncontroversial ways we can help our patients and their families practice safe firearm handling and storage using approaches that are endorsed by both firearm and hunting groups as well as public health experts.



Stewart RM, Kuhls DA, Rotondo MF, and Bulger EM. *J Am Coll Surg*, August 2018.

Freedom with Responsibility
Illustrates Dr. Stewart's approach to the firearm strategy using a public health model.

Survey of the American College of Surgeons Members on Firearm Injury Prevention

Kuhls et al. *J Am Coll Surg*, September 2021.

Survey of the American College of Surgeons Members on Firearm Injury Prevention
Results from the 2018 ACS membership survey on firearm injury prevention.

> The survey results revealed broad support among ACS members and leaders, including those who own guns, to pursue evidence-based firearm injury prevention programs. Based on this consensus, the COT IPCC moved forward with a comprehensive strategy aimed at reducing firearm injury by making firearm ownership as safe as reasonably possible and by treating the root causes of violence.

The IPCC worked hard to produce the 2019 brochure *Gun Safety and Your Health* that trauma center personnel could use to guide their injury prevention efforts. This brochure was followed by a project currently under way to create Best Practices Guidelines to support conversations with patients and implementation of firearm safety programs at trauma centers.

Gun Safety and Your Health, 2019
Brochure designed for trauma center personnel to use to guide their injury prevention efforts.

FAST Team

One of the most innovative ideas to come out of IPCC work on firearm injury prevention was the creation of the Firearm Strategy Team (FAST) Work Group in 2018. This work group comprised 22 surgeons representing a broad range of experience with firearm ownership and use, including hunters, sport shooters, self-defense proponents, law enforcement professionals, and surgeons with previous military experience, along with four surgeon leaders from the ACS COT and the ACS Board of Regents. The work group also had broad geographic representation from across the U.S., including urban, suburban, rural, and frontier residents.

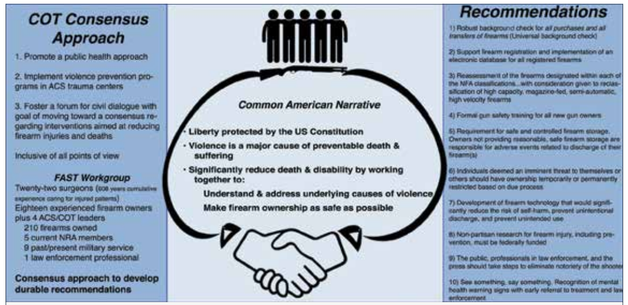
Dr. Stewart serves as the chair of the FAST Work Group. He notes, "We set out to address the issue by employing a broadly inclusive consensus strategy within the Committee on Trauma. We took all viewpoints into account." The FAST Work Group developed consensus through a variety of interactions, including internal town hall meetings, focus groups, conference calls, and numerous small group meetings across the country, which led to an ongoing dialog in which, according to Dr. Stewart:

> *"We came to realize that the community of firearm owners are often approached as part of the problem, but less commonly approached as part of the solution."*

The FAST Work Group published their recommendations in the *Journal of the American College of Surgeons*. The 2018 article, "Freedom with responsibility: A consensus strategy for preventing injury, death, and disability from firearm violence," described a path forward to the development of an effective and durable strategy for reducing firearm-related injury, death, and disability in the U.S. The article presents 13 recommendations from the work group put forth in an advisory capacity and include: strategies and tactics to increase firearm safety, reduce the probability of mass shootings, reduce firearm-associated violence, address mental health factors, and encourage federally funded firearm injury research while preserving the right to own and use a firearm. "To date, these recommendations appear to be the most unique approach to firearm safety in that firearm owners are standing up and taking responsibility and accountability for the privilege of owning a firearm in the U.S.," said coauthor Gary L. Timmerman, MD, FACS. "These recommendations reflect practical solutions to minimize death and disability from firearm injury," added coauthor Eileen M. Bulger, MD, FACS, COT Chair (2018–2022).

> *"In developing our recommendations, we also considered the value of better enforcement of existing laws and strengthening current statutes and regulations, many of which are viable ways to keep firearms away from people who endanger themselves or others. Both those who support firearm ownership and those who do not need to come together to address this public health crisis, and these recommendations provide a platform to do just that."*

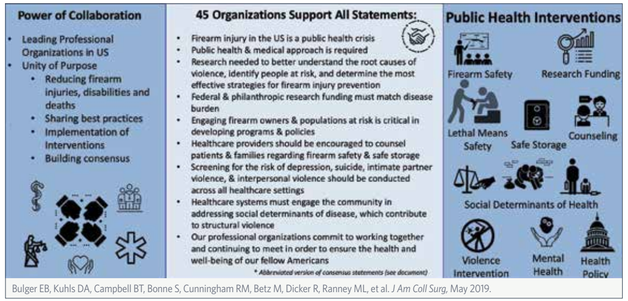
Recommendations from the American College of Surgeons Committee on Trauma's Firearm Strategy Team (FAST) Workgroup: Chicago Consensus I



Talley CL, Campbell BT, JenkinsDH, Barnes SL, Sidewell RA, Timmerman G, et al. *J Am Coll Surg*, February 2019.

FAST Recommendations
The FAST group published their recommendations in the *Journal of the American College of Surgeons* in the 2018 article. They described a path forward to the development of an effective and durable strategy for reducing firearm-related injury, death, and disability in the U.S.

Proceedings from the Medical Summit on Firearm Injury Prevention: A Public Health Approach to Reduce Death and Disability in the United States



Bulger EB, Kuhls DA, Campbell BT, Bonne S, Cunningham RM, Betz M, Dicker R, Ranney ML, et al. *J Am Coll Surg*, May 2019.

Firearm Summit Proceedings, Chicago, IL, February 10–11, 2019
Proceedings from the Medial Summit on Firearm Injury Prevention, February 2019 outlining the consensus statements supported by the participants.

JACS | Journal of the American College of Surgeons

Medical Summit: Collaboration and Consensus

In February 2019, in collaboration with 44 leading U.S. professional organizations, the ACS convened a historic Medical Summit on Firearm Injury Prevention in Chicago, IL. The leadership of these organizations came together to discuss developing a public health approach to minimize death and disability related to firearm injuries. The publication of the "Proceedings from the Medical Summit on Firearm Injury Prevention: A Public Health Approach to Reduce Death and Disability in the U.S." in the *Journal of the American College of Surgeons* in May 2019 demonstrates the extremely strong commitment of the professional medical and legal communities in eliminating needless death and suffering related to firearm injury. The report provides a roadmap for a comprehensive public health approach that can be implemented through these medical, legal, and community organizations. The report concludes with consensus statements that are supported by 47 professional organizations, including those that participated in the summit.

The report outlines the current evidence for specific interventions to address suicide, unintentional injury, and intentional interpersonal violence. These include counseling patients and families regarding safe storage of firearms; lethal means safety for suicide prevention; hospital-based violence intervention programs; identifying patients at risk for violence; the relationship between mental health and firearm injury; and issues of public policy. Many of these practical interventions can be implemented without the need for political debate.

Key Summit Organizers (top)
Brendan T. Campbell, MD, FACS; Deborah A. Kuhls, MD, FACS; and Christopher Barsotti, MD, FACEP, AFFIRM Director.

Summit Host (middle)
Deborah A. Kuhls, MD, FACS, COT IPCC Chair speaking at the summit.

Historic Medical Summit on Firearm Injury Prevention (bottom)
The ACS convened a summit in Chicago, IL, on February 19, 2019, comprising representatives from 44 leading U.S. professional organizations.

Improving the Social Determinants to Attenuate Violence (ISAVE)

Minority populations have historically had to bear a disproportionate burden of violent injury and death in the U.S., and they continue to do so. In the last several years there has been a growing interest and effort amongst trauma providers to look beyond addressing the physical injury and identify ways to address the risk factors associated with violent injury. One focus of discussion during the Medical Summit on Firearm Injury Prevention involved addressing violence via an upstream approach to understand and mitigate the root causes of violence. In fact, significant attention gravitated toward the social determinants of health (SDOH) as the focal point when addressing upstream factors associated with violence. According to the National Academy of Medicine, SDOH account for 40 percent of the factors that affect health and wellness. To address these issues, the COT leadership established the Improving the Social Determinants to Attenuate Violence (ISAVE) Work Group under the leadership of Rochelle A. Dicker, MD, FACS. ISAVE comprises a multidisciplinary group of colleagues with a common focus on shifting the paradigm of care for survivors of violence to create a more holistic approach; they include physicians from multiple disciplines in addition to representatives from community-based organizations, hospital-based violence intervention programs, and law enforcement.

Rochelle A. Dicker, MD, FACS
Vice Chair of the IPCC (2020–) and Lead of the ISAVE Work Group.

During their first meeting in December 2019, four main ISAVE initiatives were developed with corresponding work groups:

- Development of a trauma-informed care curriculum
- Investment in at-risk communities
- Integrating social care into trauma care
- Advocacy

ISAVE Work Group Meeting Participants
Improving the Social Determinants to Attenuate Violence (ISAVE) Work Group met in December 2019 to focus on shifting the paradigm of care for survivors of violence to create a more holistic approach.
Front Row: Stephanie L. Bonne, MD, FACS; Julia Orellana, Case Manager; Altovise Love-Craighead, Inspector, Philadelphia Police Department; Tamara Kozyckyj, ACS Staff; Holly Michaels, ACS staff.
Middle Row: Thea James, MD, Director, Violence Intervention Advocacy Program; Robert D. Winfield, MD, FACS; Earl Fredrick, MD, MBA; Tracey Dechert, MD, FACS; Theodore Corbin, MD, MPP, Co-Director, Center for Nonviolence and Social Justice; DeAngelo Mack, Director of State Policy, Public Health Advocates.
Back Row: Eileen M. Bulger, MD, FACS; John Rich, MD, MPH, Co-Director, Center for Nonviolence and Social Justice; Rochelle A. Dicker, MD, FACS; Teny Gross, Executive Director, Institute for Nonviolence.

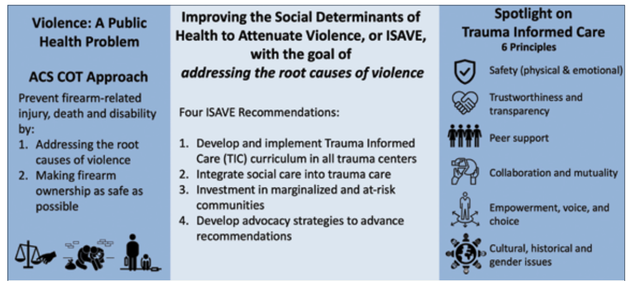
Trauma-Informed Care

Trauma care providers traditionally think of trauma as a physical injury; however, the broader definition of trauma also captures the emotional, mental, and potentially repetitive toll that trauma represents to individuals coming from communities with high rates of violence. Health care providers have their own implicit biases and their own biased coping mechanisms that can exacerbate the trauma a victim has already experienced. Trauma-informed care acknowledges these factors and provides a comprehensive approach to survivors that promotes safety, respect, empathy, and survivor empowerment. ISAVE is working with experts from the Institute for Nonviolence Chicago, Chicago, IL, and the Nonviolence Institute in Providence, RI, to develop this curriculum. In addition to teaching the basic principles and practice of trauma-informed care, this curriculum will include discussions with local community members, role-playing activities, and discussions about implicit bias and vicarious trauma. The curriculum was piloted in 2021 at several trauma centers across the country, to evaluate the experience, and the ultimate plan is to disseminate it widely.

Investment in At-Risk Communities

There continues to be a significant racial wealth gap in the U.S. Communities living at or below the poverty level experience higher rates of chronic disease at younger ages and experience higher rates of violence. If individuals of every generation of a household are unwell or injured, with limited access to financial stability, the cycle continues. Trauma centers and hospital systems can play a role in investing in our at-risk communities. ISAVE has also taken the challenge of determining the most effective ways to invest in at-risk communities as a priority initiative and will outline ways in which trauma centers can become more involved in opening up opportunities for the underserved individuals in these areas. Examples include using the services of local vendors for the hospital cafeteria food and developing pipelines for reliable employment for at-risk community members. These investment opportunities are outlined in the first ISAVE article, "Strategies for Trauma Centers to Address the Root Causes of Violence: Recommendations from the Improving Social Determinants to Attenuate Violence (ISAVE) Workgroup of the American College of Surgeons Committee on Trauma," published in the *Journal of the American College of Surgeons* in September 2021.

Strategies for Trauma Centers to Address the Root Causes of Violence: Recommendations from the Improving Social Determinates to Attenuate Violence (ISAVE) Workgroup of the American College of Surgeons Committee on Trauma



Dicker R, et al. *J Am Coll Surg*, September 2021.

ISAVE Strategies
Recommended strategies derived from conversations during the inaugural ISAVE meeting in December 2019.

Integrating Social Care into Trauma Care

The social determinants of health (SDOH) include financial status, employment, education, housing, and access to healthy food and health care, to name a few. Integrating ways to address the social needs of our violently injured survivors is critical in addressing root causes and promoting the public health approach. Trauma surgeons cannot do it alone and will need to develop collaborative partnerships as they have regarding other public health issues. ISAVE plans to outline ways that social care can be woven into trauma care. Hospital-based violence intervention is one such model by which a credible messenger is incorporated into a survivor's care team and, ultimately, shepherds the survivor to risk reduction resources based on individual needs assessments. The COT has partnered with the Health Alliance for Violence Intervention (HAVI) to support the development of these programs. ISAVE will also define the role of social care programs in trauma centers and highlight the critical role social workers should play in educating trauma providers and trainees.

ISAVE Advocacy

Advocacy, the fourth ISAVE initiative, is interwoven throughout the other initiatives and in much of the work of the COT. The ISAVE Work Group underscores the importance, as part of the other initiatives, to stand with communities at risk and to work collaboratively with local and national policymakers to address structural racism and the social determinants of health through policy and practices that can mitigate harmful societal mores. Its mission is to address violence, and in order to do so holistically, ISAVE underscores the role that trauma providers play in working shoulder to shoulder with the communities they serve.

Firearm Injury Prevention Research

The need to support firearm injury prevention research has gained recognition over the past several years with increasing support from philanthropy channels, and due to the December 2019 approval by the U.S. Congress to appropriate $25 million to the Centers for Disease Control and Prevention and the National Institutes of Health to support this work. The ACS COT advocacy team was instrumental in supporting this effort and Dr. Stewart testified before congressional committees twice in 2019. The ACS COT has also joined the American Foundation for Firearm Injury Reduction in Medicine (AFFIRM) to continue to advance this work. (In 2021, AFFIRM became an initiative of the Aspen Institute.)

In 2020, the ACS COT was awarded a two-year, $711,218 grant by the National Collaborative on Gun Violence Research, supported by the Arnold Foundation, for a multicenter, prospective study to improve understanding of the individual- and community-level risk factors for nonlethal firearm injuries in the U.S. This ACS COT study is among $7.5 million in grants announced by the collaborative for 15 research projects that will produce evidence for improving gun policy in America. Dr. Kuhls and Avery B. Nathens, MD, PhD, FACS, FRCSC, Medical Director, ACS Trauma Quality Programs (2010–), are co-PIs on this project.

The prospective multicenter study will use the infrastructure of the ACS Trauma Quality Improvement Program (TQIP) to develop a nationally representative dataset of predominantly nonlethal firearm injuries, which will be used to better understand both individual- and community-level risk factors associated with firearm injuries. A nationally representative sample of ACS TQIP trauma centers has been recruited to collect and submit additional data elements in the categories of demographics, patient-risk factors, circumstances of injury, and early functional outcomes. The patient data will then be linked by ZIP code to community- and neighborhood-level indices and data sources to explore the association of injury and social determinants of health.

Ronald M. Stewart MD, FACS
Dr. Stewart testified before members of the Labor, Health, Human Services, and Education Subcommittee of the House Appropriations Committee on the public health implications of the gun violence epidemic on March 7, 2019, and also before the Subcommittee on Health of the Committee on Energy and Commerce on October 3, 2019, at a hearing titled "A Public Health Crisis: The Gun Violence Epidemic in America."

IPCC Leadership
Brendan T. Campbell, MD, FACS, IPCC Chair (2020–); Deborah A. Kuhls, MD, FACS, IPCC Chair (2012–2020); Rochelle A. Dicker, MD, FACS, IPCC Vice Chair (2020–).

Firearm Injury Prevention Clinical Scholar

The COT welcomed the inaugural ACS COT Firearm Injury Prevention Clinical Scholar in Residence Fellow Arielle Thomas, MD, a second-year postgraduate from the Medical College of Wisconsin in Milwaukee, in July 2020. This opportunity was made possible through a collaboration with our partner organizations, AFFIRM, AAST, EAST, and the Western Trauma Association (WTA). The two-year fellowship is a fully funded, mentored research experience in injury prevention research and health policy, open to residents who have completed a minimum of two years of surgical residency. In addition, Dr. Thomas will complete a master's degree at Northwestern University Feinberg School of Medicine, Chicago, IL. Her primary mentors at the College include Brendan T. Campbell, MD, FACS, Chair of IPCC (2020–), and Dr. Nathens.

First ACS COT Firearm Injury Prevention Clinical Scholar
Arielle Thomas, MD, scholar, with one of her mentors, Brendan T. Campbell, MD, FACS, Chair of IPCC.

Other Current Initiatives

While the current IPCC, under the leadership of Dr. Campbell, has maintained its primary focus on firearm injury prevention, additional work groups continue to develop resources for other important mechanism of injury such as elderly falls, burns, motorcycle and all-terrain vehicle (ATV) collisions, and the ever-growing problem of injuries associated with motorized scooters in U.S. cities. In collaboration with the Advocacy Pillar, the IPCC published a toolkit to support state legislative efforts to ensure universal motorcycle helmet requirements. The IPCC also recently published a survey of trauma centers across the U.S. demonstrating that while more than 70 percent of centers include geriatric fall prevention as part of their mission, only 16 percent employ fall-risk screening tools in their clinics suggesting additional opportunity for improvement. Data collection on the epidemiology of motorized scooter injuries is now under way.

The Future

The vision for the future is to ensure that traumatic injury is widely recognized as a worldwide, public health problem and that injury prevention research will be well supported and will identify the best evidence-based interventions to reduce death and disability from injury. The COT IPCC will remain committed to multidisciplinary collaboration in developing strategies to implement these interventions with the support of trauma centers, trauma systems, and like-minded organizations around the world.

> Establishing a new norm in trauma care is essential. This new norm will value whole-person care so that trauma care providers take advantage of the arrival of trauma survivors into their trauma centers in order to develop meaningful interventions that reduce the risk of subsequent injury. This new norm will embrace a trauma-informed care model, support investment in our communities, and play a vital role in working with social care practitioners to provide ongoing support after hospital discharge. The outcome will be safer communities and a chance for violently injured patients to not only survive, but to thrive.

The concurrent evolution of the science of injury prevention and the prioritization of injury prevention work within the COT is an interesting story, and the IPCC and the COT actively engage in structured research, education and training, community prevention, and outreach programs that guide both state and federal policy advocacy initiatives. This work has not only been effective in reducing injuries and deaths in the U.S., but it also serves as a model for other professional organizations that wish to promote injury prevention using collaborative, community-based, and data-driven programs.

Evolution of the Name

INTERESTING INJURY PREVENTION FACTS
FROM THE COT'S FIRST 100 YEARS

- No state had a seat belt law in 1983.
- In 1962 Wisconsin became the first state to require seat belts in all 1962 model cars.
- In 1978 Tennessee became the first state to mandate child safety seat use.
- A working smoke detector reduces the risk of residential fire by 50 percent.
- Homes with smoke detectors increased from 5 percent in 1970 to 94 percent in 2000.
- North Carolina was the first state to require hunters to wear fluorescent orange while in the woods.
- For intercollegiate baseball players, pitcher injuries from line drives with aluminum bats is 2.6 times higher than they are for wood bats.
- The natural experiment of raising the legal drinking age to 21 years in all 50 states prevented more than 800 deaths per year.
- Federal standards implemented in the 1970s requiring children's sleepwear to be nonflammable significantly reduced flame burns in the number of American children.
- Michigan was the first state to introduce graduated driver licensing for teens, and the crash risk for 16-year-old Michigan drivers fell by 29 percent between 1996 and 2001.
- Speeding is a factor in an estimated 30 percent of all motor vehicle crash-related fatalities.
- New Jersey is the only state to delay novice teen driver licensing to 17 years.

Injury Prevention Trivia Source: Hemenway D. *While We Were Sleeping: Success Stories in Injury and Violence Prevention.* Univ of California Press; 2009.

Advocacy Initiatives
ACS Firearms Injury Prevention Initiatives and Advocacy

Advocacy Toolkits
Universal Motorcycle Helmet Requirement Legislative Toolkit (2017)

Position Statements of the Injury Prevention & Control Committee

Statement on Cannabis Regulation and Risk of Injury	2018
Statement on Post-Traumatic Stress Disorder in Adults	2018
Statement on Post-Traumatic Stress Disorder in Pediatric Trauma Patients	2018
Statement on Opioids and Motor Vehicle Crashes	2017
Statement on Lithium Batteries	2017
Statement on General Helmet Use	2016
Statement on Safety Belt Laws and Enforcement	Revised 2016
Statement on Prevention of Non-Traffic Vehicle-Related Injuries in Children	Revised 2016
Statement on Older Adult Burn Prevention	2016
Statement in Support of Motorcycle Helmet Laws	2015
Bicycle Safety and the Promotion of Bicycle Helmet Use	2014
Intimate Partner Violence (previously titled Domestic Abuse)	Revised 2014
Older Adult Falls and Falls Prevention	2014
Firearms Injuries	Revised 2013
Concussion and Brain Injury	2012
All-Terrain Vehicle Injuries	2009
Insurance, Alcohol-Related Injuries, and Trauma Centers	2006
Support of Legislation Regarding Fire-Safe Cigarettes	2006
Prevention of Nontraffic Vehicle-Related Injuries in Children	2005
Safety Belt Laws and Enforcement	2003
Support of Motorcycle Helmet Laws	2001

https://www.facs.org/quality-programs/trauma/advocacy/ipc/advocacy-statements

PAST CHAIRS

1985 — 
John G. West, MD, FACS
1985–1992

1992 — 
Ronald V. Maier, MD, FACS
1992–1999

1999 — 
Sylvia D. Campbell, MD, FACS
1999–2003

2003 — 
M. Margaret "Peggy" Knudson, MD, FACS
2003–2007

2007 — 
Carol R. Schermer, MD, FACS
2007–2008

2008 — 
Michael J. Sise, MD, FACS
2008–2012

2012 — 
Deborah A. Kuhls, MD, FACS
2012–2020

2020 — 
Brendan T. Campbell, MD, FACS
2020–

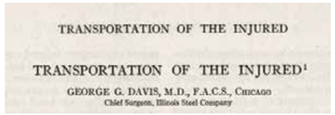
Emergency Medical Services

The evolution of modern emergency medical services (EMS), as we know it today, was greatly impacted by the work of the American College of Surgeons (ACS) Committee on Trauma (COT).

The Origins

In 1929, George G. Davis, MD, FACS, presented "Transportation of the Injured" at the Conference of Traumatic Surgery Symposium during the ACS Clinical Congress.

> Dr. Davis stated,
>
> *"...the first essential is the patient, whether he be transported ten blocks, ten miles, or one hundred miles, be fixed that he will do himself no harm."*
>
> He continued by addressing the importance of stabilizing fractures, using tourniquets, and avoiding delays by stressing that major trauma patients:
>
> *"...should be transported to a dispensary or hospital where proper surgical treatment can be given;"*
>
> thus underscoring that trauma is a surgical disease.



TRANSPORTATION OF THE INJURED

TRANSPORTATION OF THE INJURED[1]

GEORGE G. DAVIS, M.D., F.A.C.S., CHICAGO
Chief Surgeon, Illinois Steel Company

TABLE 1.—COST OF PLANT OWNED AMBULANCE

Number of calls in 1928.	
Illinois Steel Co	327
Other Companies	13
Cost	$2351.83
This includes $540.00 depreciation on ambulance.	
Number of calls in 1927.	
Illinois Steel Co	290
Other Companies	14
Cost	$2319.53
This includes $405.00 depreciation on ambulance.	
Number of calls in 1926.	
Illinois Steel Co	311
Other Companies	14
Cost	$2372.86
This includes $540.00 depreciation on ambulance.	
Average cost per call, 3 years	$7.27
At Gary, Indiana, a public ambulance service shows average cost per call	$3.50

Transportation of Injured and Cost of Ambulance
George G. Davis, MD, FACS, presented these figures during the 1929 Clinical Congress. Note the cost of a plant-owned ambulance to provide quick access to care. It was a substantial investment to provide this service versus waiting for the public ambulance service.

The EMS Committee, which first started as the Subcommittee on Ambulance Equipment in the Emergency Treatment of Fractures in 1931, chaired by Robert H. Kennedy, MD, FACS, was quickly renamed the Subcommittee on the Transportation of Fractures in 1934, has grown from a small group sitting around a table to a committee of more than 40 members and organizational liaisons. Their collective experience includes national representatives from sister organizations with a vested interest in EMS that have formed official relationships with the COT. The EMS Committee has consistently emphasized the importance of the trauma continuum of care that begins when and where injury occurs.

From educating the first responder through the Prehospital Trauma Life Support (PHTLS) Course, to forming a seminal relationship with the National Association of Emergency Medical Technicians (NAEMT), to the development of the STOP THE BLEED® program that emphasizes the role of the public as immediate responders, the EMS Committee has had, and will continue to have, a profound impact on saving lives, not just in the U.S., but across the globe.

The Past

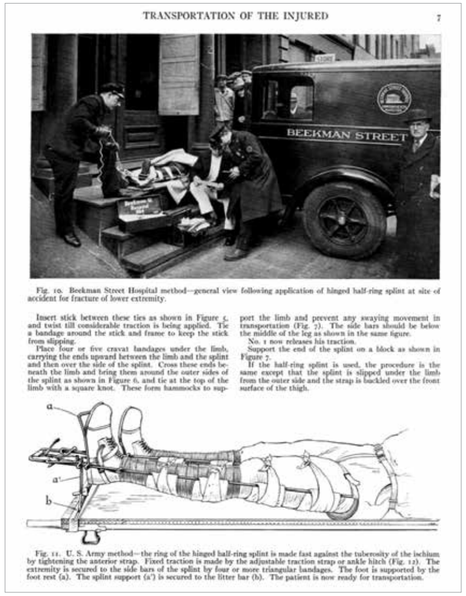
The Need for Organized EMS Systems to Transport the Injured

While modern EMS as we know it had its major evolution in the 1960s, the COT has always had an interest in the transportation of the injured. In 1931, Robert T. Findlay, MD, FACS, published a review, "First Aid for Fractures: Methods and Equipment for the Treatment of All Fractures at the Site of Accident and on the Ambulance during Transportation to the Hospital" in *The Journal of Bone & Joint Surgery*. In the June 1934 issue of the *Journal of the American College of Surgeons*, Dr. Kennedy published the article "Transportation of the Injured" discussing transportation considerations and splinting techniques. In 1936, a report from the Subcommittee on the Transportation of Fractures recommended basic equipment on ambulances, including splinting devices and proper training for the responder. The Subcommittee on the Transportation of Fractures became the Subcommittee on the Transportation of the Injured sometime during World War II, around 1944, and continued to call for the transition of the ambulance attendant role from a transporter to a caregiver. In 1940, Dr. Kennedy said,

> *"The enemy is Old Man Accident. One place where he wins many battles is on our streets and highways."*

The growth of the automobile industry and the subsequent highway system underscored the need for organized civilian EMS systems. In fact, military personnel returning from World War II were quick to point out that emergency care was often better on a remote battlefield than at an intersection down the street.

Members of the COT helped publish *Let Them Lie! A Manual of First Aid for Motorists* in 1955 to educate the public about the importance of avoiding significant movement of the motor vehicle crash victim. The COT was pivotal in highlighting the need for organized civilian EMS systems for both the government and public. In 1956, the ACS concept of an emergency medical care system serving travelers on federal highways was developed by the COT and presented to the Special Subcommittee for Traffic Safety of the Committee on Interstate and Foreign Commerce of the House of Representatives. George J. Curry, MD, FACS, Chair of the Subcommittee for the Transportation of the Injured in the early 1950s, gave the Oration on Trauma in 1958 and called the automobile the "civilian weapon" and continued to emphasize the importance of appropriate care beginning at the accident site.



TRANSPORTATION OF THE INJURED 7

Fig. 10. Beekman Street Hospital method—general view following application of hinged half-ring splint at site of accident for fracture of lower extremity.

Insert stick between these ties as shown in Figure 9, and twist till considerable traction is being applied. Tie a bandage around the stick and frame to keep the stick from slipping.

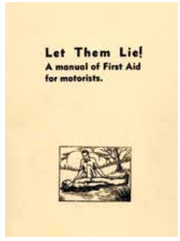
Place four or five cravat bandages under the limb, carrying the ends upward between the limb and the splint and then over the side of the splint. Cross these ends beneath the limb and bring them around the outer sides of the splint as shown in Figure 6, and tie at the top of the limb with a square knot. These form hammocks to support the limb and prevent any swaying movement in transportation (Fig. 5). The side bars should be below the middle of the leg as shown in the same figure.

No. 1 now releases his traction.

Support the end of the splint on a block as shown in Figure 7.

If the half-ring splint is used, the procedure is the same except that the splint is slipped under the limb from the outer side and the strap is buckled over the front surface of the thigh.

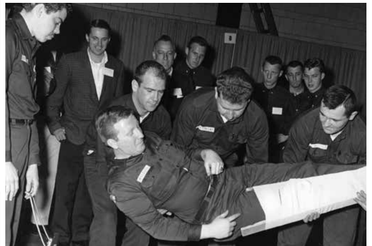
Fig. 11. U. S. Army method—the ring of the hinged half-ring splint is made fast against the tuberosity of the ischium by tightening the anterior strap. Fixed traction is made by the adjustable traction strap or ankle hitch (Fig. 12). The extremity is secured to the side bars of the splint by four or more triangular bandages. The foot is supported by the foot rest (a). The splint support (a') is secured to the litter bar (b). The patient is now ready for transportation.



An Excerpt from "Transport of the Injured," by Robert H. Kennedy, MD, FACS
Published in the *Journal of the American College of Surgeons* in 1934.
Robert H. Kennedy, MD, FACS Chair of the Subcommittee on Ambulance Equipment in the Emergency Treatment of Fractures (1931–1934) and Chair of the Subcommittee on the Transportation of Fractures (1934–1939).
Let Them Lie! A Manual of First Aid for Motorists Published in 1955 to educate the public about the importance of avoiding significant movement of the motor vehicle crash victim.
George J. Curry, MD, FACS Chair of the Subcommittee for the Transportation of the Injured in the early 1950s.

"Death in a Ditch" Heralds Major Changes in Emergency Medical Services

While J.D. Farrington, MD, FACS, was Chair of the Subcommittee on Transportation of the Injured (1965–1974) he published "Death in a Ditch" in the June 1967 edition of the ACS *Bulletin*. This article was one of the first to highlight, on a national level, the training required for ambulance attendants. He was no stranger to educating field responders. Dr. Farrington (left), along with Sam W. Banks, MD, FACS, Chair of the Chicago Committee on Trauma (right), had developed a course and had been providing training to rescue workers, civilians, and ambulance attendants in the Chicago area since 1957, with a focus on the safe extrication, emergency care, and transport of patients involved in motor vehicle crashes. In association with the Chicago Fire Academy and using a privately owned hearse as an ambulance, they trained their first responders to provide initial care for the injured, including assessment, onsite care, and proper extrication techniques using ideal equipment at the time. Shown top right, Chicago Mayor Richard M. Daley; Dr. Banks of the Chicago COT; Dr. Sullivan, surgeon to the Chicago Fire Department; Dr. Farrington; and an unknown participant review a training course syllabus for Chicago rescue workers sometime in the late 1960s. Dr. Farrington gave the 11th Scudder Oration in 1973, in which he provided much of the history of EMS and the struggles to provide appropriate care to the injured patient.



"Death in a Ditch"
Cover and pictures from "Death in a Ditch" by J.D. Farrington, MD, FACS, demonstrating extrication techniques. ACS *Bulletin* 1967.

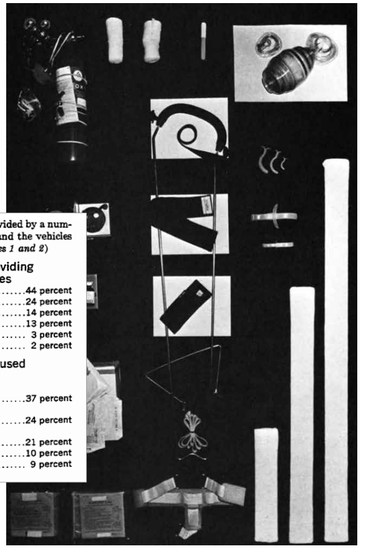
The "7 Years' War"

To better understand the ACS COT's contribution to the transformation of prehospital emergency care, it is essential to understand the state of emergency medical services in 1966. Oscar P. Hampton, Jr., MD, FACS, Chair of Transportation of the Injured Subcommittee in the mid-to-late 1950s, had developed a survey in 1959 to elucidate the prehospital infrastructure of the time. There was no unified way to contact EMS providers, no standards on ambulances or attendant training, and few functioning EMS agencies at that time. However, in 1966, two important events occurred that started what Dr. Farrington called the "7 Years' War."

> The publication of the influential white paper, *Accidental Death and Disability, the Neglected Disease of Modern Society* by the National Academy of Sciences National Research Council, assessed the mortality and injury rate among civilians during a time in which the number of people killed on the nation's roadways was near epidemic proportions. This was followed by the passage of the National Highway Safety Act, which *"turned this solo shouting match [by the COT] into an all-out war."*

After 1966, the COT and the Subcommittee on Transportation of the Injured were key players in changing the face of EMS. The National Highway Safety Act had been enacted without built-in guidelines for the proposed action. Dr. Hampton, who first developed a minimal equipment list for ambulances in 1961, subsequently revised this list in 1966, although less than one-third of the ambulances were equipped as recommended at that time. To this day, the EMS Committee continues to actively support the revision of the list. The Airlie Conference on Emergency Medical Services, a joint venture of the COT and American Academy of Orthopaedic Surgeons (AAOS) Committee on Injuries, occurred in 1969. Fifty-three representatives of American medicine and government participated in this meeting during which they developed guidelines for ambulance services, personnel and education, and emergency facilities. In 1969, ambulance design criteria were developed, ensuring that care could be rendered to a patient in the back of an ambulance.

To make certain the ambulance attendant was properly trained, the COT collaborated with other organizations to develop training criteria. In 1966, a pocket manual, *Emergency Care of the Sick and Injured*, was prepared by the ACS, and edited by Dr. Kennedy to advise law-enforcement officers, firefighters, ambulance personnel, rescue squads, and nurses on concepts of initial patient care. In 1968, *Training of Ambulance Personnel and Others Responsible for Emergency Care of the Sick and Injured at the Scene and During Transport: Guidelines and Recommendations* was developed by the National Academy of Sciences



Ambulance services were provided by a number of different organizations, and the vehicles varied considerably.[2] *(See tables 1 and 2)*

Table 1: Organizations providing ambulance services

Funeral homes	44 percent
Voluntary units	24 percent
Commercial firms	14 percent
Municipalities	13 percent
Hospitals	3 percent
Unspecified	2 percent

Table 2: Types of vehicles used as ambulances

Custom ambulances, high powered and expensive	37 percent
Station wagons, also used by police as chase vehicles	24 percent
Hearses, temporarily converted via warning device	21 percent
Panel trucks or vans	10 percent
Rescue vehicles	9 percent

Oscar P. Hampton, Jr., MD, FACS
Chair of Transportation of the Injured Subcommittee, mid 1950s.

Essential Equipment for Ambulances
Published in the 1970 ACS *Bulletin*.

Ambulance Services
Ambulance services were provided by a number of different organizations, and the vehicles varied considerably. Tables presented in the 1973 Scudder Oration "The Seven Years' War," by J.D. Farrington, MD, FACS.

Norman E. McSwain, Jr., MD, FACS
Subcommittee on Emergency Services – Prehospital Chair (1981–1986).

National Research Council. In 1971 the textbook, *Emergency Care and Transportation of the Sick and Injured* was published by AAOS. The textbook was first conceived by Walter A. Hoyt, MD, FACS (father of David B. Hoyt, MD, FACS, COT Chair [1998–2002]). Subsequent editions have featured ongoing contributions by members of the COT, and this textbook, now in its eleventh edition, remains one of the best-selling EMS textbooks available on the market. Finally, the National Registry of Emergency Medical Technicians (NREMT) was formed in 1970 to unify examinations and certifications of prehospital providers on a national level.

While immense progress had already been made, there continued to be a need for momentum in EMS trauma care as highlighted by Norman E. McSwain, Jr., MD, FACS, Subcommittee on Emergency Services – Prehospital Chair (1981–1986), in his 2005 Scudder Oration. Themes that were present both in the 1920s and still in 2005, continue to be relevant today in trauma care. These themes include the assertion that prehospital care is the beginning of the continuum of trauma care, the surgeon has a unique role in trauma management, and the essential role surgeons play in educating EMS providers. Dr. McSwain could not have said it more eloquently than in the last remarks of his oration,

> *"Trauma is a surgical disease from beginning to end. Our obligation for trauma care starts when our EMTs first touch our patients. We are the teachers and the supervisors of EMTs in trauma care."*

The goal of trauma care in the field is to establish an airway, treat life-threatening injuries such as hemorrhage, and stabilize fractures, all while maintaining minimal scene times before transport to a trauma center. The COT was pivotal in helping to create the first *Guidelines for Field Triage of Injured Patients* for destination determination of the injured patient in 2006, and the COT worked with the National Highway Traffic Safety Administration (NHTSA) and the Centers for Disease Control and Prevention (CDC) to support the evidence-based revision of these guidelines in 2009 and 2011. With the support of NHTSA, today's EMS Committee has led a multidisciplinary technical expert panel in the revision of these guidelines that took place from the fall of 2019 to the spring of 2022. This panel was informed by a series of systematic literature reviews which evaluated the triage criteria in prior versions of the guidelines as well as the overall performance of the guidelines when applied as intended. Additionally, broad stakeholder feedback was collected from EMS providers on the 2011 guidelines to inform the revision process. An article describing the revision process and the updated guidelines will be submitted for publication in early 2022.

Field Triage Decision Scheme

Measure vital signs and level of consciousness

STEP 1

Glasgow Coma Scale ..... <14 or
Systolic blood pressure ..... <90 or
Respiratory rate ..... <10 or >29 (<20 in infant < one year)

NO — Assess anatomy of injury

YES — Take to a trauma center. Steps 1 and 2 attempt to identify the most seriously injured patients. These patients would be transported preferentially to the highest level of care within the trauma system.

STEP 2

- All penetrating injuries to head, neck, torso, and extremities proximal to elbow and knee
- Flail chest
- Two or more proximal long-bone fractures
- Crush, degloved or mangled extremity
- Amputation proximal to wrist and ankle
- Pelvic fractures
- Open or depressed skull fracture
- Paralysis

NO — Assess mechanism of injury and evidence of high-energy impact

YES — Take to a trauma center. Steps 1 and 2 attempt to identify the most seriously injured patients. These patients would be transported preferentially to the highest level of care within the trauma system.

STEP 3

- Falls
  - Adults: > 20 ft. (one story is equal to 10 ft.)
  - Children: > 10 ft. or 2-3 times the height of the child
- High-risk auto crash
  - Intrusion: > 12 in. occupant site; > 18 in. any site
  - Ejection (partial or complete) from automobile
  - Death in same passenger compartment
  - Vehicle telemetry data consistent with high risk of injury
- Auto v. pedestrian/ bicyclist thrown, run over, or with significant (>20 mph) impact
- Motorcycle crash > 20 mph

NO — Assess special patient or system considerations

YES — Transport to closest appropriate trauma center which, depending on the trauma system, need not be the highest level trauma center.

STEP 4

- Age
  - Older Adults: Risk of injury death increases after age 55
  - Children: Should be triaged preferentially to pediatric-capable trauma centers
- Anticoagulation and bleeding disorders
- Burns
  - Without other trauma mechanism: Triage to burn facility
  - With trauma mechanism: Triage to trauma center
- Time-sensitive extremity injury
- End-stage renal disease requiring dialysis
- Pregnancy > 20 weeks
- EMS provider judgment

NO — Transport according to protocol

YES — Contact medical control and consider transport to trauma center or a specific resource hospital.

WHEN IN DOUBT, TRANSPORT TO A TRAUMA CENTER.

This field triage decision scheme, originally developed by the American College of Surgeons Committee on Trauma, was revised by an expert panel representing emergency medical services, emergency medicine, trauma surgery, and public health. The panel was convened by the Centers for Disease Control and Prevention (CDC) with support from the National Highway Traffic Safety Administration (NHTSA). Its contents are those of the expert panel and do not necessarily represent the official views of the CDC and NHTSA.

Development of the Prehospital Trauma Life Support Course (PHTLS)

Dr. McSwain served as Chair of the Subcommittee on Emergency Services - Prehospital (1981–1986) and was a recognized leader in the prehospital community. Early in his career, he had become interested in prehospital emergency care and spent considerable time teaching EMS personnel. Dr. McSwain was one of the founding members of the National Association of Emergency Medical Technicians (NAEMT) which was established in 1975. Dr. McSwain participated in one of the first Advanced Trauma Life Support® (ATLS®) courses taught in Nebraska in 1979, and realized the profound impact that ATLS could have on the care of trauma patients, both inside and outside the hospital and proposed the course be extended to include EMS providers.

Because the ATLS Course was designed for physicians providing initial care in the emergency department, the COT originally limited enrollment to only physicians (this restriction was later relaxed and other advanced care providers may now participate in the course). In 1981, Dr. McSwain was asked by the president of NAEMT to investigate developing a trauma course based on ATLS principles but focused on prehospital care providers. This course, originally called "ATLS for Non-Physicians," soon became the Prehospital Trauma Life Support (PHTLS) Course. The PHTLS Course was founded on the principle that prehospital care providers could make reasoned decisions regarding patient care when educated on appropriate anatomy and physiology, mechanism of injury, patient assessment, and treatment principles. Unlike medical emergencies, a critically injured trauma patient cannot be stabilized at the scene. Thus, PHTLS emphasizes rapid assessment for life-threatening injuries, limited field interventions, and rapid transport to the closest appropriate facility.

Will Chapleau, EMT-P, RN, TNS
The sixth and longest-serving Chairman of the PHTLS Executive Council.

Jeffrey P. Salomone, MD, FACS
Chair of the ACS COT Emergency Services - Prehospital Subcommittee (2007–2012).

After several pilot courses were held in 1983, national promulgation of PHTLS began in 1984 through several regional faculty workshops that trained individuals how to administer the course. Richard "Rick" W. Vomacka, a past president of NAEMT, became the first Chair of the PHTLS Committee. In the early years, Mr. Vomacka worked with a team of paramedics, nurses, and physicians to refine the course content and slides. Alex Butman, an EMS publisher, assisted with the first published PHTLS textbook (*PHTLS Basic and Advanced Pre-Hospital Trauma Life Support Third Edition*), as the previous two versions were not formally published. Mr. Vomacka also contributed significantly to promulgation of PHTLS both in the U.S. military, through the Defense Medical Readiness Training Institute, and globally.

Because of Dr. McSwain's vision, there has always been a close, symbiotic relationship between the ACS COT, ATLS, and PHTLS. While the PHTLS Course is administered by NAEMT, Dr. McSwain worked with COT leaders to develop a cooperative relationship in which the COT provides medical direction and content oversight for the PHTLS program. Dr. McSwain served in the inaugural role of medical director of PHTLS, a position he held until his death in 2015. Subsequent PHTLS medical directors have included Lance E. Stuke, MD, FACS (2015–2018), Alexander L. Eastman, MD, FACS (2018–2021), and Warren C. Dorlac, MD, FACS (2018–), as the tactical medical director and liaison to COT committees. Advances in trauma care incorporated into new revisions of ATLS fed into PHTLS, where appropriate, to ensure the content remained current and aligned. When global promulgation of PHTLS began, course development was limited to countries in which there was an approved, existing ATLS program. As PHTLS matured, the relationship grew more synergistic, as information taught in PHTLS courses was occasionally incorporated into the ATLS Course—the use of tourniquets is one such example.

