

Crises and War: Stepping Stones to the Future

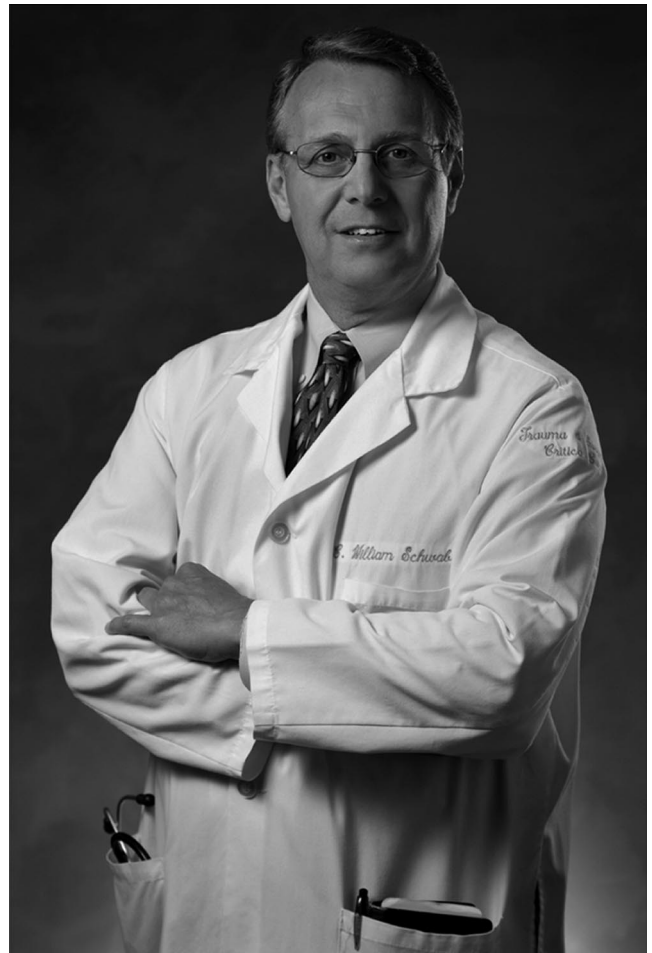
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It has been an honor and pleasure to serve as your President, and my affection for the American Association for the Surgery of Trauma (AAST), its traditions, and you, its members and supporters, has been central to my actions. To be recognized by my peers and given the responsibility of leading is my greatest honor, and I thank you for this.

This is a time of great significant crisis and need for change in injury care, science, and prevention, bringing with it a call to action for all of us in the AAST. In the face of this, I am grateful to the wisdom and contributions of those who have held this office, as well as the many contributions and advances by our membership. As I look to the future, I am inspired by the devotion and energy of those who will follow in this office, and assured by the quest for excellence of our members in all their pursuits. I believe the AAST is the most revered trauma surgical organization on our globe and through its renowned excellent communication vehicle, the *Journal of Trauma*, will continue to use its collective expertise and energy to focus on the care of the injured here in North America, but also take on this struggle globally, with great vigor. The goals for this organization for the next decade should be lofty, and outcomes from our actions should be measured by how we affect the world's most needy, the sick and injured of the poorest of our nation and of the world's developing countries.

We have come to live in a global community, and that community seems to be in a situation in which the crises outnumber the calm, where problems contradict our best plans, complaints are louder than praise, criticisms prevent contributions, conflicts overpower compromise, and stalemates win over solutions. Trauma surgery seems to be no different; our crises are numerous and our future is stalled. In this address, I want to discuss what I think are the most important challenges we face today: a set of inter-related and complex problems that require our full focus and energy if we



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are to accomplish those goals. We face a crisis in emergency care, one exacerbated by issues of supply and demand and with specific needs for considering acute care surgery, disaster preparedness, and globalization. Together we need to look forward and to incorporate key advances and successful models to create our vision of the future.

The history of trauma surgery at Penn began decades ago with I.S. Ravdin, Jonathan Rhoads, and especially Bill Fitts. These men and others from Philadelphia stimulated the modern movement in trauma care and were pivotal in the creation of the AAST and the American Trauma Society, and in strengthening the Committee on Trauma. This group of extraordinary people and their legacy planted and nurtured the seeds for injury care at the University of Pennsylvania; in

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1987, this remarkable but all-but-forgotten history is what attracted me to Penn and its hospital. During the first years at Penn, there were only a few of us and even fewer patients. Mike Rotondo, Don Kauder, and Mike McGonigal did phenomenal work in Philadelphia before moving on to different chapters of their lives. Were it not for their mentoring, coaching, and subtle “walks”, our programs at Penn would not be where they are today. In addition, our nurse partners, Kathie Martin and Mary Kate FitzPatrick, helped build these services and programs and deserve my deepest appreciation.

The Penn faculty and fellows have been the catalysts and shining lights of progress at our center, and their contributions on behalf of the critically ill and injured are too numerous to count. The 70 fellows who have trained with us over the last 17 years delivered the very best of care under conditions that at times were more like the third world rather than an American university hospital. Their untiring devotion to those less fortunate was and is today an inspiration to all. But most important, their constant presence reminded us that we are teachers responsible for guiding young people with inquisitive minds to heights that we ourselves cannot reach. As I look at you all, I am humbled by your accomplishments and the places to which you have soared.

Last, my comments about my family, and especially Margie, are so personal and intense that I would flounder and not recover if I went to those places in my heart. Suffice it to say that words cannot describe my feelings nor the joy and love I feel as I look down at you today or remember our times together over the last 40 years.

CRISIS: EMERGENCY CARE

We can no longer ignore the growing crisis in emergency care. In June of this year, four decades after the publishing of “Accidental Death and Disability, the Neglected Disease in America,” the National Academy of Science and Institute of Medicine (IOM) published a three-part report on the Future of Emergency Care (Fig. 1).¹⁻³ This 2 ½-year effort was the largest undertaking by the IOM and was, by some measure, almost a problem too big to tackle. Different from the previous reports that dealt with injury, this report came in response to a crisis already a decade in the making. In 2001, the cover of *Newsweek* and the story presented substantiated that our emergency care system was gasping for air and on the brink of falling apart. The date of this was September 10, 2001 (Fig. 2).⁴ What happened to the world the next day, September 11, changed history and literally knocked the most significant crisis in healthcare from our attention. (In fact, September 11 should not be viewed as separate from the crisis for emergency care, but serves as a warning of future potential for catastrophe.) In the ensuing 5 years, the national crisis in emergency care did not go away; rather, it grew in size, complexity, and impact.

In 2003, 113.9 million people visited emergency and trauma centers. Statistically, about one-third of the United States’ population used an emergency facility in that year for emergent needs or because they could find no other way to receive care (Fig. 3).⁵ Twenty-four million were children and adolescents; 16 million patients, the sickest or most severely injured, came by ambulance. A half million ambulances were



Fig. 1. Institute of Medicine of the National Academies three reports on the Future of Emergency Care series. (A) *Hospital-Based Emergency Care: At the Breaking Point*. (B) *Emergency Care for Children: Growing Pains*. (C) *Emergency Medical Services at the Crossroads*.

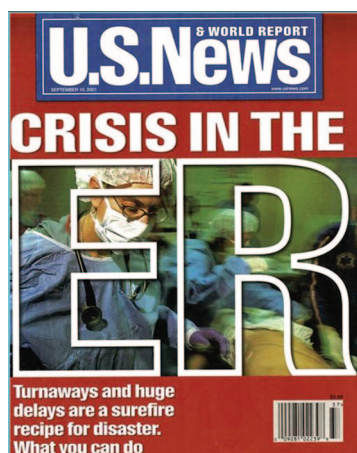


Fig. 2. The cover of US News and World Report, September 10, 2001. Crisis in the ER. (Copyright 2001, US News & World Report, L.P. Reprinted with permission.)

diverted at the rate of about one every minute. In 2001, 60% of all hospitals reported their emergency centers were at capacity, and this problem continues to worsen. Three quarters of all academic medical centers report crowding, and some were over capacity 40% of the time. The data on crowding, diversion, and workload over-capacity for our larger trauma centers is more worrisome. This logjam of our sickest patients is not portrayed in our health or medical journals, but rather appear all too frequently as stories of medical catastrophes in our newspapers and television documentaries. Our overwhelmed emergency system and its *inability* to act as our safety net jades each account of American

public safety, health, and medicine's reaction to catastrophes, whether natural or man induced.

Recommendation: Regional Emergency Care Systems

In 2003, as our committee began to analyze the staggering crisis in emergency care, it became apparent that there had also been some stunning successes in emergency care. The advancements in emergency medical services, development of emergency medicine, and establishment of trauma surgery as a discipline and trauma centers as high-quality verified facilities dedicated to the care of the most severely injured were stunning accomplishments. In addition, we found that emergency departments and trauma centers had become the largest portal of entry to American hospitals, and accounted for over 40% of all hospital admissions. But the committee found the key to the future in the model of the regional trauma system. This trauma model, based on national standards, verification of performance and constant improvement mandated for all components and personnel, was adopted as the principal vision.⁶⁻⁹

These regional emergency systems would be built on evidence-based practices and meet national standards for all providers and system components. They also would be coordinated throughout all regions and across geopolitical boundaries to assure optimal utilization of all resources. They would be verified and accredited with processes for strong performance improvement at all levels to assure the public of quality outcome, safety, and improvement (Fig. 4). In achieving that vision, many important recommendations were made. The report directs the Council on Medical Service/Medicare