In 1994, Scott B. Frame, MD, FACS—a former trauma fellow of Dr. McSwain's—joined the PHTLS Executive Council as the first associate medical director. Dr. Frame was serving as the editor of *PHTLS Basic and Advanced Pre-Hospital Trauma Life Support Fifth Edition*, when he suffered an untimely death in 2001. Will Chapleau, EMT-P, RN, TNS, became the sixth and longest-serving Chairman of the PHTLS Executive Council. Under Mr. Chapleau's leadership, promulgation of

PHTLS grew exponentially, both domestically and globally. Those interested in establishing PHTLS faculties in their countries would often travel to Mr. Chapleau's hometown of Chicago Heights, IL, to train in PHTLS. A team of three members of the PHTLS Council, including one physician, would then travel to that country to establish the initial cadre of instructors and monitor the inaugural course.

Another former trainee of Dr. McSwain's, Jeffrey P. Salomone, MD, FACS, also joined the PHTLS Executive Council in 1996, upon completion of his surgical residency and critical care fellowship at Tulane University. Dr. Salomone's primary role was overseeing the revision of the PHTLS textbook following Dr. Frame's death. He subsequently served as the lead editor of the sixth edition and contributed to the seventh edition. Dr. Salomone also served as the Chair of the ACS COT Emergency Services - Prehospital Subcommittee (2007–2012) which was simplified to the EMS Committee in 2010.

In 2001, the U.S. Army adopted PHTLS as a standardized program taught to all Army medics (military occupational specialty 91W). When the Committee on Tactical Combat Casualty Care (CoTCCC) was formed by the U.S. military in 2002, Dr. McSwain was invited to become a member. A strong relationship developed between CoTCCC and PHTLS, and a military-themed chapter was added to the fifth edition of PHTLS. This content addition expanded to multiple military chapters in the sixth edition of PHTLS and, eventually, the publication of a military edition of the text. PHTLS became a platform where revisions of the CoTCCC guidelines were published and materials for the Tactical Combat Casualty Care (TCCC) courses, which were based on PHTLS, were hosted.

Over its nearly 40 years, PHTLS has become the "gold standard" for prehospital trauma education worldwide. During this period, PHTLS has been taught to more than one million EMS professionals in more than 60 countries, and the *PHTLS Basic and Advanced Pre-Hospital Trauma Life Support* textbook has been translated into more than a dozen languages. There is little doubt that PHTLS has significantly contributed to the improved outcomes of countless trauma patients, and this achievement would not have happened without the strong support of the ACS COT.

Ambulance Equipment List

The ACS *Bulletin* article "Death in a Ditch," written in 1967 by Dr. Farrington provided the first ambulance equipment list outlining the minimum equipment necessary for emergency vehicles or ambulances. This list continued to be updated by the COT for many years.

Mary E. Fallat, MD, FACS, FAAP
Chair of the Subcommittee on Emergency Services - Prehospital (2004–2007).

As the American College of Emergency Physicians (ACEP) and other EMS organizations developed, the COT worked to align recommendations for ambulance equipment across professional organizations. The first joint document between the ACEP and the COT was published in 2000 and in 2005; the National Association of EMS Physicians (NAEMSP) also participated. In 2007, the COT partnered with the Health Resources and Services Administration (HRSA) Emergency Medical Services for Children (EMSC) program to identify the specific needs of children for ambulance equipment. Mary E. Fallat, MD, FACS, FAAP, Chair of the Subcommittee on Emergency Services - Prehospital (2004–2007), led the multiorganizational collaborative revisions of the *Equipment for Ground Ambulances* in both 2009 and 2014, in collaboration with the American Academy of Pediatrics. Components of this list were subsequently incorporated into the EMSC performance measures.

Emergency Medical Services for Children

In 1973, the U.S. Congress passed the Emergency Medical Services Systems Act of 1973. Managed by the HRSA, this act provided funding for more comprehensive state and local government EMS systems. Between 1975 and 1979, state EMS systems improved the outcomes of adult patients but not those of pediatric patients.

Strong Advocates for Emergency Medical Services
A. Brent Eastman, MD, FACS; and C. William Schwab, MD, FACS.

Senator Daniel Inouye of Hawaii had been approached by the Hawaiian Medical Association Emergency Medical Services Program to introduce legislation to establish, implement, and fund a novel national initiative to provide emergency care for children. When Senator Inouye's staff assistant's daughter developed meningitis, the quality of her care demonstrated to the senator the shortcomings of the average emergency department when treating a critically ill child. This event provided the impetus in 1984 for his support of legislation authorizing the use of federal funds for emergency medical services for children through the EMSC program. It has been reauthorized repeatedly since then, and the COT formalized its relationship with EMSC in 2007. Subsequently, children's interests have been consistently integrated in the activities of the EMS Committee and incorporated in multiorganizational consensus statements. The 2007 Institute of Medicine report the *Future of Emergency Care: Emergency Medical Services at the Crossroads* included representation on the main committee by A. Brent Eastman, MD, FACS, and C. William Schwab, MD, FACS, and on the Pediatric Subcommittee by Dr. Fallat. As a direct result of this report, EMSC introduced the concept of pediatric readiness for all hospitals and Dr. Fallat has been a driving champion for this concept through the COT for all trauma centers.

Building Relationships and Consensus

Liaison relationships make the EMS Committee (and all its prior iterations) a very special group and offer a unique ability to both connect and communicate across many professional boundaries. These relationships have been a priority since the beginning of committee activities.

> A report of the Subcommittee of the Transportation of Fractures in 1936 stated,
>
> *"At present, we believe contacts with other organizations should be maintained in a consultation capacity, but our main efforts should be exerted toward acquainting the entire medical profession, not the Fellows of the College only, with the need, advantages, and practical application of first aid care of fractures."*

Representatives from the federal government, other medical organizations, and various interests within EMS have been well represented and always given an equal voice. These relationships have helped move important projects forward with strong multidisciplinary support, while fostering important connections with other experts within the trauma community. Current liaison positions to the EMS Committee include: American College of Emergency Physicians (ACEP), National Association of EMS Physicians (NAEMSP), National Association of Emergency Medical Technicians (NAEMT), Emergency Medical Services for Children (EMSC), the National Association of State EMS Officials (NASEMSO), American Academy of Pediatrics (AAP), the Committee on Tactical Combat Casualty Care (CoTCCC), the Committee on Accreditation of Educational Programs for the Emergency Medical Services Professions (CoAEMSP), Commission on Accreditation of Medical Transport Systems (CAMTS), National Registry of Emergency Medical Technicians (NREMT), the National Disaster Medical Service (NDMS), the National Highway Traffic Safety Administration (NHTSA), the Department of Homeland Security (DHS), and the National Safety Council (NSC). The EMS Committee projects that are ongoing or have been completed are credited to the developed relationships and engagement of the strong multidisciplinary support that provided expert information supplying clarity to important prehospital consensus papers and topics.

MULTIORGANIZATIONAL GUIDANCE

TITLE	YEAR PUBLISHED
Guidelines for Withholding or Termination of Resuscitation in Prehospital Traumatic Cardiopulmonary Arrest: A Joint Position Paper from the National Association of EMS Physicians Standards and Clinical Practice Committee and the American College of Surgeons Committee on Trauma	2003
Drug-assisted Intubation in the Prehospital Setting: American College of Emergency Physicians, American College of Surgeons Committee on Trauma, and the National Association of EMS Physicians	2005
Withholding and Termination of Resuscitation of Adult Cardiopulmonary Arrest Secondary to Trauma: Resource Document to the Joint NAEMSP-ACSCOT Position Statements	2013
Appropriate Use of Helicopter Emergency Medical Services for Transport of Trauma Patients: Guidelines from the Emergency Medical System Subcommittee, Committee on Trauma, American College of Surgeons	2013
EMS Spinal Precautions and the Use of the Long Backboard	2013
An Evidence-based Prehospital Guideline for External Hemorrhage Control: American College of Surgeons Committee on Trauma	2014
Guidance Document for the Prehospital Use of Tranexamic Acid in Injured Patients	2016
Spinal Motion Restriction in the Trauma Patient – A Joint Position Statement	2018
Ketamine Use in Prehospital and Hospital Treatment of the Acute Trauma Patient: A Joint Position Statement	2020

Sample of published multiorganizational guidance papers from 2003–2020, in which COT EMS Committee either led or participated.

STOP THE BLEED®

While the full history of the STOP THE BLEED® (STB) program is outlined in Chapter 17, it is worth noting here that the EMS Committee was instrumental in the development of this program. Beginning in 2013, Eileen M. Bulger, MD, FACS, EMS Committee Chair (2012–2015), convened a multidisciplinary expert panel to conduct a systematic review of the literature and make recommendations regarding external hemorrhage control for EMS providers. This group published a guideline which supported the use of tourniquets and wound packing with hemostatic agents. At the time, this training and equipment were not widely available to EMS and wound packing was not in the scope of practice for EMTs. With the support of NHTSA, these issues were quickly addressed, and the COT supported efforts to train both EMS and law-enforcement providers in these vital skills. Subsequently, in collaboration with NAEMT, the EMS Committee, chaired by Mark L. Gestring, MD, FACS (2015–2020), worked to develop an educational course for the lay public that was originally called Bleeding Control (BCon) but subsequently became known as the STOP THE BLEED® Course. Coupled with the Advocacy Pillar of the COT, the EMS Committee continues to lead the implementation of this important program that has trained more than 1.7 million people worldwide.

Early supporters of the STOP THE BLEED® Program
Eileen M. Bulger, MD, FACS, EMS Committee Chair (2012–2015), COT Chair (2018–2022).
Mark L. Gestring, MD, FACS, EMS Committee Chair (2015–2020), STOP THE BLEED® Chair (2016–2022).

The Present

As this chapter is written, we find ourselves in the midst of the COVID-19 pandemic, the most widespread pandemic since the Spanish Flu. Members of the EMS Committee were, and continue to be, at the forefront of the crisis leading EMS systems, chairing hospital disaster teams, and in many cases, staffing COVID intensive-care units. We cannot forget the extreme sacrifice of the frontline responders in the EMS community. Unfortunately, many have been lost to the disease as a direct consequence of their work.

Despite these challenges, the EMS Committee, ably supported by Jimm Dodd, PA-C, MS, MA, COT STB Manager and his team, continues to lead initiatives to improve the care of the injured patient. The ACS COT has partnered with ACEP, NAEMT, and the National Association of EMS Physicians (NAEMSP), on a series of consensus-based guidance documents that have been published in the literature. These topics include spinal motion restriction practices, the prehospital use of ketamine, prehospital hemorrhage control, and the prehospital use of tranexamic acid.

Peter E. Fischer, MD, FACS
EMS Committee Chair (2020–).

The *Spinal Motion Restriction in the Trauma Patient – A Joint Position Statement* consensus paper, led by current EMS Committee Chair Peter E. Fischer, MD, FACS (2020–), was the most-downloaded article of 2018 across the publisher's 200 journals (more than 24,000 downloads). We are especially proud of Dr. Fischer's leadership as he is the first of the participants in the Future Trauma Leaders Program to become an ACS COT Committee Chair.

As of this writing, the EMS Committee is also finalizing the latest revision to the national *Guidelines for Field Triage of Injured Patients*, coordinated by COT Systems Manager, Holly Michaels, MPH. This effort has included a stakeholder survey of more than 9,000 EMS providers from across the U.S. to better understand how the current guideline is used, along with systematic literature reviews for each step in the current guideline. A multidisciplinary expert panel has reviewed the evidence and made significant advances to the current guideline.

> This tool is vital in achieving our goal of
>
> *"getting the right patient, to the right hospital in the right amount of time."*

The Future

From the humble beginnings of the Subcommittee on the Transportation of Fractures to the modern EMS Committee, its heart and soul continues to be its members. Without the voluntary contributions of the members and liaisons, Dr. Farrington's "7 Years' War" could still be going on today. Instead, contemporary prehospital care of the injured patient has profoundly improved, with trauma care starting when the injury occurs, thereby ensuring optimal patient outcomes across the continuum of care.

EMS will continue to evolve, and the EMS Committee will continue to change as well to meet the needs of the patients and the providers. Gone are the days where the goal of EMS was to drive fast. We are now bringing critical care to the patient. However, these paradigm shifts come with their own challenges. How much is too much? When is it time to get moving? What can realistically be done in the field and what scenario needs a hospital? The EMS Committee continues to address these challenges and to build consensus among organizations.

EMS has moved out of the traditional prehospital setting. Community paramedics are treating patients in their homes and assisting in managing chronic conditions. How do we use community paramedicine to care for the trauma patient? Can we keep a trauma patient who may have to travel hours for their follow-up appointment at home to be seen by a community paramedic with telemedicine capability?

Providers across the world will look to the EMS Committee for guidance on these questions and more, and we will deliver. Finally, we need to continue to get young trauma surgeons engaged in EMS. It is the young trauma surgeons who will continue the great work of the committee and who will lead the care of the injured patient of any age, across the entire continuum, into the future.

Key Staff Partners
Holly Michaels, MPH, COT Systems Manager; and Jimm Dodd, PA-C, MA, COT STOP THE BLEED® Manager and their teams provide strategic leadership and support to the EMS Committee.

Evolution of the Name

1931	1934	~1944*	1971	2011
Subcommittee on Ambulance Equipment in the Emergency Treatment of Fractures	Subcommittee on the Transportation of Fractures	Subcommittee on Transportation of the Injured	Subcommittee on Emergency Services – Prehospital	EMS Committee

*During the war years, many of the committee leaders were deployed and meeting records were not kept. Actual date of name change not recorded.

PAST CHAIRS

1931

Robert H. Kennedy, MD, FACS
1931–1939

1944**

Roscoe C. Webb, MD, FACS
1944**–1951**

1951**

George J. Curry, MD, FACS
1951**–**

**

Richard H. Kiene, MD, FACS
**–1965

1965

J.D. Farrington, MD, FACS
1965–1974

1974

Kenneth F. Kimball, MD, FACS
1974–1979

1979

Alan R. Dimick, MD, FACS
1979–1981

1981

Norman E. McSwain, Jr., MD, FACS
1981–1985

1985

Lenworth M. Jacobs, Jr., MD, FACS
1985–1988

1988

Frank E. Ehrlich, MD, FACS
1988–1992

1992

Stuart A. Reynolds, MD, FACS
1992–1993

1993

Albert E. Yellin, MD, FACS
1993–1997

1997

James E. Wilberger, MD, FACS
1997–2004

2004

Mary E. Fallat, MD, FACS
2004–2007

2007

Jeffrey P. Salamone, MD, FACS
2007–2011

2011

Eileen M. Bulger, MD, FACS
2011–2015

2015

Mark L. Gestring, MD, FACS
2015–2020

2020

Peter E. Fischer, MD, FACS
2020–

**No written record of the term changes could be found.

COT MEMBERS IN ACTION

Many COT members have spent or currently spend time in the field supporting emergency medical services. The relationships formed and understanding generated from field experience are invaluable to the work of the trauma community. (Pictured: Eileen M. Bulger, MD, FACS; Peter E. Fischer, MD, FACS; Kenji Inaba, MD, FACS; and Scott G. Sagraves, MD, FACS).

Trauma Systems

Optimal outcomes for severely injured patients rely on optimal care and coordination across the entire continuum from the point of injury through rehabilitation. The Trauma System Evaluation and Planning Committee has worked tirelessly to meet this goal, rising to the challenge posed by A. Brent Eastman, MD, FACS, in his Scudder Oration in 2009, *"Our challenge as trauma surgeons of the United States and Canada is to persuade the powers that be to support the development of inclusive trauma systems for every citizen and traveler, in every state and province, wherever the dart lands, and to share our knowledge around the globe."*

Emergence of the Concept of a System of Care

The publication of the National Research Council report, *Accidental Death and Disability: The Neglected Disease of Modern Society* in 1966, is often identified as a seminal moment in the development of emergency medical systems (EMS) and trauma care. This report crystallized several key concepts that would form the basis for our current approach to caring for the injured patient and drive progress for the next several decades.

A key concept stated that all hospitals are not created equal, and that the "current dictum that an ambulance should deliver a patient to the nearest emergency unit is no longer acceptable."

> This assertion directly relates to another fundamental concept of trauma care—hospitals do not function in isolation but are part of an interconnected network that includes the prehospital system (charged with initial stabilization and then transporting patients to the hospital), the hospitals providing care in the region, and the rehabilitation care needed to get patients back to their preinjury level of function.

Taken together, these elements are the components of what we now recognize as a regional trauma system. In the current age of highly technical and institution-based medical care, it is worth looking back to realize that the provision of health care has evolved significantly. At the start of the 20th century, only one hundred years or so ago, the majority of health care was provided in the home. Large hospitals existed primarily for the care of the indigent or casualties of war, a custom that dated back to antiquity. The sick and injured were cared for at home by their family unless there was no other choice, and "no gentleman…would have found himself in a hospital unless stricken by insanity or felled by epidemic or accident in a strange city."

THE TRAUMA CARE CHAIN OF SURVIVAL

Source: A National Trauma Care System, Integrating Military and Civilian Trauma Systems to Achieve ZERO Preventable Deaths After Injury. NASEM, 2016.

Hospitals Begin Providing Care to the Injured Patient Leading to the Codification of Trauma Systems

Even though the development of the hospital into a center for advanced medical technology was well under way in the early 20th century, the concept of the modern trauma center is much newer. Despite the pioneering efforts of Charles L. Scudder, MD, FACS, COT Chair (1922–1933), to establish dedicated fracture services in major hospitals throughout the 1950s, hospitals and patient care were largely focused on infectious diseases, the evolution of modern surgical techniques, and the progressive interdependence of the hospital and the institution of academic medicine, driving the evolution of graduate medical education systems and research. In both the historical and the practical literature on hospital development from the mid-20th century, the care of the injured patient is a passing comment, if it is mentioned at all.

> In the 1960s, the first hospitals to embody the concept of injury care as a discrete specialty acknowledged the implications of trauma as a growing public health issue and, furthermore, recognized the importance that a dedicated health care institutional focus would have in improving clinical outcomes.

These hospitals that pioneered the early trauma center concept largely functioned within the context of the traditional public hospital model. They were a refuge for the indigent sick by intent, and the injured by necessity, and were at the heart of medical education and research. Two hospitals that were among the first with organized trauma services were the Cook County Hospital in Illinois and the San Francisco General Hospital in California. Early successes in trauma care demonstrated by these hospitals formed a nexus for the evolution of injury care services at many public hospitals in U.S. cities. These de facto trauma centers became the destination of choice for the severely injured, and ambulances would bypass other hospitals, even large and well-resourced ones, to deliver patients based on their experience and subject matter expertise.

Attendant to the 1966 *Accidental Death and Disability* report, two pieces of legislation were passed to develop prehospital care systems. The 1966 Highway Safety Act mandated that all states develop EMS systems and established the National Highway Traffic Safety Administration (NHTSA) as the federal compliance and oversight authority.

To further support this legislation, the Emergency Medical Services Systems Act of 1973 generated a program to support regional EMS systems, emergency medical technician (EMT) training, and the development of aeromedical evacuation services (see Chapter 10). This progressive focus on transport and definitive care facilities, arising organically around these de facto trauma centers, was associated with a significant reduction in preventable deaths and injury-related mortality within the regions served. Building upon the successful trauma center construct, this nascent approach to coordinated injury care led to the first codification of the trauma system, beginning with the state of Illinois in 1971 and the creation of the statewide Shock Trauma System in Baltimore, MD. A seminal paper titled "Systems of Trauma Care: A Study of Two Counties," published in 1979 in the *Archives of Surgery* by John G. West, MD, FACS; Donald D. Trunkey, MD, FACS; and Robert C. Lim, Jr., MD, FACS, compared outcomes for injured patients in Orange County, CA, and San Francisco County, CA, and demonstrated a dramatic reduction in preventable death after injury due to the organized trauma system in San Francisco. These findings led to revolutionary efforts to organize trauma care in California in the 1980s. These early systems were centered on the development and refinement of a few high-level trauma centers and the care they provided.

From its very beginning, the American College of Surgeons (ACS) has focused on improving hospital-based care for surgical patients, with a specific focus on the injured that began with the Committee on Fractures in 1922 and is carried on in the current-day ACS Committee on Trauma (COT). For much of its first 40 years, the work of the ACS concentrated on care at the individual hospital level, thus it was logical that the COT's first efforts also would be focused primarily on the development and refinement of the concept of the trauma center. Beginning with *Optimal Hospital Resources for Care of the Seriously Injured* in 1976, this work has grown into one of the COT's core programs, the Trauma Center Verification, Review, and Consultation Program (VRC), which conducted its first site visit in 1988 (see Chapter 5).

The expansion of trauma centers in both number and sophistication highlighted the need for parallel development of a systems-based approach to trauma care that extended beyond the reach of a single high-functioning trauma center. The narrowly defined system, built around a few high-level trauma centers, was a good solution primarily in urban areas, but its limitations rapidly became apparent as administrators sought to apply the principles in the suburban and rural settings that comprise most of the U.S. It was simply impossible to construct and maintain high-level trauma centers in sufficient number and geographic distribution to provide care to the injured in these broad and diverse settings. Therefore, an inclusive trauma system model in which all health care facilities within a region provide care for the injured to the extent of their capacity, was envisioned to optimize resource use and improve outcomes.

> *"A trauma system is a partnership between public and private entities to address injury as a community health problem. A fully developed statewide trauma care system has many components – requiring a multidisciplinary team approach that allows all involved health care providers to function in pre-planned concert. A trauma system is organized to protect the people from unnecessary deaths and morbidity due to trauma. Mature trauma systems encompass a full continuum of service components – from injury research and prevention, pre- hospital care, and hospital care – to rehabilitative services and performance improvement activities."*
>
> —*Resources for the Optimal Care of the Injured Patient* (2006)

COMPONENTS OF AN INCLUSIVE TRAUMA SYSTEM

- Injury Prevention Centers
- Prehospital Agencies
- Dispatch Centers
- Regional Medical Operations Centers
- Critical Access and Community Hospitals
- Trauma Centers: Levels I–V
- Rehabilitation Centers
- Medical Examiners/Coroners

Trauma System Evaluation and Consultation

From the very beginning, the COT's successful experience with trauma center verification site visits made it clear that there was also a great need for consultative assistance in developing trauma systems around the nation. As the trauma center verification program grew, the VRC began to receive an increasing number of requests to verify multiple trauma centers in the same geographic region (a region may be defined as, for example, "in San Diego County" or "the State of New Jersey") and it became apparent that it would be valuable to assess these centers in the context of the system in which they functioned.

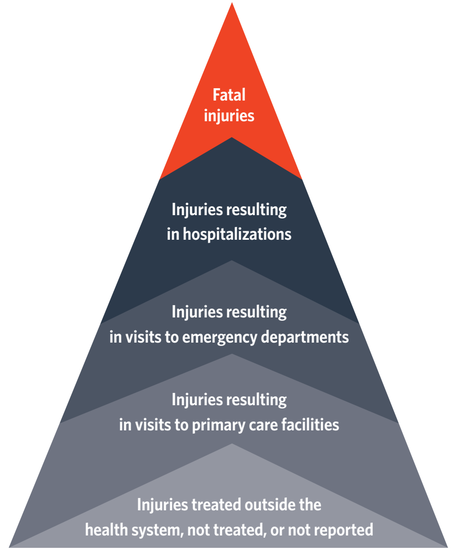
C. William Schwab, MD, FACS
Led the first trauma systems site visit pilot in 1994.

The first attempt at a formal system evaluation was carried out in Palm Beach, FL, in March 1994. This site visit pilot antedated any formal COT committee tasked to evaluate trauma systems and was organized and conducted by C. William Schwab, MD, FACS; Gail Cooper, Chief of Emergency Medical Services, San Diego County; Stephen Hargarten, MD, MPH, American College of Emergency Physicians (ACEP); and a multidisciplinary team. This trauma system evaluation was quite successful, but it highlighted the need for established standards and a formal COT-driven evaluation process. A. Brent Eastman, MD, FACS, COT Chair (1990–1994), made the case to establish a COT subcommittee charged with developing standards and facilitating trauma system development.

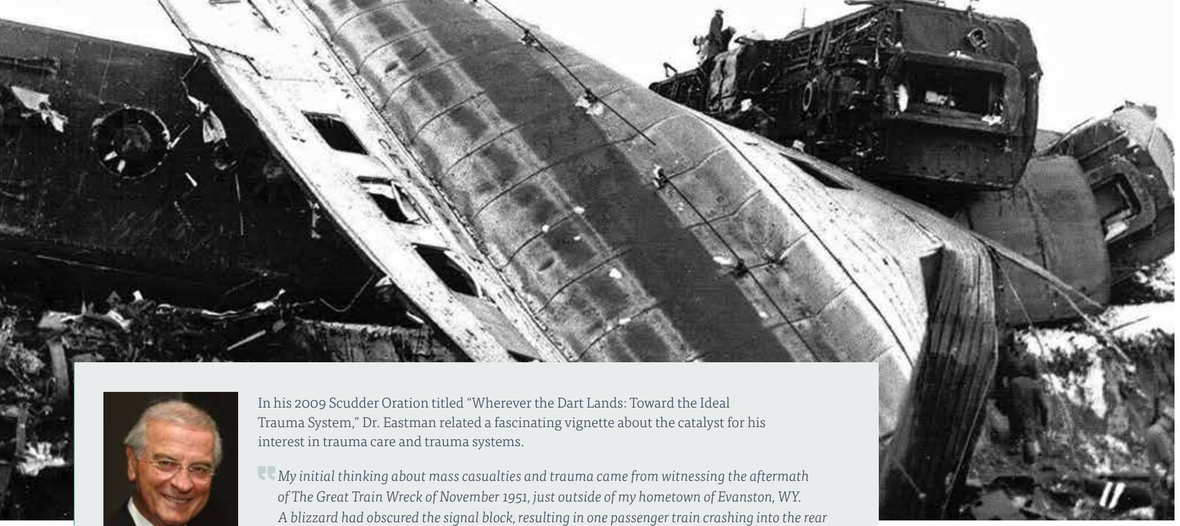
A. Brent Eastman, MD, FACS, COT Chair (1990–1994); and John A. Weigelt, MD, DVM, FACS, COT Chair (1994–1998), pictured at the ACS Clinical Congress in 1994.

Dr. Eastman was succeeded as chair of the COT by John A. Weigelt, MD, DVM, FACS, who tasked Dr. Eastman to continue to develop this idea, forming a multidisciplinary Working Group for Trauma System Evaluation on September 28, 1994. The working group, under Dr. Eastman's leadership, was charged with developing standards and a process by which trauma care systems could be evaluated. At that time, the COT did not have the necessary metrics or processes on which to base a consultation or verification program. Fortunately, the *Model Trauma Care System Plan* had been developed in 1992 under the auspices of the Health Resources & Services Administration (HRSA). Taking advantage of this blueprint, this plan was used as the template for the development of the ACS COT Trauma System Consultation Program.

Fatal Injuries Triangle



From the broad array of injured patients, trauma systems are designed to quickly identify those at risk for the most severe injuries and move them efficiently to the highest level of care while ensuring optimal care for patients with more minor injuries close to home.



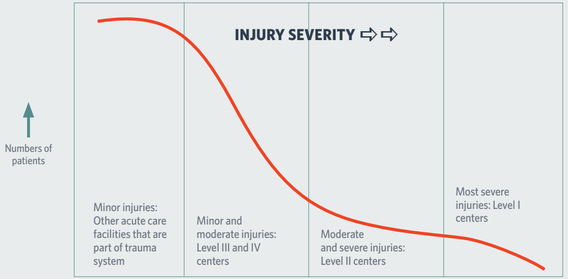
Horne, Shelly. "Remembering the Deadly Passenger Train Wreck of 1951." Uinta County Herald. March 9, 2018. *Photo Credit: Evanston Historic Preservation Committee.*

A. Brent Eastman, MD, FACS
COT Chair (1990–1994), Ad Hoc Committee on Trauma System Consultation (1999–2003).

In his 2009 Scudder Oration titled "Wherever the Dart Lands: Toward the Ideal Trauma System," Dr. Eastman related a fascinating vignette about the catalyst for his interest in trauma care and trauma systems.

> *My initial thinking about mass casualties and trauma came from witnessing the aftermath of The Great Train Wreck of November 1951, just outside of my hometown of Evanston, WY. A blizzard had obscured the signal block, resulting in one passenger train crashing into the rear end of another with such force that the mangled cars took out a freight train sitting on the sideline. At 11 years old, I was taken there the next day to see the wreckage by my father, who was a locomotive engineer on the Union Pacific railroad. I witnessed what happened there and was amazed at the coincidence—that many of the passengers on the* City of San Francisco *passenger train that rear ended the* City of Los Angeles *passenger train were surgeons returning from the ACS Clinical Congress in San Francisco. While contemplating topics for my Scudder Oration, I wrote C. Rollins Hanlon, MD, FACS, ACS Executive Director (1969–1986), who was the ACS historian at the time, and I asked if there was a way to find out what the Scudder Oration was in 1951. I was astounded to find out that the Scudder Oration that year had been on the treatment of fractures and was given by Sir Reginald Watson Jones, who had been somewhat critical of the way we were managing fractures in the United States. Ironically, one of the passengers of the* City of San Francisco *who hadn't been killed (many of the surgeons died in that wreckage) crawled out of the wreckage and into the food car, and then proceeded to fashion splints out of wooden orange crates to treat the numerous fractures and broken limbs of the injured. I think that was my first exposure to mass casualty and it awakened my interest in trauma. I never forgot that the surgeons who survived that crash, crawled out of the wreckage and helped the other survivors.*

THE INCLUSIVE TRAUMA SYSTEM



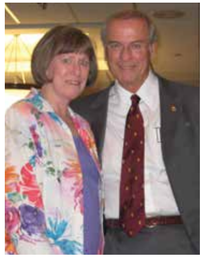
The inclusive trauma system uses the full spectrum of acute care facilities to provide trauma care.

As a result of the decision to embrace and foster an inclusive trauma systems model, the *Consultation for Trauma Systems* program was based on five key principles:

- The program would be consultative, designed to help trauma systems develop and improve
- The design would allow for evaluation of a trauma system at any stage of development, geographic location, or population density
- The program would evaluate care for patients of all ages
- The consultation team would be multidisciplinary
- The program would have a process for ongoing support and re-evaluation

The working group's first task was to build upon the *Model Trauma Care System Plan* and develop a practical, realistic, and relevant guiding document titled *Consultation for Trauma Systems* (known internally as "the Gray Book" and published in 1994). In its introduction, the Gray Book was described as "an instrument to facilitate an objective evaluation of any trauma system regardless of the stage of system maturity or the geographic location." Dr. Eastman recalled working group discussions regarding the focus and approach for the consultations, which some, including Donald D. Trunkey, MD, FACS, felt should parallel that of the VRC with exacting standards and a pass/fail verification for trauma systems. A rigid approach to system evaluation was philosophically attractive and may have been successfully applied to the small-scale regional systems based on a single trauma center that were most prevalent in the early 1990s. However, Dr. Eastman and the consensus of the working group considered that this approach would immediately fall short when applied to the much more complex and inherently political nature of the inclusive systems model postulated to be the dominant trauma system model of the future. As an alternate strategy, the working group determined that the COT would provide a consultative service, with the mission to work cooperatively with regions to facilitate the development of trauma systems based on the trauma system inclusive model.

The consultation process, like the *Model Trauma Care System Plan*, was based around system components, including administrative (leadership, system development, legislation, and finances), and operational and clinical components (injury prevention, human resources, prehospital care, definitive care facilities, rehabilitation, information systems, evaluation, and research). The focus of the consultation process was deliberately broadened beyond trauma center function, while the details of trauma center standards were left to the VRC.

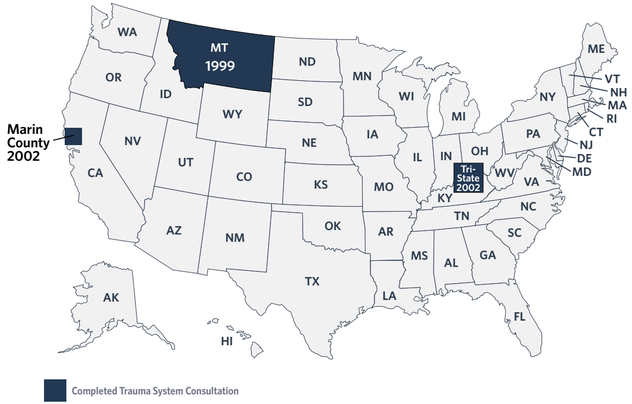


The 1999 Montana Consultation Team
Led by Dr. Eastman, and included Gail Cooper, Chief of Emergency Medical Services, San Diego County, who was a regular participant on many of the early trauma system consultations.

The Working Group for Trauma System Evaluation became the Ad Hoc Committee on Trauma System Consultation, chaired by Dr. Eastman, in 1999, the same year as the first formal COT-sponsored consultation visit to the state of Montana, which was conducted that July. In Dr. Eastman's recollection of that consultation, he noted that "we were inventing the process" and "the state of Montana was committed to bearing with us." The visit was conducted by a multidisciplinary team led by Dr. Eastman and included Ronald V. Maier, MD, FACS; J. Wayne Meredith, MD, FACS; Avery B. Nathens, MD, MPH, PhD, FACS, FRCSC; and Gail Cooper. The report from this first consultation visit generated more than 150 recommendations, and this information was used to generate recommendations for systemic improvements utilized by the Montana system during subsequent years. Though the first visit was successful as a pilot, it underscored areas of the program in need of improvement, and in Dr. Eastman's words "we kind of rewrote the whole thing" based on the lessons learned. Dr. Eastman's term as Chair of the Committee on Trauma Systems continued through 2002. During this period, two additional consultation visits were held, one in Marin County, CA, and the other in the tri-state area spanning the intersection of the states of Indiana, Ohio, and Kentucky. The committee's name was also changed to the Ad Hoc Committee on Trauma System Consultation.

Dr. Eastman's passion for improving trauma systems of care remains steadfast to this day. After describing the genesis of his interest in mass casualty and trauma in his 2009 Scudder Oration, he further opined on his conceptual organization of regional trauma systems that inspired the oration's title "*Wherever the Dart Lands…*". He elucidated on the origin of his now well-renowned oration, explaining that he was being interviewed before a congressional committee when one of the congressmen asked, "Dr. Eastman, what do you mean by a system-wide regionalized system for the United States?" Having never been asked that question before,

Trauma Systems Evaluation and Planning Committee Consultations
A. Brent Eastman, 1999–2003



Dr. Eastman replied: "Well, envision me standing before a large map of the United States with a dart in my hand and being blindfolded and throwing a dart at the map. It shouldn't matter wherever the dart lands, only that somebody injured at that particular geographic location should be expeditiously transported to the level of care commensurate with their injuries."

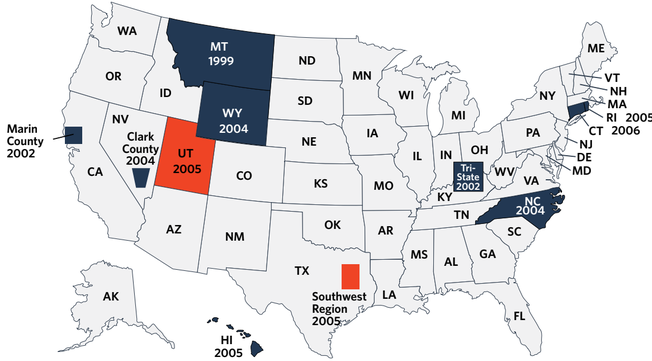
In 2002, Robert C. Mackersie, MD, FACS, succeeded Dr. Eastman as the second chair of the Trauma Systems Consultation Committee. As the committee gained experience, the consultation process was refined and expanded. Consultation visits were held in Wyoming (2004), North Carolina (2004), Hawaii (2005), Rhode Island (2006), and Illinois (2006). Dr. Mackersie described the trauma system consultation process as *"a rich environment to work in… you get to work closely with people with very different backgrounds with different perspectives, but they're all in it for the same reason—they all want to improve the care of the trauma patient."*

Robert C. Mackersie, MD, FACS
Chair Ad Hoc Committee on Trauma System Consultation (2003–2006).

During Dr. Mackersie's tenure as chair, funding for trauma system development through Title XII of the Public Health Service Act ended, however, there was still significant federal support for trauma system development, and the committee worked to establish ties with various partner agencies involved. Representatives from the Health Resources & Services Administration ([HRSA] – Cheryl Anderson), the National Highway Traffic Safety Administration ([NHTSA] – Drew Dawson), the Centers for Disease Control ([CDC] – Richard C. Hunt, MD), and the Emergency Medical Service for Children ([EMSC] – Diana G. Fendya, RN, MSN) became regular attendees at the committee's meetings.

During this time, HRSA also provided funding and support to update the *Model Trauma Care System Plan*, which transformed the component-based model of the 1992 document to one based on the CDC's model of public health, which had been very successful in the fight against infectious diseases. This work culminated in the publication of *Model Trauma System Planning and Evaluation* in 2006. This document further expanded on the concept of the inclusive trauma system, and added a section on benchmarks, indicators, and scoring (BIS) that embodied the intent of the original *Model Trauma Care System Plan* to provide a means to evaluate trauma systems in various settings and at different levels of maturity. Many of the authors and reviewers who contributed to the creation of the 2006 document were members or federal partners of the Ad Hoc Committee on Trauma System Consultation. In line with the philosophy of the HRSA document, the committee's name was changed to the Trauma System Evaluation and Planning Committee (TSEPC).

Trauma Systems Evaluation and Planning Committee Consultations
Robert C. Mackersie, 2003–2006



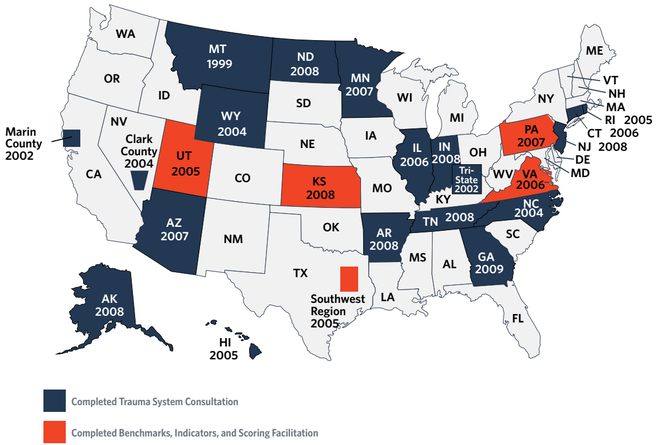
Trauma System Consultations Expand Across the Nation

Michael F. Rotondo, MD, FACS, was appointed as the third chair of what was now known as TSEPC in 2006. The TSEPC continued its primary mission of fostering trauma system development nationwide, expanding the scope of the consultation program, broadening federal partnerships, and advocating for trauma system funding. Working from a graphical model that was commonly used at the COT Annual Meeting to demonstrate the expansion of various educational programs, including the Advanced Trauma Life Support® (ATLS®) and the Rural Trauma Team Development Course (RTTDC), Dr. Rotondo enthusiastically embraced the challenge of *"turning the map blue," working toward the goal of holding consultations in all 50 states.*

Michael F. Rotondo, MD, FACS
Chair Trauma Systems Evaluation and Planning Committee (2006–2009).

In the first years of the Trauma System Consultation Program's existence, from 1999 to 2005, a total of 9 consultations had been completed. In those early years, the pace of consultations, measured as significant adjustments in the program, were being made in tandem with these visits. During Dr. Rotondo's term as committee chair, the number of states visited more than doubled; a total of 14 consultations and 2 facilitated BIS assessments were done, including 5 consultations in both 2008 and 2009 (a pace that remains an annual record). Consultations and BIS facilitations were held in Pennsylvania, Arizona, Minnesota, Tennessee, North Dakota, New Jersey, Kansas, Alaska, Arkansas, Indiana, Georgia, Colorado, Missouri, Louisiana, West Virginia, and Ventura County, CA. These site visits were carried out by a dedicated group of surgeons, emergency physicians, state emergency medical services directors, and state trauma managers, along with the dedicated consultants and staff of the TSEPC during this period (including Nels Sanddal, PhD; Jane Ball, PhD; Michelle Wielgosz; and Holly Michaels, MPH).

Trauma Systems Evaluation and Planning Committee Consultations
Michael F. Rotondo, 2006–2009



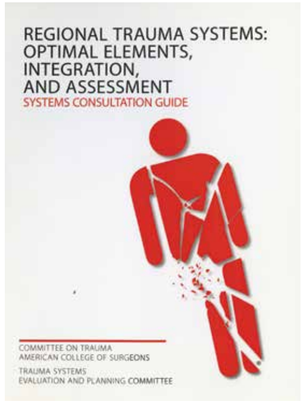
By their very nature, trauma consultations are hard work. The teams work closely together over many hours, traditionally in windowless conference rooms, to review the submitted information and form cogent recommendations to present back to the trauma system representatives. Trauma systems consultation lore lays some of the blame for those windowless conference rooms on Dr. Mackersie's demonstrated angst from being forced to look out over Waikiki Beach while trying to complete the first Hawaii consultation! This busy active period in the development of the Trauma System Consultation Program saw many important milestones, including the first use of the public health model and the new "White Book." Consultation team members will remember fondly key anomalies of many of those consultation trips: the Seven Seas Inn located in North Dakota is unforgettable because the Seven Seas Inn was not actually located near any body of water (unless you count the indoor waterpark filled with screaming children!); the side road trip by the team to see Denali National Park while in Alaska; a clandestine run for pizza and beer in Georgia in order to take a much needed-break from hotel food as the team worked late into the night; and July in Baton Rouge, Louisiana, with Norman E. McSwain, Jr., MD, FACS, serving as one of the key surgeon champions for the consultation. It was noted by the consultation team that while the hotel in Ventura, CA, was located on the beach, there were no windows present in the conference room to provide a distraction and they wondered if that had been planned.

Texas consultation team in 2010

From left to right: Nels Sanddal, PhD, consultant; Rajan Gupta, MD, FACS, FCCP, observer; Theodore R. Delbridge, MD, MPH, emergency physician; Christoph R. Kaufmann, MD, FACS, team leader; Jolene R. Whitney, MPA, program manager; Jane Ball, PhD, consultant; Drexdal Pratt, Chief, EMS Director; and Alasdair K. T. Conn, MD, FACS, trauma surgeon.

Front row: Gerry Pratsch, RN, observer; Holly Michaels, COT Manager, Trauma Systems; Jolene R. Whitney, MPA, program manager; Jane Ball, PhD, consultant; Rajan Gupta, MD, FACS, FCCP. Back row: Alasdair K. T. Conn, MD, FACS; Theodore R. Delbridge, MD, MPH, emergency physician; Christoph R. Kaufmann, MD, FACS; Nels Sanddal, PhD; and Drexdal Pratt, chief, EMS director.

Trauma System Evaluation and Planning Version 2.0

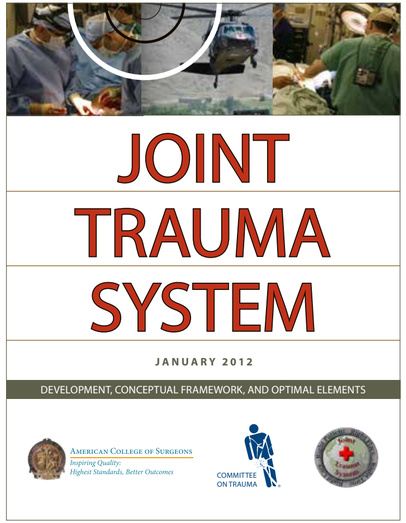


Regional Trauma Systems: Optimal Elements, Integration, and Assessment: The Systems Consultation Guide, also known as the "White Book," as published in 2008.

Avery B. Nathens, MD, MPH, PhD, FACS

In addition to the primary mission of state consultations, Dr. Rotondo began two other major initiatives during his first meeting as committee chair. The first was a revision of the original consultation manual, the "Gray Book," to align with the recently revised *Model Trauma System Planning and Evaluation* document published by HRSA in 2006. The Gray Book's revision was a major undertaking, led by Dr. Nathens, and involved more than 25 contributing authors from stakeholder groups spanning the continuum of trauma care. The resulting manual, *Regional Trauma Systems: Optimal Elements, Integration, and Assessment: The System Consultation Guide* was published in 2008 and christened the "White Book." This guide has continued to serve as the basis for the trauma system consultation process to the present day. In addition to outlining an approach to trauma system design based on public health principles, the "White Book" incorporated the BIS system put forward in the 2006 HRSA document and integrated the specific benchmarks into the fabric of the trauma system design and evaluation process.

The second major project overseen by Dr. Rotondo was the study of trauma systems that had gone through the systems consultation process to objectively assess the program's impact. This work was led by Robert J. Winchell, MD, FACS, working with a team that included Nels Sandal; Gail Cooper; Jane Ball; Christoph R. Kaufmann, MD, FACS; and Holly Michaels. The project used a selected subset of 16 indicators from the full BIS tool (the "sweet 16") to estimate before and after scores for each center. The study evaluated six state-wide trauma systems that were visited between 2004 and 2006, collecting data from the final consultation reports and from guided conference calls with system leadership from each state. The analysis showed a statistically significant increase in the aggregate indicator scores after consultation. The largest gains were seen in systems with the longest time interval between consultation and final assessment. Individual indicators related to system planning and quality assurance infrastructure showed the most improvement, however little or no change was seen in indicators related to system funding. While subjective feedback from trauma systems regarding the benefits of the consultation process had been positive, this study represented the first objective assessment of the program. Baseline assessment of the 16 selected indicators was adopted as an integral part of the consultation process beginning in 2007, and has been used since that time to assess system progress.



Joint Trauma System: Development, Conceptual Framework, and Optimal Elements
Published by the U.S. Army Institute of Surgical Research in 2012, an outcome of the strong partnership between the military and the ACS COT.

The Joint Theater Trauma System (JTTS)
Developed in Iraq and Afghanistan and implemented as a joint effort amongst the U.S. Army, Navy, and Air Force to improve, advance, and coordinate how medical care is provided on the battlefield.

Incorporating Lessons Learned in Conflict

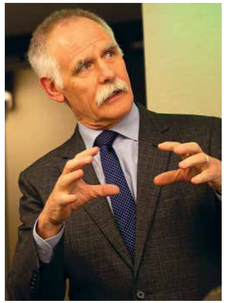
Dr. Rotondo's tenure as Chair of the TSEPC coincided with the later phases of the ongoing conflicts in Iraq and Afghanistan. During these conflicts, the military approach to the care of the injured was continually refined, leading to significant improvements in survival. For the first time, many of the surgeons called to duty in the theater of war had prior experience with civilian trauma systems and with the COT, and programs such as the Senior Visiting Surgeon Program (see Chapter 15) based in Landstuhl, Germany, brought additional expertise from the civilian trauma community. By 2007, the military's deployed Joint Theater Trauma System (JTTS) was operating at a high level, capable of treating combat wounded at forward surgical facilities within one hour of injury, with evacuation to high-level care at Landstuhl Regional Medical Center within 24 to 72 hours, and to top-level facilities within the U.S. as soon as 72 hours from injury.

> A great many lessons had been learned in the development and coordination of the JTTS, including the widespread use of continuously evolving clinical practice guidelines, networks for patient transportation, and the implementation of the Joint Theater Trauma Registry.

The JTTS epitomized the concept of the learning health care system (LHS) model, well before that term was coined by the Institute of Medicine (now the National Academy of Medicine). While the JTTS was in full operation in 2007, the eventual end of large-scale conflicts in Iraq and Afghanistan was inevitable at some point, and with this came the growing concern that the hard-won knowledge developed would be lost as the JTTS stood down.

Working with leadership of the JTTS and the overarching Joint Trauma System (JTS) (including Colonel Jeffrey A. Bailey, USAF, MD, FACS; Mary Ann Spott, PhD [Deputy Director of the JTS]; Colonel George P. Costanzo, USAF, Retired, MD, FACS; Captain James R. Dunne, USN, MD, FACS; Colonel Warren C. Dorlac, USAF, MD, FACS; and Colonel Brian J. Eastridge, USA, MD, FACS), Dr. Rotondo led a working group from the TSEPC that set out to codify the structure and function of the JTS within the framework used by the TSEPC in its work with civilian trauma systems. The resultant book, *Joint Trauma System: Development, Conceptual Framework, and Optimal Elements*, was published by the U.S. Army Institute of Surgical Research in 2012, the culmination of several years of dedicated work involving a large number of contributors. This project, among others arising from the wars in Iraq and Afghanistan, is illustrative of the growing partnership between the military and the ACS, the COT, and TSEPC that has characterized the past 20 years.

Maturation of the Consultation Process

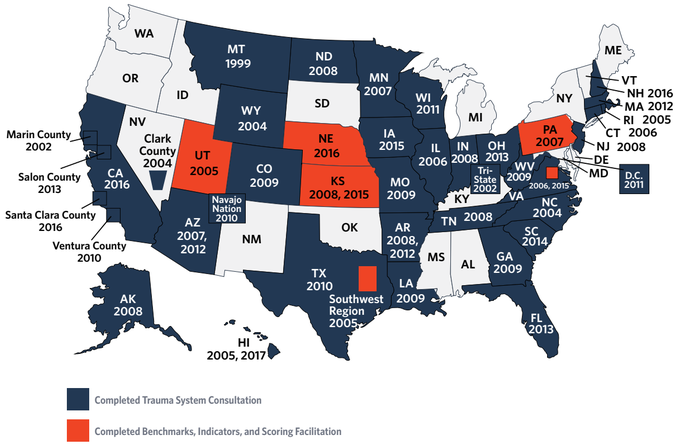


Robert J. Winchell, MD, FACS
Chair Trauma Systems Evaluation and Planning Committee (2009–2018).

In the spring of 2010, Dr. Winchell became the fourth Chair of the TSEPC. Dr. Winchell had been a member of the committee since 2006 and he served as Vice Chair under Dr. Rotondo. The committee continued its core mission to 'turn the map blue', and over Dr. Winchell's eight-year tenure, a total of 18 state or regional consultation visits were conducted (including one autonomous nation), in addition to two facilitated BIS visits. By the spring of 2018, TSPEC had conducted a total of 49 state and regional consultation activities and had participated in trauma system development in 37 out of 50 states. As the pool of states seeking a broad, high-level state consultation narrowed, and as lead agencies faced significant financial challenges in the wake of the Great Recession (2007–2009), Dr. Winchell sought to broaden the reach of the Trauma System Consultation Program, and its scope was expanded to include more focused consultations aimed at helping with a specific question, most commonly with the optimal distribution of trauma centers within the system. Consultations and BIS facilitations have been held in Texas, the Navajo Nation, Arkansas (second visit), Wisconsin, Clark County (second visit), the District of Columbia, Massachusetts, Arizona (second visit), Florida, Ohio, Solano County, CA, South Carolina, Iowa, Kansas (second BIS facilitation), Virginia, New Hampshire, California, Nebraska, Santa Clara County, CA, and Hawaii (second visit).

Some notable highlights from this time period included wild parties (the host hotel clearly was also a favorite spot for younger folk in the community to congregate) and wild dogs in Window Rock (the team stayed in an area of the Navajo Nation where many dogs roamed free, making the Chicago city staff a little nervous); the famous Peabody ducks greeting the review team each day in the hotel lobby in Arkansas; yoga breaks in Arizona to ensure the team didn't get stiff while working around the clock; a team of lawyers larger than the consult team in Florida during the opening session of the consultation (not to mention the subterranean Onyx Room that the team worked in all week); barbecue and ping pong in South Carolina; a blizzard in Iowa; and a return to the beaches of Waikiki, and visits to every trauma center in the state of Hawaii.

Trauma Systems Evaluation and Planning Committee Consultations
Robert J. Winchell, 2009–2018



Needs Based Trauma Center Designation Consensus Conference at the ACS headquarters, Chicago, IL, in August 2015.

Trauma Center Designation Based on Need

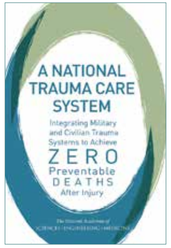
Though trauma centers had always been a major focus of trauma system consultations, the intensity of the debate regarding the number and distribution of Level I and II trauma centers increased dramatically beginning around 2010. This expansion threatened to dominate many of the other elements of the consultation process that stressed the inclusive system approach and broad incorporation of all elements of the public health model. Trauma center designation based upon need was a nearly universal priority recommendation, and the "trauma systems ≠ trauma centers" slide was a cornerstone of nearly every consultation exit presentation. Heated debate about the addition of another Level I trauma center in Boston was followed by a similar debate centered on the Valley of the Sun in Arizona, and reached its ultimate culmination in Florida, where the subject of trauma center designation had sparked a contentious legal battle that pitted many colleagues against one another in what was essentially a civil war within the trauma community. In fact, a nationwide lack of consensus regarding the criteria that should guide trauma center selection, the appropriate metrics for assessment of need, and the lack of agreement on methods of data analysis was sharply highlighted by the Florida consultation visit.

In response to this controversy, the TSEPC developed a position statement on trauma center designation based on need that was approved by the ACS Board of Regents in October 2014 and published January 2015. Subsequently Dr. Winchell, as TSEPC Chair, and Ronald M. Stewart, MD, FACS, as COT Chair (2014–2018), proposed and organized a meeting involving a wide group of stakeholders representing all sides of the trauma center designation debate, with the goal of developing comprehensive consensus around the principles outlined in the position statement, and working to develop tools that could guide lead agencies in the process. The ACS COT convened the Needs Based Trauma Center Designation Consensus Conference at the ACS headquarters, Chicago, IL, in August 2015. The group unanimously endorsed the ACS COT position statement and produced an initial draft of the Needs Based Assessment of Trauma System (NBATS) tool, based on legislation that had been passed in Florida following recommendations made in the 2013 consultation visit. This work has continued to guide the TSEPC's approach to trauma center designation, in the context of systems development. The NBATS tool has undergone validation and testing in various regional systems and continues to be actively refined, shifting the focus from suggesting a specific number of trauma centers to the use of geospatial modeling principles and estimates of trauma center capacity to provide objective data to support policy decisions.

The Case for Trauma Systems

The TSEPC continued its efforts to develop the evidence demonstrating the efficacy of trauma systems and the trauma system consultation process. The initial 2008 follow-up study was extended and expanded, looking at postconsultation progress in a total of 20 systems visited between 2002 and 2010, including the six described in the original work. This study further supported the efficacy of the trauma system consultation process overall, as well as the ongoing challenges related to system funding. The TSEPC supported the conception and execution of a project assessing the impact of specialty designation of pediatric emergency departments, funded as a Targeted Issues grant through HRSA and EMSC, and the work was completed in conjunction with Dr. Meredith and Wake Forest University Health Sciences. In addition to Dr. Meredith, the investigative and program staff included: Ginger Wilkins, MSN, from Wake Forest; Thomas J. Esposito, MD, FACS; Nels Sanddal; Jane Ball; N. Clay Mann, PhD; and Holly Michaels. The TSEPC also engaged in a long-term partnership with researchers at the University of Arkansas, working on the National Institutes of Health-funded Comparative Assessment Framework for Environments of Trauma Care (CAFE) project, beginning in 2015. This project sought to develop an objective way to assess the organizational attributes of trauma systems and trauma centers, ultimately with the aim to correlate with optimal function and patient outcomes.

In 2016, the National Academies of Science, Engineering, and Medicine (NASEM) published *A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury.*



Book cover: *A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury.*

This report focused on the ongoing problem of injury since the initial National Academies of Sciences National Research Council published *Accidental Death and Disability: The Neglected Disease of Modern Society* in 1966. The publication of this document brought a renewed national focus on trauma system development in parallel with the military and presented a new opportunity to seek policy change at the national level. This report changed much of the focus and priority for the TSEPC, and in a larger sense for the COT, for the next few years.

Participants from the "Zero Preventable Death and Disability" summit in spring 2017.

Ronald M. Stewart, MD, FACS, ACS COT Chair (2014–2018), leading the "Zero Preventable Death and Disability" summit in spring 2017.

In the fall of 2016, the Executive Committee of the COT put forward its commitment to work toward implementation of the NASEM's recommendations, work that encompassed many of the TSEPC's activities. With the support of NASEM and NHTSA, the COT, under the direction of Dr. Stewart, convened a broad stakeholder group with the aim to develop specific plans for the implementation of the NASEM report findings. This conference was held in Bethesda, MD, in the spring of 2017, and focused on five major category areas: advocacy, trauma system governance, research, data sharing and integration, and military/civilian workforce readiness.

The TSEPC Team, Past and Present
Robert J. Winchell, MD, FACS, Chair (2009–2018); Holly Michaels, MPH, COT Manager, Systems Programs; Brian J. Eastridge, MD, FACS, Chair (2018–).

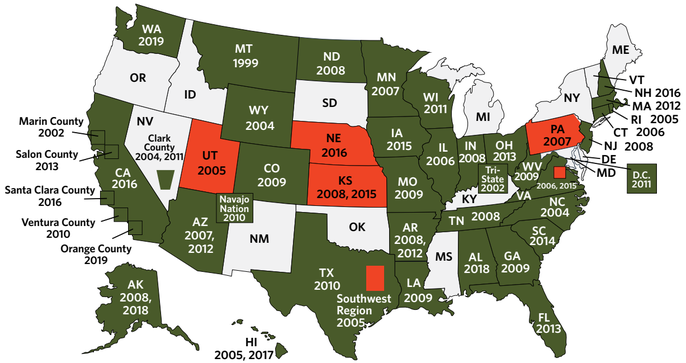
Appointed to the TSEPC Chair position while still an Army Reserve surgeon, Dr. Eastridge's U.S. Army roots were immediately apparent, as one of his first administrative imperatives was to change the TSEPC's mission from "turning the map blue" (the colors originally used by Dr. Rotondo to track the progression of completed trauma systems consultations) to "turning the map Army green!" as he tracked the ongoing promulgation of the consultation program… a change Dr. Eastridge insisted was purely coincidental! By early 2020, state consultations had been held in Alaska (second visit), Alabama, Washington, and Orange County, CA, bringing the total number of states visited to 39.

Notable events from these visits included a trip to the northernmost trauma center in the world in Utqiaġvik (Barrow), Alaska, where the team enjoyed polar bear sightings; learning how to appropriately use the phrase "bless your heart" in Alabama; and finally visiting Washington State where the state drink isn't the typical "milk" we often find when researching state fun facts to list in the exit presentation—but, rather, coffee. Restrictions imposed by the global COVID-19 pandemic forced a suspension of the traditional team-based consultations in early 2020.

The conference findings relating to trauma system governance envisioned a broad federal mandate that would require states to develop a framework to address the problem of injury at the policy level, and it presented a set of essential trauma system elements that would define the minimum standards for such a framework. Since publication of these essential elements, the TSEPC has sought input from a wide range of trauma-related organizations and has worked to develop a broad base of support that would enable implementation of the standards at a federal level.

In the spring of 2018, Dr. Eastridge was appointed as the fifth chair of the TSEPC. Dr. Eastridge was the original deployed JTTS Trauma System Director and one of a core group of military surgeons who led the development and refinement of the JTS and the JTTS, formally codified as the combat trauma system for the U.S. Department of Defense. Dr. Eastridge had previously worked substantively with the TSEPC, having conceptualized the *Joint Trauma System: Development, Conceptual Framework, and Optimal Elements* manual development with Dr. Rotondo and the ACS Trauma Systems staff.

Trauma Systems Evaluation and Planning Committee Consultations
Brian J. Eastridge, 2018–Present



ESSENTIAL TRAUMA SYSTEM ELEMENTS

As of January 2022

Essential Trauma System Element #1: Continuum of Care
The trauma system SHOULD address the full continuum of injury from prevention and prehospital/interfacility emergency medical services, to acute hospital care (referring and accepting facility) through rehabilitation. The system SHOULD address all injured patients with special attention to pediatric, geriatric, those with mental illness, and other vulnerable populations.

Essential Trauma System Element #2: Statutory Authority
Statutory authority to enable development and implementation of a trauma system SHOULD exist. A lead agency with sufficient authority to implement policy, maintain well defined administrative rules, and allocate trauma system funds, SHOULD be established, or identified. A multidisciplinary advisory group, consisting of stakeholders representing the full spectrum of trauma care, SHOULD guide the lead agency.

Essential Trauma System Element #3: Multidisciplinary Advisory Group
A multidisciplinary advisory group, consisting of stakeholders representing the full spectrum of trauma care, SHOULD be established. The role of the advisory group SHOULD be to guide the lead agency regarding trauma system development and operations. Representation SHOULD be diverse, with respect to geography, population (rural/urban, adult/pediatric, burn), phases of care (prehospital and rehabilitative) and trauma center level designation.

Essential Trauma System Element #4: Trauma System Plan
An integrated trauma system plan SHOULD be created and implemented. This plan SHOULD be reviewed annually, and updated every three years at a minimum, under the direction of the lead agency and the multidisciplinary advisory group.

Essential Trauma System Element #5: Needs Based Designation
The lead agency SHOULD develop and administer a trauma center designation process, based upon population needs.

Essential Trauma System Element #6: Funding
The lead agency SHOULD establish a sustained funding mechanism for trauma system infrastructure. Funding SHOULD include physical and staffing resources for program administration and oversight, data collection, data storage, data analysis, quality improvement activities, education, and support for disaster response and military integration.

Essential Trauma System Element #7: System Trauma Registry
The lead agency SHOULD have the authority to establish and maintain a trauma system registry to collect, validate, and analyze injury surveillance data. Data collection SHOULD include the full continuum of care from point of injury through rehabilitation. These data SHOULD include all care facilities that treat injured patients. These data SHOULD be integrated with other data collection systems (for instance, vital records, medical examiner, law enforcement, and rehabilitation). Data definitions and patient inclusion criteria SHOULD be standardized to a national standard. Data sharing SHOULD be optimized to include system stakeholders to support quality improvement, research efforts, and to inform legislation pertaining to trauma.

Essential Trauma System Element #8: Injury Epidemiology
The lead agency SHOULD have systems and processes in place to regularly track and report on injury frequency, rates, and patterns across the entire jurisdictional population. Analysis and reporting SHOULD be based on multiple pertinent data sources (e.g., vital statistics, hospital discharge data, EMS, ED data, and trauma registries), including information obtained through surveillance activities. Data from these sources SHOULD be synthesized to provide a comprehensive description of injury and analyzed to identify trends and patterns to inform system development, injury prevention, and performance improvement efforts.

Essential Trauma System Element #9: System-wide Performance Improvement
The lead agency SHOULD establish a system-wide trauma performance improvement (PI) process to evaluate all aspects of the trauma system. The plan SHOULD define audit filters to monitor and track specific processes and outcomes, such as access to care, availability of services, and effectiveness of injury prevention initiatives. In addition, the plan SHOULD define a process for ongoing tracking of the audit filters, and addressing performance gaps, and loop closure.

Essential Trauma Element #10: Confidentiality and Discoverability
The lead agency SHOULD establish a process to ensure patient confidentiality and provide statutory protection from discoverability to support trauma system performance improvement and research efforts.

Essential Trauma System Element #11: Disaster Preparedness
A comprehensive emergency disaster preparedness and response plan SHOULD be established and reviewed annually. This plan SHOULD integrate all components of the trauma system and coordinate with all existing response entities including local, state, federal, and particularly military partners. There SHOULD be a developed Regional Medical Operations Center (RMOC) as a major component of the disaster preparedness plan. The plan SHOULD be exercised regularly, at least, semiannually. One of these exercises SHOULD be operationally based (not tabletop), testing all components of the system.

Essential Trauma System Element #12: Military Integration
The trauma system SHOULD actively support integration and cooperation with military personnel, medical treatment facilities, and transport capabilities. This SHOULD include patient care, education, data collection, performance improvement, research, training, disaster response, and clinical readiness.

The Present

The TSEPC has continued to refine and build support for the trauma system essential elements as part of the COT's ongoing efforts to lay the groundwork for a National Trauma System following the NASEM report findings. As part of this project, the TSPEC is in the midst of rewriting the guiding document for the consultation process, the "White Book," to align with the new essential elements, while retaining the inclusive system focus and public health roots of the prior document. These efforts are being driven by several working groups drawing from both TSEPC and the larger trauma community. Work group leads include Barbara A. Gaines, MD, FACS (Trauma System Components and Needs Based Designation); John H. Armstrong, MD, FACS (Statutory Authority and Funding); Robbie Dumond, BSN, MHA (Multidisciplinary Advisory Group and Trauma System Plan); Dr. Dorlac (Data Collection, Confidentiality and Discoverability; System-wide Performance Improvement); and Anne G. Rizzo, MD, FACS (Military Integration and Disaster Preparedness). The Steering Committee overseeing the "White Book" revision includes work group leads Dr. Eastridge, Dr. Winchell, Dr. Dorlac, and D. Anderson Millar, MD, FACS; as well as staff members Melanie Neal, MS; Holly Michaels, MPH; and Jimm Dodd, PA-C, MS, MA.

Warren C. Dorlac, MD, FACS
Vice Chair TSEPC (2018–2022) leads a special cross-pillar work group to refine the RMOC concept.

Another key area of focus for the TSEPC committee is the development of a robust follow-up program with states/regions where consultations have taken place. The purpose of this program will be to better understand how our consultation report is used and what challenges systems experience in implementing those recommendations. The program will also serve as a tool to maintain relationships with systems and to monitor progress in system development across the country.

In 2021, in response to a series of news media articles highlighting the significant costs associated with trauma center proliferation and excessive pricing of trauma team activations by some for-profit centers, the COT Executive Committee published a revised Trauma Center Based on Need Guideline which included a section addressing these economic drivers.

The COVID-19 pandemic highlighted several opportunities to improve TSEPC processes. Virtual and modular/tactical trauma system consultations are being developed with the intent to both increase the promulgation and enhance the value of the TSEPC process, thereby augmenting consultation access. In identifying the need to continue to promote state and regional trauma system development, the committee currently is working on a virtual trauma systems consultation format, with the aims of recreating the same open dialogue between the review team and system stakeholders and delivering just as rich and meaningful a consultation report. It is anticipated that virtual consultations will offer the opportunity for scalability and modularity in consultations.

Another opportunity highlighted as a critical system component by the pandemic response is the concept of the Regional Medical Operations Center (RMOC). The goal of the RMOC is to strengthen regional care delivery through enhanced coordination, rather than redefining its structure and function if they already are successfully in existence. The purpose of this model is to define and advocate for the structural and functional capabilities which should exist within the system. The RMOC model is designed to facilitate the most appropriate level of care based on each individual patient's acuity for as many patients as possible, while simultaneously maintaining patient safety and keeping as many patients as possible within local facilities capable of providing high quality care. A key tenet of the RMOC model is the philosophy that no facility will ever be left behind or forced to stand on their own in a time of health care crisis when health care resources could be rationed. Rather, the RMOC enables the entirety of a region's health care system to 'load balance' patient care needs across health care facilities and health care systems prior to any individual facility transitioning to a crisis standard of care. Led by Dr. Dorlac, the Vice Chair of the TSEPC, a special working group formed from the Trauma Systems and Advocacy Pillars of the ACS COT, as well as several specialty stakeholders, seek to refine the RMOC concept to present for legislative consideration. Incorporating the principles of an RMOC into the consultation process as well as creating a stand-alone consultation and/or education module is currently being discussed.

The Future

The core mission of the TSEPC remains firmly grounded in its founding tenets, one of which is that hospitals do not function in isolation but are part of an interconnected network, and though much progress has been made in the last 30 years, the goal of a comprehensive national trauma system remains elusive. The experience gained during those 30 years has demonstrated the long-term value of the trauma system consultation process, while also opening new avenues to advance trauma system development. The publication of the 2016 NASEM report, *A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury*, provided a new impetus and new energy to the trauma system development process and led to significant shifts in the way the TSEPC and the COT continue their work. The future direction of the TSEPC will certainly include a renewed and invigorated trauma system consultation program based upon the newly refined essential elements, which will increasingly focus on return visits to states and regions (for the map will soon be fully colored in!), as well as more focused "tactical" or problem-oriented consultations.

The overarching long-term vision of the TSEPC is the development and implementation of a National Trauma and Emergency Preparedness System (NTEPS) architecture at the federal level, building upon the 2016 NASEM report, and incorporating the lessons learned from the COVID-19 pandemic. As illustrated in the graphic "Ready Regions, Ready Communities" by Dr. Stewart, a comprehensive trauma system will support not only the daily needs for injury care but can also serve as the framework for mass casualty and disaster response and support research to advance injury care. We believe now is the time to advocate for federal support for the infrastructure needed to develop a truly national system that will support the ongoing development of state and regional systems and unite them with a common framework which will allow regional and national coordination of major events impacting our health systems. In partnership with the American Trauma Society, we are launching a public awareness campaign along with our centennial year messaging to support these advocacy efforts.

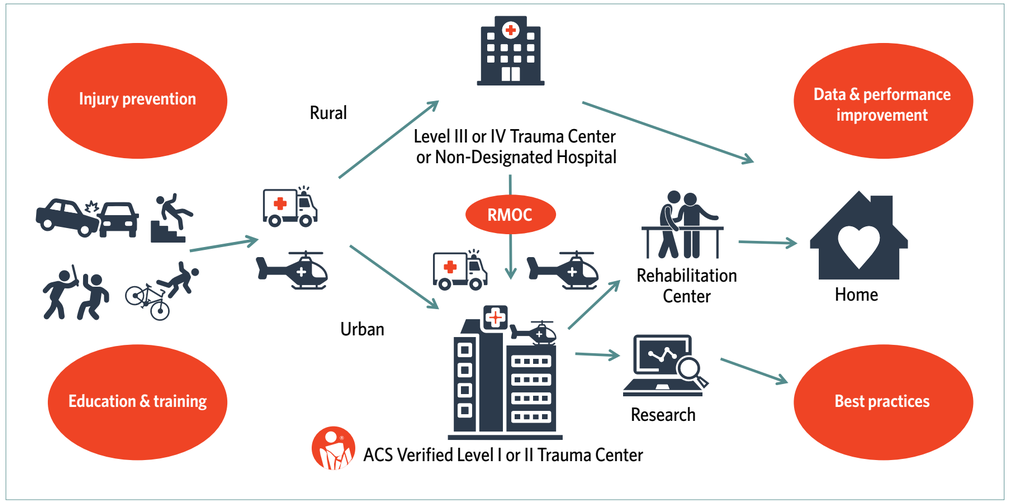
A National Trauma and Emergency Preparedness System will be predicated upon strong leadership at the federal level, operationalizing the recommendations of the report and ongoing advocacy and trauma system leadership from the ACS COT.

Philosophically, this NTEPS would support the consensus objectives developed by the American College of Surgeons Committee on Trauma, including the following:

- The NTEPS would prioritize care for all injured patients, regardless of age, demographics, or geography.
- Resources would be integrated across the continuum of the patient experience, from point of injury to reintegration in society.
- The NTEPS would be a continuous learning community with three pillars: trauma care, injury prevention, and system readiness. These pillars rise from a foundation of research, quality improvement, standards, and education.
- The NTEPS will support an integrated network of Regional Medical Operations Centers which can facilitate daily movement of trauma patients and scale up to work collectively to manage any mass casualty event.
- Success of the NTEPS would be measured in improved access, quality, and efficiency of injury care, reduce injury, and enhance readiness.

As part of this work, the TSEPC will continue to develop and refine metrics of trauma system performance and build processes to assist lead agencies in making policy decisions around trauma center designation. In collaboration with the Disaster Committee, the TSEPC will develop standards for RMOCs and incorporate these into the trauma system consultation program. The COT will also continue to support research that provides evidence for the efficacy of trauma systems, identifies best practices for system implementation, and validates metrics of system progress. Hopefully, the COT's next 100 years will see the implementation of a National Trauma and Emergency Preparedness System, built on a public-private partnership, and it will be a given that an injured patient will receive top-quality care as Dr. Eastman referred to in his Scudder Oration "Wherever the Dart Lands."

Trauma Systems: Ready Regions, Ready Communities



Trauma Systems: Ready Regions, Ready Communities
Depicts the goal of the RMOC to strengthen regional care delivery through enhanced coordination of all providers throughout the continuum of care.

Navajo Nation Consultation, 2010

Nels Sanddal, PhD; Amy Eberle, RN, BSN, EMT; Robert J. Winchell, MD, FACS; Anselm Roanhorse, former Executive Director of the Navajo Division of Health; Janet Griffith Kastl, EMS Director; Charles F. Rinker, II, MD, FACS; Sylvia Etsitty (Haskie), Health Planner, Navajo Nation Division of Health; Jane Ball, PhD, consultant; and James D. Upchurch, MD.

Navajo Nation Council Chamber.

New Hampshire Consultation, 2016

The consultation team was ready for an evening work session after dinner; however, the hotel staff was nowhere to be found, and the door key didn't work. Dr. Winchell to the rescue with a little B & E!

PAST CHAIRS

1999 

A. Brent Eastman, MD, FACS
1999–2003

2003 

Robert C. Mackersie, MD, FACS
2003–2006

2006 

Michael F. Rotondo, MD, FACS
2006–2009

2009 

Robert J. Winchell, MD, FACS
2009–2018

2018 

Brian J. Eastridge, MD, FACS
2018–

Evolution of the Name

1994	1999	2006	2010
Working Group for Trauma System Evaluation	Ad Hoc Committee Trauma System Consultation	Ad Hoc Trauma System Evaluation and Planning Committee (TSEPC)	Trauma System Evaluation and Planning Committee (TSEPC)

Hawaii Consultation, 2017

This was the second time the ACS went to Hawaii; and this time, Dr. Winchell and Holly Michaels, COT Manager, Trauma Systems, got to be the "team" that traveled to each island and every single trauma center.

Late Night Consultation

Drs. Rotondo and Winchell working hard.

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Timeline of Key Events

1955 Vietnam War—inspired the concept of emergency medicine (First ER in the world established in the U.S. in this time period) *Concept*

1966 National Academies of Science's (NAS) National Research Council published the *Accidental Death and Disability: The Neglected Disease of Modern Society* *Publication*

1966 Highway Safety Act established the Department of Transportation, the first national initiative focused on reducing injuries and deaths on highways *Federal Legislation*

1973 Emergency Medical Services System (EMSS) Act established block grant funding and guidelines for Regional EMS Systems, with Trauma as one of the 15 essential components *Federal Legislation*

1976 American College of Surgeons (ACS) Committee on Trauma (COT) published *Optimal Hospital Resources for Care of the Injured Patient*, with later revisions published as *Resources for Optimal Care of the Injured Patient* for a stronger focus on trauma systems (rev. 1979, 1983, 1987, 1990, 1993, 1999, 2006, 2014) *Publication*

1976 ACS COT published the Field Triage Decision Scheme to guide EMS and trauma centers in the appropriate care of injured patients, with the Centers for Disease Control and Prevention (CDC), in partnership with the National Highway, Traffic and Safety Administration (NHTSA), publishing later revisions as *Guidelines for Field Triage of Injured Patients* (rev. 1986, 1990, 1993, 1999, 2005 and 2006, 2011) *Publication*

1980 Orange County, CA, demonstrated the effectiveness of regionalized and coordinated trauma and EMS care *Assessment*

1981 When the EMSS Act provision for funding was cut, the Omnibus Budget Reconciliation Act consolidated EMS funding into State Preventive Block Grants *Federal Legislation*

1984 With Health Resources and Services Administration (HRSA) as the governing agency, Emergency Medical Services for Children (EMSC) Program authorized *Federal Program*

1985 Institute of Medicine (IOM) and the NAS National Research Council published *Injury in America: A Continuing Public Health Problem* *Publication*

1986 Injury Prevention Act amended the Public Health Service Act to establish national research, program assistance, and reporting on injuries *Federal Legislation*

1987 American College of Emergency Physicians (ACEP) published *Guidelines for Trauma Care Systems* *Publication*

1988 NHTSA established the Statewide Technical Assessment Program, and the Development of Trauma Systems Course to help states evaluate the effectiveness of their EMS and Trauma services *Federal Program*

1990 Trauma Care Systems Planning and Development Act created the Public Health Service Act to improve EMS and Trauma services, and established the Division of Trauma and EMS within the Department of Health & Human Services (DHHS) to achieve this goal *Federal Legislation*

1990 Injury Control Act amended the Public Health Service Act to enable cooperative agreements, grants, and contracts for injury control research *Federal Legislation*

1992 National Center for Injury Prevention and Control established within the CDC *Federal Program*

1992 HRSA published the *Model Trauma Care System Plan*, with a later revision published as the *Model Trauma System Planning and Evaluation* (rev. 2006) *Publication*

1992 CDC National Injury Control Conference published the position paper, *Setting the National Agenda for Injury Control* in the 1990s, discussing the value inclusive trauma system *Publication*

1994 National Institute of Health (NIH) published *A Report of the Task Force on Trauma Research* *Publication*

1996 ACS COT published the *Consultation for Trauma Systems*, with a later revision published as the *Regional Trauma Systems: Optimal Elements, Integration and Assessment – System Consultation Guide* (rev. 2008) *Publication*

1998 IOM "Skamania Conference" derived consensus between trauma leaders and led to recommendations to improve trauma system performance and evaluation *Publication*

1999 IOM published the *Reducing the Burden of Injury* report to describe the national commitment to trauma care systems at all levels *Publication*

2004 NHTSA published the *Trauma System Agenda for the Future* *Publication*

2007 IOM published *Hospital-Based Emergency Care* *Publication*

2016 National Academies of Sciences, Engineering, and Medicine (NASEM) published the *A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve ZERO Preventable Deaths after Injury* *Publication*

2016 National EMS Advisory Council (NEMSAC) aligned the HRSA *Model Trauma System Evaluation and Planning* document with the NASEM *National Trauma Care System Report* *Publication*

Rural Trauma

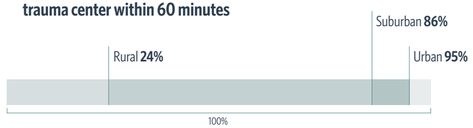
Approximately 20 percent of the U.S. population lives in a rural environment, depending on how the reader defines "rural." In fact, rural areas can be classified as any location where the injured person is isolated in terms of geography, population density, weather, distance to care, availability of professional or institutional resources, or a combination of these factors. It is important to note that only 24 percent of rural residents have access to a Level I or Level II trauma center within 60 minutes, compared with 86 percent of suburban and 95 percent of urban residents.

The "Neglected Disease"

There are many challenges to caring for injured people in a rural location, all of which culminate in a delay in definitive care. The result is that, regardless of how outcome is measured, the burden of injury is shouldered more heavily by those in rural areas.

- Greater than 50 percent of motor vehicle crash fatalities occur in the rural setting, and the potential fatality rate is 1.5 times higher in rural areas.
- Age-adjusted death rates following unintentional injury are approximately 50 percent higher in nonmetropolitan areas when compared to urban locations.

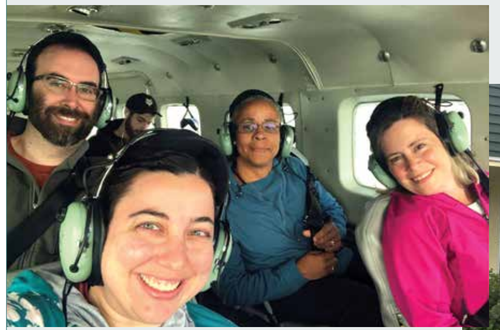
Residents who have access to a Level I or Level II trauma center within 60 minutes



The Rural Trauma Committee
March 2017, Washington DC.

The traditional model of trauma center and trauma system development focused mainly on the urban environment. This focus led to rural trauma becoming the "neglected disease" of the 21st century. Addressing this challenge is the mission of the American College of Surgeons (ACS) Committee on Trauma (COT) Rural Trauma Committee, which was established following the COT Strategic Planning meeting held in February 1994.

ALASKA KNOWS RURAL!



Alaska State Chair Elisha G. Brownson, MD, FACS (front); and teammates Ryan Urbonas, DO; Angeline Washington, MSN, RNC, CAPT, USPHS; and Wendy Allen, RN, BSN, TCRN; traveling by small plane to teach RTTDC in Klawock, AK, in August 2019.

Dr. Brownson with Angeline Washington, MSN, RNC, CAPT, USPHS; and Frank Sacco, MD, FACS, in Dutch Harbor, AK (Aleutian Islands), June 2018.

Teaching RTTDC. Gregory Lisse, MD, MPH, FACS; Monja Proctor, MD, FACS; Angeline Washington, MSN, RNC, CAPT, USPHS; Wendy Allen, RN, BSN, TCRN; and Elisha G. Brownson, MD, FACS, in Utqiagvik, AK (formerly known as Barrow, and the northernmost city in North America!), in January 2020.

Rural Trauma Committee

The purpose of the Rural Trauma Committee is to identify and address issues that contribute to the morbidity and mortality of trauma patients in rural areas, and to provide leadership and advocacy support for those same rural trauma issues. The committee comprises members from both the Regional Committees on Trauma (state, provincial, and country leadership) and the central COT. The work of the Rural Trauma Committee is largely centered on ensuring that the perspective and challenges of the rural environment are represented in the various quality, system, education, and advocacy efforts of the COT. To facilitate this, the Rural Trauma Committee members represent these concerns through their participation in other committee areas. This structure allows for an integrated input from the Rural Trauma Committee regarding all activities of the COT.

Specific objectives of the Rural Trauma Committee are:

- Develop and enhance data collection and standardization related to rural trauma in conjunction with the National Trauma Data Bank® (NTDB®)
- Partner with emergency medical services (EMS) credentialing organizations to develop and enhance current prehospital transport guidelines and interfacility transport guidelines
- Develop and continuously monitor criteria for the triage, treatment, and transport of rural trauma victims
- Provide recommendations to the COT Education Pillar for the inclusion of course content relating to rural trauma care in ACS standardized courses such as the Advanced Trauma Life Support® (ATLS®) Course and targeted education such as the Rural Trauma Team Development Course (RTTDC)
- Develop an education and outreach standard for Level I and II trauma centers related to rural trauma facilities within their referral region
- Contribute to research being performed in rural trauma using data from the NTDB
- Serve as a resource on the rural trauma perspective for the committees of the COT

Tailoring Trauma Education to the Needs of the Rural Care Team

rttdc™
RURAL TRAUMA TEAM DEVELOPMENT COURSE

Perhaps the most meaningful project developed by the Rural Trauma Committee is the Rural Trauma Team Development Course (RTTDC). In 1998, a small group of members of the Rural Trauma Committee recognized that there was an unmet need for trauma education at rural facilities.

After many discussions to identify the missing gaps and unique experiences of the practitioners at these facilities, the group determined that a rural trauma education course should be developed specifically for rural health care providers with the following considerations:

- Special emphasis on a multidisciplinary team approach
- Recognition of the need for minimal equipment requirements
- Address the potential delays and transfer challenges in rural trauma care
- Deliver at a reasonable cost in the rural institution or setting so a course can include all associated providers and be tailored to their unique practice environment

While there was standardized trauma education for physicians (ATLS), nurses (Advanced Trauma Course for Nurses [ATCN] and Trauma Nursing Core Course [TNCC]), and prehospital providers (Prehospital Trauma Life Support [PHTLS]),

> ...there was a noticeable gap regarding how to apply the concepts from these valuable courses to a small, frequently resource-limited, rural facility.

RTTDC Founding Fathers
Thomas M. Foley, MD, FACS; James W. Kessel, MD, FACS; and G. Douglas Schmitz, MD, FACS.

First RTTDC in Sisterville, WV in 2003
Drs. Jim Kessel and Tom Foley are kneeling in the front row.

To bridge this gap, the RTTDC was developed, led by founding fathers Thomas M. Foley, MD, FACS; James W. Kessel, MD, FACS; and G. Douglas Schmitz, MD, FACS. They began by surveying rural facilities in their respective states to learn about the resources available to care for injured patients. They found that the lowest common denominator was that at least three people—a lead provider (physician, physician assistant, advanced nurse practitioner), a nurse, and one other person (aide, clerk, EMS provider, and so on) were present at the facility at any given time.

From this realization, the concept of a "three-person team" emerged, which led to an emphasis on teamwork to treat the severely injured patient and minimize the delay to definitive care.

Rural Trauma Team
From RTTDC 4th edition slide deck – this is a visual of the "three-person team."

One key aspect of developing the RTTDC is that it would be presented at the local facility. The course would be flexible to allow teaching the essential content while being mindful of the varied resources and capabilities present in the rural centers. Also important in the creation of the course is that it was designed for all trauma team members—everyone who would have a role in the care of the injured person at that facility.

"Lumberjack" Video
Still shot from the "Lumberjack" video of the patient with the tree branch in his neck; a great illustration of the unique nature of injury often seen in rural settings.

To illustrate the challenges of managing a patient in the rural environment, the "Lumberjack" video has been a part of the RTTDC since the beginning, and the story behind the video is one of amazing serendipity. Dr. Foley was a general surgeon in Marshalltown, IA. One day he was called to the emergency department to see a man with appendicitis. Dr. Foley noted severe scarring on the man's neck, which led to the story of how this man had been working as a lumberjack in 1989, before the development of trauma systems. As written by Dr. Foley, the man "had just cut down a tree on a slope and was jogging away from the tree and did not see the previously felled tree in his path. He fell on the tree with one of the branches penetrating his neck.... His brother found their truck and called for the nearest ambulance service, which met them at the nearest paved road. The man was taken to the local hospital that was a small, rural facility." The amazing part of the story is that the man had a videotape of the entire process of care at this facility prior to his transfer for definitive care. Dr. Foley asked, and received permission, to use this video as part of the developing RTTDC. It has remained an integral feature of the course, helping to engage participants in discussing key topics relevant to the types of injuries and practice challenges they are familiar with in their environments. This is an important differentiation from the standard education courses that generally rely on patient scenarios more common in urban settings and familiar to those in Level I or Level II centers.

Rural Trauma Team Development Course (RTTDC) Matures

The first version of the RTTDC was completed and ready for its initial presentation on February 20, 2003, in Sistersville, WV. Course materials included a PowerPoint presentation and 87 pages of printed materials housed in a three-ring binder. A total of five courses were presented that inaugural year. Fourteen courses were presented in 2004, and the course now had a black-and-white printed book.

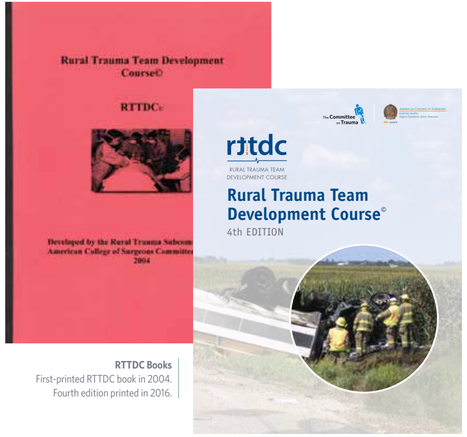
From its beginning in 2003, the RTTDC was in a constant state of revision with Drs. Foley, Kessel, and Schmitz frequently modifying the content based on the experience from each course presentation. The Rural Trauma Committee kept track of this development. By 2010, the third edition was finished, complete with a spiral-bound color book, a digital version of the Lumberjack video, interactive discussion points outlining pitfalls and techniques in communication, and a new set of 253 PowerPoint slides.