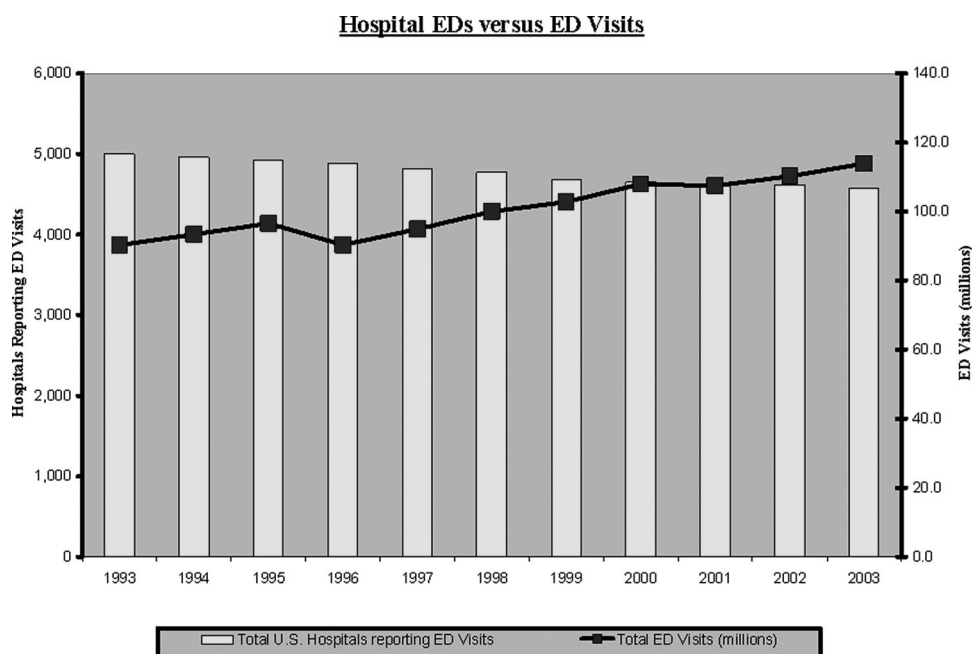
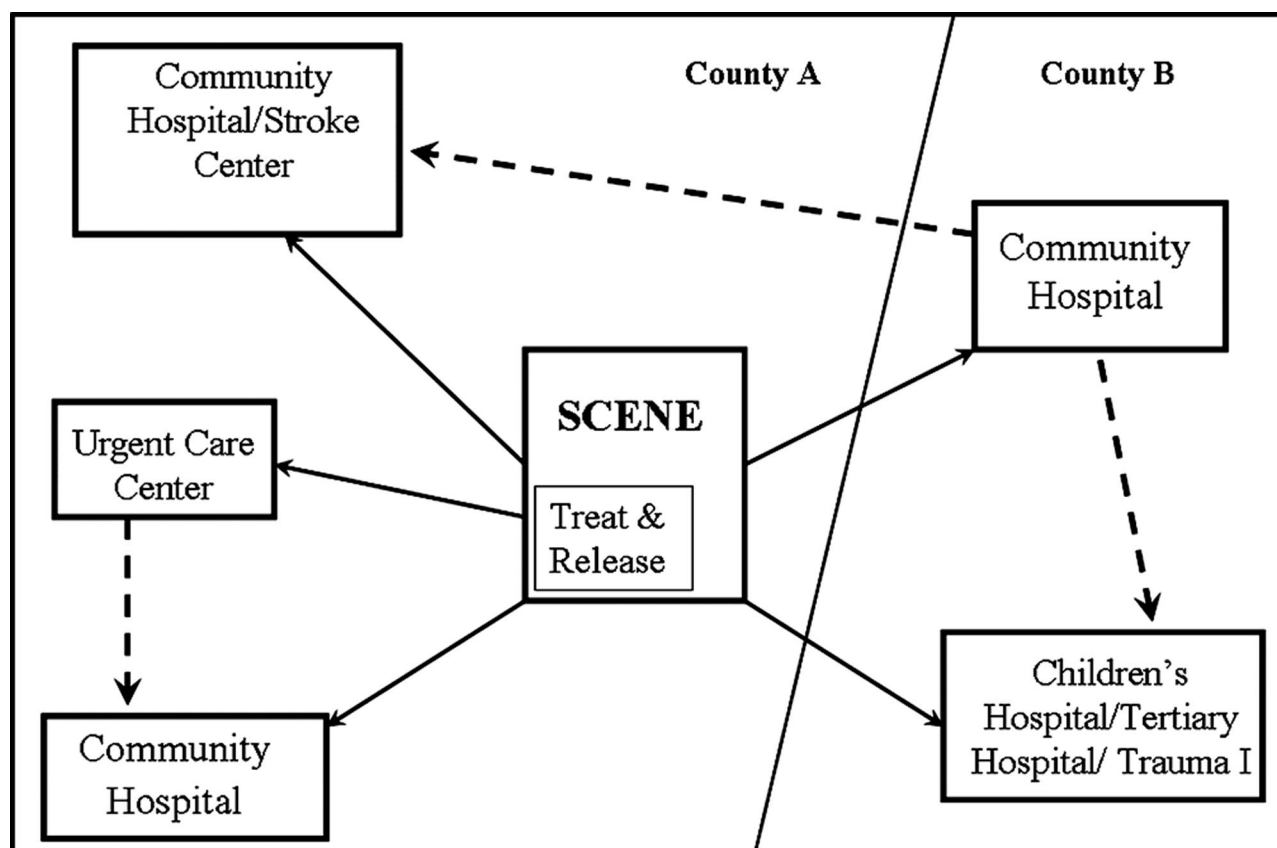


Fig. 3. Hospital emergency departments versus number of visits. (Reproduced from the IOM report: Hospital-Based Emergency Care: At the Breaking Point. From the American Hospital Association Annual Survey Database and National Hospital Ambulatory Medical Care Survey, 2005.)