Shortly after the introduction of the RTTDC's third edition, interest began developing regarding global promulgation of the content. The course was eventually translated into French, Spanish, and Ukrainian, and was presented in India, Mongolia, Nepal, Chile, Colombia, South Africa, Canada, United Arab Emirates, and the Ukraine. Now in its fourth edition (2016), the original intentions of Drs. Foley, Kessel, and Schmitz have been realized. The RTTDC is presented hundreds of times annually, across the U.S. and around the world.

> A fortuitous consequence of the RTTDC format has proven to be, perhaps, its best feature. Because the course is provided at the local facility, it requires the instructors to travel to that location. The instructors are generally from urban trauma centers that receive patients from the rural locations, and it is an eye-opening experience for them to learn, firsthand, about the realities of trauma care away from the urban environment.

This situation has led to two important, perhaps, unintended benefits. First, the RTTDC fosters the building of relationships between providers at rural and urban trauma centers. Aside from the educational benefits inherent in the RTTDC, the relationship development component is a noted strength of the program. Second, RTTDC has become an important part in the development of rural trauma systems, specifically because it is designed for the rural centers and because of the bridges it helps build between trauma centers, local care providers, and prehospital care.

First Edition of RTTDC
Title Slide from first Edition RTTDC in 2003.



RTTDC Books
First-printed RTTDC book in 2004. Fourth edition printed in 2016.

RTTDC July 13, 2010-today

Total courses in CMS
1,326

Total physicians trained
2,967

COUNTRY	PHYSICIANS	NON PHYSICIANS
USA	2,168	18,692
Canada	761	1,974
Chile	28	10
United Arab Emirates	10	7
Malaysia	They have held two courses, with no participant data shared	
Ukraine	They have potentially held a few courses, with no participant data shared	

RTTDC in Waverly, IA (top)
Dr. Foley teaching, 2011.

RTTDC in Canada (middle)
RTTDC being taught in an ambulance garage in Selkirk, Manitoba, Canada, September 20, 2016.

RTTDC in Logan, OH (bottom)
The full patient care team at Hocking Valley Community Hospital and the trauma service personnel from their referral trauma center, Grant Medical Center in Columbus, OH. Seen here with Instructor Richard A. Sidwell, MD, FACS, on the far left, October 15, 2013.

The Future

As we continue to strive toward the development of and support for a National Trauma System—which will ensure that no matter where the injury occurs there is a strategy to facilitate rapid stabilization and transport to the appropriate level of care—it is vital that we draw on the experience and expertise of surgeons who live and work in rural communities. While engagement with the COT Rural Trauma Committee has been outstanding, it remains challenging for those in rural, nonacademic practice to participate in these activities. To address this gap, we are currently working to establish a Rural Trauma Advisory Council which will meet virtually to provide ongoing input from frontline providers working in rural communities. The Rural Advisory Council will comprise providers from rural centers, Level IV and smaller, and will provide valuable input across all COT programs. Michael A. Person, MD, FACS, Chair of the Rural Trauma Committee (2021–), along with Richard A. Sidwell, MD, FACS, past-Chair of the Rural Trauma Committee (2015–2021), began recruitment of the Advisory Council in May of 2021, soliciting self-nominations through a variety of networks. This multidisciplinary, multiregional council will develop strategies and tactics to help ensure that rural patient and provider needs are integrated into COT programs and initiatives. Examples of opportunities for input and collaboration may include the following: rural needs assessment, trauma system development, EMS guideline development, trauma center care standards and guidelines, data quality improvement and benchmarking, injury prevention, and trauma education.

Richard A. Sidwell, MD, FACS
Chair of the Rural Trauma Committee (2015–2021).

Michael A. Person, MD, FACS
Chair of the Rural Trauma Committee (2021–).

To ensure alignment with the other COT education courses, the RTTDC revisions working group has been moved under the Education Pillar. Under the direction of the RTTDC Course director, who will continue to actively liaise with the Rural Trauma Committee, the RTTDC will continue to evolve to meet the educational needs in this environment while working on optimizing communication across regional trauma systems. The needs of the rural trauma team also will be championed by the COT Diversity, Equity, and Inclusion Work Group as it seeks to ensure optimal engagement with everyone in the trauma community.

RTTDC Fourth Edition Work Group
Back row: Corey Detlefs, MD, FACS; Ryan Hieronymus (ACS Staff); Michael Person, MD, FACS.
Middle row: G. Douglas Schmitz, MD, FACS; Froilán A Fernández, MD, FACS; Kristen Sihler, MD, FACS; Freddie Scruggs (ACS Staff); Raymond Price, MD, FACS.
Front row: Alison Wilson, MD, FACS; Richard A. Sidwell, MD, FACS; David C. Borgstrom, MD, MBA, FACS.

As telemedicine platforms continue to evolve, this technology provides additional opportunities to build bridges between the Level I and II trauma centers and rural hospitals. Not all states have designated Level IV trauma centers, and we believe this engagement with rural hospitals is key to continuing to support their work in the community. The Rural Trauma Committee is committed to continuing to advocate for the needs of rural care providers and hospitals, and to develop programs that support the optimal care of the injured patient in these more challenging locations.

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Rogers FB, Shackford SR, Osler TM, et al. Rural trauma: The challenge for the next decade. *J Trauma*. 1999;47(4):802-821.

PAST CHAIRS

1994 — 
Stuart A. Reynolds, MD, FACS
1994–1995

1995 — 
June E. Heilman, MD, FACS
1995–2001

2001 — 
James A. Anderson, MD, FACS
2001–2006

2006 — 
Thomas M. Foley, MD, FACS
2006–2008

2008 — 
James W. Kessel, MD, FACS
2008–2015

2010 — 
Reginald A. Burton, MD, FACS
2010–2015

2015 — 
Richard A. Sidwell, MD, FACS
2015–2021

2021 — 
Michael A. Person, MD, FACS
2021–

Disaster Preparedness

13

Disaster Preparedness

Trauma systems serve as the framework for mass casualty and disaster response. The trauma community not only responds to the immediate crisis but also has worked tirelessly to advance our preparedness for these tragic events.

Disaster as an Emerging Reality, and the Need to Prepare for It

> *Preparedness: the quality or state of being prepared; to make ready beforehand in some purpose, use or activity; to put in a proper state of mind.*—Merriam Webster
>
> *Those who cannot remember the past are condemned to repeat it.*—George Santayana, 1905

Providing optimal care to the injured patient has always been a top priority for the American College of Surgeons (ACS) Committee on Trauma (COT). The underlying premise that trauma is a surgical disease requiring surgical leadership has not changed. In the early days of the COT, the focus was on the care of a single patient or a small number of simultaneous patients with little reference to mass casualty and disaster preparedness. Large numbers of patients in civilian settings were not overtly addressed by the COT until events in the 1950s and 1960s, including the Cold War and social unrest, prompted members of the committee to explore how to best manage what proved to be an emerging reality. In his Oration on Trauma in 1955, Frank B. Berry, MD, FACS, Assistant Secretary for Defense (Health and Medical), spoke of the lessons learned from the San Francisco earthquake in 1906, the Halifax Explosion in 1917, the Cocoanut Grove fire in Boston in 1942, and the Texas City disaster in 1947, as well as a then-recent tornado in Worcester, MA, in 1953. Dr. Berry spoke in detail of Operation Alert, a drill held in June 1955 to simulate the response to a massive nuclear attack in several U.S. cities. He also provided a comprehensive overview of the factors to consider in organizing a medical response, and he called on the surgeons in the audience to help lead in these efforts.

Early articles from the COT demonstrating the scope of mass casualty and disaster incidents and the corresponding challenges in patient care were published in the ACS *Bulletin* in 1965. In one of these articles, Robert H. Kennedy, MD, FACS, COT Chair (1939–1952), who also was serving as the Director of the Committee on Trauma Field Program, summarized comments he made at a disaster medicine seminar sponsored by the Medical and Chirurgical Faculty of the State of Maryland at the National Naval Medical Center in Bethesda in October 1964. In "Considerations in Local Disasters," he talked about the growing prevalence of disasters, and the accompanying loss of life that he felt could be reduced by better civic planning and drills. Dr. Kennedy also described the lessons learned from a train crash in the Hudson Valley of New York with 26 casualties; a train derailment in Wisconsin with 59 casualties; a bus crash near Altoona, PA, with 19 casualties, and a bus crash near Rutherford, NJ, with 39 casualties.

Frank B. Berry, MD, FACS
Assistant Secretary for Defense.

Retro Indy 1963 Coliseum Explosion
The site of a "Holiday on Ice" performance became a makeshift morgue after an explosion killed 74 on October 31, 1963. *(Photo: Joe Young/Indystar).*

In this article, he defined a disaster as, "an occurrence which causes to be sent to the hospital within a brief period, say from a half to one hour, more patients than it can attend without upsetting its ordinary routine."

> Stated another way, a disaster is an event in which the resources to meet the demands of patient care are overwhelmed.

After describing this catalogue of tragic occurrences, Dr. Kennedy argued that such civilian events need to be anticipated and plans for dealing with the event developed. He called on the surgical community to be actively engaged in local discussions with prehospital providers and hospitals. He reiterated the goals of saving more lives and reducing morbidity and permanent disability. To this end, Dr. Kennedy outlined recommendations from the Indiana Committee on Trauma that were developed from the after-action report following an October 1963 explosion at the Indiana State Fairgrounds Coliseum which resulted in 436 casualties, including 74 fatalities, after a 100-pound propane tank exploded beneath a seating area. These recommendations underscored the critical components of an appropriate response to a disaster incident, including a basic structure for incident command and control, triage of casualties, education of health care providers and organization at the hospital level, and the need for region-wide drills and exercises to ensure all participants know their roles during such events. He advocated for written response plans that are practiced, critiqued, and re-practiced at regular intervals. Those recommendations, as it turns out, are virtually identical to the principles developed by the Ad Hoc Committee on Disaster and Mass Casualty Management as it was resurrected in 2002 by the ACS Board of Regents, and they remain relevant today.

Partnering with Other Agencies

In the 1960s, the COT Subcommittee on Disaster Surgery worked closely with the American Medical Association (AMA) Committee on Disaster Medical Care, part of its Council on National Security. In a report by George W. Paschal, Jr., MD, chair of the AMA committee, the activities of the COT Subcommittee were reviewed, which included the following: (1) development of a document titled, *The Principles of Disaster Surgery* (circa 1969); (2) a toolkit for local committees on trauma to support participation in disaster planning; and (3) a policy statement urging regional COT members to be knowledgeable in disaster planning and participate in training for all health disciplines.

In 1980, Marshall B. Conrad, MD, FACS, Chair of the Subcommittee on Disaster Planning (1978–1981), defined a disaster and tasked the surgeon to have familiarity with, and involvement in, all aspects of disaster planning. The report points out common, recurring deficits in the response to events, including poor central control, incompetent medical control, and communication failures. The subcommittee again urged the national COT to recommend that the local COTs become intimately involved in local disaster planning. Dr. Conrad also recommended that the ACS reach out to federal agencies, such as the Federal Emergency Management Agency (FEMA), to develop relationships that might contribute to better and more integrated response planning. The sense was that not much headway had been made in adequate disaster planning in the fifteen years between the writings of Dr. Kennedy and Dr. Conrad.

Disaster response remained a topic of discussion at annual COT meetings throughout the 1980s; however, the ambivalent attitude toward organized disaster planning continued. The 1981 disaster planning report stated, "disaster planning by and large is a government responsibility, and it is not certain what a small group like the COT can do." The COT was described as having a consultative role, providing expertise and support to the U.S. government and to FEMA.

DEFINING DISASTERS

January 1980
Marshall B. Conrad, MD, FACS
Chair, Subcommittee on Disaster Planning (1978–1981)

"The term disaster may be defined as a sudden calamitous event bringing great damage, loss, or destruction. The surgeon is principally concerned with the potential for the occurrence of a large number of casualties in a brief period of time as a result of a disaster. Treatment of these casualties is, of course, the function of the medical profession. However, in order to assure efficient management with minimal morbidity and mortality, physicians must be familiar with, and involved in, all aspects of disaster planning. Unfortunately, those responsible for disaster preparedness tend to ignore the medical profession or mistakenly assume that the health care system will somehow manage to respond to the demands of a disaster."

"Adequate, efficient management of a disaster situation depends on a well-organized local and/or regional plan with state and federal help as required. Since a disaster commonly results in casualties sometimes in large numbers, the health care system must be actively involved. This must include ambulance services, hospitals, and the medical profession, and must provide for medical supervision and direction. It is difficult to understand why such an obvious need is so universally ignored."

Engaging the Regional Committees

Donald D. Trunkey, MD, FACS
COT Chair (1982-1986).

Frank L. Mitchell, MD, FACS
Chair, Subcommittee on Disaster Planning (1981–1985).

In 1982, the Subcommittee on Disaster Planning was re-energized by Donald D. Trunkey, MD, FACS, the new COT Chair (1982–1986), and active planning for a three-hour educational event at the 1983 COT Annual Meeting in San Antonio began in earnest. The focus was to provide an overview of factors to consider in disaster response and provide resources for COT state chairs. Dr. Trunkey also charged the subcommittee with developing disaster plans for hospitals, and a registry of national disasters that would be populated and referenced by the state chairs as a formal repository of problems identified and lessons learned. Frank L. Mitchell, MD, FACS, Chair of the Subcommittee on Disaster Planning (1981–1985), led a review and subsequent endorsement, in concept and principle, of the National Disaster Medical System (NDMS). In 1984, NDMS was established as a public-private partnership between several branches of the federal government and private health care institutions as part of the Public Health Service in the Department of Health and Human Services. Its primary purpose was to provide medical evacuation and definitive care in the U.S. for military casualties returning from an overseas conflict. Its secondary mission was to support state, local, tribal, and territorial authorities following disasters and emergencies by supplementing health and medical systems and response capabilities. NDMS subsequently developed medical response teams to deploy to major events composed of volunteers who serve as intermittent federal employees when activated.

In 1985 the COT Executive Committee approved Appendix H, titled "Hospital Resources for Disasters or Mass Casualties" to update the 1976 ACS "Hospital and Prehospital Resources for Optimal Care of the Injured Patient" document. This appendix was approved and published in the October 1985 issue of the ACS *Bulletin* as a checklist to assist hospitals in developing their own unique plan for disaster response. In 1987, members of the Subcommittee on Disaster Planning were instructed to reach out to the NDMS specifically to review hospital capability criteria for participation in the NDMS. The state COT chairs were asked to become involved in the assessment to ensure appropriate physician involvement. The subcommittee also requested that a requirement for disaster planning be added in the revision of "Hospital Resources for Disaster and Mass Casualties - Appendix H." That would enable the Ad Hoc Committee on Verification/Consultation to assess a hospital's commitment to disaster preparation. In parallel to this request, the subcommittee was to investigate The Joint Commission on Accreditation of Hospitals (JCAH) survey practices regarding disaster plans. Over the next three years, conversations continued with the NDMS to determine how the COT could contribute to this work. Lawrence H. Pitts, MD, FACS, was the last Chair of the Subcommittee on Disaster Planning (1986–1990) before it was seemingly dropped from the committee rolls in 1991.

In 1995, in response to the bombing of the Alfred P. Murrah Federal Building in Oklahoma City, the San Francisco earthquake, and the World Trade Center explosion in New York, Albert E. Yellin MD, FACS, Chairman of the Subcommittee on Emergency Services-Prehospital (1993–1996), suggested that his subcommittee should be engaged in supporting disaster planning initiatives. Dr. Yellin noted the unmet need since the prior Subcommittee on Disaster Planning had been de-emphasized several years prior for reasons that were unclear. Along these lines, the Subcommittee on Education also proposed a conference titled, "Unresolved Issues in Disaster Management" to be presented at the 1997 Trauma Symposium. In conjunction with these efforts, the content on mass casualty management in the Advanced Trauma Life Support® (ATLS®) curriculum was reviewed, and the Ad Hoc Committee on Verification/Consultation was asked to consider more extensive questioning about disaster training and drills during verification site visits. The Subcommittee on Emergency Services-Prehospital revised its mission statement in 1996 to assume a role in disaster planning and management. In line with this, the subcommittee encouraged the COT to engage in planning and legislation at multiple governmental levels.

The tragic events of September 11, 2001—with attacks on the World Trade Center towers in New York City, the Pentagon in Washington, DC, and the crash of a third airplane near Shanksville, in Somerset County, PA—were a wake-up call across the U.S. on several fronts.

Observing these events, along with the rest of the world, was a trauma surgeon in Florida, Eric (Rick) Frykberg, MD, FACS, who had previously responded to the Marine Corps barracks bombing in Beirut in October 1983 that killed 241 U.S. service personnel, 220 of whom were Marines.

Eric (Rick) Frykberg, MD, FACS
Chair, Ad Hoc Committee on Disaster and Mass Casualty Management (2002–2006).

Dr. Frykberg, as a young U.S. Navy lieutenant surgeon aboard the USS *Iwo Jima*, stationed off the coast of Lebanon, was one of the surgeons receiving wounded from the Beirut explosion. He realized that surgeons needed a methodology to manage casualty loads of this magnitude and injuries that were more complicated than what they were accustomed to in usual trauma and emergency care practice.

The events of September 11 reignited the spark in Dr. Frykberg and his assertion that surgeons need to be prepared to lead, not just participate in, such response efforts. In October 2002, the ACS COT re-established the Ad Hoc Committee on Disaster and Mass Casualty Management with Dr. Frykberg as the Chair (2002–2006).

Susan M. Briggs, MD, MPH, FACS, one of the founding members of the revamped COT disaster committee and a leader in the NDMS, reflected that at their first meeting, there had been debate about what the role of the committee should be. At the time, Thomas R. Russell, MD, FACS, who was the ACS Executive Director (2000–2009), firmly believed that surgeons should play a key role in disaster medical response. In November 2003, led by Dr. Frykberg, the COT published a "Statement on disaster and mass casualty management" in the *Journal of the American College of Surgeons* calling on surgeons to take a leadership role in disaster planning saying,

> *"The American College of Surgeons believes that the surgical community has an obligation to participate actively in the multidisciplinary planning, triage, and medical management of mass casualties after all disasters. Surgeons should provide leadership at the community, regional, and national levels in disasters involving physical trauma to casualties that will likely require surgical intervention and management (i.e., explosions, structural collapses, shootings, fires, and large-scale vehicular accidents)."*

The committee next proposed that formal education for surgeons was needed to support this vision.

Development of the DMEP Course

The impetus for the development of the Disaster Management and Emergency Preparedness (DMEP) Course was very personal for those involved. Like Dr. Frykberg's story, Jorie Klein, MSN, MHA, BSN, RN, then-trauma program manager at Parkland Hospital, UT Southwestern, had a personal story that drew her to the DMEP planning group.

> Born and raised in Texas, in 1979 her family lost everything in a tornado. Ms. Klein understood the personal effects of a disaster, as it took her three days to find her family in the postdisaster chaos. Just six years later, while an emergency room (ER) charge nurse at Parkland Hospital in Dallas, TX, she was involved with the response to the Delta Flight 191 crash.

Jeffrey S. Hammond, MD, FACS
Early member of the DMEP planning group.

With more than 137 deaths, only 28 patients survived the crash. She recalled the chaos and lack of preparedness at the hospital. Among the failures of preparation and coordination were poor communication, minimal security, and lack of attention to the psychosocial aspects of care. Ms. Klein knew that trauma teams and trauma centers were unaccustomed to such responses but were ideally suited to manage them with the proper training. She felt that hospitals needed to do better. She was later invited to attend a North Atlantic Treaty Organization (NATO) conference on disaster and terror response where she met Jeffrey S. Hammond, MD, FACS. Dr. Hammond and Dr. Frykberg were in the early discussions of course development and Dr. Hammond asked her to join the COT group in the development of the course.

Dr. Hammond first experienced mass casualties during his residency training at the time of the Miami riots in 1980. He realized that surgeons, along with others, were poorly prepared to deal with multiple casualty management. This assertion was supported by a survey conducted by the Eastern Association for the Surgery of Trauma (EAST), which demonstrated that surgical trainees were unprepared to manage disaster and mass casualty incidents. The goal for the development of DMEP was to create a model for multidisciplinary disaster education comparable to the ATLS Course.

Dr. Frykberg was familiar with the Israeli experience in response to terrorist bombings that they had so well documented in the literature. With the support of the ACS, Dr. Frykberg, Dr. Hammond, and Ms. Klein visited Israel to learn firsthand from their experience. Following that trip, Dr. Frykberg convened a small group at Clinical Congress 2001 in New Orleans, LA, that included Dr. Hammond; Ms. Klein; Patricia A. O'Neill MD, FACS; and John H. Armstrong MD, FACS, from Florida to discuss strategies to improve mass casualty response in the U.S. It was clear that there was a need to prepare surgeons to respond to such events. The group decided to create an operational-level course that would focus on the management of the event at the hospital level. In addition to surgeon education, the course would encourage participation from the C-suite, managers, public safety personnel, nurses, and physicians of all specialties. A stated goal of the course was to break down silos and support collaborative efforts across the hospital.

A didactic course, Disaster Management and Emergency Preparedness, or DMEP for short, was developed, with many of the course's principles having been emphasized by Dr. Kennedy 35 years earlier.

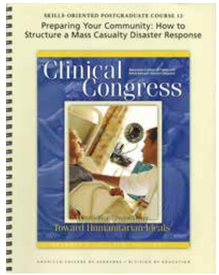
> The DMEP Course centered around the six Ps: preparation, planning, prehospital, processes for hospital response, pathophysiology of injury, and pitfalls.

Syllabus for the First DMEP Course
Offered at the Michigan COT on May 17, 2006.

Initially, the course was nothing more than a syllabus, a few articles, and a collection of ideas. In reference to the DMEP Course's case scenario component, Dr. Armstrong noted that "we really wanted to do something that could be more consistently delivered and that's where the scenarios came from." Through an iterative planning process and beta-course testing at the University of Florida, Gainesville, it was soon ready for deployment. The first full DMEP Course was offered at the Michigan meeting of the COT on May 17, 2006, with a rudimentary syllabus.

> The DMEP Course was intentionally collaborative. As members of the Ad Hoc Committee on Disaster and Mass Casualty Management represented various organizations, the course content also reflected a diverse spectrum of topics.

David G. Greenhalgh, MD, FACS, the first burn liaison to the COT, recalled that it was an honor to be invited onto the committee and to contribute to this important course. It was an opportunity for the burn community to learn from the larger disaster plan for trauma centers as well as contribute expertise to the course material.



Debut of DMEP as a postgraduate skills course at the 2006 Clinical Congress.

The DMEP Course first officially appeared on the 2006 Clinical Congress Program as a postgraduate skills course, after having debuted in May 2006. At that point, the PowerPoint slides were developed, along with the interactive scenarios. Leonard J. Weireter, Jr., MD, FACS, was appointed as the Chair of the Ad Hoc Committee on Disaster and Mass Casualty Management (2008–2013) and was charged with developing a manual and formalizing the course. The Board of Regents approved the DMEP Course at their meeting on February 7, 2009. The first DMEP Course manual was published in 2010.

As the DMEP Course was being developed, the committee was aware that there were already several disaster courses being taught by other organizations around the country.

> To distinguish the COT course from others with similar content, the committee decided that the DMEP Course would be a hospital-based course and not an individual self-preparedness or predeployment course.

The focus would be on hospital organization including the incident command structure, communication, planning and preparation, and principled approaches to optimal care of patients. The course was designed to appeal to not only urban academic hospitals but also rural and critical access facilities.

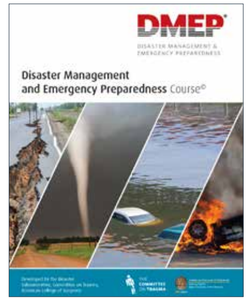
To support wider dissemination of the course, the committee also worked to develop an electronic version; DMEP was the first ACS COT course to develop this approach. The first electronic version was made using flash media that combined PowerPoint with asynchronous video from speakers. Although that technology is now obsolete, it was an important precursor for the future of asynchronous didactic education. Work on the second edition of DMEP began as Jay J. Doucet, MD, FACS, assumed the position of Chair of the Ad Hoc Committee on Disaster and Mass Casualty Management (2013–2017). While the basic principles remained the same, more data was added to support the management of blast injuries and additional resources were added for the management of chemical and radiation exposures and treatments for biological agents. New material on managing social media and responding to events in austere environments was also included.

DISASTER MANAGEMENT & EMERGENCY PREPAREDNESS

Two of the Original Creators of the DMEP Course
John H. Armstrong MD, FACS and Jorie Klein, MSN, MHA, BSN, RN.

Leonard J. Weireter, Jr., MD, FACS
Chair, Ad Hoc Committee on Disaster and Mass Casualty Management (2008–2013).

Jay J. Doucet, MD, FACS
Chair, Ad Hoc Committee on Disaster and Mass Casualty Management (2013–2017).



DMEP Manual
The second edition of the *Disaster Management and Emergency Preparedness* manual was released in March 2018.

The devastation in Haiti following the total collapse of buildings and houses was immense.

Susan M. Briggs, MD, MPH, FACS (red shirt on bottom right) commander of the National Disaster Medical System (NDMS) International Medical/Surgical Response Teams (IMSuRT), led efforts to provide much needed medical care following the earthquake.

Henri R. Ford, MD, FACS, a COT member and later an ACS Regent, provides care.

Many members of the COT answered the call to support the medical response in Haiti, either as members of the National Disaster Medical System (NDMS) International Medical/Surgical Response Teams (IMSuRT), led by Dr. Briggs or through the many nongovernmental organizations that rapidly responded to the earthquake. These experiences shaped the perspective of the subsequent leadership of the COT and raised awareness of the importance of surgeon engagement in disaster preparedness. Eileen M. Bulger, MD, FACS, later EMS Committee Chair (2011–2015) and COT Chair (2018–2022), then a member of the NDMS IMSuRT, was among the many COT surgeons who responded to the event and noted, "The opportunity to deploy to Haiti was one of the formative experiences in my career. I saw the impact these devastating events can have on the entire health care infrastructure and learned the challenges of operating in an austere environment. I experienced the value of surgical leadership, modeled by Dr. Briggs, and the importance of advanced planning and preparation to support an effective response."

Dr. Briggs (red shirt) oversees the evacuation of a critically ill neonate to the USS *Comfort* Navy hospital ship.

Eileen M. Bulger, MD, FACS, then a member of the NDMS IMSuRT, was among the many COT surgeons who responded to the event.

Response to the 2010 Haiti Earthquake Helps COT to Define Its Role

A devastating 7.0 earthquake struck the Caribbean Island of Hispaniola in January 2010. Estimates of mortality exceeded 100,000 lives with countless injuries. The COT Executive Committee was meeting in Chicago when news of the earthquake broke. At the time, the College was not prepared to organize surgeons to deploy to such an austere environment. Under the direction of Dr. Weireter and David B. Hoyt, MD, FACS, ACS Executive Director (2010–2022), the COT established an incident command structure within the ACS to respond to these types of events. Just-in-time educational material was made available for the surgeons engaged in the response including the Advanced Surgical Skills for Exposure in Trauma (ASSET) module on the technique of four-compartment fasciotomy. While establishing an incident command structure within a professional organization was a novel approach, it also has served the ACS well in the current response to the COVID-19 pandemic.

Following the 2010 earthquake in Haiti, the COT discussed different approaches to organizing surgeons interested in responding to these events. COT leadership then made a conscious decision that it would not function as a clearinghouse to match potential volunteers to respond to an event but would support the efforts of the ACS Operation Giving Back program and encourage surgeons to participate in the disaster teams supported by the NDMS. The COT also encouraged those interested in responding to major events to pursue training for individual disaster response and the challenges of working in an austere environment and recommended the Advanced Disaster Medical Response Course developed by Dr. Briggs in 2003 as an ideal program to support this readiness training.

The Joint Committee to Create a National Policy to Enhance Survivability from Intentional Mass Casualty and Active Shooter Events met on April 14, 2015. The committee developed a call to action that focused on implementation of strategies for effective hemorrhage control under the leadership of Lenworth M. Jacobs, Jr., MD, MPH, FACS, sitting third from the left in the front row.

Twin Tragedies in New England: The Sandy Hook School Shooting and Boston Marathon Bombing

The mass shooting at the Sandy Hook Elementary School in Newtown, CT, in 2012 and the bombing at the finish line of the Boston Marathon in 2013 both focused national attention on the response to these mass casualty events and furthered the work of the COT to ensure a coordinated emergency response. As described in detail in Chapter 17, under the leadership of Lenworth M. Jacobs, Jr., MD, MPH, FACS, the ACS convened a series of meetings with representatives from governmental, law enforcement, health care, and other agencies, to create a national policy to enhance survivability from active shooter and intentional mass casualty events. The resulting recommendations, which became known as The Hartford Consensus, provided a framework for mass shooting response which incorporated a focus on early hemorrhage control by both law enforcement and EMS; this eventually led to the COT's STOP THE BLEED® program which continues to educate the lay public on bleeding control. Subsequently, the injury patterns experienced in the Boston Marathon bombing further supported the importance of tourniquets and wound packing for hemorrhage control. The Boston Marathon bombing also highlighted the importance of an organized trauma system in managing such an event with only three fatalities among the 260 wounded; sixteen patients required amputations.

The Present: Current Challenges

The Response to Mass Shootings

News update from John Fildes, MD, FACS, following the 2017 mass shooting in Las Vegas. *Courtesy: Fildes.*

Over the last decade, the U.S. has seen a dramatic increase in the number of mass shooting events that have further challenged our trauma systems' response. Notable examples include the Pulse nightclub shooting in Orlando, FL, in 2016, with 50 deaths and an additional 58 injured; the Las Vegas shooting in 2017, with 60 deaths, 411 wounded by gunfire, and more than 400 with additional injuries resulting from the crowd evacuation; and the Sutherland Springs church shooting in Texas in 2017, with 28 deaths and 20 wounded. Many COT leaders were directly involved in the response to these events including past COT chairs, John Fildes, MD, FACS (2006–2010), Ronald M. Stewart, MD, FACS (2014–2018), and Deborah A. Kuhls, MD, FACS, who was Chair of the Injury Prevention and Control Committee (2012–2020) at the time.

> These experiences have not only reinforced the COT's commitment to firearm injury prevention but also have influenced efforts to enhance trauma center and trauma system preparedness to support the large number of casualties requiring emergent surgery.

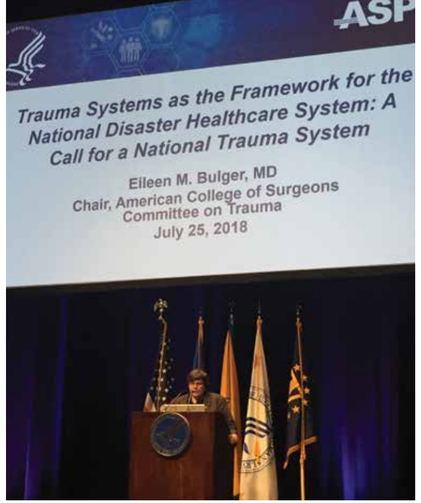
The surgeons engaged in the responses to these events have widely shared their lessons learned and the COT is working with the Office of the Assistant Secretary for Preparedness and Response (ASPR) and the American College of Emergency Physicians (ACEP) to aid in the development of a training program to support hospital preparedness for these tragic events.

The COVID-19 Pandemic

Throughout 2020, 2021, and 2022, the worldwide COVID-19 pandemic has challenged all members of the COT and the surges of critically ill patients have challenged our hospitals and our trauma systems. As the scope of the pandemic became clear in March 2020, Dr. Hoyt swiftly established an incident command structure to support the ACS response. The ACS quickly called for cessation of all nonurgent surgery to support the surge capability of the hospital systems. The ACS developed a comprehensive communication strategy to support surgeons and provided a web-based platform for easy access to educational and guidance material for members. The COT Annual Meeting and Global Symposium had been planned to be held in Chicago, on March 11–15, 2020, but given the concern for the growing number of cases and the initiation of travel restrictions, the leadership decided to cancel the in-person meeting and quickly converted to a virtual webinar format. (The 2021 COT Annual Meeting and Global Symposium were similarly presented in a virtual webinar format.)

Immediately following that meeting, the COT brought together members of what is currently called its Disaster and Mass Casualty Management (Disaster) Committee and the Trauma System Evaluation and Planning Committee (TSEPC) to quickly produce a guidance document to help trauma medical directors better engage in regional and hospital planning for the pandemic, thus maintaining trauma center access and care during the COVID-19 surges. The release of this guidance document was followed by additional efforts to support the New York City COT as they entered a dramatic surge in the spring of 2020. The COT recognized that regional coordination of the health care response was critical to prevent individual hospitals from becoming overloaded and impeding the delivery of care, not only for COVID-19 patients, but also for other time-sensitive emergencies such as traumatic injury.

Drawing on the experience of the regional advisory committees in Texas and the early experience with regional coordination of the COVID-19 response in Seattle, WA, Drs. Stewart and Bulger established a guidance document for the formation of regional medical operations centers (RMOCs) to support the pandemic response. RMOCs support the integration of public health, emergency management, and the acute health care systems (emergency medical services [EMS] and hospitals) in responding to a crisis. RMOCs provide situational awareness through real-time data collection across the health care system and support the distribution of patients based on available resources. In collaboration with members of the Federal Emergency Management Agency (FEMA) Healthcare Resilience Taskforce, the COT supported a webinar to promote this approach and the development of a toolkit by the FEMA taskforce.



Eileen Bulger, MD, FACS, COT Chair (2018–2022), presents the COT's position on trauma systems as a framework for a national disaster health care system during an ASPR conference in July 2018.

Robert P. Kadlec, MD, Assistant Secretary for Preparedness and Response, (third from left) headlined a special session on Disaster Health Response during the 2019 COT Annual Meeting. Also shown, from left, are: Eric Epley, Executive Director, Southwest Texas Regional Advisory Council; Eileen Bulger, COT Chair (2018–2022); Dr. Kadlec; Lisa Schlitzkus, MD, FACS; and Jake Ferry, MA, project manager, for the Nebraska Regional Disaster Health Response Network; Paul D. Biddinger, MD, FACEP, Massachusetts Regional Disaster Health Response Network; and James R. Ficke, MD, FACS, Chair, COT Disaster Committee (2017–2022).

The Future

Trauma Systems as a Framework for Disaster Response

Over the past five years, the COT has worked closely with the office of the Assistant Secretary for Preparedness and Response (ASPR) and the Department of Homeland Security to support an overarching, regionalized approach to disaster response built on the framework of the trauma system. Robert P. Kadlec, MD, Assistant Secretary for Preparedness and Response, spoke at the 2019 COT Annual Meeting on ASPR's approach to advancing regional coordination and development of the health care coalitions. The COT looks forward to continued collaboration with its federal partners to support the integration of the health care coalitions and the RMOC approach with a goal of comprehensive coordination at the regional level that could then report to the state level and, ultimately, provide overarching situational awareness and response at the federal level. The current response to the COVID-19 pandemic has highlighted many of the vulnerabilities in the current system and our hope is that further support of this approach will establish the infrastructure and relationships to support future wide-scale events.

In the wake of the COVID-19 pandemic, the COT has developed a blueprint for a National Trauma and Emergency Preparedness System which will support the advancement of state and regional trauma systems and incorporate an integrated network of RMOCs that can support the day-to-day movement of trauma patients within the system and scale up to coordinate the health care response to any major event.

The Evolution of Disaster Education

In 2019, the Advanced Disaster and Medical Response (ADMR) Course developed by Dr. Briggs and offered for many years through Harvard Medical School, Boston, MA, was generously donated to the ACS COT Disaster Education portfolio. The COT trauma education team, including David Zonies, MD, FACS, COT's Course Director for Disaster Education, currently is working with Dr. Briggs and Co-Course Director David V. Shatz, MD, FACS, to adapt the concept and course components into an online premier program for disaster readiness; the new online revision of the course is expected to be released in 2022. Where the ADMR Course focuses on the disease specificity and the deployable practitioner, the DMEP Course is focused on hospital coordination and response. These courses are synergistic and will allow development of a menu of options that can be individualized for the interested physician. The committee envisions introductory modules on core concepts such as incident command and the principles of triage, followed by advanced modules utilizing DMEP for hospital planning and response and ADMR for individual response. Lessons learned from the mass shooting events and pandemic response also will be integrated into the modules. Operationally, this content needs to migrate to a just-in-time, online, interactive format to engage the learner and be readily available in times of crisis.

J. Wayne Meredith, MD, FACS
COT Chair (2002–2006).

Since 2008, it has been suggested by every chair of the COT Disaster and Mass Casualty Management Committee and its predecessors that disaster education should be included in the standards for trauma center verification, which remains an aspirational goal of the committee. J. Wayne Meredith, MD, FACS, COT Chair (2002–2006), once noted that "surgeons need to be at the disaster table but are not always on the invite list." Many still see disaster preparedness as a governmental or other agency function, rather than something to be planned and managed by the practitioners involved in the medical response.

As trauma care is regionalized, and as the scope of disasters continues to expand and the frequency of mass casualty incidents rises in the U.S., there is a definitive need to include disaster preparedness education in every trauma center. Just as ATLS training is a requirement to be an active credentialed trauma surgeon in most institutions, the COT Disaster and Mass Casualty Management Committee has proposed that DMEP be required training for trauma medical directors and members of the trauma call panel. The Centers for Medicare and Medicaid Services (CMS) currently specifies that hospital employees must have disaster-preparedness training, but the details have been vague and most current efforts are superficial at best. To respond to this need, the revised trauma center verification standards require that, in Level I trauma centers, the trauma surgeon liaison to the trauma center's disaster committee successfully completes the DMEP Course.

According to Dr. Zonies, COT Course Director for Disaster Education (2019–2022), recent course feedback has signaled a growing interest in disaster training from students and residents. Further efforts to integrate these principles into medical school curriculum and surgical residency programs are needed to lay a foundation for the future leaders in these events.

David Zonies, MD, FACS, COT Course Director for Disaster Education (2019–2022), and Susan M. Briggs, MD, MPH, FACS, founder of the Advanced Disaster and Medical Response (ADMR) Course, discuss the adaption of the course into an online program that will be offered as part of the COT's Disaster Education.

Ronald I. Gross, MD, FACS
An instructor for the first DMEP Course.

According to Ronald I. Gross, MD, FACS, who was an instructor in the first DMEP Course,

"We need to continue to teach the basic principles of disaster management. This includes incident command and the basic semantics of disaster medicine. The committee needs to continue to press the course forward, not for just for self-preservation, but for the preservation of all of those who are going to be involved in future disasters."

Dr. Armstrong believes that the DMEP Course has fulfilled its stated purpose and has made a difference. "The Disaster and Mass Casualty Management Committee has made an impact and now is really working on broader issues. I'm hopeful that by the end of this decade we're going to have a comprehensive assessment tool for drills, we're going to have standards for the implementation of drills, and we will be better prepared," Dr. Armstrong said.

Our Vision

In the late 1970s, inadequate hospital care of injured patients prompted the development of ATLS. Forward-thinking leaders of the ACS COT developed ATLS with the goal of it becoming the global standard for the initial care of the injured patient. In the first decades of the new millennium, mass casualty incidents, natural disasters, terrorist attacks, and pandemics have exposed the ongoing challenges hospitals face in mounting an effective response to these events. The ACS COT leadership continues to support disaster preparedness through standards and training to support team-based disaster-response capability. The COT Disaster and Mass Casualty Management Committee envisions DMEP and ADMR as natural companions with ATLS to promote optimal mass casualty care. Further, DMEP should serve as the basis for trauma center and system verification standards to emphasize ongoing disaster readiness training and drills, along with a comprehensive dashboard of measurable outcomes for mass casualty events. We anticipate that like ATLS, DMEP and ADMR will drive enduring change through education and training.

At the system level, we envision a true National Trauma and Emergency Preparedness System as a public-private partnership which will provide federal support to strengthen state and regional trauma systems, and standards to develop an integrated network of Regional Medical Operations Centers (RMOCs) functioning on a single data platform which collects real-time data from every EMS agency, hospital, and health care system to provide situational awareness regarding health care capacity and support communication and coordination for any mass casualty event.

This structure also would support the distribution of patients and resources as needed to optimize the response in a region and for larger events, such as a pandemic, and allow for coordination at the state and federal levels. The COT is actively working with our advocacy team and stakeholder coalitions to advance this strategy in federal legislation (see Chapter 11).

The enduring role of the COT Disaster and Mass Casualty Management Committee is one of advocacy and education. Formal disaster preparedness training serves as a proven approach for managing future disasters, pandemics, and mass casualty events.

> If, as Dr. Kennedy stated in 1965, our goals are to save more lives, reduce morbidity, and decrease permanent disability, then the more seamlessly we can activate a well-coordinated disaster response the more likely we are to be successful.

We look forward to the day when we have a network of RMOCs across the U.S. that not only can coordinate the day-to-day management of the local emergency health care system, but in times of crisis also can provide real-time data across the health care system to the state and federal emergency operations centers and support coordination of the medical response and patient movement at the regional level.

> As trauma surgeons who act as primary caretakers and coordinators of complex injury care we are perfectly situated to help lead this effort.

Multidisciplinary group working with ASPR in Anniston, GA, in December 2018, to develop a hospital training course for mass shooting response. COT leaders Eileen Bulger, MD, FACS; Deborah A. Kuhls, MD, FACS; John Fildes, MD, FACS; and John H. Armstrong, MD, FACS, were among the participants.

COT and American Burn Association (ABA) representatives John H. Armstrong, MD, FACS; Deborah A. Kuhls, MD, FACS; Eileen Bulger, MD, FACS; John Fildes, MD, FACS; and Colleen M. Ryan, MD, FACS, of the ABA.

PAST CHAIRS

mid-1960s — **Joseph R. Shaeffer, MD, FACS**
mid-1960s–1964

1964 — **Nicholas J Giannestras, MD, FACS**
1964–1966

1966 — **Francis C. Jackson, MD, FACS**
1966–1975

1975 — **Gerald E. Gustafson, MD, FACS**
1975–1978

1978 — **Marshall B. Conrad, MD, FACS**
1978–1981

1981 — 
Frank L. Mitchell, Jr., MD, FACS
1981–1985

1985 — 
Kimball I. Maull, MD, FACS
1985–1986

1986 — 
Lawrence H. Pitts, MD, FACS
1986–1990

2002 — Revived in 2002 as the Ad Hoc Committee on Disaster and Mass Casualty Management

2002 — 
Eric R. Frykberg, MD, FACS
2002–2006

2006 — 
Jeffrey S. Hammond, MD, FACS
2006–2008

2008 — 
Leonard J. Weireter, MD, FACS
2008–2013

2013 — 
Jay J. Doucet, MD, FACS
2013–2017

2017 — 
James R. Ficke, MD, FACS
2017–2022

2022 — 
David Zonies, MD, FACS
2022–

Evolution of the Name

1965 — Subcommittee on Disaster Surgery

1970 — Subcommittee on Disaster and Communications

1975 — Subcommittee on Communications

1978 — Subcommittee on Disaster Planning [sunset in 1991]

2002 — Ad Hoc Committee on Disaster and Mass Casualty Management

2010 — Disaster and Mass Casualty Management Committee

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THE DUAL ROLE OF SURGEONS IN DISASTER RESPONSE

Hands-on as Surgeon: Jeanette M. Capella, MD, FACS, in Haiti, 2010.

As Advocates: Ronald M. Stewart, MD, FACS; Melissa Harvey, RN, MSPH, Director, National Healthcare Preparedness Programs, Office of the Assistant Secretary for Preparedness and Response (ASPR), U.S. Department of Health and Human Services; Dan Hanfling, MD, a biosecurity and disaster response expert; Eileen Bulger, MD, FACS; and Eric Epley, NREMTP, Executive Director, Southwest Texas Regional Advisory Council for Trauma. This group is comprised of long-term collaborators vising the National Security Council in 2017 to advocate for trauma systems as a framework for disaster response.