Service Configurations in Regionalize Systems

Hospital Based Subcommittee Report

Fig. 4. Service configurations in the regionalized emergency care system of the future. This illustration of potential transport options shows that the basic emergency medical service system is not altered. Refined protocols will ensure that the patient goes to the optimal facility given the type of injury or illness, the travel time, and facility status (e.g., emergency department, operating room, and intensive care unit bed availability). Over time, based on the evidence on the effectiveness of alternative delivery models, some patients may be transported to nearby urgent care centers or treated on the street and released. Whichever pathway the patient follows, communications will be enhanced, data collected, and performance of the system evaluated and reported to assure on-going improvement. (Modified from the IOM report: Hospital-Based Emergency Care: At the Breaking Point.)

and the third party payers to re-examine the funding for emergency care. It calls for money to offset losses from uninsured care and immediate action for funding pilot projects and to establish best practices. It directs government to change the Emergency Medical Treatment and Active Labor Act and to recognize and embrace the fact that emergency and trauma care are unique parts of medicine and public safety and key for disaster response, and therefore require a single lead agency in the Federal government. The recommendations call for Congress to study the workforce needed to assure future emergency and trauma care delivery, and it directs distinct funding for emergency and trauma research and injury control coordinated through a dedicated national center or institute. The IOM report is comprehensive and provocative, and the recommendations are well supported.

Next Steps

Implementing the recommendations will take sustained leadership and strong advocacy, diplomacy, and energy. Most of the recommendations are very doable and, when one steps back and examines the details of the solutions (though they are many), they can be accomplished. The AAST and other societies whose constituency render emergency and trauma care have an obligation to demand these solutions. New national, state, and community policy about emergency and trauma care need to be created and action plans need to be initiated. Without our strong advocacy, change will not occur, and the crippled emergency care system, being sustained by the sheer will of the professionals that work within it, will break down entirely.

Earlier this year, I asked Len Jacobs, the Chair of our Legislative Committee, to convene a group to critically review the report and bring back to the AAST an objective assessment of the how the findings and recommendations of the IOM affect surgeons and, very selfishly, the AAST. That task force wholeheartedly endorsed the IOM's conclusions and affirmed that, as trauma and emergency surgeons, we are major stakeholders in the arena of emergency. Secondly, the AAST should use the report as an opportunity to partner with other stakeholders in emergency care and drive home the central message: to quickly re-engineer emergency care and compel government and others to provide the necessary resources to do so. Another strong recommendation was to accelerate the development of acute care surgery as a means to offset the spreading shortage of surgical workforce that is being experienced by emergency departments. Lastly, they recommended that we quickly position surgical leadership at the table with those struggling to solve the emergency care crisis and that, as a learned surgical body, knowledge of the report's content arms us with information and gives us the authority to insist on change at all levels.

WORKFORCE HERE AND ABROAD

Crisis: Growing Shortage of Surgeons for Emergency Care

The shortage of surgeons to provide emergency care needs our utmost attention. It is a key element that, if not addressed, could prevent any progress. The *Hospital-Based Emergency Care at the Breaking Point* volume provides some detail about this increasing dilemma.³ However, that volume and the cited work look at these surgeon shortages from the specialist surgeon's point of view and not from data on emergency patient needs. In two recent surveys of emergency departments nationwide, two-thirds to almost three-quarters report worrisome shortfalls in specialists, especially surgical specialists.^{10–16} One fifth of emergency department staff said they would seek care at another hospital because of the lack of a specialist on staff. Of all specialties, neurosurgery appears on the surface to be in shortest supply.^{17–21} The bigger problem, however, defined by sheer numbers of why people come to an emergency facility, lands squarely on the back of general surgery or, more correctly, trauma and emergency surgeons. Though I am going to confine my comments to general surgery and trauma and critical care surgery, some comments describe and relate to the general orthopedists and the challenges they face with an ever increasing workforce of specialist and super-specialists, many of whom, like us, are opting out of emergency work.²²

At present, the problem of medical workforce for America is daunting and at a complexity that few understand; predicting the future is even more difficult.^{23–31} Fewer young people are interested in a career in medicine. Were it not for the increased matriculation of women, the future workforce of physicians might be decimated. (Salsberg, E. Physician workforce issues and trends: implications for surgical spe-

cialties. Presented at ACS Emergency Workforce Meeting, Chicago, Illinois, March 2005).

For general surgery and trauma surgery, the picture is grim. Though a slight rebound was seen last year, the number of physicians finishing general surgery training and practicing general surgery is at an all-time low and decreasing annually.^{25,32} Some 70% to 80% of all general surgery chief residents enter fellowship training and thereafter narrow their practices to a single area of surgical focus. Few remain in the "core" of general surgery practice and quickly lose their comfort in emergency general and trauma surgery.³³ No one has begun to look at the future effect of emergency coverage beyond estimating gross numbers, and few can predict with certainty the effect this will have on the quantities of individual surgical specialists. All analysts predict a shortfall. Adding the current shortage and the projections of what Americans will need in 2025 as we cope with the 70+ million Baby Boomers, some futurists forecast a full-blown catastrophe in our surgical workforce. Besides the compounding problem of not enough doctors being produced and the increasing care needed for the aging population of America, a third trend may further limit size of the "working" medical workforce. After the doctor boom of the 1970s and early 1980s, the "Boomer" physicians are likely to begin to retire soon and at an unprecedented rate.^{24,34,35} Currently, the average age of retirement in the American College of Surgeons is 62, and if that holds true for the first wave of Boomers, some 800 to 1,000 general surgeons may begin to retire in 2008 or 2010 and annually thereafter (Fig. 5). (Personal Communication: Collicott, P. ACS Surgeons by year of birth. August 2006). Many of these surgeons practice broad-based general surgery in communities where they are the backbone of emergency surgical response. More importantly, the effect on removing large numbers of our elders from the medical and academic ranks could result in a scarcity of educators, administrators, role models, and long-term leaders. Sage advice, wise counsel, and the "wisdom of the years" in the foundation of all surgery and general surgery may be a limited commodity in the near future.

The reasons for the near death of the broad-based specialty of general surgery are many and have been well articulated in the past. Medicine in the later 20th century rapidly changed and demanded ever-increasing complex operations to care for more complex diseases and correct more challenging pathology. With the evolution of specialization beginning in the 1920s and increasing exponentially in the last 20 years, more surgeons responded and became focused on a single organ and even single operation practices. I am not critical of this. I would seek one of these very busy, highly focused surgical specialists in a second for my family and seek their solution to the problem. *They are great at what they do but can only do what they can.* However, the demands of this type of surgical practice leave little focus or interest in emergency surgery, and the general surgical skills honed during surgical training and the confidence to handle a myriad of different

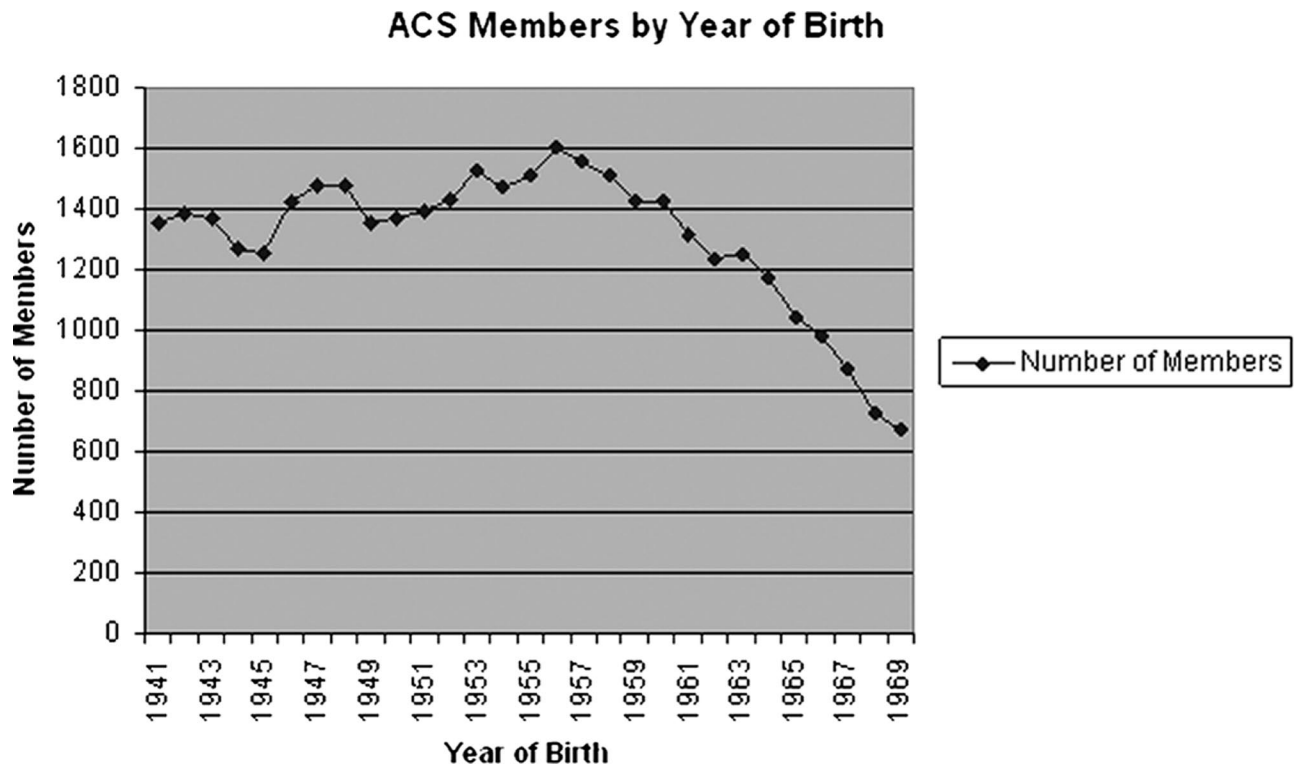


Fig. 5. The “Boomer” surgeons are shown here in the circle and represent the number of general surgeons/Fellows of the American College of Surgeons by year of birth. (Data supplied by Paul Collicott MD, FACS, and ACS staff.)

surgical problems will soon fade. Many of these specialists even claim they are no longer qualified to render emergency general surgery and some actively seek removal from hospital emergency call rosters.