Surgical Skills Training

14

Surgical Skills Training

With diminishing operative experiences available in trauma surgery, the Committee on Trauma's (COT) Executive Committee recognized the need to provide surgeons with the proper skill set necessary to treat complex, multiply injured patients.

The (Not so) Distant Past

Rumblings of developing a COT operative skills course began in the late 1990s but the first official record of the committee's intention to develop such a course can be found in the 2001 COT Annual Report where it is listed as one of the objectives for the Subcommittee on Education. At that time, it was well recognized that several COT members had already participated in local, homegrown courses or courses developed by other associations, such as the U.S. Air Force trauma refresher course or the International Association for Trauma and Intensive Care's (IATSIC) Definitive Surgical Trauma Care (DSTC™) Course. Lenworth M. Jacobs, Jr., MD, MPH, FACS, was simultaneously developing a CD-ROM-based program for operative skills that was officially unveiled as Advanced Trauma Operative Management (ATOM®) later that year.

In 2003, following a presentation at the American Association for the Surgery of Trauma (AAST) by Dr. Jacobs on the ATOM Course and a presentation by Lawrence N. Diebel, MD, FACS, about the cadaver-based trauma course he and his colleagues in Detroit had been running for nearly a decade, COT Chair J. Wayne Meredith, MD, FACS (2002–2006), created a taskforce under the oversight of Demetrios Demetriades, MD, PhD, FACS, Chair of the Subcommittee on Education (2003–2005). With the assistance of Gregory J. Jurkovich, MD, FACS, Dr. Diebel was asked to lead this task force to plan and execute an American College of Surgeons (ACS) COT-sponsored operative skills course. The task force members supported the development of a cadaveric-based course and, over the next three years, began to work on the outline of a concise syllabus centered on ten lifesaving procedures. The first operative skills pilot, planned by Dr. Diebel with the working title Operative Exposure Course, would accommodate 6 to 24 senior residents, fellows, or surgeons, and would use cadavers. It was agreed that Dr. Jacob's ATOM Course should have a significant role to play in the development of the COT's course, but some had concerns about the logistics required for the ATOM Course as it required one instructor and one pig for each student.

Lawrence N. Diebel, MD, FACS
Developed a cadaver-based training course pilot that was the precursor to what is now the ATOM Course.

Demetrios Demetriades, MD, PhD, FACS
Chair, Subcommittee on Education (2003-2005).

Fred A. Luchette, MD, FACS
First Chair, Ad Hoc Committee on Surgical Skills (2005–2010).

Leveraging the efforts of Dr. Diebel's task force, the COT formed an Ad Hoc Committee on Surgical Skills with Fred A. Luchette, MD, FACS, appointed as the first chair (2005–2010). The Ad Hoc Committee on Surgical Skills, which first met at the Clinical Congress in October of 2005, was tasked with reviewing and evaluating existing trauma surgical courses (ATOM and the Operative Exposure Course, now called the Anatomically Based Surgery for Trauma Course, that was still under development) and with developing a matrix for the educational needs of medical students, residents, fellows, and community surgeons; or as Dr. Luchette recalls, to "bring ATOM to the COT and develop that surgical trauma course."

Members of the Ad Hoc Committee on Surgical Skills felt that ATOM and the Anatomically Based Surgery for Trauma Course (later known as Advanced Surgical Skills for Exposure in Trauma or ASSET in 2010) would sufficiently cover the educational needs of senior residents, fellows, and community surgeons. The members of the Ad Hoc Committee even entertained the idea of combining the two courses, although they did note a distinction in audiences, with the Anatomically Based Surgery for Trauma Course tending to benefit beginning residents and community surgeons. The leadership and vision of the COT executives, particularly that of Dr. Meredith and David B. Hoyt, MD, FACS, Medical Director (2002–2006), allowed this new committee to flourish.

Over the ensuing years, the Ad Hoc part of the name dropped, and the Surgical Skills Committee helped further develop and promulgate both ATOM and ASSET. With the increasing use of the resuscitative endovascular balloon occlusion of the aorta (REBOA) technique, the COT Executive Committee felt strongly that it could help formalize and promulgate training for appropriate practitioners. In 2016, the Basic Endovascular Skills for Trauma (BEST) Course, developed at the R. Adams Cowley Shock Trauma Center, University of Maryland Medical Center, Baltimore, came under the umbrella of the Surgical Skills Committee of the COT. The program is under the direction of Megan Brenner, MD, FACS, BEST Course Director (2016–), and the first participant in the Future Trauma Leaders (FTL) Program to become an ACS COT Course Director.

> To date, there have been more than 1,214 ATOM courses, 1,043 ASSET courses, and 144 BEST courses offered in more than 25 countries across the world.

Hartford Hospital, University of Connecticut, hosted the development of the ATOM Course.

The second ATOM Course performed outside the U.S. occured in Accra, Ghana in 2005.

ATOM™

ADVANCED TRAUMA
OPERATIVE MANAGEMENT

Lenworth M. Jacobs, Jr., MD, MPH, FACS
Founder and original ATOM Course Director (2007-2010).

The idea for a standardized operative simulation course was inspired by Dr. Jacobs' experience with the Definitive Surgical Trauma Care (DSTC) Course in South Africa and the realization that residents were doing much less operative trauma as rates of penetrating trauma decreased and nonoperative management of blunt injuries increased. Dr. Jacobs also took inspiration from the very effective simulation training of aircraft pilots.

The goal of the ATOM Course was to include common injuries that every trauma surgeon really should know how to fix. The course was developed with 10 to 15 trial runs between 1998 to 2000 during which actual clinical cases in the operating room were recreated to establish what was reproducible and tolerable for the animal (porcine) model. Karyl J. Burns, RN, PhD, a medical educator, was essential in establishing valid educational methods and measurements in the course, while trauma fellows contributed greatly to help standardize everything from the clinical scenarios featuring a series of injuries to the lectures and test questions. These trial runs also allowed the animal care providers to become more skilled and develop a standard workflow.

> The name of the course, ATOM, took some time to develop. The "AT", advanced trauma was taken from Advanced Trauma Life Support® (ATLS®) and the "O" was for operative. "M" for management completed the acronym.

The ATOM Course was first presented to the COT in 2000, with great interest and was affectionately known as Dr. Jacobs' "CD-ROM-based program for operative skills." The first course was taught in June 2001 at Hartford Hospital, University of Connecticut, and over the next two years, great care was taken to collect data from residents, fellows, and attending surgeons who took the course. A panel of 20 national experts that had taken the course was established to further evaluate and enhance the educational goals and requirements of the ATOM Course. The initial textbook was edited by Dr. Jacobs, Ronald I. Gross, MD, FACS, and Stephen S. Luk, MD, FACS.

The course begins with of a series of clinically focused lectures on operative trauma management. This is followed by the laboratory experience that is based on several clinical scenarios where the faculty create a series of injuries without the student's knowledge. The student then must identify and treat these injuries while being evaluated by the faculty. The initial faculty-to-student ratio of 1:1 was expanded to 1:2 in select courses in 2012, under the guidance of Jameel Ali, MD, FACS, who served as a surgeon educator on the committee.

The ATOM Course was presented at the Eastern Association for the Surgery of Trauma (EAST) in January 2002, and the first course performed outside Hartford was at Massachusetts General Hospital in 2003. The first non-U.S. course was held in Canada in 2003, followed by a course presented in Ghana in 2005. As the course matured, word spread, and ATOM was embraced by the ACS COT in a five-year transition plan to officially became part of the Ad Hoc Surgical Skills Committee in 2007 with Dr. Jacobs as the first ATOM Course Director (2007–2010). Over the ensuing years, Sharon M. Henry, MD, FACS, (2010–2014), Dr. Gross (2014–2018), and most recently, Jody M. Kaban, MD, FACS, succeeded as ATOM Course Director.

ATOM Manual
3rd Edition, 2021.

The first ATOM Course was held at Hartford Hospital, University of Connecticut, June 2001.

Sharon M. Henry, MD, FACS
ATOM Course Director (2010–2014).

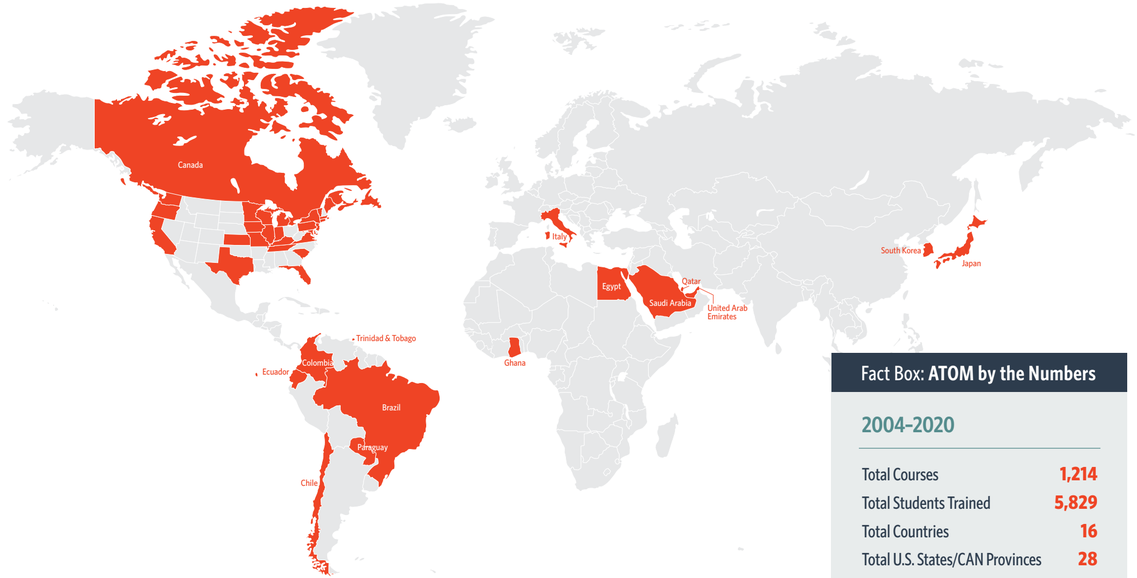
Ronald I. Gross, MD, FACS
ATOM Course Director (2014–2018).

Jody M. Kaban, MD, FACS
ATOM Course Director (2018–).

Dr. Jacobs always felt that the ATOM Course had the potential to have a long-lasting impact. His most memorable experience of developing the course was seeing the increase in self-confidence among residents and fellows after completing the course. The global development of the course was also very meaningful and, in his words, *"I have learned more from teaching than I have taught."*

Dr. Kaban, the current course director, continues to advance the ATOM Course and has been instrumental in developing the third edition of the ATOM textbook. She also brought the course model under review again in 2021 and received permission from the Executive Committee to expand the 1:2 model to more course sites in 2022.

ATOM—Course Sites 2004–2020



Fact Box: **ATOM by the Numbers**

2004–2020

Total Courses	**1,214**
Total Students Trained	**5,829**
Total Countries	**16**
Total U.S. States/CAN Provinces	**28**

ASSET™

ADVANCED SURGICAL SKILLS
FOR EXPOSURE IN TRAUMA

With the creation of the Ad Hoc Committee on Surgical Skills in 2005, the stage was set to create and implement an in-house COT-sponsored high-quality, cadaveric, anatomically based trauma exposure course. Though the original task force that had been working on the Operative Exposure Course had been disbanded, one of the original members, then-U.S. Air Force State Chair, Colonel Mark W. Bowyer, MD, FACS, convinced Dr. Luchette, Chair of the Ad Hoc Committee on Surgical Skills, to add him to the committee to represent the military. Under Dr. Luchette's leadership, the committee reviewed all the existent cadaver-based exposure courses including the DSTC Course conducted by the International Surgical Society, the Definitive Surgical Trauma Skills (DSTS) Course developed jointly by the Royal College of Surgeons of England and the Uniformed Services University of the Health Sciences (USUHS) in the U.S., as well as the Emergency War Surgery (EWS) Course managed by the U.S. military to prepare surgeons to care for combat casualties.

Over the next year and a half, an extensive list of life- and limb-saving skills that were considered required for all surgeons caring for victims of trauma was developed, and the Ad Hoc Committee on Surgical Skills used a modified Delphi approach to finalize the list of skills that should be included in a trauma exposure course. All skills that achieved a 90-percent concurrence were included in the final list. The skills selected included exposure and control of every major blood vessel from the chin to the toes, as well as thoracotomies, fasciotomies, and intra-abdominal damage-control procedures.

Work began on a lab manual and slide set, section editors were chosen, and chapters were assigned. The editorial board for this manual included Drs. Luchette, Bowyer, and Gross, as well as Patricia M. Byers, MD, FACS; Edward E. Cornwell, III, MD, FACS; Joseph Cuschieri, MD, FACS; Deborah A. Kuhls, MD, FACS; Joseph P. Minei, MD, FACS; Renato S. Poggetti, MD, FACS; Peter M. Rhee, MD, FACS; and John T. Schulz, III, MD, FACS.

Mark W. Bowyer, MD, FACS
One of the primary drivers and original ASSET Course Director (2008–2018).

Dr. Bowyer had been working at the same time to help revise the EWS Course and to that end, had collected several high-quality cadaveric dissection images and created narrated videos of many of the skills to be incorporated into the new Advanced Surgical Skills for Exposures in Trauma (ASSET) Course. Additionally, Elizabeth Weissbrod, MA, CMI, a talented medical illustrator, created high-quality illustrations for both the manual and presentation.

The committee decided to keep the length of the ASSET Course to one day and to focus primarily on operative skills. As such, a decision was made to present a brief case in the lab highlighting specific injuries, with interactive discussion of next steps followed by a few slides of relevant anatomy and a brief video demonstrating the desired skill. Following this, students are then asked to perform the skill in a time-pressured manner with the help of the table faculty.

The beta ASSET Course, initially named the Anatomically Based Surgery for Trauma Course, was conducted in Washington, DC, at the USUHS on March 11, 2008, with several members of the committee serving as faculty for a group of military chief residents from National Naval Medical Center and the Walter Reed National Military Medical Center. Following this, further beta courses were conducted across the U.S. and were extremely well received. The name of the course was changed to the ASSET Course and, at the advice of Dr. Ali, the initial faculty-to-student ratio of 1:2 was changed to 1:4. With the manual, written tests, policies, and procedures, as well as lab slides finalized, the ASSET Course was officially launched at the spring COT meeting in March 2010. The first global course was held in Toronto in August 2010.

Dr. Bowyer became the second Chair of the Ad Hoc Committee on Surgical Skills (2010–2018) and served as a special consultant for global courses (2019–2021). Under his leadership, the ASSET Course was promulgated to more than 180 course sites in 19 countries. Additionally, the U.S. military replaced the cadaver portion of the EWS Course with the ASSET Course. The German, Swedish, Hungarian, and Estonian militaries have also incorporated the ASSET Course into combat-readiness training for their surgeons.

> The ASSET Course curricula have undergone rigorous validation, and studies to date have shown that participants show marked improvement in selected vascular exposures over baseline after taking the course.

The first beta presentation of the Anatomically Based Surgery for Trauma (later renamed ASSET) Course conducted at the Uniformed Services University of the Health Sciences in Bethesda, MD, March 11, 2008.

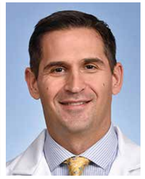
First non-U.S. ASSET Course held in Toronto, Canada, August 25, 2010.

A graphic rendering of an ASSET Course with the 1:4 model.

Additionally, the skills appear to be well-retained at one-year follow-up.

Neil G. Parry, MD, FACS
Chair, Surgical Skills Committee (2018–).

Eric J. Kuncir, MD, FACS
ASSET Course Director, (2018–2021).



Daniel J. Grabo, MD, FACS
ASSET Course Director, (2021–).

Neil G. Parry, MD, FACS, assumed the role of Chair, Surgical Skills Committee (2018–), at the same time Eric J. Kuncir, MD, FACS, was appointed as ASSET Course Director (2018–2021). Over the last few years Drs. Parry, Kuncir, and Bowyer have served as the editorial board to revise and expand the ASSET Course as well as produce a second edition of the manual. Daniel J. Grabo, MD, FACS, took over as ASSET Course Director in 2021. With the help of more than 120 trauma surgeons, the original manual has been updated and revised to include skills such as REBOA, cricothyroidotomy, and vascular shunting in the standard course. In addition, the revised manual will include skills for rural, humanitarian, and military surgeons with chapters on damage control ophthalmology, neurosurgery, orthopaedics, caesarean section, management of postpartum hemorrhage, amputations, and management of burns.

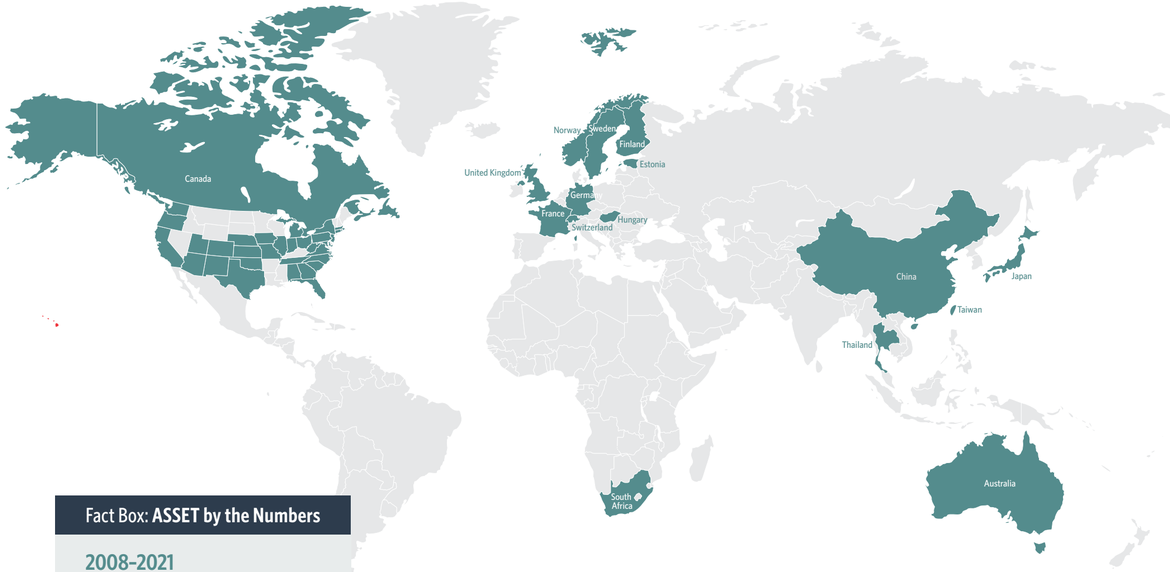
Since 2017, the U.S. military, under Dr. Bowyer's leadership, has been working to adapt and expand the original ASSET Course to better meet the needs of military surgeons who may be tasked to perform a variety of skills not typically performed by general surgeons, particularly when subspecialists are not available. This effort has led to the development of an expanded ASSET Course called ASSET + (ASSET Plus) which has been developed and fielded through the cooperation of the COT, USUHS, and the Military Health System Strategic Partnership of the American College of Surgeons.

> ASSET + is a two-day course that differs from the original ASSET Course in that there is a 1:1 faculty-to-student ratio (two students and two faculty per cadaver) with ongoing real-time assessment of the learners and selective perfusion of the cadaver (fluid and air).

The first day is a formative experience similar to the original course with scenario-based dissections; however, the faculty use a tablet-based app to rate the student compared to expert criterion immediately following each procedure. At lunch time, each faculty provides individualized feedback. After lunch the students rotate to a second table where they are evaluated by a second, different, instructor with individualized feedback at the end of the day. On day two, the students are given a new cadaver and are asked to perform most of the procedures from day one in a summative testing experience as they are evaluated in real-time by two faculty that they were not exposed to on day one. Each student is, therefore, evaluated by four experienced trauma surgeons and the assessment tool enables identification of gaps in skills to allow for focused remediation, if needed. The summative testing experience takes half of the second day with the remainder of the day spent rotating to specialty skills on damage-control orthopaedics; caesarean section and control of postpartum hemorrhage on a task-specific simulator; lateral canthotomy on a simulator; and craniotomy on both simulator and cadaver models.

The ASSET + Course has also been subjected to rigorous psychometric analysis and validation. Based upon this preliminary work, the ASSET + Course has been accepted by the U.S. military to completely replace the current EWS Course. The ASSET + Course will be a mandatory requirement of all active-duty surgeons that must be repeated every two years.

ASSET—Course Sites 2008–2021



Fact Box: **ASSET by the Numbers**

2008–2021

Total Courses	**1,043**
Total Students Trained	**6,492**
Total Countries	**17**
Total U.S States/CAN Provinces	**39**

BEST™

BASIC ENDOVASCULAR
SKILLS FOR TRAUMA

Megan Brenner, MD, FACS
Founder and Course Director, BEST (2016–), FTL Alum, class of 2015.

As trauma surgeons continued to look for ways to manage patients with exsanguinating, noncompressible torso hemorrhage, more and more clinical reports emerged about the use of resuscitative endovascular balloon occlusion of the aorta (REBOA) in 2009. At the same time, Megan Brenner, MD, FACS, had just finished her trauma fellowship at the R Adams Cowley Shock Trauma Center, University of Maryland Medical Center, Baltimore, where they, too, were very interested in the clinical applications and indications of endovascular hemorrhage control. After completing endovascular and vascular fellowships, she astutely realized that there was a lack of succinct courses to teach civilian trauma surgeons basic endovascular techniques, specifically REBOA. With support from Thomas M. Scalea, MD, FACS, Dr. Brenner developed the course as a natural progression from their shared clinical experience. She routinely incorporated learned clinical lessons into the course using simulation modules that included perfused cadavers.

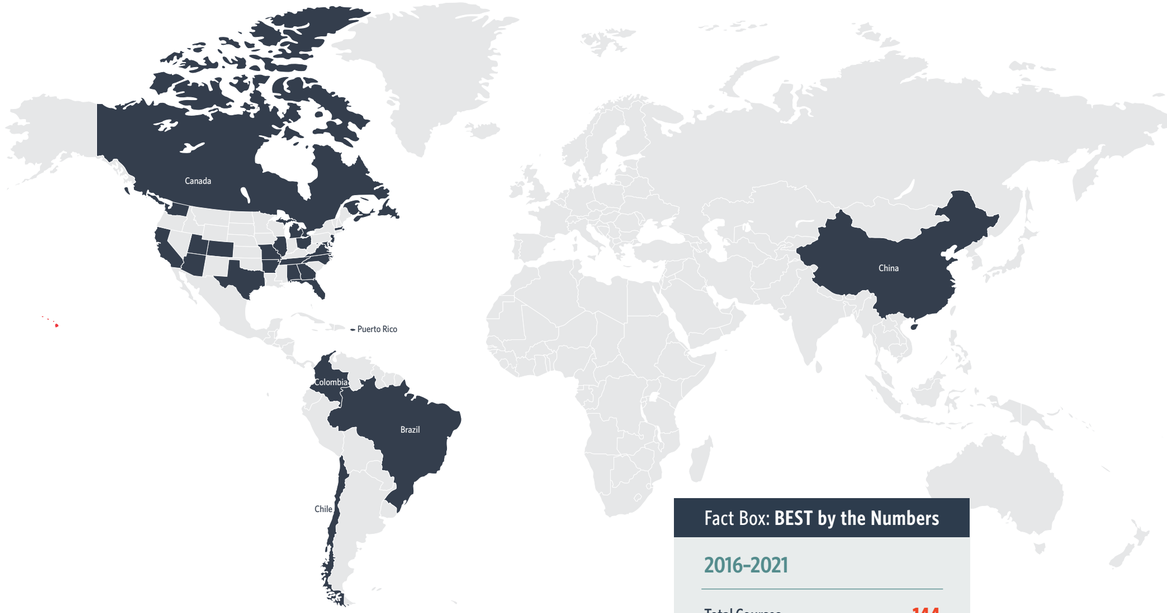
> The first Basic Endovascular Skills for Trauma (BEST) Course was run for the surgical faculty at Shock Trauma in 2013. In 2014, the course was opened to the surgical public and, due to the large interest, they ran one course per month for several years.

In 2016, as technology was evolving rapidly for REBOA, BEST officially joined the COT and the Surgical Skills Committee. This was a brave, novel move for the COT as this course was teaching a new procedure without high-level evidence to support its use. Nevertheless, with exponential adoption in the U.S. and worldwide, the requests for courses increased dramatically. Laura J. Moore, MD, FACS, and Joseph J. DuBose, MD, FACS, had also been using and teaching REBOA at their own institutions and these facilities became the first additional course sites following COT adoption. Over the subsequent years, sites expanded throughout the U.S. and even globally, as workshops were given at various academic meetings including EAST, the ACS Clinical Congress, the Panamerican Trauma Society, and the Trauma Association of Canada.

Megan Brenner, MD, FACS, leads a cadaver lab skills session during a BEST Course in 2014.

BEST Course at the R Adams Cowley Shock Trauma Center, University of Maryland Medical Center, Baltimore in 2014.

BEST—Course Sites 2016–2021



Fact Box: **BEST by the Numbers**

2016–2021

Total Courses	144
Total Students Trained	817
Total Countries	6
Total U.S. States/CAN Provinces	25

The Future

The Surgical Skills Committee of the COT continues its mission to promote and advance the care of the injured patient with high-quality, contemporary surgical courses that can be adopted to a wide range of diverse audiences and cultures. We look forward to exploring new educational approaches including simulation and virtual reality with the goal to ensure the highest-quality skills training for surgeons caring for patients with life-threatening injuries.

We strive to ensure that these critical skills training courses can be incorporated into surgical resident education across the globe, are widely available for practicing surgeons, and are readily available as just-in-time training for surgeons prior to deployment into combat zones.

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COMMITTEE CHAIRS

2005

Fred A. Luchette, MD, FACS
2005–2010

2010

Mark W. Bowyer, MD, FACS
2010–2018

2018

Neil G. Parry, MD, FACS
2018–

OPERATIVE SKILLS COURSES HAVE BEEN VERY POPULAR AROUND THE WORLD

A 2008 ATOM Course in Doha, Qatar.

A 2010 ATOM Course in São Paulo, Brazil.

Military-Civilian Collaboration

15

Military-Civilian Collaboration

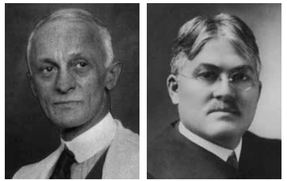
Historically, surgical medicine has been inextricably linked with war and has frequently served as a catalyst for advances in the field. Hippocrates famously asserted, *"He who desires to practice surgery must go to war."*

The Past

History of Military Surgery and the American College of Surgeons

As fate would have it, the formation of the American College of Surgeons (ACS) coincided with the onset of World War I, and the College's subsequent involvement spurred myriad advancements and invaluable lessons on the necessity of wartime medical preparedness.

In 1914, England declared war on Germany only a few days after the Fifth Clinical Congress in London concluded. While the U.S. would not formally enter the conflict until 1917, some of the earliest leaders of the College would become involved at the start of the war. In fact, American surgical units were deployed to Europe more than two years before the arrival of the first U.S. combat troops. The scale of carnage during World War I was, according to one historian, "in itself, devastating: over 21 million military wounded, and nearly 10 million killed. On the battlefield, the injuries were shocking, unlike anything those in the medical field had ever witnessed." The medical personnel faced with treating the wounded adapted with celerity and, seemingly overnight, fashioned a medical network to care for sick and injured soldiers. As the world continued to plunge into the depths of combat, leadership of the fledgling ACS would play an integral role in the development of this new medical network. By the time all hostilities had ceased, ninety percent of all Fellows had participated in the war effort in some capacity.



Harvey Cushing, MD, FACS
A founder of the ACS (Fellow from 1913), ACS President (1922–1923).

George Crile, MD, FACS
A founder of the ACS (Fellow from 1913), ACS President (1916–1917), *Surgery, Gynecology and Obstetrics* Editorial Board member (1920–1942).

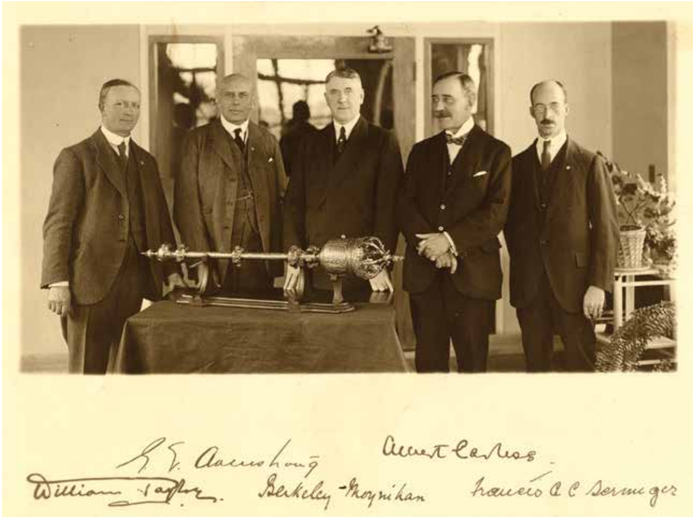
Harvey Cushing, MD, FACS, ACS President (1922–1923), and George Crile, MD, FACS, ACS President (1916–1917) were among the first surgeons to arrive on the battlefield, each having organized a medical team from their respective teaching hospitals to serve on a rotating basis.

> Of his experience, Dr. Cushing wrote,
>
> *"The actual surgery itself, it would seem, is not very difficult, but the judgment of knowing what and how much to do, and the wheres and whens of intervention—these are the important things, only to be learned by experience... Everyone, of course, tells us that we know nothing yet of what it can really be like."*

Dr. Crile, who had previously served in the Spanish-American War, organized the surgical department of *Ambulance Americaine*, a field hospital in France. Upon Dr. Crile's return stateside, U.S. Surgeon General W.C. Gorgas, MD, FACS (1914–1918), asked him for help formulating the essentials of a military medical plan. Dr. Crile would eventually serve as a member of the Committee of American Physicians for Medical Preparedness alongside Frank F. Simpson, MD, FACS, a founding member of the ACS; William J. Mayo, MD, FACS, chair of the committee, a founding member of the ACS, and ACS President (1917–1920); John M.T. Finney, MD, FACS, first ACS President (1913–1916), and member of the ACS Board of Regents (1913–1933); and Franklin H. Martin, MD, FACS, primary founder of the ACS, Managing Director of the ACS (1913–1935), and ACS President (1928–1929).

By early 1915, ACS Fellows had established several hospital units on the western front. Dr. Martin would serve on the Advisory Commission of the Council of National Defense and organized the Volunteer Medical Services Corps of the United States, designed to "whip up enthusiasm in the profession for the military effort" and inspire younger eligible doctors to join the Medical Reserve Corps. Several advancements in patient care resulted from the lessons learned over the course of World War I. By war's end, neurosurgery for brain injuries, laparotomy for abdominal wounds, and forward surgery had become routine. Despite these advancements, the U.S.' short participation in the war belied efforts to motivate the College's membership to participate in military action; once hostilities ceased on November 11, 1918, the "rapid mobilization of military and civilian resources...were quickly relaxed."

In 1920, the Royal College of Surgeons, inspired by the relationships fostered among surgeons from the U.S. and U.K., presented the Great Mace to the American College of Surgeons. The inscription reads, "From the Consulting Surgeons of the British Armies to the American College of Surgeons in memory of mutual work and good fellowship in the Great War 1914–1918."



Presentation of the Great Mace to the ACS by Surgeons of Great Britain, 1920
Left to right: Sir William Taylor, KBE; George E. Armstrong, MD, FACS; Sir Berkeley Moynihan, KCMG, CB; Albert Carless, CBE; Francis A.C. Scrimger, VC.

Over the course of the next several decades, the ACS would grow in both size and stature and would play an important role in all subsequent armed engagements in which the U.S. would be involved. Through the collaborative efforts of the Military Health System Strategic Partnership American College of Surgeons (MHSSPACS) and the ACS Committee on Trauma, a broad coalition of stakeholders has continued to "preserve lessons learned from the battlefield, translate those lessons to civilian care, and ensure service members maintain their readiness to deploy in the future." For without these collaborative efforts, as the philosopher George Santayana once asserted, 'Those who cannot remember the past are condemned to repeat it.'

The Military Health System Strategic Partnership American College of Surgeons (MHSSPACS)

Military surgery has a long history of service to this country. Whenever there is a conflict, military surgeons have been there to provide state-of-the-art surgical care to the soldiers, airpersons, sailors, and marines. Surgeons deployed to combat areas often have developed new procedures and treatments that they bring back to the U.S. to improve civilian patient care. In the process, the troops fighting for our nation as well as patients throughout the world have benefited from the training that surgeons have received at U.S. medical centers prior to deployment to military hospitals. In an era of resident work-hour restrictions, threats on the home front, ongoing conflicts abroad, and rising demands for the efficient delivery of cost-effective, high-quality surgical care, it became apparent that there was a need for a synergistic relationship between the ACS and the U.S. Department of Defense Military Health System.

> This strategic relationship, officially known as the Military Health System Strategic Partnership American College of Surgeons (MHSSPACS), was formally established in 2014 to focus on educational opportunities, systems-based practices, research endeavors, quality improvement programs, combat readiness, and disaster preparedness efforts.

Since its establishment, the MHSSPACS has provided long-term benefits to surgical care in both garrison and combat arenas with readily translatable lessons to civilian surgical practice.

David B. Hoyt, MD, FACS, Executive Director, American College of Surgeons, and Jonathan Woodson, MD, FACS, Assistant Secretary of Defense for Health Affairs, sign the Military Health Service Strategic Partnership American College of Surgeons (MHSSPACS) charter in 2014.

The Excelsior Surgical Society

One key element of the MHSSPACS was the re-establishment of the Excelsior Surgical Society in 2016. The original Excelsior Surgical Society, a group of 80 medical officers, met for the first time at the end of World War II in 1945 at the Excelsior Hotel in Rome, Italy, to discuss their experiences. The society consisted of surgeons who had been deployed to the Mediterranean Theater of Operations (MTO) and they chose the Excelsior Hotel to host that first meeting as it was the location of General Mark Clark's headquarters during the Italian campaign. Originally the society was launched as a "club" (which later became a society within the ACS in 1951).

> The "club" met once a year in the fall at a chosen medical center to coincide with the opportunity to watch a "good" football game and repair for "relaxation."

Excelsior Surgical Society original and current logos. The original symbol of the Capitoline Wolf, which is considered a symbol of Rome, was incorporated into the current logo to honor the history.

Excelsior Surgical Society, 1945, Rome, Italy.

Excelsior Surgical Society, 2018 ACS Clinical Congress.

Michael E. DeBakey, MD, FACS
The last member of the original Excelsior Surgical Society, established at the close of World War II.

Edward D. Churchill, MD, FACS
A prominent surgeon and consultant to the U.S. Army in the Mediterranean Theater, who also presented the first keynote address to the Society in 1945.

Founding members included prominent surgeons, and the society met annually until the death of the last World War II member Michael E. DeBakey, MD, FACS. The original Excelsior Surgical Society logo featured the *La Lupa Capitolina* (the Capitoline Wolf) a reference to the founding of Rome by Romulus and Remus who, according to legend, were suckled by a she-wolf as infants. This symbol has been incorporated into the modern logo of the Excelsior Surgical Society to honor this tradition.

The other key and enduring feature of the original club was the establishment of the yearly Churchill Lecture, officially known as the Excelsior Surgical Society Edward D. Churchill Lecture, now one of the most pre-eminent orations in American surgery. This lecture was introduced to recognize the accomplishments and contributions of Edward D. Churchill, MD, FACS, who served as consultant to the U.S. Army in the Mediterranean Theater and whose 1972 memoir *Surgeon to Soldiers* (published the year of his death) is as relevant today as it was 75 years ago. This lecture was continued for the existence of the original Excelsior Surgical Society until its last meeting in 1986, and then was presented at the ACS Spring Meeting until being moved into the Clinical Congress in 2008. The list of preeminent surgeons who have given the Churchill Lecture reflects the impact that Dr. Churchill had on American surgery and demonstrates the "shared ethos" between civilian and military surgeons. One of the most notable orations was in 2014, when then-Retired U.S. Army Colonel Norman M. Rich, MD, FACS, DMCC, MC, presented

Retired U.S. Army Colonel Norman M. Rich, MD, FACS, DMCC, MC, presented with the first Award for Distinguished Service to the Military at the 2019 ACS Clinical Congress by Ronald V. Maier, MD, FACS, ACS President (2018–2019).

"Military Surgeons and Surgeons in the Military," which highlights this shared history.

The modern Excelsior Surgical Society had its inaugural meeting the Sunday of the Clinical Congress on October 4, 2015, with the Keynote Speaker Jonathon Woodson, MD, FACS, then-Assistant Secretary of Defense for Health Affairs, and the key military leader responsible for providing the resources needed to launch the MHSSPACS. That meeting also featured the first Major John P. Pryor Memorial Lecture, appropriately delivered by C. William Schwab, MD, FACS, titled "Training of a Combat Surgeon." Both lectures continue yearly at the Excelsior Symposium, which also includes Panel Sessions on timely topics, and yearly updates from the leadership of the U.S. Army, Air Force, and Navy. The initial goals of the new society, as reflected in its charter, are to support the MHSSPACS, become a "home of military surgeons," serve as an "on and off ramp" for military surgeons (for example, those joining or separating from the armed services), and to provide a yearly scholarly forum. The Excelsior Surgical Society has flourished under its first five presidents: Captain Eric A. Elster, MD, FACS, USN; Colonel Stacy A. Shackelford, MD, FACS, USAF; Colonel Robert B. Lim, MD, FACS, USA (Retired); Captain Gordon G. Wisbach, MD, MBA, FACS, USN; and Colonel Todd E. Rasmussen, MD, FACS, USAF, and now includes more than 300 members (active duty, retired, and reserve members of the military; residents, fellows and medical students); a dues structure; and a number of committees (program, outreach and diversity, communications, membership), thus fulfilling its mission to be a "home" for military surgeons.

Military Surgery and the ACS Committee on Trauma – Region 13

As noted earlier in this chapter, the ACS has a long and distinguished relationship with the U.S. military. As early as World War I, members of the newly formed ACS, led by Franklin H. Martin, MD, FACS, advocated for national preparedness, oversaw medical mobilization, and offered the services of the ACS to the Army Surgeon General. About 90 percent of the ACS fellowship participated in the war effort at that time and approximately 50 percent served on active duty, making this wartime experience foundational to the establishment of the Committee on Fractures (later to become the Committee on Trauma) within the ACS.

Although intermittent and beset by a loss of experience during peacetime, wartime trauma continued to spur advances in civilian trauma care through close personal relations facilitated by the committee, as well as through peer-reviewed publications.

> During World War II, correspondence between military medical leaders and the Committee on Fractures advanced the combat casualty care principles of blood transfusions, phased wound management, the use of penicillin in wound care, and fracture splinting practices. The Korean and Vietnam Wars saw advancement in helicopter evacuation, burn care, and trauma systems of care including levels of hospitals and critical care transport of patients.

Franklin H. Martin, MD, FACS, was the founder and Managing Editor (1905–1935) of the College's journal *Surgery, Gynecology and Obstetrics (SG&O)*, which today is known as the *Journal of the American College of Surgeons (JACS)*; Director-General of the American College of Surgeons (1913–1935); and ACS President (1928–1929).

The care of patients with complex, multi-system injuries dramatically improved during the Vietnam era, as did the treatment severe burns, complex soft tissue injuries and Acute Respiratory Distress Syndrome (ARDS). Vascular surgery and limb salvage improved, emanating from the experience obtained during the Vietnam War.

In 1966, the National Academies of Sciences National Research Council released the seminal report, *Accidental Death and Disability: The Neglected Disease of Modern Society.* Three Fellows of the American College of Surgeons—Sam Seeley, MD, FACS; Alan P. Thal, MD, FACS; and John M. Howard, MD, FACS—played a critical role in the crafting of this document. The report was, in large measure, stimulated by Drs. Howard and Seeley's experiences during their military deployment in the Korean War. After military retirement, General Seeley, a member of the COT, worked for the National Research Council of the National Academies of Sciences, where he brought federal and academic medical communities together to collaborate in the fields of shock and trauma management. Drs. Howard, Seeley, and Thal integrated lessons learned on the battlefield with lessons learned at home in the creation of this seminal report. The findings and recommendations described in the National Academies of Sciences report were pivotal in the development of emergency medical services (EMS), emergency medicine, trauma surgery, trauma centers, and trauma care systems across the nation.

During the interwar years, military-civilian relationships tended to fade, while military surgeons had almost no chance during peacetime to practice their battlefield skills. Following the Vietnam War, with the backdrop of controversies generated across the U.S., prominent military fellows, and the specialty governors on the ACS Board of Governors, who represented the three U.S. military medical services, lobbied for more visibility for military surgery within the ACS. To that end, in the early 1970s, the leadership of the COT made significant efforts to ensure inclusion of the military community in COT activities. These efforts included inviting Dr. Rich who was the inaugural chair, department of surgery, Uniformed Services University of the Health Sciences (USUHS), Bethesda, MD, to contribute to the program at the 50th anniversary of the COT that was held in Charleston, SC, in 1972.

In addition to the COT, the leadership of the American Association for the Surgery of Trauma (AAST) had been participating in discussions to determine how best to incorporate contributions from the military into its initiatives. Several of the officers of both organizations were also prominent military surgeons and contributed greatly to the dialogue, including Basil A. Pruitt, Jr., MD, FACS. Together, these military leaders made a formal request to give a short report from the military at the annual ACS Board of Governors' meeting, but this request was denied.

The Present

In 1980, the ACS announced that a formal military region (Region 13) would be established within the COT.

> Region 13 includes a Region Chief and Chairs from each of the U.S. military medical services (Army, Navy, Air Force), the U.S. Department of Veterans Affairs, and the Canadian forces. Early efforts of this regional committee focused on participating in the annual COT Resident Trauma Papers Competition and promulgation of Advanced Trauma Life Support® (ATLS®) courses throughout the military.

Graphic from the front and back of the centennial coin designed to commemorate Region 13's contributions to the Committee on Trauma on its 100th anniversary.

In fact, one of the inaugural ATLS courses was conducted at USUHS in August 1980. Similarly, the first Advanced Surgical Skills for Exposure in Trauma (ASSET) Course was provided for deploying surgeons at USUHS and still serves as a basis for developing and testing the skills needed for the expeditionary military surgeon. The Region 13 Resident Trauma Papers Competition was formalized in the 1990s and has garnered steady interest since then. Notably, military residents from Region 13 have won the national COT competition in 2016 and 2018.

> Beginning in 2001, the U.S. military, Canadian forces, and the U.S. Department of Veterans Affairs deployed surgeons and received casualties from the major conflicts in Afghanistan and Iraq. The military region of the COT became a portal through which information was exchanged and improvements were delivered to both military and civilian surgeons involved in trauma care.

Such improvements included the establishment of a Joint Theater Trauma System in the combat theaters of operation in Afghanistan and Iraq that matured and expanded to encompass the global continuum of U.S. and coalition military combat casualty care.

The Joint Trauma System (JTS) was built by military leaders who had extensive experience working in civilian trauma systems, using standards developed by the ACS COT in its *Resources for Optimal Care of the Injured Patient* manual. The original trauma system in Operation Iraqi Freedom was directly modeled from military surgeons' experience in developing the Southwest Texas Regional Advisory Council's Trauma System. Once established, the Joint Trauma System drove significant advances including bleeding control and use of tourniquets, forward surgical care (small surgical teams that provide life-saving surgical care near the battlefield before transfer to definitive care), use of whole blood for resuscitation, rapid transport of injured patients, and new brain injury treatments. The ACS COT's STOP THE BLEED® program, which has trained 1.8 million civilians in bleeding control is a testament to the JTS bleeding control programs. These achievements demonstrate the power of military-civilian partnerships in improving care of both populations.