Recommendation: Increase Capacity for Broad-Based General Surgery

At the same time that surgery had to specialize, our leaders, most of whom were not involved or interested in emergency care, lost the vision for what most emergency patients need. A 2003 report on all emergency department visits shows that about 40 million patients came to an emergency department for an injury, approximately 35% of all visits.^{3,11} Injury is the largest problem that brings people into the emergency system. After injury, there is a wide range of medical problems. However, the third cause in frequency of emergency department visits is abdominal pain (3.9%) (Table 1).³⁶ Some crude math abstractions can predict surgical workload: 40 million for injury and 4 to 5 million abdominal problems or 45 million incidents. If merely 15% to 20% require the presence of a surgeon, 6 to 9 million surgical patient contacts must take place annually for these two problems alone. More comprehensively, common “surgical” afflictions requiring evaluation, management, and operation measure in the tens of millions in this country and perhaps number over 100 million worldwide. Most surgical problems that are common emergencies are dependent on timely, accurate, and urgent surgery for good outcomes.

Globally, the need to provide broad-based and skilled general surgery is as necessary as it is in North America. Recent reports from the World Health Organization, the World Bank, the National Institutes of Health, and the Forgy Center clearly show that, after communicable conditions (tuberculosis, human immunodeficiency virus, diarrheal diseases, childhood diseases, etc.) and noncommunicable conditions (malignancy, diabetes, cardiovascular, etc.), injury ranks third as a burden to low- and middle-income countries.^{37,38} Second, in evaluation of cost-effective strategies to address these problems, surgical services and emergency care rank near the top of the list with things like childhood immunizations, HIV/AIDS, and malaria treatments. The necessary surgical services to improve health in these countries and relieve human suffering are based on the same type of surgery that we are struggling to reinvent. Management of injury, burns, hemorrhage, surgical infections, perforated viscera, and fractures is necessary. In addition, providing these general surgery skills at smaller district hospitals in the appropriate countries seems to be able to provide the greatest good while also being the most cost effective and assuring for lowering the burden of avertable disease.^{39,40}

Next Steps: Acute Care Surgery

The AAST is proposing Acute Care Surgery as a way to enhance trauma surgery and provide emergency surgery.^{41–43} The IOM report specifically describes this “emergency sur-

Table 1 The 20 Leading Diagnoses for Emergency Department Visits*

Principal Reason for Visit	Percent (%)
Contusion with intact skin surface	4.2
Acute upper respiratory infections, excluding pharyngitis	4.0
Abdominal pain	3.9
Chest pain	3.7
Open wound, excluding head	3.6
Spinal disorders	2.5
Otitis media and eustachian tube disorders	2.3
Sprains and strains, excluding neck and back	2.2
Fractures, excluding lower limb	2.1
Open wound of head	2.0
Sprains and strains of neck and ankle and back	2.0
Acute pharyngitis	1.7
Urinary tract infection	1.6
Chronic and unspecified bronchitis	1.6
Superficial injuries	1.6
Cellulitis and abscess	1.6
Pyrexia of unknown origin	1.5
Asthma	1.5
Heart disease, excluding ischemic	1.5
Rheumatism, excluding back	1.5
All other	53.1
Total	99.7

In 2003, approximately 40.2 visits or 35.3% of visits were related to injury. About 70% of injury related visits were for unintentional injury, falls, unintentionally being struck by a falling object, motor vehicle crashes, and injuries from a piercing instrument. Five percent were intentional injuries including assaults and self-inflicted injuries. After injury the most common diagnosis among emergency department patients were acute upper respiratory infections (5.7%), abdominal pain (3.9%), chest pain (3.7%), and spinal disorders (2.5%). (*Reproduced from the IOM report: *Hospital-Based Emergency Care: At the Breaking Point*. From McCaig and Burt, 2005.)

gery specialist” as a promising development to address the workforce shortfall and, along with regionalization of specialty care, improvements in compensation, liability, and Emergency Medical Treatment and Active Labor Act reform seem to be key reforms to begin to address the emergency workforce issues.¹ The Acute Care Surgery model calls for developing a surgeon, built on the character of the old-fashioned general surgeon but fully equipped with the skills, knowledge base, and the expertise of the modern trauma, burn, and critical care surgeon. This would be a surgeon who is comfortable working in the emergency environment, who takes responsibility for all surgical emergencies, and in most cases is the definitive surgeon and intensivist. A number of articles document that acute care surgery has many features to make it attractive to younger physicians, as well as better efficiencies for managing the increasing numbers of the emergency patients.^{44–46} It also improves efficiency for surgeons in elective practices, is an excellent return on investment for the hospital; documentation of a higher quality of care and better outcomes for common emergency general surgical problems is beginning to appear.^{47–48} However, well

beyond “fixing” trauma surgery, this new paradigm begins to respond to the much bigger crises we face in assuring a future emergency surgical workforce.