The Three Amigos
Ronald M. Stewart, MD, FACS; Michael F. Rotondo, MD, FACS; and John Fildes, MD, FACS.

In 2007, the ACS COT began partnering with leaders in the JTS to help sustain and improve the Joint Trauma System as the conflicts continued. This led to consultative JTS visits and reports by John Fildes, MD, FACS, COT Chair (2006–2010); and Michael F. Rotondo, MD, FACS, Chair, Ad Hoc Trauma System Evaluation and Planning Committee (TSEPC) (2006–2009), COT Chair (2010–2014), as representatives from the COT; and Ronald M. Stewart, MD, FACS, at the time, COT Region 6 Chief (2005–2011) and representing both the San Antonio Military Civilian Partnership and the National Trauma Institute (NTI), now restructured as the Coalition for National Trauma Research (CNTR), working with JTS leadership.

The goals of these visits were to enhance the JTS and ensure its long-term success. As described in Chapter 11, the collaborative work of leaders from Region 13, and other COT members from the TSEPC area, culminated in the joint ACS COT-U.S. military publication titled *Joint Trauma System: Development, Conceptual Framework, and Optimal Elements* in January 2012. The COT continued to support and assist with maturation of the Joint Trauma System and military trauma care through trauma system assessments, and continued discussions. The results and conclusions of these activities were provided in publication and testimony to the Defense Health Board, directly contributing to the continuous improvement and the enduring statutory establishment of the U.S. Department of Defense (DoD) Joint Trauma System in the 2017 National Defense Authorization Act.

Synergistic advancement in both military and civilian trauma care have been realized through efforts within Region 13 and the COT, including the principles of military damage-control resuscitation and surgery that have been incorporated into the COT's ATLS and ASSET courses. The latest edition of ASSET includes modules developed in partnership between military and civilian members to provide additional training for care relevant to both deployed uniformed service personnel and civilian surgeons serving in remote areas (see Chapter 14). These lessons have helped to facilitate the mutual goals of both partners and the ongoing efforts to sustain military trauma skills during peacetime and to establish a national military-civilian trauma system within the U.S.

Members of the military's Joint Trauma System (JTS) and COT leaders collaborated to review and codify the JTS within the structure used by the COT Trauma System Evaluation and Planning Committee in its work with civilian trauma systems. In 2008 and 2011, in an extension of the Senior Visiting Surgeons Program, senior COT leadership were brought to the combat theater to assess the military trauma system for improvements. The resultant book and recommendations led to lasting change with commitment for an enduring U.S. Department of Defense (DoD) Joint Trauma System, a fitting culmination of several years of dedicated work and illustrative of the continuing partnership between the military and the ACS COT.

Clockwise from top left:

Ronald M. Stewart, MD, FACS; John Fildes, MD, FACS; Col. Warren C. Dorlac, MD, FACS (Trauma Consultant to the USAF Surgeon General); and Kathleen D. Martin, MSN, RN (Trauma Nurse Director, LRMC), on a review of the CENTCOM Joint Theater Trauma System and visiting Landstuhl Regional Medical Center (LRMC), in Germany as part of that review trip, October 2008. *Photo courtesy of Ms. Martin.*

Col. Warren C. Dorlac, MD, FACS (Trauma Consultant to the USAF Surgeon General), and John Fildes, MD, FACS, in an Army C-12 over Afghanistan, October 2008.

Ronald M. Stewart, MD, FACS, in an Army C-12 over Afghanistan, October 2008.

Critical Care Air Transport Team (CCATT) Mission

The CCATT program was developed by the U.S. Air Force to provide continuous en-route care, moving the critically injured soldier from the far-forward echelons of care (combat support hospitals or forward surgical facility in the theater of operation) to a more established, higher level of care (such as LRMC). Each CCATT team is composed of three members: a critical care physician, a critical care-qualified nurse, and a respiratory therapist, and is designed to be capable of providing care for three critically injured patients (or six less severely injured) for up to 72 hours.

Col. Jeffrey A. Bailey, MD, FACS (USAF); Kathleen D. Martin, MSN, RN (Trauma Nurse Director, LRMC); Lt. Col. Anne G. Rizzo, MD, FACS (USAFR Trauma Surgeon); Thomas M. Scalea, MD, FACS (AAST member, Shock Trauma, host to the USAF C-STARS program); and Michael F. Rotondo, MD, FACS, COT Chair (2010–2014), on an October 2011 Afghanistan review of the CENTCOM Joint Theater Trauma System. *Photo courtesy of Ms. Martin.*

Col. Donald H. Jenkins, MD, FACS, USAF; M. Margaret Knudson, MD, FACS; Col. Todd E. Rasmussen, MD, FACS, USAF; Capt. Joshua B. Alley, MD, FACS, USAF, at Balad Air Base, Iraq, 2008 where Dr. Knudson was deployed for two weeks as part of the Senior Visiting Surgeon's Program. *Photo courtesy of Dr. Knudson.*

The Senior Visiting Surgeons Program

In parallel to the work on the review of the military systems, another effort that included the AAST, the Society for Vascular Surgery, and the COT was the development of, and the support for, the Senior Visiting Surgeons (SVS) Program in 2006. Many civilian trauma surgeons, seeing their military colleagues repeatedly deployed to Iraq and Afghanistan, wanted to assist in combat casualty care but recognized that they were not qualified to be deployed in the "Theater of Operations." Instead, the DoD together with both the COT and the AAST, funded a program that allowed civilian surgeons to volunteer at the Landstuhl Regional Medical Center (LRMC), Germany, which is operated by the U.S. Army. This program offered civilian surgeons the opportunity to participate in the care of those critically injured combat casualties who were evacuated from Iraq and Afghanistan. Over the course of seven years, more than 200 trauma and vascular surgeons volunteered to work in two-to-four-week rotations at LRMC. The Orthopaedic Trauma Association also provided volunteer civilian surgeons to this program. This initiative resulted in a continuous exchange of knowledge, the development of a robust performance improvement program, and an atmosphere that generated research ideas. Another benefit was the formal verification of LRMC as a trauma center by the ACS COT—the first center to be granted verification outside of the U.S. (see Chapter 5).

The Future

Military-Civilian Partnerships and the Readiness Mission

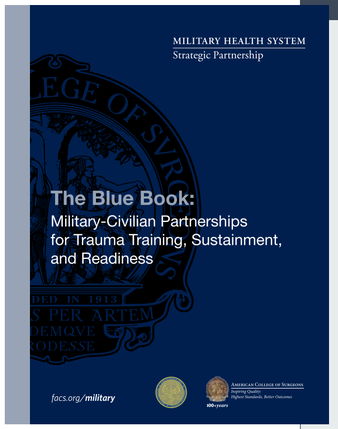
Maintaining readiness of the clinical skills required for deployment is the primary mission of the military health system. Despite this mission, however, most military surgeons and other members of the combat casualty team do not participate in trauma care routinely in their garrison practice. Providing them with ongoing trauma experience outside of deployment can be accomplished in two ways: by having military hospitals participate in the civilian trauma system or by having them partner with a civilian trauma center for trauma team training. At the end of 2021, ten U.S. military treatment facilities (MTFs) are designated or pursuing designation as trauma centers. Brooke Army Medical Center (BAMC)/San Antonio Military Medical Center has been verified as an ACS Level I center for the past 24 years and is fully integrated into a civilian trauma system as a designated trauma center for the region. The BAMC model provides an environment where complete DoD teams can be fully prepared to care for critically ill patients in theater, while training in a DoD environment. This model develops active-duty trauma leaders who have experience managing and leading in both an ACS Level I trauma center and a trauma system.

There are five formal military-civilian partnerships (MCPs) at civilian trauma centers that have been in existence for 20 years and other less formal MCPs are in existence as well. The original five include Ryder Trauma Center in Miami, FL (Army), the University of Southern California at LA County (Navy) and St. Louis University, the University of Maryland, and the University of Cincinnati (Air Force).

U.S. Military Treatment Facilities (MTFs) Designated or Pursuing Designation as Trauma Centers

Name	COT VRC Level	State Designation Only
Brooke Army Medical Center	I	
Madigan Army Medical Center		II
Tripler Army Medical Center	II	
Walter Reed National Military Medical Center	II	
Landstuhl Regional Medical Center	II	
Naval Medical Center Camp Lejeune	III	
Womack Army Medical Center	III	
Dwight D. Eisenhower Army Medical Center	In process	
Fort Belvoir Community Hospital	In process	
Mike O'Callaghan Military Medical Center	In process	

(as of September 15, 2021)



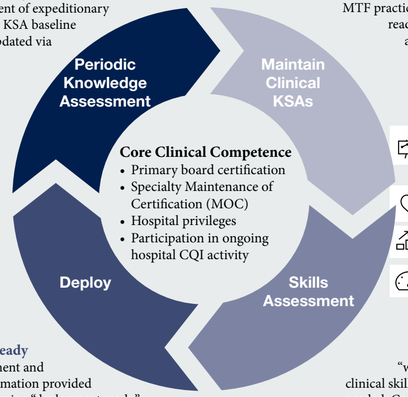
CLINICAL READINESS LIFE CYCLE

1. Periodic Knowledge Assessment
Individual assessment of expeditionary clinical knowledge. KSA baseline lists periodically updated via the JTS/JTTED.

2. Maintain Clinical KSAs
MTF practice aligned with KSAs to maintain readiness-related clinical skills. Gaps addressed through VA and TAAs.

3. Skills Assessment
Deliver in pre-deployment "window." Complete expeditionary clinical skills assessment and train/retrain as needed. Conduct team training as necessary.

4. Deployment Ready
Knowledge assessment and skills training information provided to Services to determine "deployment ready."



New Military Medical Model = Readiness Based

- KSAs will be included in QPP as a readiness threshold for active duty physicians driving caseload, case mix, and complexity
- Recapture high-value cases ensuring future readiness by prioritizing GME training and medical R&D
- Economic metrics will likewise improve
- Force function to improve coding and documentation in order to properly measure and evaluate system readiness

M. Margaret Knudson, MD, FACS
MHSSPACS Medical Director.

The 2017 National Defense Authorization Act (NDAA) tasked the major MTFs to either become trauma centers and participate in their local civilian trauma system or to partner with an existing civilian trauma center. The funding for this legislative directive is termed "The Mission Zero Act." As of late 2021, the funding for Mission Zero has been appropriated by the House of Representatives and is awaiting approval by the Senate. It is anticipated that eligible MCPs (both new and established partnerships) will need to formally apply for these grants through a centralized process. To that end, the MHSSPACS, under the leadership of M. Margaret Knudson, MD, FACS, MHSSPACS Medical Director, convened a series of meetings that included key stakeholders and developed the criteria through which a MCP may be chosen and subsequently evaluated. These criteria are summarized and were formally published in 2020 by the ACS in *The Blue Book: Military-Civilian Partnerships for Trauma Training, Sustainment, and Readiness*. This book has been endorsed by the U.S. Defense Health Board, the Secretary of Defense, and the Defense Health Agency. Like other verification programs at the ACS, a pre-review questionnaire and the agenda for formal site visits will need to be developed for this purpose.

The 2017 NDAA also provides for the establishment of a Joint Trauma Education and Training Directorate to ensure that military trauma providers maintain deployment readiness. The MHSSPACS will continue to work with the military joint trauma system director to develop knowledge assessment exams and skills courses to assess deployment readiness of members of the combat casualty team on a regularly scheduled basis. Additionally, the MHSSPACS is in the process of developing an aligned curriculum that can be assessed world-wide for a refresher or just-in-time training for general surgeons and surgical specialists. These efforts will need to be continued in the future as domestic trauma care and combat casualty care continue to evolve.

The Excelsior Surgical Society presented this plaque to the ACS during the 2015 Clinical Congress, containing two flags flown by the 772nd Forward Surgical Team at Al Asad Air Base, Iraq (left), and the 555th Forward Surgical Team at Camp Brown, Kandahar, Afghanistan (right) to honor the special relationship between the College and its military surgeons.
Pictured from left are Colonel Jeffrey A. Bailey, MD, FACS; M. Margaret Knudson, MD, FACS; Colonel Robert B. Lim, MD, FACS; Commander Gordon G. Wisbach, MD, FACS; Colonel Jeffrey D. McNeil, MD, FACS; Colonel Matthew J. Martin, MD, FACS; Major Steven A. Satterly, MD, FACS; David B. Hoyt, MD, FACS, ACS Executive Director; Captain Eric A. Elster, MD, FACS.

Trauma Systems, Disasters, and Pandemic Response

According to the 2016 report from the National Academies of Sciences, Engineering and Medicine (NASEM), a comprehensive trauma system that includes both military and civilian trauma centers has the capacity to save an estimated 20,000 to 30,000 lives in the U.S. each year. This is particularly important for those injured in rural areas, many of whom lack access to comprehensive trauma care within an hour of injury. Military Treatment Facilities (MTFs) that are verified and designated trauma centers enhance the response to a mass casualty event as was demonstrated in the Sutherland Springs church shooting outside San Antonio, TX, and the Amtrak train derailment in Tacoma, WA, both in 2017. Military personnel embedded in civilian centers also augment a response as occurred in the Las Vegas shooting in 2017. When the U.S. Navy ships the *Comfort* and the *Mercy* were deployed during the COVID-19 pandemic, and military field hospitals were established at several locations to handle hospital overload, the MHSSPACS suggested that these temporary MCPs should be guided by the criteria in *The Blue Book: Military-Civilian Partnerships for Trauma Training, Sustainment, and Readiness*. To that end, the book was made available on the ACS website, and was downloaded more than 300 times during the pandemic by surgeons all over the world. The MHSSPACS looks forward to working with the COT to develop a comprehensive trauma system that includes both military and civilian trauma centers that covers the entire U.S. and expands our ability to manage man-made and natural disasters, mass casualty events, and, even, pandemics.

Trauma Research

At the present time, the major funder of trauma research is the U.S. Department of Defense. Several projects supported by the Coalition for National Trauma Research (CNTR) have been developed based on combat experience, such as the use of whole blood for resuscitation and the determination of the causes of prehospital deaths following trauma. Another group examining clotting disorders after injury (also DoD-funded) is now participating with the National Institutes of Health to develop prevention and treatment strategies for pathologic clotting in patients with COVID-19. These efforts, together with the COT's National Trauma Research Action Plan, will perhaps finally result in the establishment of a true national trauma institute fully funded by the federal government. The MHSSPACS looks forward to working with the COT and CNTR to achieve our shared goal of achieving zero preventable trauma deaths and minimizing disability after injury.

Region 13

Established in 1980, the formal military region (Region 13) comprises a Region Chief and Chairs from each of the U.S. military medical services (Army, Navy, Air Force), the U.S. Department of Veterans Affairs, and the Canadian forces. The collaboration of the military branches, together with the ACS COT and MHSSPACS continue to drive the mission to reduce or eliminate preventable death and injury.

Region Chief

1980 – **Norman M. Rich, MD, FACS** 1980-1995

1995 – **M. Gage Ochsner, MD, FACS** 1995-2000

2000 – **Christoph R. Kaufmann, MD, FACS** 2000-2003

2003 – **David G. Burris, MD, FACS** 2003-2009

2009 – **Brian J. Eastridge, MD, FACS** 2009-2012

2012 – **Jeffrey A. Bailey, MD, FACS** 2012-2018

2018 – **Stacy A. Shackelford, MD, FACS** 2018–

The U.S. Department of Veterans Affairs

1980 – **Andrew C. Ruoff, MD, FACS** 1980-1986

1986 – **John F. Stremple, MD, FACS** 1986-1995

1995 – **Peter Mucha, Jr., MD, FACS** 1995-1998

1998 – **R. Neal Garrison, MD** 1998-1999

1999 – **Lorrie A. Langdale, MD, FACS** 1999-2006

2006 – **Ralph G. DePalma, MD, FACS** 2006-2015

2015 – **Kenneth A. Lipshy, MD, FACS** 2015-

U.S. Army

1981 – **James M. Salander, MD** 1981-1990

1990 – **Juan C. D'Avix, MD** 1990-1992

1992 – **William F. McManus, MD, FACS** 1992-1995

1995 – **Christoph R. Kaufmann, MD, FACS** 1995-2000

2000 – **David G. Burris, MD, FACS** 2000-2003

2003 – **John H. Armstrong, MD, FACS** 2003-2006

2006 – **Brian J. Eastridge, MD, FACS** 2006-2012

2012 – **Matthew J. Martin, MD, FACS** 2012-2018

2018 – **Jennifer M. Gurney, MD, FACS** 2018–

U.S. Navy

1980 – **Donald L. Sturtz, MD, FACS** 1980-1988

1988 – **Gregory A. Timberlake, MD, FACS** 1988-1992

1992 – **M. Gage Ochsner, MD, FACS** 1992-1995

1995 – **Frederic J. Cole, Jr., MD, FACS** 1995-1998

1998 – **K. Dean Gubler, MD, FACS** 1998-2002

2002 – **Peter M. Rhee, MD, FACS** 2002-2008

2008 – **James R. Dunne, MD, FACS** 2008-2012

2012 – **Eric J. Kuncir, MD, FACS** 2012-2014

2014 – **Zsolt T. Stockinger, MD, FACS** 2014-2017

2017 – **Travis M. Polk, MD, FACS** 2017–

U.S. Air Force

1981 – **Constantine J. Nonas, MD, FACS** 1981-1983

1983 – **James E. Payne, Jr., MD, FACS** 1983-1987

1987 – **Daniel P. Connelly, MD, FACS** 1987-1994

1994 – **Thomas E. Scott, MD, FACS** 1994-1998

1998 – **Peter C. Muskat, MD, FACS** 1998-2003

2003 – **Mark W. Bowyer, MD, FACS** 2003-2009

2009 – **Warren C. Dorlac, MD, FACS** 2009-2012

2012 – **Alan D. Murdoc, MD, FACS** 2012-2015

2015 – **David P. Blake, MD, FACS** 2015-2018

2018 – **Joseph DuBose, MD, FACS** 2018-2021

2021 – **Brian J. Gavitt, MD, FACS** 2021–

Canadian Military

2003 – **Jay J. Doucet, MD, FACS** 2003-2007

2008 – **Homer Tien, MD, FACS** 2008-2016

2016 – **Andrew N. Beckett, MD, FACS** 2016–

Public Health Service

1982 – **David R. Boyd, MD, FACS** 1980-1982

1995 – **Christoph R. Kaufmann, MD, FACS** 1995

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Global Engagement

16

Global Engagement

Led by the Committee on Trauma, the American College of Surgeons has become a global organization sharing best practices and resources to support the care of the injured patient around the globe.

Going Beyond the Borders

While the American College of Surgeons (ACS) initially focused on improving the care of the surgical patient within North America, surgeons from other countries had strong involvement in achieving this goal. Early in the 1920s, formal outreach to colleagues in South America was made and regular programs and events were organized to share experiences and educational offerings. After World War II, there were some pocket areas of interest in program development beyond South America. The last 25 years has seen tremendous growth in the promulgation of ACS and Committee on Trauma (COT) programs beyond the U.S., Canada, and South America, and the ACS has gone from a national organization with international members to an organization that is strongly committed to global engagement and the improvement of surgical care throughout the world. In many ways, this effort has been led by the COT.

Ricardo G. Sonneborn, MD, FACS.

Global interest in the activities of the COT was evident in 1955, with the request to translate the manual, *The Management of Fractures and Soft Tissue Injuries*, into Spanish. The discussion of forming regional committees outside of the U.S. and Canada began in 1968 and was supported by the subsequent widespread promulgation of the Advanced Trauma Life Support® (ATLS®) program. Mexico (1968), Panama (1972), and Colombia (1983) were the first regional committees to form outside of North America. In 1987, Latin America became the 14th region of the COT under the direction of Ricardo G. Sonneborn, MD, FACS; new regional committees formed in Argentina, Brazil, and Chile, joined by Mexico, Panama, and Colombia under the new regional umbrella. Region 14 was renamed the International Committee on Trauma in 1995.

1971 Section Map of the COT
Mexico was the first regional committee to form outside the U.S. and Canada, however it was not assigned to a Section.

Three International Regions Formed in 2007
Region Chiefs: Renato S. Poggetti, MD, FACS, (Region 14); Claus Falck-Larsen, MD, (Region 15); and Michael J. Hollands, MBBS, FACS, (Region 16).

By 2007, three international regions were established; the International Committee on Trauma again became Region 14, encompassing Latin/South America and the Caribbean; newly formed Region 15 included Europe, the Middle East, and Africa; and newly formed Region 16 included Australasia and the Pacific Rim. The first Region Chiefs in these newly formed regions were Renato S. Poggetti, MD, FACS, (Region 14); Claus Falck-Larsen, MD, (Region 15); and Michael J. Hollands, MBBS, FACS, (Region 16).

In 2011, a Fourth International Region was Formed
Saud Al Turki, MBBS, FACS, ODTS, FRCS (Region 17).

In 2011, Region 17 was formed for the growing programs in the Middle East and North Africa, with Saud Al Turki, MBBS, FACS, ODTS, FRCS, as its first Region Chief.

Global COT Representatives - 2017 COT Annual Meeting
This group represents the ongoing global growth and engagement in COT meetings and programs.

Early Steps

Global Promulgation of ATLS

Without question, the COT's first foray into the field of global engagement, and the largest and longest lived, has been in the teaching of the ATLS Course. The ATLS Program has grown globally to the point that the annual number of courses given outside the U.S. exceeds the number given within, and the number of people participating in the ATLS Global Symposium, presented each spring in conjunction with the COT Annual Meeting, continues to grow. From its roots in Nebraska (see Chapter 4), ATLS was adopted by the ACS COT in 1980, and with an initial investment, developed course materials and began dissemination of the course within the U.S., followed by Canada a year later. The course was promulgated to Latin America in 1986, Europe and Australia in 1988, and is now taught in 84 countries worldwide.

> The ATLS Course, including its development and dissemination, is now a truly global undertaking and it continues to evolve with input from educators and surgeons around the world.

Though the name and the patient management strategy developed by the COT had become widely disseminated via the ATLS Course by the dawn of the 21st century, the concept of true global engagement was less well-developed. The content and method of teaching ATLS was tightly controlled by the COT and allowed for very little input from those outside the U.S. during the first 20 years. As the global audience for ATLS grew, so too grew the realization that true success would only be achieved when the COT began to change its stance, working as a partner to develop capacity in other countries, rather than merely as the vendor of a program. It was this change in vision, beginning in the early 2000s, that has led to the truly remarkable success of the ATLS program globally.

Systems and Centers

During the same period that the ATLS Course was being developed, the concepts of the trauma center and the trauma system also were being actively expanded through COT programs. The COT has worked since its inception to develop and disseminate standards for the care of injured patients. Through the late 1970s and early 1980s, the COT had created and refined a core set of standards for trauma centers, and it began the ACS COT Verification Program, establishing a process to ensure centers were meeting those standards. The Trauma Verification, Review, and Consultation Program (VRC), as it is known today, has grown dramatically within the U.S. (see Chapter 5). From its roots, the trauma center verification process was completely focused on, and very specific to, the U.S. health care system.

> Though there was interest in the COT's approach to trauma center verification from outside the U.S., the U.S. standards were not directly applicable to any other country due to their specific connection to the U.S. health care systems and the U.S. approach to trauma center structure.

Concern for the integrity of the U.S. process led the Verification Review Committee (VRC) to adapt a policy of very strict adherence to the standards, with no allowance for modification. It was impossible for a facility outside the U.S. to seek verification through the standard pathway, and the mission of the VRC did not include development of a global program.

Region 14 Advocate
Maria F. Jimenez, MD, FACS, past Region 14 Chief, Chair I2C2 (2016–2019).

Global interest in the verification program was evident based on the unofficial translation of the *Optimal Resources for the Care of the Injured Patient* into several languages without input from the COT. There was early interest from Region 14, led by Maria F. Jimenez, MD, FACS, to make an official translation of the 2006 edition of the document (the "Green Book") into Spanish and Portuguese, but it soon was recognized that a literal translation of the *Optimal Resources for the Care of the Injured Patient* would be of limited value due to the variances in system structure noted previously, so the project was not officially sanctioned.

REGION 14 LEADERSHIP

Julio L. Trostchansky, MD, FACS, Chief, (2019-).

Region 14 Meeting, 2017.

> The discussion was shifted toward identifying ways the U.S. standards, in their original form and language, could be used as a guide for trauma center development in other countries.

In parallel fashion, the COT has been deeply invested in trauma system development from its beginnings, and in a more focused and formalized way since the establishment of the Working Group for Trauma System Evaluation in 1994. As the Trauma System Consultation (TSC) Program in the U.S. gained momentum, there was increasing interest in trauma system consultation from outside the country as well. In 2012, after watching the newly developing regional structure pioneered by the ATLS program, Robert J. Winchell, MD, FACS, Chair of the Trauma System Evaluation and Planning Committee (TSEPC) (2009–2018), invited the international Region Chiefs to participate in the activities of the committee.

> By its very nature, trauma system development is not well-defined by specific standards, and so by intent, the TSC Program has always been focused on consultation and collaborative solutions.

The concept of universal principles that can be used to guide development, paired with the understanding that the implementation of these principles is completely dependent upon local factors, which is inherent in the TSC process, removed many of the barriers initially faced in extending the COT's work on trauma center development. As part of efforts to expand the scope of the TSEPC, Dr. Winchell reached out to the World Health Organization (WHO) and was invited to Geneva, Switzerland, to give a special presentation on trauma system development, held at the first meeting of the WHO's Global Alliance for Care of the Injured (GACI) in June of 2012. This presentation and subsequent work with GACI led to the incorporation of many of the COT's principles into the WHO's approach to global trauma system development.

Applying COT Standards Outside of the U.S.

In 2012, Dr. Winchell and Chris Cribari, MD, FACS, Chair of the Verification Review Committee (VRC) (2010–2014), were approached by Dr. Falck-Larsen, an orthopaedic trauma surgeon and inaugural chief of Region 15, with the idea of conducting a site visit at his facility, the Rigshospitalet, a top-level academic trauma center in Copenhagen, Denmark. After discussion with leadership of the COT (Michael F. Rotondo, MD, FACS, COT Chair [2010–2014]; and Raul Coimbra, MD, PhD, FACS, COT Vice Chair [2010–2014]) and the leadership of the Rigshospitalet, and with the understanding that the function of a single trauma center was best understood in the context of the regional trauma system, the decision was made to conduct a joint visit under the auspices of the TSEPC. The site visit was conducted in July of 2012 by Drs. Cribari, Winchell, Christoph R. Kauffman, MD, FACS, Chair of the ATLS Committee (2003–2007), and Nels Sanddal, PhD, consultant to the TSEPC. The final reports, including a statement that Rigshospitalet was "found to be functioning at a level consistent with that of a Level I center," were approved by the COT Executive Committee and the leadership of the ACS. This represented the first formal effort to apply the COT's principles for trauma center and trauma system function outside of the U.S.

2012 Site Visit Team for the Rigshospitalet, in Copenhagen, Denmark
Robert J. Winchell, MD, FACS, TSEPC Chair (2009–2018); Chris Cribari, MD, FACS, VRC Chair (2010–2014); Christoph R. Kauffman, MD, FACS, ATLS Chair (2003–2007); and Nels Sanddal, PhD, TSEPC Consultant.

A second combined trauma center and trauma systems visit was conducted at Hamad General Hospital in Doha, Qatar, in March of 2013. This review team consisted of Samir M. Fakhry, MD, FACS, Drs. Cribari and Kauffman, and Nels Sandal. The two visits illustrated some of the challenges in applying standards and programs across different health care systems and different cultures. The Danish health care system and its trauma system have fundamental distinctions in structure and in the roles of different medical disciplines, so many of the U.S. criteria could never be met in a literal sense but were in fact met at a conceptual level. It was, therefore, impossible at the outset for Rigshospitalet to "pass" a U.S. site review, but the recommendations and findings based upon extrapolation of the standards were well received. In contrast, the trauma program at Hamad General Hospital was established, in large part, by U.S.- and Canadian-trained surgeons, with similar staffing, and so bore a very high degree of similarity to a U.S. trauma center. This similarity led to the perception that Hamad could "pass" a U.S. site review, though, in fact, there were still sufficient differences in the Qatari system to make this unlikely at the time. The Hamad Medical Corporation has continued to invest in creating a high-quality trauma center and trauma system serving their nation and is considering another verification review application. The differences between consultation for capacity-building and the provision of an official external verification can be blurred even within a single societal system, and the potential is much greater across different societies.

Trauma Registry Data

Paralleling the development of the National Trauma Data Bank® (NTBD®), and the growth of the other global efforts outlined thus far in this chapter, the late 1990s and early 2000s were marked by an increased interest in the development of trauma registries. As the NTDB and the use of risk adjustment to provide benchmark data matured, the National Trauma Data Standard (NTDS) became a model for the creation of trauma registries in some regions, and as a result, the potential for data exchange across the globe grew. Early research in data registries included work by Dr. Poggetti and Enrique Ginzburg, MD, FACS, concerning the development of the Argentine trauma registry, which later evolved into the Panamerican Trauma Society's registry. This registry's developers included many COT members, and it shares many characteristics with the NTDB. The more active involvement of the COT in the deployment of new trauma registries in undeveloped systems, and in global data sharing, was met with many obstacles, including resource availability and data-sharing agreements. The concept of an international (global) trauma data bank (ITDB) was introduced by Drs. Coimbra and Winchell, Avery B. Nathans, MD, PhD, FACS, FRCSC, and others, but lacking a central focus within the COT, it has not progressed.

As part of the collaboration with the WHO's GACI, members of the COT, including Drs. Coimbra, Winchell, and Michel B. Aboutanos, MD, MPH, FACS, were pivotal in the development of the WHO's trauma data standards, including a minimal trauma data set to facilitate registry implementation in low- and middle-income countries. This work, which began in 2012, has now been implemented as part of the WHO's global strategy for injury care.

REGION 15 LEADERSHIP

Region 15 representatives at the 2019 COT Annual Meeting.

Andrew R. Baker, MBChB, FACS, Chief, (2017-2020).

Joakim Jorgensen, MD, FACS, Chief, (2020-).

REGION 16 LEADERSHIP

Gilberto Leung, MBBS, FACS, Chief, Region 16 (2016-2022); and Scott D'Amours, MD, FACS.

Region 16 representatives at the 2019 COT Annual Meeting.

The International Injury Care Committee (I2C2)

Though the COT's initial efforts in global engagement led to many notable successes, these early steps were focused efforts driven by the interest and engagement of specific subcommittees or specific COT members. There wasn't an overarching philosophy or a centralized coordination of effort regarding global engagement. The growing scope of this work, and its increasing involvement of a broader cross-section of the COT, combined with the growing voice of the global ATLS regions highlighted the need for a set of guiding principles and a unified home for the COT's efforts in global engagement.

In October 2011, at the regular meeting of the global Region Chiefs and COT leadership—including Chair Dr. Rotondo; Vice Chair, Dr. Coimbra; and ATLS International Chair John B. Kortbeek, MD, FACS (2009–2014)—the discussion expanded from the usual topic of ATLS Course promulgation to the need for a forum in which the broader spectrum of global activities could be addressed, and the idea for a new committee was conceived. During the intervening months, Drs. Rotondo, Coimbra, and John Fildes, MD, FACS, COT Medical Director (2010–2014), worked to refine the concept, which included a significant shift in the way the COT, and the ACS, would approach global engagement.

> This conceptual shift was approved by the ACS Board of Regents, and during a March 2012 meeting the guiding principles were further refined, outlining a pathway by which the COT would engage local leadership in a collaborative and culturally sensitive way, seeking to adapt principles developed by the COT to meet local needs, rather than simply impose U.S. standards and processes at the local, global level. In addition, the scope of the global regions, and the global region chiefs, was broadened to include the full spectrum of trauma care beyond the maintenance and promulgation of the ATLS Course.

Finally, a new committee, the International Injury Care Committee (I2C2) was formed to advise on global engagement in three primary areas: education; quality programs, including trauma system and trauma center development; and trauma registries. As initially conceived, the I2C2 was to be headed by the Vice Chair of the COT, and to include the global Region Chiefs, the chairs of several COT committees with global programs, including ATLS, TSEPC, and VRC, and other members with demonstrated interest in this area and relevant expertise. The first meeting of the new I2C2 was held in Chicago in September 2012 and was chaired by Dr. Coimbra.

2011 – A Push for Organized Global Engagement

Top: Raul Coimbra, MD, PhD, FACS, COT Vice Chair (2010–2014), and first I2C2 Chair in 2012; and Michael F. Rotondo, MD, FACS, COT Chair (2010–2014).

Bottom left: John B. Kortbeek, MD, FACS, ATLS International Chair (2009–2014).

Bottom right: John Fildes, MD, FACS, COT Medical Director (2010–2014).

In its first few meetings, the I2C2 continued to discuss the best ways in which the programs and experience of the COT could be used to further the mission of improving injury care across the globe. The global Region Chiefs, including Drs. Poggetti, Falck-Larsen, Al Turki, and Hollands, all voiced the need for a collaborative approach, and expressed optimism that the COT's newly adopted philosophy, embodied by the I2C2, would create an environment to foster this collaboration.

> One of the initial priorities established by Drs. Coimbra and Rotondo was the development of a group of COT members with skills, experience, and global focus who could form the "diplomatic corps" of the COT, working with different countries and regions on specific needs, rather than promoting a cookie-cutter use of COT programs and services.

Region 17 meeting in 2017.

Region 17 meeting in 2018.

George S. Abi-Saad, MD, FACS
Chief, (2017-).

Dr. Coimbra also promoted the concept of a global data repository and a program for sharing and benchmarking of trauma data between countries as an early priority. In the area of education, barriers to the further expansion of the ATLS Program were discussed, primarily in the context of aiding low- and middle-income countries that lack both the human and financial resources to support the ATLS Program.

Under the initial leadership of Dr. Coimbra, the I2C2 further refined its mission and adjusted its structure and function. One such change was the realization that the position of I2C2 Chair should be distinct from that of the COT Vice Chair. As a result, after his term as COT Vice Chair ended in 2014, Dr. Coimbra remained in the position of I2C2 Chair until the spring of 2016.

> Dr. Jimenez, a trauma surgeon from Bogota, Colombia, was appointed I2C2 Chair (2016–2019) and her appointment was a true indicator of the new philosophy for global engagement, as she was the first surgeon from outside the U.S. to serve as a COT committee chair, and to be a member of the Executive Committee.

At the conclusion of her term, Dr. Jimenez was succeeded by Dr. Al Turki, a trauma and vascular surgeon from Riyad, Saudi Arabia, who is the current I2C2 Chair (2019–2023). I2C2 has become an important committee that provides input from the global community to all COT programs.

Key Accomplishments

Education

While the promulgation of the ATLS Course remains under the strict control of the COT regarding content and course standards, the input and collaboration of the global ATLS family has ensured that it has been a tremendous success around the world. Unfortunately, the establishment and continued operation of an ATLS program requires substantial local resources, and as a result, ATLS is not feasible for many low- and middle-income countries. The challenge of expanding trauma education in these areas outside of the formal ATLS Program was one of the major factors that led to the creation of the I2C2 and has been a primary focus of the COT's global engagement.

TEAM™
TRAUMA EVALUATION & MANAGEMENT

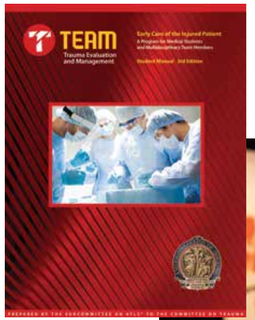
One of the first initiatives undertaken by the I2C2 was the adaptation of the Trauma Evaluation and Management (TEAM) Course to low- and middle-income countries. The TEAM Course is based on the fundamentals of the ATLS Course and was initially developed for teaching U.S. medical students. TEAM requires far fewer resources to teach, and with some modification, can be adapted to a broader group of provider types.

In one of the earliest examples of the COT's new approach to global engagement, Dr. Coimbra, and members of the I2C2, worked with the COT's Education Pillar and leadership to make the TEAM Course available to qualified countries and regions for only the cost of materials.

Dr. Coimbra led the first faculty group to test this concept, establishing the TEAM Course in Ghana in November 2015. Following this model, the TEAM Course has been expanded to more than 43 countries, with the goal to establish TEAM in every country that does not offer ATLS.

As the I2C2's efforts to spread trauma education in low- and middle-income countries expanded, so too did the coalition of people and organizations involved in this effort. Within the COT, the educational materials in TEAM have been supplemented with information featured in the Rural Trauma Team Development Course (RTTDC) and with the STOP THE BLEED® Course.

To help cover the costs and logistical challenges associated with expanding the TEAM Course around the world, a multilateral coalition was developed through the connections fostered by the I2C2, including the Latter-day Saint (LDS) Charities (Mark H. Stevens, MD, FACS; and Raymond R. Price, MD, FACS), as well as resources from the Education Pillar of the COT. Through the ACS Foundation, a fund was developed to support the global promulgation of ATLS and more recently, Kimberly T. Joseph, MD, FACS, Chair of the ATLS Committee (2018–2022), generously established a Global Trauma Education Fund focused on supporting efforts to advance trauma education in low-resource environments. As we embark on the planning for the 11th edition of ATLS, work is ongoing to develop options that are more adaptable to the resources and culture of the local environment.

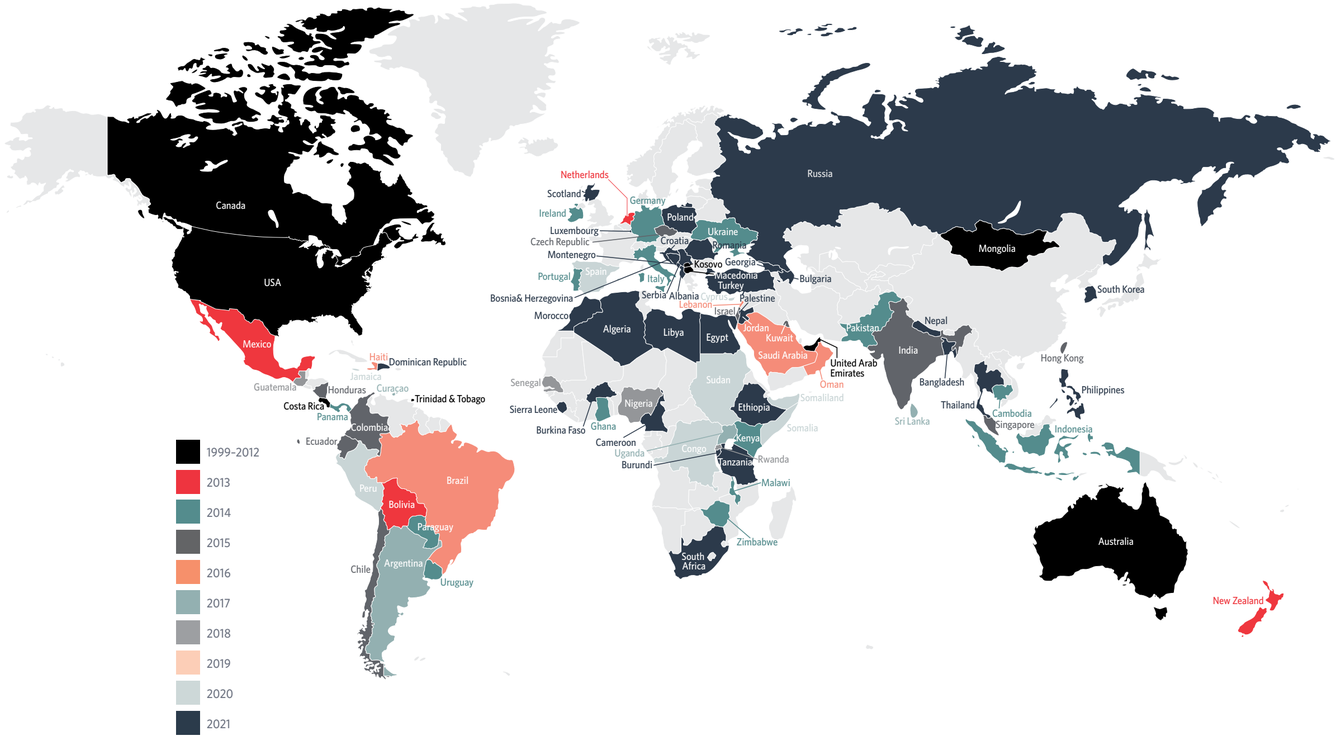


TEAM Manual, 3rd Edition.

Inaugural Donor and Founder of the Global Trauma Education Fund
Kimberly T. Joseph, MD, FACS, ATLS Chair (2018-2022).

TEAM'S REACH 2013–2021

TEAM's Reach
The COVID-19 pandemic forced us to get creative with delivery of TEAM education. Some training occurred in person, other students participated virtually; many individuals and organizations have joined efforts to spread trauma education throughout the world. Informal records indicate that some form of training from the TEAM Course has touched more than 90 countries between 2013 and 2021 as depicted on this map.



Quality Programs—Region 14 Trauma Center Consultation Project

The idea of creating an official translation of the *Optimal Resources for the Care of the Injured Patient* manual into Spanish and Portuguese, initiated by Dr. Jimenez prior to 2012, had continued to slowly grow and adapt. Dr. Jimenez, working with Dr. Cribari from the VRC, and Dr. Winchell from the TSEPC, had changed the focus from a direct translation of the manual into one that also sought to adapt the U.S. standards to be relevant in the environmental context of countries the located in Region 14. With the new direction of the COT with respect to global engagement, this project found a true home and a supportive environment in the I2C2.

The concept of a country- or region-specific *Optimal Resources for the Care of the Injured Patient* manual had been difficult to reconcile with the established process within the U.S., but such a resource is the logical centerpiece of a country- or region-specific trauma center consultation or verification program.

> The shift in focus from the translation of a COT manual to the development of a country- or region-specific program, and the shift of the COT's role to that of a consultant and a collaborator in local capacity-building, working through the I2C2, solved the problem of reconciliation between the U.S. VRC process and the Region 14 project.

Region 14 *Optimal Resources for the Care of the Injured Patient* manual was the first adaptation of standards for use outside of the U.S.

Shifting focus to the 2014 edition of the *Optimal Resources for the Care of the Injured Patient* manual, Dr. Jimenez and a dedicated group from Region 14 worked through the translation of the text and the adaptation of the standards to create a version relevant to the medical culture and societal conditions of Region 14. Ronald M. Stewart, MD, FACS, COT Chair (2014–2018); Rosemary A. Kozar, MD, FACS, VRC Chair (2014–2017); along with Drs. Winchell and Cribari worked with the Region 14 group on the adaptation of the standards to help ensure consistency with the spirit and intent of the U.S. standards. After more than two years of work, the Spanish and Portuguese versions of the Region 14 *Optimal Resources for the Care of the Injured Patient* manual was completed in January 2017.

During the same period, the concept of a regional trauma center consultation program, as part of a region-specific trauma quality program, was codified and approved by the COT Executive Committee, as well as by ACS leadership, and by David B. Hoyt, MD, FACS, Executive Director of the ACS (2010–2022). Region 14 would serve as a pilot for the project.

The first trauma center consultation site visit under the Region 14 program was conducted in May 2017, at the Hospital Maciel in Montevideo, Uruguay, in conjunction with the annual Region 14 meeting. Dr. Winchell and Dr. Stewart conducted the site visit, with leaders from Region 14 taking part as observers. The visit was very successful, both in terms of the logistics and in terms of using the Region 14 specific criteria as a basis for the review. With the leadership and coordination of Dr. Poggetti, plans were in place for the second set of Region 14 site visits to be held in São Paolo, Brazil, in the spring of 2020, but these plans were delayed by the COVID-19 pandemic.

It is difficult to overstate the significance of the Region 14 trauma center consultation project in terms of the profound change in the COT's approach. When the concept of adapting the U.S. trauma center standards to reflect the intent of the standard applied in a different societal context was raised at a COT meeting in 2012, it was summarily rejected ("The title of the book says *Optimal* for a reason…"). A little more than five years later, the concept of a region-specific trauma center consultation program had been embraced. The project has equally great significance in terms of its potential to both amplify the lessons learned from the development of the U.S. trauma center verification program and improve the care of injured patients in other parts of the world that lack well-developed trauma systems.

A Report Writing Session (top)
Diogo F.V. Garcia, MD, FACS, Chair, Brazil COT; Newton Dijn Mori, MD, FACS; Robert J. Winchell, MD, FACS, Special Consultant for Global Quality Programs (2018-2022); and Maria F. Jimenez, MD, FACS, past Region 14 Chief, Chair I2C2 (2016-2019).

First Region 14 Trauma Center Consultation Site Visit Program (bottom)
Key leaders during the Uruguay consultation included: Julio L. Trostchansky, MD, FACS, Chief, Region 14; Newton Dijn Mori, MD, FACS; Diogo F.V. Garcia, MD, FACS, Chair, Brazil COT; Dario Birolini, MD, FACS; Jaime Cortes-Ojeda, MD, FACS; Rudy Ustarez, MD, FACS, PHTLS Chair, and Vice Chair, Bolivia; talking with Dr. Winchell (back of head).

Quality Programs - The Global Standards Project

The process of adapting the U.S. trauma center standards to the context of Region 14 leads logically to the thought of extending this process to other parts of the globe. The Region 14 project began very pragmatically as the direct translation of the U.S. version to a Region 14 version—looking for the overarching principle underlying each of the highly specific standards, then working to make it relevant and meaningful in the Region 14 context. In some cases, little or no modification was required; while some standards required substantial changes, other standards were not relevant to the regional context at all. This analysis is not specific to the Region 14 project but can be generalized to any other region.

The goal of the Global Standards Project was to take each of the U.S. standards and analyze it to uncover its underlying concept, and then look at the country- or region-specific variables that would need to be defined to make the standard specific to any given region. The result of this "reverse-engineering" process would be a set of trauma center standards that capture the essence, and the experience, of the U.S. program that could then be applied in a consistent and reproducible fashion in another country or region that might have a very different medical or cultural context. These standards would then form the basis for a country- or region-specific trauma center consultation/verification program.

The Global Standards Project was conceived and initiated as an extension of the Region 14 pilot project, working within the structure of the I2C2. In the spring of 2018, Dr. Winchell, Special Consultant for International Quality Programs (2018–2022); Dr. Jimenez, I2C2 Chair (2016–2019); and Nirav Y. Patel, MD, FACS, I2C2 Vice Chair (2017–2023), attended each of the global region meetings to request their input and engagement in the development of the global standards. Each region was provided with a full listing of criteria deficiencies from the 2014 edition of the *Optimal Resources for the Care of the Injured Patient* and asked to categorize each standard as either Green (no modification required); Yellow (modification of specific parameters required); or Red (not applicable) in the context of their region. For standards categorized as Yellow, further input was sought regarding the specific variables that would need to be modified to make the standard applicable, and for universal wording of the standard that could be applied in any context. Input was also sought from I2C2 members and COT leadership.

Over the next six months, input from various sources was collated and evaluated. From this point a small working group of the I2C2, including Drs. Al Turki, Jimenez, Patel, Avery B. Nathens, MD, MPH, PhD, FACS, FRCS; Winchell, and Ajai K. Malhotra, MBBS, FACS, took this input and used it to create the set of global standards, with placeholders for country- or region-specific parameters that would be defined for each unique case. This work also resulted in significant consolidation of the standards due to redundancies extant in the U.S. standards. Toward the end of the process, this work began to overlap with the revision of the U.S. *Optimal Resources for the Care of the Injured Patient* manual, which involved significant consolidation, and a change in the format of the standards to move toward alignment with other ACS quality programs. These modifications were incorporated into the draft of the global standards, which was completed in January 2020. Concurrent with the development of the global standards, Dr. Nathens, Trauma Quality Program Medical Director; Melanie Neal, Assistant Director, Trauma Quality Programs; and Dr. Winchell worked to develop a framework for collaboration between the COT and regions seeking assistance in establishing a trauma center verification program.

Region 14 Compatriots
Friolan A. Fernandez, MD, FACS; J. Esteban Foianini, MD, FACS; and Jaime Cortes-Ojeda, MD, FACS.

Region 17 Colleagues
Saud Al Turki, MBBS, FACS; Dr. Ibrahim Elsayed Dawoud; Jeethi Varish Gill, former ATLS Coordinator - UAE; Wesam T. Abuznadah, MBChB, FRCSC, FACS; and Heba Youssef, MD.

Region 16 Representatives
Gilberto Leung, MBBS, FACS; Katherine Martin, MBBS, FRACS; Di Leverone-Baker (South Africa, Coordinator, Educator); Debbie Paltridge, Chair, SEAB; Scott D'Amours, MD, FACS; Karen J. Brasel, MD, FACS, Global ATLS Director (2014-2018); Lesley Dunstall, RN; and Andrew R. Baker, MBChB, FACS, Region 15.

Region 15 Leaders
Michael J. Hollands, MBBS, FACS; Claus Falck-Larsen, MD; and Inger B. Schipper, MD, FACS.

Quality Programs—International Trauma Data Bank (ITDB) and Related Efforts

One of the first priorities set out for the I2C2 at its inception was the development of an ITDB, with the goal of sharing trauma data globally, and allowing for the risk-adjusted benchmarking of trauma programs. This goal has proven elusive, for a complex set of reasons that include inconsistencies in data structures and data coding, and concerns around data use, data storage, and patient confidentiality. Such concerns had complicated the development of the NTDB within the U.S., and presented an even greater challenge across global borders, a challenge that the I2C2 has not been able to resolve to date.

An even larger, and potentially more impactful, challenge is the development of basic trauma registries in countries that currently do not collect systematic data related to injury care. A key step in building systems that collect data that could be compared to other countries or regions is the creation of a set of data standards that define the minimum set of data points that will support analysis and specify the way these data will be collected and recorded. Several members of the COT have been involved with the development of the WHO minimum trauma data set, which has subsequently been implemented as a centralized trauma registry based at WHO. In parallel, acknowledging lessons learned from NTDB and Trauma Quality Improvement Program (TQIP) development, the COT has worked to create a similar minimum data set that would allow for risk-adjusted benchmarking of outcomes. In alignment with the work described earlier in this chapter to build capacity for trauma center verification, the COT, through I2C2, continues to work on potential collaborative channels that will aid the development and deployment of basic trauma registry capabilities in low- and middle-income countries.

The Future

The COT's collaborative global engagement efforts, focused through the I2C2 and the global regional committees, continue to grow and develop. The COT has transformed its vision to one of truly global collaboration and partnership, and has done so rapidly, as dictated by the current world situation. This change has had a tremendously positive impact in the target areas of education and trauma quality programs, including trauma center and trauma system development. The vision for trauma education in lower- and middle-income countries—built around the TEAM Course, STOP THE BLEED®, and elements of RTTDC—is to institute these training programs at minimal cost in all countries that lack active ATLS programs. A broader coalition, including partners outside the COT, including LDS Charities, Operation Giving Back, and the International Association for Trauma and Intensive Care (IATSIC) is working to implement this goal.

The Region 14 Trauma Center Consultation Project is moving forward, with the ongoing development of administrative infrastructure and a cadre of regional reviewers. The next set of site pilot visits is planned using consultants from the U.S. COT along with Region 14 reviewers. The intent is to continue to build toward a free-standing Region 14 trauma center consultation and verification program, consistent with the tenets of the U.S. VRC.

Building from the Region 14 experience, the staff of the COT along with I2C2 will continue to develop a consultative program to support capacity-building across the spectrum of trauma quality programs, including trauma center consultation and verification based on the global standards and trauma registry development— including data set standardization, data storage and software platforms, and data sharing to enable risk-adjusted benchmarking. Under the leadership of current I2C2 Chair Dr. Saud Al Turki, preliminary work to identify partner health care facilities and to expand this concept to systems development in Region 17 is under way.

Our ultimate vision is that the COT serves as a truly global organization, welcoming and engaging surgeons and other health care professionals from around the world to work together on strategies to support injury prevention and provide optimal care for injured patients. We seek to support the development of quality improvement programs and educational opportunities for all those who care for injured patients in every country in the world and to be a resource for the development of trauma systems by facilitating the expansion of local infrastructure to support trauma center verification. Through the COT's regional committees, we hope to provide a forum for collaboration in achieving these goals.

Global Champions
More than just ATLS promulgations, Karen J. Brasel, MD, FACS, Global ATLS Director (2014-2018); and Sharon M. Henry, MD, FACS, Global ATLS Director (2018-2022), have served as champions for the voice of the global trauma community.

I2C2 Chairs

2012 — **Raul Coimbra, MD, PhD, FACS** 2012–2016

2016 — **Maria F. Jimenez, MD, FACS** 2016–2019

2019 — **Saud Al Turki, MBBS, FACS** 2019–

Special Consultant for Global Quality Programs

2018 — **Robert J. Winchell, MD, FACS** 2018–2022

Advocacy & STOP THE BLEED®

17

Advocacy & STOP THE BLEED®

Advocacy is the action of achieving support for a particular position or policy. Surgeon involvement in advocacy-related initiatives, specifically as it relates to health care policy, is key to safeguarding patient-centered care.

Advocacy with Impact

Although advocacy is commonly considered an activity that involves engagement with local and federal policymakers, this work also involves communicating our health care-related priorities with practices, hospitals, and health care systems to achieve better care for our patients and communities. Advocacy often motivates collective attention and action to solve a problem. Participants in advocacy-related activities can be surgeons, members of the health care team, hospital and health care leaders, professional societies, appointed and elected government officials, and the public. Successful advocacy has an explicit intended outcome, such as a change in behavior, policy, rules, laws, or funding.

The Committee on Fractures was actually the third standing committee of the American College of Surgeons

1. Bone Sarcoma Registry, 1921
2. Committee on the Treatment of Malignant Disease with Radium and X-ray (now the Committee on Cancer), 1922
3. Committee on Fractures, 1922
4. Committee on Standardization of Clinical Laboratories, 1922

A Tradition of Advocacy

From its beginning as one of the first standing committees of the American College of Surgeons (ACS), the Committee on Trauma (COT) has been an ardent advocacy organization.

> While the "how" has varied, the objective has been the same: preventing injury in the first place, saving more lives, and returning the injured to a productive life.

The COT progenitor, the Committee on Fractures (COF), recognized the importance of advocacy in efforts to promote the best practices in fracture management. Through its local and regional committee structure, the COF, and later the COT, sought to partner with a broad array of organizations to advance this mission. They advocated for improvements in the transportation of the injured, hospital standards for emergency care, first-aid training in the community, and improved trauma education in medical schools.

In the 1950s, in response to the increasing severity of motor vehicle crash injuries, the COT began to focus on injury prevention and the establishment of an emergency care system for these patients. In February 1955, the ACS Board of Regents approved a resolution, previously adopted by the COT, acknowledging that motor vehicle crash injury prevention was both a civic and professional obligation of the College.

In 1956, the ACS COT concept of an emergency medical care system on federal highways and the need for injury prevention, including seat belts, was presented to the Special Subcommittee for Traffic Safety of the Committee on Interstate and Foreign Commerce of the House of Representatives. The COT supported the National Traffic and Motor Vehicle Safety Act of 1966, which defined standards for motor vehicle safety and established the U.S. Department of Transportation (USDOT) and several travel safety administrations including what would eventually become the National Highway Traffic Safety Administration (NHTSA) following passage of the Highway Safety Act in 1970, tasked with keeping people safe on America's roadways. Oversight of emergency medical technician (EMT) ambulance training became part of NHTSA in the early 1970s, and the Emergency Medical Services Systems Act provided grant funds for EMT education and training in 1973.

Through the 1980s and 1990s, as the structure for trauma systems evolved with the implementation of the Advanced Trauma Life Support® (ATLS®) Program, the COT Verification, Review, and Consultation Program, and the Trauma System Consultation Program, state and regional advocacy efforts by members of the COT began to advance legislation to support trauma system development.

> As a result of these efforts, the ACS COT trauma center verification standards have been included in many state statutes as the standard for designating trauma centers. In states that maintain state verification, the ACS COT standards for trauma center verification have been incorporated into state regulations and are considered the gold standard.

In 2008, the ACS COT released the systems consultation guide, *Regional Trauma Systems: Optimal Elements, Integration, and Assessment*, with demonstrated improvement in state resource support for trauma systems. The second edition of the guide is in development.

The COT also has remained active in advancing prehospital care for injured patients.

> In 1986, the COT developed a standard for field triage, the "Field Triage Decision Scheme," and advocated for its adoption by state and local emergency medical service (EMS) organizations as guidance for determining the most appropriate destination facility for the injured patient within the local trauma system.

Since the initial publication of *Guidelines for Field Triage of Injured Patients* in 2006, the guideline has been revised through broad collaboration with the Centers for Disease Control and Prevention (CDC) and NHTSA. The CDC hosted meetings of the National Expert Panel on Field Triage, which included representatives from the COT, EMS, public health, the automotive industry, and federal agencies to support the evidence-based revision of these guidelines in 2009 and 2011. With the support of NHTSA, the COT EMS Committee convened a multidisciplinary technical expert panel, and the latest revision process has been initiated for planned publication in early 2022 (see Chapter 10).

COT Members in Action
Michael Coburn, MD, FACS, COT Advocacy Chair (2014-2020) making visits on the Hill.
Joseph V. Sakran, MD, MPH, MPA, FACS, FTL Alum Class of 2016, testifies about the issue of gun violence before a congressional hearing.

COT Advocacy Pillar

The COT Advocacy Pillar was created under the combined leadership of Michael F. Rotondo, MD, FACS, COT Chair (2010–2014), and John Fildes, MD, FACS, Trauma Medical Director (2010–2014). Prior to the decision to create the Advocacy Pillar, the COT would engage the ACS Division of Advocacy and Health Policy (ACS DAHP) in Washington, DC, and review priorities with consultants. Dr. Rotondo appreciated that advocacy was a COT priority and felt it was essential to ensuring that injury prevention and high-quality trauma care was a priority. Thus, as part of his reorganization of the COT committee structure, Dr. Rotondo established the Advocacy Committee within the Injury Prevention and Advocacy Pillar of the COT. Edward E. Cornwell, MD, FACS, was appointed as its first Chair (2011–2013) and the DAHP assigned Kristin McDonald as the COT's advocacy staff representative. Leonard J. Weireter, MD, FACS, succeeded Dr. Cornwell and served briefly as Advocacy Chair (2013–2014) before serving as COT Vice Chair (2014–2018). Katie Oehmen is the ACS Manager of the ACS Professional Association Political Action Committee (ACSPA-*Surgeons*PAC), and Grassroots Programs, and partners quite closely with the COT Advocacy Chair to advance the participation in the PAC. Michael Coburn, MD, FACS (2014–2020), and John H. Armstrong, MD, FACS (2020–), were the more recent appointees. The COT was pleased to also welcome ACS Congressional lobbyist Amelia Suermann to the team in early 2021. The Advocacy Committee has been influential in working with the ACS federal and state DAHP staff to support legislative priorities to ensure optimal outcomes for injured patients.

COT Advocacy Pillar
Michael F. Rotondo, MD, FACS, COT Chair (2010–2014), and John Fildes, MD, FACS, Trauma Medical Director (2010–2014), together established the COT Advocacy Pillar in 2011.

Edward E. Cornwell, MD, FACS
Appointed first COT Advocacy Chair (2011–2013).

COT Advocacy Chairs
Michael Coburn, MD, FACS (2014–2020), and Leonard J. Weireter, MD, FACS, (2013–2014), with Katie Oehmen, Manager, ACSPA-*Surgeons*PAC and Grassroots (ACS staff partner).

Kristin McDonald
Manager, Legislative and Political Affairs (ACS staff partner).

John H. Armstrong, MD, FACS
COT Advocacy Chair (2020–).

Amelia Suermann
ACS Congressional Lobbyist (ACS staff partner).

Current Advocacy Priorities

The current advocacy priorities of the COT include: (1) dissemination of the STOP THE BLEED® (STB) program; (2) implementation of the recommendations of the 2016 National Academies of Science, Engineering, and Medicine (NSEM) report, *A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury*; (3) support for firearm injury prevention efforts and research; and (4) establishment of regional medical operations centers to enhance the coordination of the health care response to mass casualty, disasters, and pandemics. The following section describes the development of the STOP THE BLEED® program in detail as a model of the ACS COT approach to addressing a critical public health issue through comprehensive advocacy. Other initiatives are described in more detail later in this chapter.

STOP THE BLEED®

The Story of STOP THE BLEED®

The STB campaign was officially launched at the White House in 2015 and continues to show the impact that COT advocacy efforts can have in advancing trauma care. STB represents a culmination of COT policy-related achievement that has built on a century of COT advocacy success.

> Because bleeding is a major cause of preventable death in the injured patient, the control of active hemorrhage has been prioritized in trauma care.

Yet, as hemorrhage control at the trauma center was progressively refined by applying Advanced Trauma Life Support® (ATLS®) Program "C-Circulation" principles, techniques in prehospital hemorrhage control were variable. Recognition of this gap in control of active hemorrhage and rediscovery of the value of the tourniquet occurred in three groups: the U.S. military, the National Association of Emergency Medical Technicians (NAEMT), and the ACS COT.

> In 1996, research conducted by the U.S. Department of Defense (DoD) concluded that having readily available tools (wound-packing supplies and tourniquets) in the hands of trained men and women in the armed forces saved lives with timely bleeding control.

Under the leadership of Captain Frank K. Butler, MD, USN (retired), this finding was translated into part of the Tactical Combat Casualty Care (TCCC) guidelines, which are evidence-based and battlefield-proven to reduce deaths at the point of injury (POI); DOD and NATO allies require TCCC training for deploying forces because it combines effective tactics and medicine. In turn, deliberations of the Committee on TCCC of the Defense Health Agency accelerated the guidelines into a course for the closest potential responders in theater, namely, all deploying soldiers, sailors, airmen, marines, and coast guard, based on the pattern of the war injuries seen in Iraq and Afghanistan. There was an acknowledgement that training in bleeding control to save lives could be valuable in the civilian population as well. On March 30, 2011, this sentiment was expressed in 'Presidential Policy Directive 8, National Preparedness,' which emphasized that "the national preparedness system shall include recommendations and guidance to support preparedness planning for businesses, communities, families, and individual."

In 2012, the need for training bystanders to stop injury-related bleeding was amplified by an increasing number of mass shootings, and in particular, the event at Sandy Hook Elementary School, Newtown, CT, where 20 children and six adults were killed. In April 2013, the Joint Committee to Create a National Policy to Enhance Survivability from Intentional Mass Casualty and Active Shooter Events was convened by the ACS in collaboration with the medical community and representatives from federal agencies, the National Security Council, the U.S. military, and emergency medical response organizations.

Convener-in-Chief
Lenworth M. Jacobs, Jr., MD, MPH, FACS, was a primary catalyst in the formation of a series of meetings known as The Hartford Consensus to create a national policy that would enhance survivability from active shooter and mass casualty events.
Right: Lenworth M. Jacobs, Jr., MD, MPH, FACS, second from left, speaks at the White House STOP THE BLEED® event October 6, 2015, in a photo tweeted by the Department of Homeland Security.

The STB Team
From the left: Mark L. Gestring, MD, FACS, STOP THE BLEED® Chair (2016–2022).
Jimm Dodd, PA-C, MS, MA, Manager, STOP THE BLEED® (COT staff partner).
Jessie Romanz, Coordinator, and Marie Gilliam, Operations Manager, STOP THE BLEED® program (COT staff partners).

The committee—formed under the guidance and leadership of trauma surgeon Lenworth M. Jacobs, Jr., MD, MPH, FACS, an ACS Regent (2011–2020) and former Chair of the COT Subcommittee in Emergency Services - Prehospital Committee (1985–1988)—sought to create a national policy to enhance survivability from active shooter and intentional mass casualty events. Over a series of four meetings, the committee developed recommendations to support early hemorrhage control at the scene; an integrated response by law enforcement, EMS, fire and rescue, and public safety officials; and public education to support national resilience. These recommendations became known as The Hartford Consensus.

> The Harford Consensus adopted a model of effective grassroots advocacy: defining a problem; identifying a solution; building a broad coalition of public and private partners; maintaining a consistent message; and leveraging multiple channels for communication. "STOP THE BLEED®" became a rallying cry to gain public attention on the importance of bleeding control.

In 2013, in support of these efforts, and with funding from NHTSA, Eileen M. Bulger, MD, FACS, EMS Committee Chair (2011–2015), convened a multidisciplinary expert panel to conduct a review of the evidence to support external hemorrhage control by EMS providers. In 2014, this group published "An Evidence-based Prehospital Guideline for External Hemorrhage Control" in the *Journal of Prehospital Emergency Care* that supported the use of tourniquets and hemostatic agents by EMS providers.

At the time, this equipment was not widely available on all ambulances, and wound packing was not in the scope of practice for EMS professionals. Through collaboration with NHTSA, STB skills were added to the core curriculum and scope of practice. Widespread efforts to train and equip law enforcement officers for on-scene hemorrhage control were also initiated.

In 2013, the NAEMT released the first bleeding control course for nonmedical first responders called Law Enforcement and First Response Tactical Casualty Care (LEFR-TCC).

> **Peter T. Pons, MD, FACEP, an emergency physician and a member of the Prehospital Trauma Life Support (PHTLS) Committee authored the course saying,**
>
> *"...law enforcement officers are often the first and sometimes the only personnel to initially contact a trauma patient until EMS can safely enter. Having the technical skills to provide basic medical interventions such as bleeding control and opening an airway will save a patient's life, perhaps a fellow officer or maybe an injured bystander, when seconds matter the most."*

Inaugural STB Training at the Clinical Congress 2016
(from the left)
Kimberly T. Joseph, MD, FACS, provides STB instruction during the high school program.
Barbara A. Gaines, MD, FACS, receives tourniquet tips.
Dany Westerband, MD, FACS, practices compression on a dummy leg.
Dr. Pons provides some explanation to Dr. Esposito.

The need for a course to engage the general public in bleeding control was quickly apparent, and Dr. Pons and Norman E. McSwain, Jr., MD, FACS, PHTLS Medical Director and NAEMT liaison to the ACS COT, then developed the curriculum for a course on bleeding control that was similar to how cardiopulmonary resuscitation (CPR) prepared bystanders for a cardiac emergency. In 2014 the NAEMT Bleeding Control Basic (B-Con) Course was introduced to the general public and forms the foundation of today's STOP THE BLEED® Course.

In 2015, a White House event, organized by National Security Council adviser and emergency medicine physician Richard C. Hunt, MD, launched a national campaign to "Stop the Bleed." This event put the spotlight on The Hartford Consensus and the B-Con Course. As the concept gained traction, the need for consensus on an instructional curriculum for the public was obvious.

> While the NAEMT had a proven track record of prehospital professional education, a broad public effort was needed to make this training visible and appropriate for the lay public. The ACS was the obvious choice for this outreach, and in 2016, the COT became the facilitator for the STOP THE BLEED® program, taking responsibility for the development of the educational program and committing the COT regional committees to disseminate this training.

The ACS developed a website for public education and a program to support instructor training and course implementation. The COT developed a steering committee, chaired by Mark L. Gestring, MD, FACS, EMS Committee Chair (2015–2020) and STB Work Group Chair (2016–2022) and three workgroups to support these efforts—Dissemination and Outreach, Education, and Advocacy. Jimm Dodd, PA-C, MS, MA, Manager, STOP THE BLEED®, provides key leadership and support for this program within the ACS staff.

The formal launch of the ACS COT STOP THE BLEED® program occurred during the 2016 Clinical Congress in Washington, DC. Continuous training courses were offered throughout Congress Week to all Congress attendees. Participants in the high school program that is organized each year by the ACS Division of Education were engaged in a special training session all their own. Dr. Jacobs made the rounds of the different key ACS organizational groups to talk about the program, its importance, and its goals.

In June 2017, the congressional baseball shooting in Alexandria, VA, put a further spotlight on the value of STB for saving lives. Congressman Brad Wenstrup used STB techniques to assist critically injured Congressman Steve Scalise, House Majority Whip. Interest in STB training on Capitol Hill has led to a series of member and staff training events, that periodically are conducted by ACS COT members on Capitol Hill.

> STB has gained traction in state advocacy as well. In 2017, the Georgia COT successfully advocated for additional Georgia Trauma Commission funding to establish a formal state-wide school response program for STB training and kit placement in all Georgia public schools.

In 2019, the Texas legislature passed, and the governor signed H.B. 496, which requires all Texas school districts to develop a protocol for school employees and volunteers to follow in the event of a traumatic injury and includes the installation of bleeding control kit stations and the training

2017 STB Capitol Hill Training Event
From left to right: Joseph V. Sakran, MD, MPH, MPA, FACS; Leonard J. Weireter, Jr., MD, FACS; Lenworth M. Jacobs, Jr., MD, MPH, FACS; House Republican Whip Stephen J. Scalise (R-LA); John H. Armstrong, MD, FACS; Mark L. Gestring, MD, FACS; and Jack Sava, MD, FACS.

U.S. Rep. Sheila Jackson Lee (D-TX) (left) learns how to apply pressure to stop bleeding from Dr. Jacobs and Dr. Armstrong.

STB Goes Global
Members of a STOP THE BLEED® class at the University of Calabar Teaching Hospital in Calabar Nigeria in June of 2018. Fifty-one students were trained in that session. *Photo provided by Nicholas Maxwell, MD.*

of a school peace officer, resource officer, and other school personnel expected to use the bleeding control kit. Also in 2019, Indiana adopted H.B. 1063, by which all public schools "shall" develop a STOP THE BLEED® program that includes the training of at least five school staff and installation of bleeding control kits in locations determined by the school resource officer.

STB Education
Kenji Inaba, MD, FACS, STB Course Director (2018–2022), and incoming STB Chair (2022–).

A little more than five years after the ACS COT took responsibility for the informing, educating, and empowering of the general public, Dr. Jacobs remains a tireless advocate and ensures that the STOP THE BLEED® program continues to retain a triad of advocacy priorities: large-scale training in STB; public access to bleeding control tools; and public policy that supports STB and other trauma priorities. What began as the Bleeding Control Basic (B-Con) Course in 2014 has undergone several revisions and is now known as the STOP THE BLEED® Course. Under the direction of Kenji Inaba, MD, FACS, STOP THE BLEED® Course Director (2018–2022), two virtual versions of the course were launched in 2021 that inform and begin the education of the learner. Students of the virtual courses are still encouraged to participate in an in-person skills training session to be considered fully trained.

> STB has demonstrated resiliency during the COVID-19 pandemic, including ongoing efforts to support virtual training and ensure proper public health precautions for small group training. The program is adaptive in delivery, while consistent in content.

While differing cultural requirements and formularies in countries around the world have challenged the standardized materials, the STOP THE BLEED® Course has gone global and has been taught widely, represented in 129 countries. The central office works with groups in each area to accommodate country and local requirements and adjust as necessary to allow the training of bleeding control to continue. Translations of the course have been facilitated in multiple languages for wider adoption.

> STB teaches immediate responders how to recognize life-threatening hemorrhage and how to control it in an injured patient. In less than an hour, the program informs, educates, and empowers learners to use three key skills: direct pressure, wound packing, and tourniquet application.

A decentralized approach to course dissemination has led to rapid uptake: by the end of 2021, through the assistance of over 94,000 STB instructors representing 25 health care and non-health care professionals, more than 1.8 million people have been trained as immediate responders to provide care during a bleeding emergency in 129 countries. Dr. Inaba has been named to succeed Dr. Gestring as the STOP THE BLEED® Chair, beginning in 2022.

STB during COVID-19 Teaching STOP THE BLEED® skills in person during the pandemic involved careful planning. Additional personal protective equipment, social distancing, and outdoor courses were all used to help keep this training available.
Left: Training at the University of Rochester. *Photo provided by Mark Gestring, MD, FACS.*
Right: Training at the University of Texas San Antonio. Dr. Stewart demonstrates proper wound packing.

Supportive public policy has emerged at local, state, and federal levels to increase program visibility, integration into communities, and funding for purchase, placement, and maintenance of STB kits. While automated external defibrillator (AED) devices have become ubiquitous in public places, STB kits are not yet as prevalent. STB has been essential for promoting relationships with legislators on STB and other COT policy priorities, and helpful for collaboration with federal agencies, such as the DoD and Department of Homeland Security. STB is the lynchpin of COT state advocacy efforts, with the goal of fifty states plus the District of Columbia permeated with training and kit availability. The ACS COT has pursued a synergistic collaboration between federal and state efforts for STB dissemination. Toward this end, the Prevent Blood Loss with Emergency Equipment Devices (BLEEDing) Act, shaped by the ACS COT, was introduced in the House in 2019 and the Senate in 2020 and would provide grant funding to states for bleeding control kits and training.

STB has made great strides with large corporations recognizing the importance of this life-saving training through corporate initiatives to implement STB training for their employees. This implementation further provides a level of safety and response in the event of a bleeding emergency whether in the workplace or the employee's personal life. The Hartford Foundation, Amazon.com, Inc., and Lewis Tree Service, Inc., are some of the organizations that have committed to establish STB as a core part of their employee training and ensure that STB equipment is readily available to employees during any emergency. This organizational STB initiative is another way the STB Committee continues to promote the need of this life-saving training in communities across the globe.

Background

In 2012, the need for training bystanders to stop injury-related bleeding was amplified by an increasing number of mass shootings.

Motivated by the 2012 tragedy in Sandy Hook and multiple tragedies that have occurred in the ensuing years, what has become known as The Hartford Consensus was convened to bring together leaders from law enforcement, the federal government, and the medical community to improve survivability from man-made or natural mass casualty events. The injuries resulting from these events generally present with severe bleeding. If left unattended, this type of injury can result in death. The participants of The Hartford Consensus concluded that by providing nonmedical first responders (law enforcement) and the lay public the skills and basic tools to stop uncontrolled bleeding in an emergency situation, lives would be saved. The first responder program has been very well received and is widely being used across the country. The next step is to focus on teaching bleeding control techniques to the general public.

Civilians need basic training in bleeding control principles, so they can provide immediate, frontline aid until first responders are able to take over care of an injured person. Due to many factors, there may be a delay between the time of injury and the time a first responder is on the scene. In these circumstances, immediate intervention is essential to prevent death from exsanguinating hemorrhage.

Mission

The goal is to turn civilian bystanders into immediate responders.

The American College of Surgeons Committee on Trauma (ACS COT) is leading the effort to teach the civilian population effective bleeding control techniques in the face of life-threatening external hemorrhage. This goal will be accomplished by the development of a comprehensive and sustainable bleeding control education and information program targeted to the general public that will inform, educate, and empower the 300 million citizens of the U.S.

Implementation of the Recommendations of the 2016 NASEM Report

In 2016, the National Academy of Sciences, Engineering, and Medicine (NASEM) published the report, *A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths after Injury*. The ACS was one of the sponsors of this project, and the COT, under the leadership of Ronald M. Stewart, MD, FACS, COT Chair (2014–2018), accepted responsibility to advocate for implementation of the recommendations from this report. Dr. Stewart convened a multidisciplinary meeting in Washington, DC, in 2017 to discuss strategies to address these issues (see Chapter 11).

> The report recommendations were divided into four main topics for discussion: development of a National Trauma System, military-civilian collaboration, support for trauma research, and linkage of data across the continuum of care.

All the federal agencies involved in this work participated in this meeting. The COT Advocacy Pillar has supported efforts to advance these priorities including: the Mission Zero Act, which authorizes funding to support integration of military teams into civilian trauma centers for ongoing training; increased research funding appropriations to support DoD-funded trauma research; and increased funding support for firearm injury prevention research from the CDC. As a core member of the Coalition for National Trauma Research (CNTR), the COT continues efforts to support research funding commensurate with the burden of disease from injury.

Firearm Injury Prevention

As detailed in Chapter 9, Injury Prevention, the COT has been very active in working to frame firearm injury as a public health problem and to advocate for legislation to support injury prevention research and the development of hospital-based violence intervention programs (HVIP). Dr. Stewart has testified before congressional committees twice in 2019 on the importance of supporting these research efforts. The fiscal years 2020 and 2021 federal budgets included appropriations of $25 million, split between the CDC and the National Institutes of Health, specifically to support firearm injury prevention research. In addition, the ACS is supporting the Bipartisan Solution to Cyclical Violence Act, which passed the House in 2020 and would provide funding to support HVIPs.

Regional Medical Operations Centers can scale up rapidly for any mass casualty event. Representatives from all stakeholders convene to coordinate the response. *Photo: South Texas Regional Advisory Council RMOC.*

Regional Medical Operations Center to Support Disaster Response

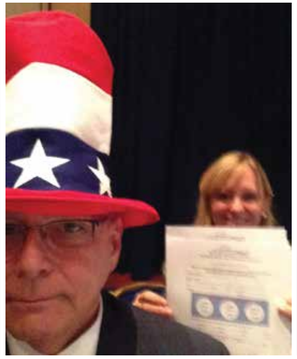
COT leaders have been working with the U.S. Department of Health and Human Services Office of the Assistant Secretary for Preparedness and Response and the Department of Homeland Security for a regionalized approach to disaster management based on the trauma system framework. The COVID-19 pandemic has added focus to the need for infrastructure to support regional coordination of the health care system for more effective management of these large-scale events. As a result, the COT has been advocating for the widespread adoption of Regional Medical Operations Centers (RMOCs), also known as Medical Operations Coordination Cells (MOCCs). These centers help to rapidly mobilize and coordinate all relevant stakeholders for large-scale response, including public health agencies, emergency management, and all components of the acute health care system. Drs. Bulger and Stewart have participated in several webinars and panel discussions, including one sponsored by the Federal Emergency Management Agency; also known as the FEMA Healthcare Resilience Task Force, which has developed a toolkit for MOCC development.

> As the COVID-19 surge unfolded in New York City (NYC) in spring 2020, the ACS worked to support the NYC COT and sent letters highlighting the value of the RMOC approach in the pandemic response to the mayors and public health officials of every major city in the U.S. The COT Advocacy Pillar has written a policy statement outlining this approach and is advocating for federal grant programs to support this infrastructure.

Energized COT Advocacy

The 2010–2020 decade has been a time of increasing engagement by trauma surgeons as advocates. STB has demonstrated the rapid impact of comprehensive advocacy through standards, professional education, cross-sector collaboration, citizen training, and public policy. STB is seen as an essential skill for everyone. Further, STB has added energy to COT engagement in strategic advocacy on other issues.

The ACS has recognized the growing importance of public sector advocacy and has increased its presence in Washington, DC, from establishing its first office in Georgetown in 1979, to the current building at 20 F Street which opened in 2010 and is within view of the Capitol. The Advocacy Pillar has emphasized the importance of COT member participation in ACS advocacy with grassroots outreach to members of Congress through *Surgeons*Voice, a nationwide, interactive advocacy program designed to make interacting with colleagues and Congress easier by bridging the connection between ACS members, key ACS advocacy priorities, and legislators. In 2002, *Surgeons*PAC was started to offer bipartisan support to members of Congress who share surgery's perspective on health care policy issues, plus individuals well-positioned to advocate for ACS-supported priorities; COT members are encouraged throughout the year to participate in the ACS advocacy initiatives, and to make contributions to *Surgeons*PAC. Further, the Advocacy Pillar has consolidated COT efforts in federal and state advocacy while integrating activities with the COT Systems Pillar, Injury Prevention and Control Committee, and the STOP THE BLEED® Committee. The advocacy initiatives of the COT have received outstanding support from the ACS Department of Advocacy and Health Policy team in Washington, DC.



A Culture of Giving

THE HAT first made its debut at the 2013 Clinical Congress. Dr. Fildes wore the hat and, supported by Kristin McDonald, made an impassioned pitch for support of the *Surgeons*PAC. (middle)

Dr. Coburn assumed the honors when he became Advocacy Chair in 2014, and THE HAT then made regular appearances at each COT Business Meeting during his tenure. (left)

Dr. Rotondo had his own strategy with his 2014 'grassroots' campaign; each contributor proudly wore a sticker depicting grass and roots, saying 'Action Accomplished.' (right)

The Future

The COT has a national platform that inspires results in patient, professional, and public advocacy. Still, there are gaps in the availability and quality of trauma care across U.S. communities. Thus, the goal for the next decade is authorization of, and appropriation for, a National Trauma and Emergency Preparedness System. This system will: (1) establish and implement national standards for trauma care, injury prevention, and system readiness; (2) support system-wide performance improvement activities; (3) ensure readiness through the development of a network of Regional Medical Operations Centers (RMOCs); and (4) support research to advance the field. The National Trauma and Emergency Preparedness System also will support the ongoing development of military-civilian partnerships and it will be a strategic asset for response and resilience to large-scale mass casualty events. Lessons from the development of the STOP THE BLEED® program will inform the inclusive advocacy approach for a National Trauma and Emergency Preparedness System and emphasize partnerships through stakeholder coalitions.

Perseverance is essential to achieve the COT vision of eliminating preventable death and disability from injury around the globe. Moving from greater awareness of traumatic injury as a global public health problem to multifaceted actions that prevent injury and improve injury care in the public and private sectors will leverage the COT's vision through advocacy.

Advocacy Pillar Chairs

2010

Edward Cornwell, MD, FACS
2010–2013

2013

Leonard J. Weireter, Jr., MD, FACS
2013–2014

2014

Michael Coburn, MD, FACS
2014–2020

2020

John H. Armstrong, MD, FACS
2020–

STOP THE BLEED® Chairs

Lenworth M. Jacobs, Jr., MD, MPH, FACS
Chair of The Hartford Consensus, Founder of the ACS COT efforts

2016

Mark L. Gestring, MD, FACS
2016–2022

2022

Kenji Inaba, MD, FACS
2022–

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Successful advocacy relies on a strong partnership between the professional societies that are focused on trauma care. Participants in the annual leadership meeting between the COT and the American College of Emergency Physicians in 2018.

Looking to the Future

18

Looking to the Future

The legacy of the Committee on Trauma (COT) is the result of the dogged persistence of a committed group of surgeons focused on reducing the burden of injury through a multifaceted approach. These efforts have transformed trauma care in much of the world and established an approach to regionalized care and performance improvement that has been applied across the House of Medicine. Until we reach our vision of eliminating preventable death and disability from injury across the globe, this mission must continue.

As we look to the future of the COT, we are excited by the passion and commitment of the next generation of trauma and acute care surgeons who will carry on this mission. As part of the commemoration of the COT Centennial, we conducted more than 40 interviews of past and present COT leaders, and it is evident that serving on the COT has been one of the most valuable and impactful experiences of their careers.

The COT has fostered a worldwide community of physicians, nurses, educators, and health care professionals from across the continuum of care, who work tirelessly to reduce injury rates and improve the care of injured patients. Working together has fostered lifelong friendships that have enriched all of our lives.

The Trauma Community Comes Together
The ACS TQIP Annual Conference pulls together members of the trauma community across the continuum of care, for several days of learning and sharing best practices, discussing performance improvement, and fellowship. This gathering represents the best of trauma, and inspires the group to further the mission of zero preventable deaths.

Describing what the COT means to them, here are some quotes from recent leaders:

Once you have been a part of the COT, it changes your life. It gives you back much more than you could ever give it. I can tell you that's truly how I feel about it. You couldn't find a better place to act on your passion for caring for patients than in the COT.

—Michael F. Rotondo, MD, FACS

The ability to make an impact…for every surgeon who works in the community of trauma, that's one of the beautiful things about the COT. I think every single person can significantly advance trauma care through their active participation. The COT process has a meaningful influence on the care of patients in their local community and across the globe.

—Ronald M. Stewart, MD, FACS

I can't think of a group of surgeons that I would have wanted to spend my career with other than this group of trauma surgeons. I really mean that. All physicians are committed, but trauma surgeons are really, really committed and that commitment and dedication rubs off…. You will never find a group of people better to be associated with, to share with, to rely on…. The COT as a support group is unbeatable.

—Ronald V. Maier, MD, FACS

As surgeons, nothing brings us greater joy than to manage patients and use our skills and knowledge to save their lives and improve their survival, but at that point you are dealing with patients, one at a time. However, when you step up to something like the COT, the decisions you make are affecting thousands, if not tens of thousands of patients at a time.

—John Fildes, MD, FACS

Many of us make meaningful contributions at our local organizations, but all who are part of the COT really reflect on the relationship with the ACS and their peers at the table of the COT as probably the most important aspect of their careers. It's the place where they really feel like they can make a difference and I feel that way. I feel that the COT has given me so much opportunity. We all want to give back to the COT, to the trauma community, and that is why I think we have such great impact–because there is an emotional connection to the COT.

—Avery B. Nathens, MD, PhD, FACS, FRCSC

2021 MENTORING DAY—CHICAGO

This day provided the opportunity for lectures, one-on-one mentoring discussions, leadership and team challenges (which leadership style was most effective in building the tallest structure out of spaghetti noodles, a paper plate, and a marshmellow?), and group discussions. Masked interactions between senior surgeon mentors and early-career surgeon mentees created much-needed energy and excitement after so many months of COVID-19 limitations. The connections made during this session will form a solid base from which the Future Trauma Leaders will launch their careers and service to the injured patient.

Mentoring for Excellence in Trauma Surgery

> We all recognize that mentorship is invaluable in supporting and developing one's career, and past COT leaders all uniformly credited their mentors for engaging them in the work of the COT and laying the foundation for their commitment to collaboratively advance its mission.

The COT has supported the Resident Trauma Papers Competition since 1978, which provides an early but limited exposure to COT activities. Early-career engagement in the COT traditionally begins in the regional committees; this is necessary given the limited size of the central committee, where opportunities to engage at that level have traditionally been limited to mid- to late-career surgeons.

In 2014, Eileen M. Bulger, MD, FACS, COT Membership Committee Chair (2014–2018), recommended a more purposeful approach to mentoring younger trauma surgeons. Her concept was approved, and the COT established the Mentoring for Excellence in Trauma Surgery (METS) program as the umbrella mentorship program that incorporated early-career surgeons that came to the COT through a variety of channels. Initially, the METS program comprised the existing liaisons to the COT from the American College of Surgeons (ACS) Resident Associate Society and the Young Fellows Association, along with members from a new COT program that would be called the Future Trauma Leaders (FTL) program. In 2020, the METS program also incorporated the COT Firearm Injury Prevention Clinical Scholar.

> The METS program was designed to be a two-year immersion into the activities of the COT with travel scholarships provided to support participants' engagement in key COT and ACS meetings.

All participants in the METS program are matched with mentors in the COT who share their areas of interest and assigned to relevant committees and work groups to engage in COT projects. METS participants also are encouraged to engage in research projects with TQIP; attend Verification, Review, and Consultation (VRC) Program visits as observers; and be exposed to all the educational courses offered by the COT. Support is provided for participants to attend the spring and fall COT meetings, the ACS Leadership and Advocacy Summit, and the TQIP Annual Conference.

The FTL Program itself, was launched in 2015, with two new participants selected each year; after the first two years, it was expanded to four per year. Eligible applicants to the FTL Program must be within five years of completing their fellowship training. In 2022, with the support of the Military Health System Strategic Partnership ACS, a fifth position was added to support a career military surgeon.

Inaugural METS Participants and Mentors, 2015
Back row: Mentors Ronald M. Stewart, MD, FACS; Leonard J. Weireter, Jr., MD, FACS; Eileen M. Bulger, MD, FACS; Rosemary A. Kozar, MD, FACS; and Joseph DuBose, MD, FACS, YFA Liaison to the COT, METS participant.
Front row: Peter Fischer, MD, FACS, FTL Class of 2015; Ashley Hink, MD, RAS Liaison to the COT, METS participant; Megan Brenner, MD, FACS, FTL Class of 2015; Katie Wiggins-Dohlvik, MD, FACS, RAS Liaison to the COT, METS participant.