My aim here is not to debate the pros, cons, or medical politics of bringing on a new surgical specialty. Nor is it to try and rationalize whether or not the acute care surgeon should have a scope of practice of the “European master” or a country hospital model.⁴⁹ In fact, having only one model of Acute Care Surgeon will be ineffective. Several models must be created based on patients’ needs and fitted to the logistical requirements of whether the surgeon practices in resource-rich or resource-limited environments. Logistics and need should drive the skill set and assure proficiency, not turf or opinion. Designed with flexibility, Acute Care Surgery has the potential to have widespread application in urban, rural, remote, and military environments. Designed correctly with very broad surgical skill sets, Acute Care Surgery may be how we and our European partners begin to develop a surgical workforce that can help the third world. Lastly, Acute Care Surgery may provide a home for developing the surgical organization and workforce for disaster and mass casualty readiness.⁵⁰

CRISIS: RESPONDING TO DISASTER AND MASS CASUALTIES

A year ago, as the IOM’s committee began its final preparations, hurricane Katrina struck the Gulf coast. Our committee struggled to determine if we needed to rethink the entire effort and refocus the report on how emergency systems should respond to disaster. What we found was that “emergency” could not respond and was not capable of even moderate surges in a sustained fashion. More sobering was how we responded in actual performance to disaster and catastrophes; our media caught us off guard time and time again. The briefings from Columbine, Oklahoma City, 9/11, and Katrina all showed us ill prepared and poorly trained and organized. Even after 9/11, most physicians were still not interested, and of the billions of dollars poured into Homeland Security, little went to emergency medical services or to hospitals; none went to surgical services.

RECOMMENDATION: MODEL FOR INVOLVING EMERGENCY CARE AND TRAUMA

The search to find a plan for disaster preparedness involving hospital-based physicians and surgeons does not exist. However, there is an excellent high-level blueprint for partnering the Departments of Defense, Homeland Security, and civilian emergency responders (defined as safety, police, fire, and prehospital emergency and rescue responders). The plan, created in 2004 for the National Research Council entitled the Command, Control, Communication, Computers, Intelligence, Surveillance and Reconnaissance, spends considerable time on high-level abstraction.^{51,52} It calls on the Army’s Northern Command to partner with civilian emergency response providers to collaborate, share, and establish

research; to develop and evaluate infrastructure in support of the emergency responder community; to find common areas of science and technology; and to establish joint operations. If it were expanded to include hospital-based resources and our trauma systems, this blueprint would be exactly what we need. However, had it not been for Dr. George Sheldon's review for the IOM, not a single physician would have seen it. (Personal Communication: Sheldon, GF. C4ISR Report, National Research Council 2004. August 2006). Perhaps having no representatives from medicine or health among the advisors was just an oversight, but it was a huge oversight. Our trauma systems provide coverage for over 80% of our population, and virtually all metropolitan areas have one or more trauma centers. Recent studies show how, with mere relocation of our vast medical helicopter systems to more peripheral areas of our densely populated areas, more Americans would have better access to trauma and other emergency care.^{8,9} Any disaster planning needs to embrace this vast system and include the surgeons—those that have the duty to care for the most severely injured. The need to have both broad-based general and orthopedic surgeons involved in disaster medicine is apparent in any historical review of catastrophes that left people alive.^{53–56} Our regional trauma centers and their leaders, along with those of Emergency Medical Services and emergency medicine (both adult and pediatric), must be a part of preparing America for the next catastrophe that comes to our shores or to our cities.^{1–3}

SUCCESSFUL MODELS AND APPROACHES: BATTLEFIELD MEDICINE AND COMBAT SURGERY

Are we correct about Acute Care Surgery? Do we have the correct answers for designing responses to mass causality and disaster? Let me turn to the current war in Iraq and, with this experience, provide some answers to these and other questions.

The history of war is the history of surgery and, pointedly, the absolute history of trauma surgery. In every war, surgeons have been profoundly influenced and changed by the human carnage and their despair of not being able to save lives. War is a laboratory of nightmares, but it precipitates, catalyzes, and creates new efforts to save lives, decrease suffering, and, more than any other recorded events in history, war has advanced the care of the injured.^{57–63} The current war in Iraq and Afghanistan is no exception and is generating new experiences in battlefield systems design, medicine, and combat surgery.⁶⁴