(Beginning in 2024, there will be a permanent military position, due to a generous donation received through the FTL100 Campaign.) Interest in the program has been tremendous, averaging more than 50 applications per year. Participants in the program have been incredibly productive and have engaged in all aspects of the COT.

The first FTL participants were Megan Brenner, MD, FACS, who is the course director for the Basic Endovascular Skills for Trauma (BEST) Course, which she developed, and Peter E. Fischer, MD, FACS, who is Chair of the COT Emergency Medical Services (EMS) Committee. The participants in the FTL Program have provided the perspective of early-career surgeons and helped set the course for the future. To keep the FTL participants engaged in the COT beyond their two-year term, the COT leadership developed a METS transition term, which allows them to seek opportunities for engagement and participation in the regional committees. It is our hope that this transition term will provide the opportunity for the FTL alums to serve the COT for many years.

Given the incredible success of early participants from the first several classes, the Executive Committee felt the need to ensure funding to enable the program to continue outside of general operating expenses. In 2018, the FTL100 fundraising campaign was launched to raise sufficient funds to ensure the sustainability of the METS and FTL Programs. Our goal was to raise $1 million by our 100th anniversary in 2022. Please see the recognition of our generous donors listed at the end of this book—**mission accomplished!**

Pioneering Women Surgeons of the COT

> Women surgeons have been increasingly welcomed and actively engaged in COT leadership for just over forty years.

The first woman to serve as a member of the central committee was Anna M. Ledgerwood, MD, FACS, in 1981. She also was the first woman to give the Scudder Oration on Trauma in 1996. Sylvia D. Campbell, MD, FACS, was the first woman to serve as a subcommittee chair, serving as the Chair, Injury Prevention and Control Committee (IPCC) from 1999 to 2003. She was followed by M. Margaret (Peggy) Knudson, MD, FACS (2003–2007); Carol R. Schermer, MD, FACS (2007–2008); and Deborah A. Kuhls, MD, FACS (2012–2020). Barbara A. Barlow, MD, FACS, FAAP, the founder of the Injury Free Coalition for Kids, also was an active early participant in the IPCC committee. Susan M. Briggs, MD, MPH, FACS, was the second woman to give the Scudder Oration (2016) and is recognized as a leader in disaster preparedness across the globe. Dr. Knudson was the first woman to serve as the Vice Chair of the COT and Chair of the Regional Committees (2006–2010), and the third woman to give the Scudder Oration (2019). Rosemary A. Kozar, MD, FACS, was the first woman to chair the Verification Review Committee (2014–2017), and Christine S. Cocanour, MD, FACS, was the first woman to chair the Performance Improvement and Patient Safety (PIPS) Committee (2021–). Karen J. Brasel, MD, FACS, was the first woman to chair the Advanced Trauma Life Support® (ATLS®) Committee (2010–2014). Dr. Brasel was followed by Sharon M. Henry, MD, FACS (2014–2018), and Kimberly T. Joseph, MD, FACS (2018–2022), who were the first Black women to serve in leadership positions in the COT.

Mary E. Fallat, MD, FACS, FAAP, was the first woman to chair the Subcommittee on Emergency Medical Services – Prehospital (the precursor to today's EMS Committee) (2004–2007), and she has continued to make major contributions to enhance pediatric trauma care across the U.S. Eileen M. Bulger, MD, FACS, was the first woman to serve as a Region Chief in 2006 (Region 10). Mary vanWijngaarden-Stephens was the first woman Region Chief from Canada in 2010 (Region 11). Maria Fernanda-Jimenez from Colombia was the first woman to serve as an International Region Chief in 2013 (Region 14) and the first to chair the International Injury Care Committee (2016–2019). Dr. Jimenez has worked tirelessly to advance trauma education across the world. Inger B. Schipper, MD, FACS, from the Netherlands was the first woman to serve as Region Chief in Region 15 (2014). Dr. Bulger served as Chair of EMS Committee (2011–2015), Chair of the Membership Committee (2014–2018), and in 2018 was appointed as the first woman to serve as Chair of the COT during its 100-year history.

WOMEN LEADERS DRIVING THE FUTURE OF THE COT

Anna M. Ledgerwood, MD, FACS
Central COT member (1981), Scudder Orator (1996).

Mary Fallat, MD, FACS, FAAP
Chair Subcommittee on Emergency Medical Services – Prehospital (2004).

Eileen M. Bulger, MD, FACS
Region Chief (2006), COT Chair (2018).

M. Margaret Knudson, MD, FACS
COT Vice Chair and Chair of the Regional Committees on Trauma (2006).

Karen J. Brasel, MD, FACS
ATLS Chair (2010).

Maria Fernanda-Jimenez, MD, FACS
International Region Chief (2013).

Inger B. Schipper, MD, FACS
Region 15 Chief (2014).

Rosemary A. Kozar, MD, FACS
VRC Chair (2014).

Sharon M. Henry, MD, FACS
ATLS Chair, and Black woman leader (2014).

Kimberly T. Joseph, MD, FACS
ATLS Chair, and Black woman leader (2018).

Christine S. Cocanour, MD, FACS
Chair PIPS (2021).

Advancing Diversity, Equity, and Inclusion (DEI)

The philosophy of the COT has been one of maximal inclusion, seeking to hear all points of view and building relationships with specialty societies and health care providers across the continuum of injury care and practice settings. Despite these efforts, we know there is an opportunity to increase the diversity of the COT membership and ensure that all members are included in opportunities to engage in COT activities.

Lillian S. Kao, MD, FACS.

In 2019, the commitment to be purposeful in the execution of this philosophy was put into action with the appointment of Lillian S. Kao, MD, FACS, as the first Lead, COT DEI Work Group, reporting up through the COT Membership Committee.

There are now several sub-work groups with specific purposes that focus on everything from expanding the diversity of candidates for membership or award programs, to the reduction of bias in educational programs, and so on.

Next Steps

Despite the progress we have made with women in leadership roles, women surgeons are still underrepresented across the COT membership, and there is even less diversity in terms of race and ethnicity. In addition, there is a need for greater engagement from those practicing in rural, Level III and Level IV trauma centers.

The COT established the DEI Work Group to be an advisory body specifically for the Executive and Membership Committees, and generally across the COT. Chaired by Dr. Kao, the group published a statement on the COT's commitment to DEI and, in 2020, conducted a survey of all COT members on several diversity-related issues. As a result of the feedback received from the survey responses, the work group developed several initiatives to address areas of opportunity, which have been integrated into the membership engagement arm of the strategic plan led by Jeffrey D. Kerby, MD, PhD, FACS, Chair of the Membership Committee (2018–2022); and Patrick M. Reilly, MD, FACS, FCCP, Chair of the Regional Committees on Trauma (2018–2022). To increase opportunities for engagement of members and transparency in the path to leadership, the COT launched the Participation and Leadership Opportunity Boards in 2021; these are online postings of open positions where any member can self-nominate for open leadership or work group roles.

Partnering to Enhance Member Engagement
Jeffrey D. Kerby, MD, PhD, FACS, Chair of the Membership Committee (2018-2022); and Patrick M. Reilly, MD, FACS, FCCP, Chair of the Regional Committees on Trauma (2018-2022).

It is encouraging the see the increasing diversity of the next generation of trauma surgeons and we seek to embrace the opportunity to engage them in the exciting work of the COT.

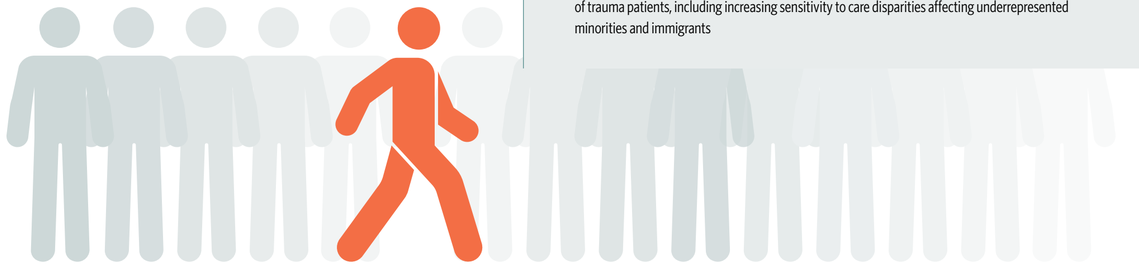
We will continue to work with the Regional Committees on Trauma to increase opportunities for early-career surgeons to become involved in their local trauma systems and to become vice chairs at the state/provincial/country level, a role that allows for participation in the work of the committee at the national level. We also will continue to look for opportunities to grow our mentorship programs. With the tremendous response we have received to the FTL100 Campaign we are confident that we can not only sustain but also grow this popular program.

COT STATEMENT ON DIVERSITY, EQUITY, AND INCLUSION

The Committee on Trauma (COT) is committed to upholding the principles of diversity, equity, and inclusion, within both the organization and the community that it serves. These principles are essential to ensure the COT's effectiveness as an organization dedicated to injury prevention and optimal care of the injured patient.

The COT will underscore its commitment to diversity, equity, and inclusion by:

- Respecting and promoting diversity in recruitment and retention across all categories of membership
- Ensuring equal opportunities for leadership roles
- Developing policies, guidelines, and practices to address barriers to inclusion and equity in the organization
- Upholding zero tolerance for discrimination, harassment, or bullying
- Educating the COT membership and the broader trauma community about individual and organizational barriers to inclusion and equity
- Disseminating best practices for equity, diversity, and inclusion to the COT membership and the trauma community
- Educating the trauma community on the care of diverse patient populations
- Providing resources to the trauma community to assess and address inequities in the care of trauma patients, including increasing sensitivity to care disparities affecting underrepresented minorities and immigrants



Future Trauma Leaders—Their Vision for the Future

FTL2015 Alum

Megan Brenner, MD, MS, FACS
(March 2015–October 2016)

I can say without hesitation that my participation in the FTL Program—and the opportunities it has provided—has been the single most pivotal, educational, and gratifying experience of my career, in more ways than I could have ever imagined. I do not know of any other opportunity for junior faculty that allows them to contribute so significantly to trauma care, as far as the arms of the COT reach, which as we all know is around the world.

The FTL Program enabled us to learn from the greatest leaders in trauma. From Day One we became actively engaged in projects that aligned with our interests and have had the opportunity to continue growing and expanding our roles within the organization. We are so grateful to the COT, to our FTL mentors, the FTL donors, and to the institutions who supported our participation in this program.

My vision for the future of the COT is that it continues to adapt and grow to meet the national and international needs of the trauma community, that it will influence both practice and policy, and most importantly, that it will always keep the patient at the center of its mission.

FTL2015 Alum

Peter E. Fischer, MD, FACS
(March 2015–October 2016)

We can support the COT in its vision to eliminate preventable deaths and disabilities across the globe by engaging the next generation of trauma surgeon leaders early and fostering their growth to ensure the COT remains the leading organization in revolutionizing the future of care to the injured patient. The program that does that is the FTL. Winston Churchill said, 'We make a living by what we get. We make a life by what we give.'

My vision for the COT is to continue to be the leading organization advancing care of the injured and fostering young trauma professionals through their professional growth.

FTL2016 Alum

Joseph V. Sakran, MD, FACS
(March 2016–October 2017)

The FTL Program has been instrumental in allowing me to understand how the COT functions at the state, regional, and national level in order to advance care of the injured patient. The ability to grow both personally and professionally has been a result of the incredible mentorship across the organization and the ability to engage with a talented cohort of FTLs.

My vision for the future of the COT and trauma care—the next 100 years will ensure the development of a National Trauma and Emergency Preparedness System (NTEPS) that ensures timely access to high-quality trauma care for all Americans. At the center of leading this change is the COT where they are both training the next generation of future trauma leaders, while functioning across the public and private sector to ensure a resilient trauma system.

FTL2016 Alum

Samuel Mandell, MD, FACS
(March 2016–October 2017)

For me, the FTL Program has been an unparalleled experience in terms of engagement and mentorship. Surgery has long valued seniority and experience, which can make it hard for younger surgeons to get involved with national trauma organizations. The FTL Program provides a seat at the table with project work done with, not for, senior trauma surgeons. Being engaged with work on national projects has provided me with new skills, friendships, and opportunities that would not have been possible otherwise.

My vision for the future—I have no doubt that the COT will continue to be a premier quality improvement program at the ACS. My hope is that the COT continues to become an increasingly inclusive and diverse organization, beginning with continued reinvigoration of local and state groups. This growth will occur in tandem with the development of a Trauma Institute at the National Institutes of Health to further coordinate trauma research throughout the U.S. With such a coordinated approach, promising basic science research can be more easily translated to the bedside and tested with multicenter trials. Additionally, we will have a much better understanding of the long-term and psychological effects of trauma on the patient experience. Trauma care will not only treat acute injury, but we also will be prepared to holistically help patients transition from being trauma victims to trauma survivors.

FTL2017 Alum

Stephanie Bonne, MD, FACS
(March 2017–October 2018)

The FTL Program has been so much more than just the project, the mentorship, and getting exposure early to the COT. Those are all important components but the synergy of the program, the support of the COT for the program, and the enthusiasm on the part of the COT membership for my work has been palpable. As an early-career surgeon, the feeling that such a meaningful group "has your back" and is rooting for your success has made me more productive and confident and brought enthusiasm for the future of trauma care to my work.

My vision for the future— I see trauma becoming more focused on public health and our role in communities. In the past 100 years, we have become really, really good at saving people's lives and taking care of their injuries. While there is always room for improvement in clinical care, I see the future as caring for our communities and populations in new and innovative ways. We are uniquely positioned to be pillars of public health promotion and I look forward to trauma care becoming a truly preventative and multidisciplinary endeavor.

FTL2017 Alum

Aaron R. Jensen, MD, FACS
(March 2017–October 2018)

The FTL Program has been invaluable in in providing opportunity for engagement in the COT at an early career stage. Mentorship from experienced members of the COT and opportunities for involvement in working groups has accelerated my engagement in national quality improvement activities. Just four years after starting the FTL Program, I am leading national quality improvement initiatives in collaboration with the COT and Emergency Medical Services for Children (EMSC) that will incite meaningful change and improve care for injured children. As a junior faculty member, the thing I desired most was the opportunity to get involved and contribute to the work that needs to be done. This mentored engagement opportunity has by far exceeded my expectations.

My vision for the future of the COT and trauma care is to continue to build on the collaborative nature fostered by the COT to build a national inclusive trauma system across the continuum of care. My specific vision is to improve the inclusive integration of children into that national trauma system such that every child has access to high-quality care regardless of where they are treated and how they enter the trauma system. Expanding national data collection systems to gain a better understanding of pediatric resuscitation processes that occur in critical access to hospitals prior to transfer to trauma centers is needed to improve care across the continuum and I am looking forward to participating in these efforts.

FTL2017 Alum

Margaret M. Morgan, MD, FACS
(March 2017–October 2018)

The FTL Program opened doors in my career that I did not even know were there. Being a part of the FTL allowed me to forge connections with other trauma surgeons across the country through which I was able to collaborate on projects within the American College of Surgeons Military Health Strategic Partnership, the Defense Committees on Trauma, and the National Association of Emergency Medical Technicians' Prehospital Trauma Life Support Committee. It was perhaps the biggest stepping stone of my career, and I am forever grateful for the opportunities and mentorship.

My vision for the future—over the next 100 years, my vision for the future of the COT and trauma care is INTEGRATION. My focus is primarily within the military targeting the education of both prehospital and inhospital military providers and I believe that the most successful way to do that will be to fully integrate with civilian trauma communities to increase the quality and delivery of trauma care across the continuum.

FTL2017 Alum

Mayur B. Patel, MD, FACS
(March 2017–October 2018)

The FTL Program is a network of motivated young colleagues interested in improving the care of the injured patient that prioritizes the mentorship of the

next generation of tomorrow's leaders in trauma and surgery.

The future of the COT and trauma care will involve leading and optimizing surgical health care delivery in austere, off-planet environments.

FTL2017 Alum

Kyle Remick, MD, FACS
(March 2017–October 2018)

As a military trauma surgeon, the FTL Program provided a tremendous opportunity to experience the inner workings of the COT and to put optimal trauma care principles into practice on the battlefield as a military trauma leader. The collective wisdom and experience of this 100-year-old organization proved invaluable towards bringing the goal of zero preventable death and disability to the battlefield.

FTL2018 Alum

Brian Beldowicz, MD, FACS
(March 2018–October 2019)

The disparity between the global burden of injury and the resources available for its treatment makes collaboration essential. The ACS COT has, for a century, provided tools and resources necessary for interdisciplinary, multi-institutional, and even transnational collaboration to achieve the best possible outcomes for injured patients. With the Future Trauma Leaders Program, the COT has now developed a platform for intergenerational mentorship that assures tools for trauma education and collaboration will keep pace with evolving medical science and patterns of injury in a socially responsible way. The relationships and experiences I developed through the program are among my most valued professional and personal resources, whether caring for injured patients on the battlefields of Iraq and Syria or in trauma bays here at home.

FTL2018 Alum

Erin C. Hall, MD, FACS
(March 2018–October 2019)

The FTL experience has been an unparalleled opportunity to be able to contribute to the big picture of trauma care on a national level. I feel continuously grateful for the chance to have made friends I can lean on, learn from, and be supported by incredible mentors; and feel launched into a position where I can continue to work on important and rewarding projects and initiatives.

My vision for the future of the COT and trauma care—the next 100 years is to continue to expand and enrich our definitions of a good outcome for our patients. I want us to leverage the systems, data collection and evidence base, and our dedication to those at the worst moments of their lives to make an inflection toward better overall health using multidisciplinary and innovative interventions.

FTL2018 Alum

Bindi Naik-Mathuria, MD, FACS
(March 2018–October 2019)

The FTL Program meant the opportunity to meet and be inspired by the leaders of American trauma. It also inspired me to join Twitter and apply for and be successful in securing a grant on firearm violence prevention as a public health issue.

My vision for the future of the COT and trauma care, the next 100 years—Better and better! Decrease violent injuries, especially by firearms. Include more pediatric-specific trauma care. Continue the tradition of excellence and saving lives.

FTL2018 Alum

Brian P. Smith, MD, FACS
(March 2018–October 2019)

The FTL Program epitomizes the College's commitment to education and mentored leadership. The FTL Program has been the preeminent professional network into all branches of trauma care across the country.

During the next 100 years of evolving trauma care, the interface of local, regional, and national trauma networks will become seamless, and technology will be leveraged to bring exemplary and equitable care to everyone in need of it. It will be the efforts of the dedicated clinicians working together to ensure this care for the next generation.

FTL2019 Alum

Laura Godat, MD, FACS
(March 2019–October 2021)

This program brought me into the COT community, providing amazing mentorship, resources, and the true opportunity to positively impact care of the injured patient. This program has helped me to develop skills and relationships that will allow me to be more impactful in local and national trauma care. I am honored to have been selected and will continue to work to contribute to the COT long after my time in the FTL Program has passed.

My vision for the future of the COT and trauma care, the next 100 years—as the COT continues to lead the way for our surgical community in best practices and quality improvement, I look forward to reaching the goal of zero preventable deaths and disability after trauma. It is programs like FTL that will cultivate the future leaders who will continue to work toward accomplishing this goal.

FTL2019 Alum

D. Anderson Millar, MD, FACS
(March 2019–October 2021)

It has been an absolute honor and privilege to be part of the Future Trauma Leaders Program. Previously, I had received excellent mentoring from my partners and local administrators, but I had never imagined a world outside of that. It has been invaluable to me to receive further mentoring and guidance, and to establish multiple friendships and relationships that will help further my own personal growth as well as the delivery of care for traumatically injured patients. This has been a true springboard to my career and is giving me opportunities that I would never have otherwise had. I am especially grateful for the leaders of the COT and the FTL Program who have made this all possible.

My vision for the future of the COT and trauma care, the next 100 years—I am incredibly impressed by the major advancements in the delivery of care for trauma patients over even just the last 20 years. The science, education, and care delivery has been improving exponentially. The COT has been instrumental in furthering this great work with the help of surgeon-scientists and committed individuals who have dedicated their life to trauma care. I envision the COT continuing to grow and expand its opportunities and influence. The FTL Program continues to help provide many young surgeons like myself with the exposure that they need to organize themselves and to execute their own level of influence on their local and regional systems. I see the COT helping our federal government to establish and maintain a cohesive and collegial National Trauma and Emergency Preparedness System that can help to standardize the delivery of care across multiple levels and disciplines.

FTL2019 Alum

Regan Williams, MD, FACS
(March 2019–October 2021)

The FTL Program is an integral part of my education of trauma on a national and global level. My trauma training was outstanding but really focused on the clinical care of a single patient. The FTL Program has introduced me to making large-scale changes to trauma care that can affect many patients. The COT is comprised of surgeons dedicated to making a difference in the lives of patients with traumatic injury and to make the biggest difference we must address issues outside of clinical care of the individual patient alone. It is all about education, quality care, and legislation to truly optimize the lifetimes of our patients. FTL has also shown me that each individual surgeon can make a BIG difference when working with a group of dedicated people for a common goal—to develop and implement programs that support injury prevention and ensure optimal patient outcomes across the continuum of care.

Vision for the future—prevent traumatic injury and provide equal access to the highest level of trauma care for ALL patients when injury cannot be prevented. Continue to engage young trauma surgeons to ensure the future of the COT as a global leader in trauma care. The earlier they learn, the more effective we can work as a team to make positive changes to improve care.

FTL2019 Alum

Brian K. Yorkgitis, PA-C, DO, FACS
(March 2019–October 2021)

The FTL Program has provided me incredible opportunities in my career as a trauma surgeon. The program has enhanced my knowledge of trauma systems and trauma care. Most importantly, it has provided mentorship and networking with amazing colleagues who provide unparalleled support.

My vision for the future of the COT and trauma care over the next 100 years is to develop a National Trauma and Emergency Preparedness System that allows deliver of high-quality, evidenced-based care to each patient through the continuum of care starting with injury prevention and going through rehabilitation and restoration of health.

FTL2020

Galinos Barmparas, MD, FACS
(March 2020–)

The FTL Program has given me ample opportunity to grow academically and professionally. It allowed me to collaborate with, learn from, and be mentored by diverse and multidisciplinary groups of professionals. Most importantly, however, it expanded and solidified the meaning and my understanding of what we call

"trauma care." I am now part of a big, novel idea; a big goal; a big purpose.

My vision for the future of the COT and trauma care over the next 100 years—prevention, wide expansion of access to trauma care, knowledge advancement, breakthrough technologies, strong collaborations, diversity, and zero preventable deaths; and in the center of it all: quality and humane care.

FTL2020

Angela Ingraham, MD, FACS
(March 2020–October 2022)

The Future Trauma Leaders Program has provided me with an outstanding opportunity to grow as I develop the knowledge, skills, and relationships necessary to become a leader in trauma and surgical care. The trauma programs and systems thriving under the American College of Surgeons serve as models for high-quality care. To see firsthand the integral components and workings of the Committee on Trauma and to engage with the people that make all this possible is inspiring and motivating!

My vision for the future of the Committee on Trauma and trauma care in the next 100 years surrounds continued growth and development while at the same time fostering the critical relationships that support such excellence. The pandemic has reinforced to me that when individuals come together, particularly under adverse circumstances, we can achieve great things. As we continue to strive to prevent injury and optimize quality, the future of trauma care is bright as the Committee on Trauma renews its commitment to its providers but also to the public.

FTL2020

Meera Kotagal, MD, FACS
(March 2020–October 2022)

The FTL Program has been an incredible opportunity to engage with leaders across the country in trauma and trauma systems – to think about social determinants of health and injury prevention as well as diversity, equity, and inclusion in our field and the Committee on Trauma. I have learned a tremendous amount from individuals I might otherwise have never met and have developed mentoring relationships that will serve me for a lifetime. I have also had an opportunity to learn and become involved in the central COT—learning how the systems work and the ways in which the members of the COT can have an impact on their communities.

My vision for the future of the COT and trauma care over the next 100 years—we consistently provide equitable care to all trauma patients regardless of who they are and where they live.

FTL2020

Elizabeth Scherer, MD, FACS
(March 2020–October 2022)

The FTL Program has provided an opportunity to connect with colleagues and mentors across the country at a time when we have otherwise felt isolated and, at times, helpless. I have truly enjoyed the opportunity to be given the latitude and support to explore my interests within the Advocacy Pillar. All the members with whom I have worked on multiple projects have created an environment where I am comfortable expressing ideas and asking questions. It's an environment where everyone's thoughts are heard and taken seriously. I couldn't ask for a better experience and I feel privileged to be part of such incredible progress that will positively impact patient care.

My vision for the future is that the COT continues to be inclusive and diverse in its representation of surgeons as well as in its pursuit of improvement of patient care. I would hope that our future colleagues will be able to reflect on the improvement in care delivery and patient outcomes that comes from the development and implementation of a National Trauma and Emergency Preparedness System.

FTL2021

Charisse Berry, MD, FACS
(March 2021–October 2022)

Becoming a member of the FTL family has been such an amazing experience and has opened a door filled with opportunity, mentorship, sponsorship, and unyielding support for my career as I continue to develop the leadership skills necessary to help improve the trauma system and trauma care for all injured patients through groundbreaking research and data-driven policy changes.

My vision for the future of the COT and trauma care for the next 100 years is to have the COT membership and leadership reflect the people whom we serve and to have a National Trauma and Emergency Preparedness System where all links within the trauma care chain of survival are integrated at the regional, state, and national level, and health care inequities and disparities across the continuum of trauma care are eliminated.

FTL2021

Samuel W. Ross, MD, FACS
(March 2021–October 2022)

We stand on the shoulders of giants; these are figures that are larger than life and we cannot even fathom making similar impacts on surgery. How do you learn to carry on that legacy? It is by walking among the giants, so to speak. The Future Trauma Leaders Program provides an avenue to interact with every level of the Committee on Trauma, to see the why and how the COT organized and built the structure of quality the way it did, and in real time to help guide the future of trauma care in a dynamic era. Although I am just getting started, I have already seen that we too can make and lead important initiatives. This mentor relationship, not just with a single person, or committee, but with the COT writ large, teaches leadership, it gives experience, it provides avenues to direct passion into form that will make a lasting change. I can only hope to give back to the COT as much as I have learned in my short time here.

When I imagine what trauma care will look like 100 years from now, I hope for pharmacological marvels that will advance the control of hemorrhage; prevent motor vehicle crashes before they happen; or mitigate their severity with automated artificial intelligence (AI) algorithms; and reduced intentional violence through outreach and injury prevention measures for those most at risk. But what I know is that we will have a National Trauma and Emergency Preparedness System that is far beyond what we experience today. I know this because it is the mission of the COT, and the COT has tirelessly moved the needle of quality and safety in a positive direction for the past 100 years. Perseverant leadership has led to paradigm shifts and a true integrated national system would help mitigate any disaster, storm, or pandemic so that our nation could coordinate from the smallest local hospital level to the largest national systems. Eventually this would span the globe, getting the right patient, to the right place, at the right time, for the betterment of all.

FTL2021

Chethan Sathya, MD, FRCSC
(ACS Initiate 2021)
(March 2021–October 2022)

The FTL Program has undoubtedly provided me, a junior attending, with the opportunity of a lifetime. It has not only given me an early seat at the table, but it has also given me a voice. The mentorship and dedication to making my FTL experience a worthy one is nothing short of incredible. Everyone is rooting for us to succeed. And to have that type of network and support so early on in one's career is a game changer. The opportunity is now mine to make the most of it.

My vision for the future—the COT's efforts are already transforming trauma care nationally. The future is bright, and with sustained effort, the development of a national trauma system, and stronger injury prevention efforts, we will collectively make our communities safer and live in a world where we prevent injuries before they happen, rather than treating injured patients after the fact.

FTL2021

John W. Scott, MD, MPH
(ACS Initiate 2021)
(March 2021–October 2022)

The COT's FTL Program gives junior faculty unparalleled access to the leaders in trauma care around the country. The work of the COT has set the standard of excellence in trauma care over the last 100 years and the opportunity to access, learn from, be mentored by, and work along with the nation's leaders in trauma is a career-altering opportunity. Most of all, the FTL Program is focused on investing in people, growing the next generation of leaders today. I am excited to work alongside current and future trauma leaders to improve the care of the injured patient for decades to come.

In the next 100 years the COT will be instrumental in eliminating preventable deaths due to injury. Additionally, the COT will lead the way to guide patient care, research, advocacy, and policies to ensure that all patients are able to get their lives back and thrive after injury. Eliminating unnecessary variation and inequities in outcomes after injury is possible and the COT will lead the way to make this vision a reality.

Jeffrey D. Kerby, MD, PhD, FACS
Incoming COT Chair.

Leading Us into the Next Century

Incoming COT Chair: Jeffrey D. Kerby, MD, PhD, FACS

A native of Missouri, Jeffrey D. Kerby, MD, PhD, FACS, received both his undergraduate degree and medical degree from the University of Missouri in Kansas City in 1989. He completed his surgical residency in general surgery at the University of Alabama at Birmingham (UAB) in 1999, along with a postdoctoral research fellowship in 1996, earning a PhD in biochemistry and molecular genetics from UAB. Following residency, Dr. Kerby served in the U.S. Air Force as an active-duty surgeon until 2003, deploying as a combat trauma surgeon in support of Operation Enduring Freedom in 2002. In 2003, he retired from the Air Force as a lieutenant colonel and joined the faculty at UAB. He quickly rose through the academic ranks, achieving professor of surgery in 2010. Dr. Kerby has served as the Brigham Family Endowed Professor and director of the Division of Trauma and Acute Care Surgery, department of surgery, at the UAB Marnix E. Heersink School of Medicine since 2014. He also has been a leader in establishing the Alabama State Trauma System and serves as the state trauma consultant to the Alabama Department of Health. He is the medical director for the Regional Air Medical Services.

Dr. Kerby's clinical expertise is in trauma, critical care, and emergency general surgery. He serves on the editorial boards of *Prehospital Emergency Care* and the *Journal of Trauma and Acute Care Surgery*. His research interests focus on interventional trials and outcomes in the prehospital emergency care setting. He is part of a collaborative group of investigators that has published a large body of research in the medical literature on this topic. For 10 years (2005–2015), Dr. Kerby was principal investigator of the Alabama Resuscitation Center of the Resuscitation Outcomes Center network, a multicenter trials network funded by the National Institutes of Health that focused on prehospital interventional trials in trauma and cardiac arrest.

Dr. Kerby has established a military-civilian partnership between the UAB and the U.S. Air Force Special Operations Command to support the ongoing training of special operations surgical and critical care teams. This program currently hosts nearly 30 active-duty Air Force personnel and has also established trauma skills sustainment programs for Air Force pararescue jumpers. In addition, the UAB Division of Trauma and Acute Care Surgery hosts three teams of Air Force Special Operations surgeons on a permanent basis through a training affiliation agreement with Air Force Special Operations Command.

Dr. Kerby has been a leader in the Committee on Trauma (COT), serving on the Executive Committee and as the Chair of the Membership Committee over the last four years. He has taken a maximally inclusive approach, expanding the subspecialty representation on the COT and developing strategies to increase member engagement. He has led the Future Trauma Leaders Program and helped develop our Diversity, Equity, and Inclusion Work Group initiatives. In preparation for the COT centennial celebration, Dr. Kerby has gained a unique perspective on the history of the COT by interviewing all the past COT leaders and Scudder Orators. He also has served on the COT Research Committee, the Trauma System Evaluation and Planning Committee, and the Emergency Medical Services Committee.

Eileen M. Bulger, MD, FACS, said:

"We are excited to have Dr. Kerby lead us into the next century as he assumes the role of COT Chair in March of 2022! He is the perfect person to lead the COT into its next century of transforming care and reducing injuries across the globe."

My Vision for the Future

I am extremely humbled and honored to be selected to serve the American College of Surgeons (ACS) Committee on Trauma (COT) as its next Chair, beginning in March 2022. The opportunity to lead the COT into its next 100 years and continue the global mission to ensure optimal outcomes for our trauma patients across the continuum of care is something the entire COT leadership eagerly anticipates. As we stride purposefully into the future, I think we have several opportunities to advance this mission.

Establishment of a federally funded national trauma system of care should be a priority and a focal point of our strategic priorities. While we have great programs built around optimizing trauma outcomes, if patients don't have adequate access to this care, our vision of eliminating preventable death will never be realized. Our current leadership has created an excellent opportunity within our Advocacy and Trauma Systems Pillars to push forward with a plan to develop a federally funded National Trauma and Emergency Preparedness System (NTEPS) with an emphasis on the value of Regional Medical Operation Centers (RMOCs) to provide coordination across the health care system. It will take the entire trauma community working together to make this happen. We must build a strong coalition with other trauma-focused organizations and intensify the coordinated support for advocacy efforts from the entire COT community.

To fully achieve our goal of zero preventable deaths in trauma, we will continue to **encourage the active engagement of general surgeons in trauma care**, not only in the direct care of trauma patients, but also in leadership to establish trauma centers in areas of need and build quality programs to improve outcomes. We also need to send a clear message to residents in general surgery training programs about the importance of incorporating trauma care into their general surgery practices. A potential opportunity exists around refinement of resident education standards in trauma care, with instruction not only in clinical trauma care, but also around the importance of trauma systems. We need to be mindful and push back against efforts to de-emphasize clinical trauma rotations in later years of general surgical training, which seems to be a growing trend in training programs.

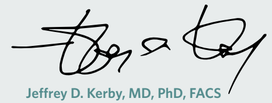
To be effective in all our initiatives, we need to continue to **expand a diverse and actively engaged membership**. We have worked over the last four years to transform the membership and make it more representative of our trauma care community, however there are additional opportunities to continue to grow in this area. We need to make sure all members of the COT have an opportunity for active engagement across the spectrum of COT initiatives. Continuing to grow local and regional COT infrastructure will provide early career opportunities for those with an interest in investing their time and energy to propagating the mission.

Trauma education will continue to be a focal point of the COT with the need to **provide enhanced access and promulgate our educational content** to as many learners as possible. The ability to pivot quickly to a hybrid model during the recent pandemic showed the resiliency and talent of our educational leadership and staff to adapt training to any situation. Continued efforts to modify our training programs (for example, development of more virtual content) will continue to expand the impact our education efforts have on improving care, even in resource-limited areas of the world.

The COT must remain focused on quality outcomes for our patients and continue to lead the development of these programs across the spectrum of surgery. Multiple opportunities to **expand the power of Trauma Quality Improvement Program data collection and reporting architecture to improve trauma outcomes** have been outlined and will be operationalized over the coming years. Future endeavors around patient-reported outcomes and social determinants of health will continue to expand our understanding of issues related to patient recovery and further inform our patient advocacy efforts for trauma care. Our injury prevention efforts have expanded and become more refined over the recent years. We must continue our efforts to **decrease the incidence of firearm injury through engagement in effective research and advocacy efforts**. As trauma is a global issue and our mission is to support optimal outcomes for all patients, **support and propagation of COT programs internationally** will remain a point of emphasis moving forward.

If you are new to the field of trauma and acute care surgery, we hope you are inspired by the mission of the COT and the major impact the COT has had on injury prevention and trauma care across the world. There is much work to be done to reach our vision of "eliminating preventable death and disability from injury across the globe," and we hope you will seek to carry on this work. If you are within five years of completing your training, we encourage you to apply to the Future Trauma Leaders Program. We also suggest you seek out your regional state/provincial/country chair and identify opportunities to engage in the activities of your local and regional COT. The future success of the COT is reliant on your individual commitment to volunteer your time and talents to advance the collaborative work of the COT members along with our incredible ACS trauma staff partners to execute the vision of providing optimal injury prevention and trauma care. By continuing to focus on doing the right thing for the patient, we know the COT will continue to develop innovative programs in trauma care.

We are excited to see what the next 100 years will bring.



Jeffrey D. Kerby, MD, PhD, FACS

Addenda

The Committee on Trauma Centennial Quilt

Designed and Handmade by Eileen M. Bulger, MD, FACS, Chair, Committee on Trauma (2018–2022)

This quilt was made in honor of the 100th anniversary of the American College of Surgeons (ACS) Committee on Trauma (COT) in 2022. The quilt was designed to capture the many contributions of the members of the COT toward the goal of eliminating preventable death and disability from injury across the globe. The quilt also seeks to capture the spirit of the COT, including an unwavering focus on keeping the patient at the center of our work, a commitment to maximal inclusiveness in our efforts, and the development of a supportive community for our members.

The theme, "Injury, a moment of crisis, a lifetime of impact," speaks to the perspective of patients and families impacted by these sudden, unexpected events, and will feature in our ongoing promotions and communications with our external constituents. As trauma surgeons we are privileged to care for the injured and will continue to seek every opportunity to improve our systems of care to reduce their burden.

The center block of the quilt is the logo of the Committee on Trauma which includes the Broken Man symbol first used in the publication of the *Optimal Resources for the Care of the Injured Patient* in 1990. The Broken Man logo reminds us of one of the guiding principles of the COT, which is to focus on the best interests of the patient or population served, and to use that knowledge to direct all key decisions and programs. To capture the significance of the patient in all COT initiatives, the same red fabric was used wherever the patient appears throughout the quilt.

I personally want to thank all the COT members and staff partners who I have had the honor to work with as the COT Chair. I am blessed to have you as friends, and I am grateful for your dedication and commitment to this mission. Despite the challenges of facing a worldwide pandemic, you have kept the COT mission alive, and our programs continue to thrive. You may have noticed in the border of the quilt that I added to our pillar structure the pillar of Friendship. I believe the community we have built has been central to our success, and I hope that future generations of passionate trauma surgeons will continue to find their home in the Committee on Trauma.

THANK YOU!
Eileen M. Bulger, MD, FACS

This first block represents the Chair of the COT. This role is key to setting the strategic direction of the COT but more importantly, this individual serves as a convener to establish teams to lead the COT programs, and as an ambassador of the COT to partner organizations, governmental agencies, and the Regional Committees on Trauma (RCOT). Those who have had the honor to serve in this role describe it as one of the greatest experiences in their career.

The Scudder Oration on Trauma is named for Charles L. Scudder, MD, FACS, the first Chair of the Committee on Fractures, which evolved into the Committee on Trauma. The Scudder Oration is given each year at the ACS Clinical Congress. Being selected as a Scudder Orator is one of the highest honors bestowed upon a trauma surgeon for his or her contributions to the field.

The camaraderie and lasting friendships that come from working side by side with a common purpose are the focus of this block. The multiple colors used reflect the COT's goal to be maximally inclusive and support a diverse membership.

The Future Trauma Leaders (FTL) Program was established in 2015 as part of the COT's Mentoring for Excellence in Trauma Surgery Program. The shooting stars represent the participants in this program and the trees represent the future growth of the COT due to their engagement.

This block honors all the committees and work groups of the COT where surgeons partner with the COT staff and liaisons to manage the programs of the COT. A representation of a virtual meeting was added in recognition of the shift to this format during the pandemic.

Surgeons perform the central role in the care of the injured patient, as emphasized in the surgical skills courses developed by the COT including: Advanced Surgical Skills for Exposure in Trauma (ASSET), Advanced Trauma Operative Management (ATOM®), and Basic Endovascular Skills for Trauma (BEST).

The reception and banquet held each year at the COT Annual Meeting and ACS Clinical Congress provide the opportunity to recognize major accomplishments including the winners of the annual Resident Trauma Papers Competition and provide a venue for socializing with friends. Traditionally the entertainment has been legendary.

Chicago is home to the ACS headquarters and most of the COT staff. Cloud Gate, commonly known as "The Bean" is a landmark sculpture in Millennium Park designed by artist Anish Kapoor.

The Advanced Trauma Life Support® (ATLS®) program is the only COT program that has two blocks in the quilt. This was done to reflect the global reach of this important program as well as the goal of ATLS to provide a common language for all providers caring for injured patients.

The STOP THE BLEED® program seeks to empower bystanders to become immediate responders by teaching the basic skills of bleeding control and making equipment available in public places. This block honors all who have contributed to, and continue to drive, this campaign.

This block is a tribute to all of those who provide rural trauma care and the Rural Trauma Committee of the COT, which developed the Rural Trauma Team Development Course.

We acknowledge some of the many mechanisms of injury that impact our patients. Importantly, we recognized burn injury as part of trauma and appreciate the active engagement of burn surgeons in the COT.

Emergency medical services (EMS) play a critical role in the continuum of trauma care; this block represents and honors both the work of the COT to help establish EMS as a profession, and the EMS Committee, which helped develop the Prehospital Trauma Life Support (PHTLS) Course and continues to advance prehospital trauma care.

This block is a tribute to the major contributions of the COT to injury prevention, including both its initial push and its ongoing advocacy for improvements in motor vehicle safety that have led to dramatic reductions in mortality associated with motor vehicle collisions.

We honor the ongoing work of the COT Injury Prevention and Control Committee to develop strategies to reduce firearm injuries by addressing the root causes of violence and developing hospital-based violence intervention programs.

All of the subspecialty surgeons who care for trauma patients and are integral members of the COT are honored in this block, which also recognizes the increasing number of women surgeons across all surgical specialties and celebrates their contributions to the evolution of the COT.

This block represents the critical role that rehabilitation services play in the continuum of trauma care and pays homage to all those who work to reduce long-term disability. It also emphasizes the importance of collecting long-term outcomes data for our patients.

The injury prevention efforts of the COT to reduce traumatic brain injury through helmet campaigns and other efforts to improve road safety are acknowledged in this block.

This block recognizes the work of the COT Advocacy Pillar and the ACS advocacy and health policy team in Washington, DC, at both the state and federal levels, which speaks on behalf of the injured patient. The purple fabric represents the importance of a bipartisan effort to address these issues.

We are committed to furthering the importance of trauma research and ongoing advocacy efforts to ensure federal funding commensurate with the burden of the public health impact of injury. The COT is proud to be a core member of the Coalition for National Trauma Research (CNTR) to advance this mission.

The Trauma Quality Improvement Program (TQIP) has been vital to the work of the COT Quality Pillar to establish a data-driven approach to quality improvement. This block honors all those who worked tirelessly to establish the National Trauma Databank® and its transformation to TQIP.

The second ATLS block represents the regional committees that were started by Dr. Scudder in 1922, including both the U.S. and Canada. The global growth of COT programs followed the promulgation of ATLS. There are now 17 regions which include 4 international regions: Region 14: Latin America; Region 15: Europe and South Africa; Region 16: Australasia; and Region 17: Middle East and North Africa.

The Verification, Review, and Consultation Program has been fundamental to ensuring optimal quality of care for injured patients. This block honors all those who worked tirelessly to develop this program and continue to support this vital effort.

This block recognizes the celebration of the 100th anniversary of the COT and is an expression of gratitude to all those who have worked for more than two years to capture the rich history of the COT and prepare for this celebration.

The ancillary services that support injured patients and, particularly all those who have worked to advance the science of blood transfusion and all those who donate blood are recognized in this block.

This block acknowledges all the members of the COT Disaster and Mass Casualty Management Committee and those who have responded to disasters and mass casualty events across the globe. This block also recognizes the educational contributions of the Disaster Management and Emergency Preparedness Course and the Advanced Disaster Medical Response Course.

COT members work tirelessly to improve pediatric trauma care and ensure that the needs of children are addressed in all COT programs.

All of the COT members who have worked to improve the care of elderly trauma patients and ensure that their needs are addressed in all COT programs are honored in this block.

This block is a tribute to all COT members who have served in the military and recognizes the importance of military-civilian partnerships in advancing our vision for a National Trauma System. We also recognize the contributions of Region 13 which represents all branches of the military.

This final block looks forward to the day that we achieve the COT vision of Zero Preventable Death and Disability (ZPDD) after injury across the globe. Perhaps we can raise this flag when we celebrate our 200-year anniversary in 2222!

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Thank you for your donations! *(October 23, 2015 to January 6, 2022)*

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*Due to ACS office closures during the COVID-19 pandemic, the Trauma Educations Program team was unable to take an in-person group photo and was instead brought together digitally, as so many things have been during this time!

2021—THE YEAR OF THE ZOOM TEAM

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