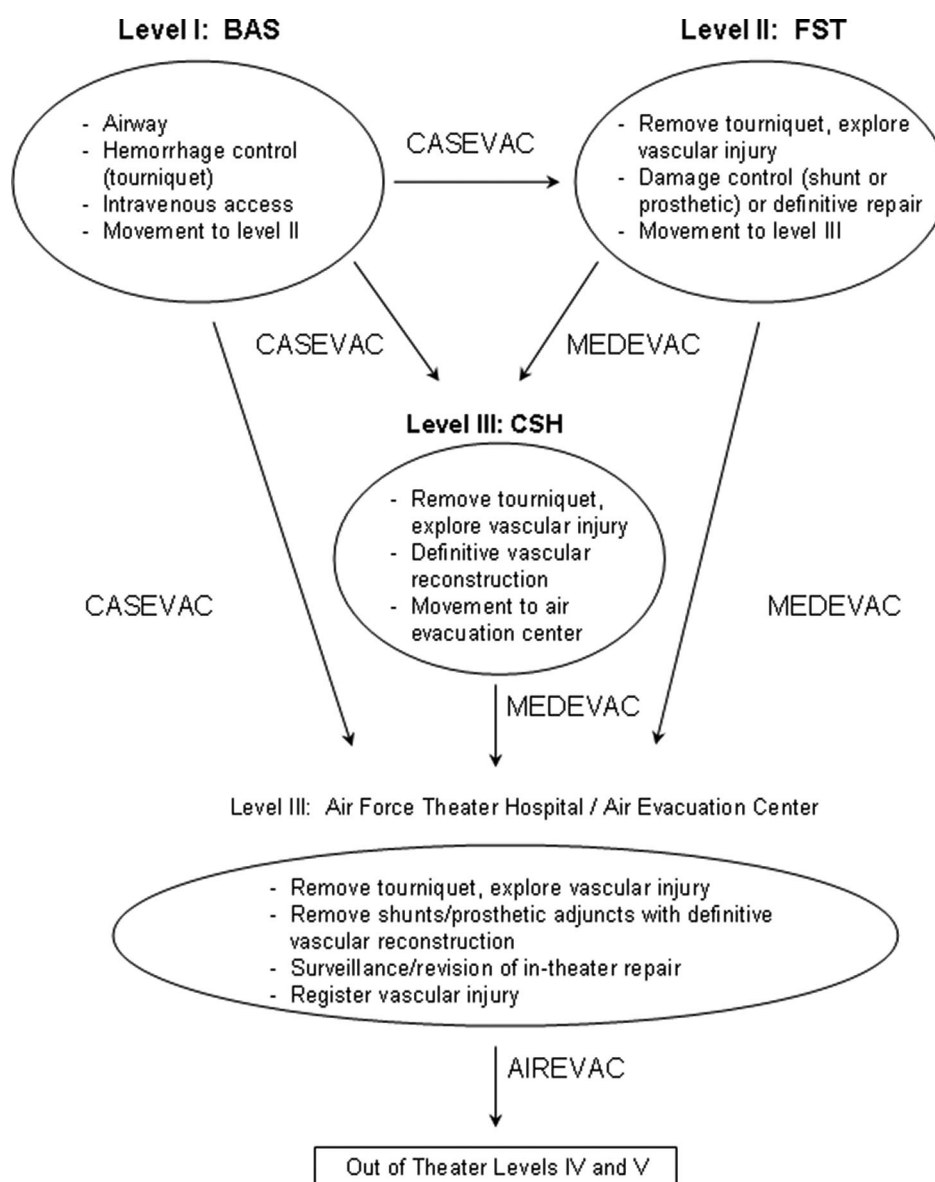
The military trauma system and the pivotal role of surgeons deserve serious consideration as proof that the solutions for the crises in emergency care and disaster response will work. The current military trauma system for Iraq is one of the progressive resources in echelons of surgical care.^{64,65} Each higher echelon is further away from the battle by some thousands of miles and is located in different countries. Each has more capability, surgical manpower, and nursing resources (Fig. 6). It places at the front forward surgical teams

with a surgeon alongside combat units like fast moving battalions and those at greatest risk of incurring casualties. Further back, or “down range”, are slightly larger casualty hospitals staffed with a surgeon, anesthetist, and usually an orthopedist. This model of progressive echelons throughout four of five levels is designed and adapted directly from our modern civilian trauma centers and systems. However, the system works on a worldwide platform and is joined together by highly sophisticated aeromedical transport. These Critical Care Air Transport Teams of the United States Air Force have recent experience with transporting tens of thousands of ill and injured soldiers intercontinentally. Never before have we had the ability to safely globally transport the most critically injured. Troops return to the United States within 4 to 5 days of wounding and, at Walter Reed, Bethesda, Brooke Army Hospital, or Wilford Hall, these soldiers and sailors have the access to all specialists and to their families.^{64–74} The mere fact that the American military can pull this off is historical if not astounding.

Each level of combat hospitals has different resources, but at the core is a general surgeon, at times partnered with a general orthopedic surgeon. Their caseloads vary but they function as partners in acute care management and within an overall medical philosophy of damage control to stabilize and then transport patients down range for more definitive care.^{67,71,74–79} These battlefield surgeons are generally young, with many recently out of residencies or fellowships. Most are not well prepared by their training to be combat surgeons. General surgeons “in country” are the general of general surgeons and must have expertise with a very broad range of surgical skills. They become *acute care surgeons* with minimal preparation and training and quickly find themselves dealing with extreme injury. When an orthopedist is not available, the general surgeon becomes the orthopedic trauma surgeon and, de facto (as there are so few neurosurgeons forward), the general surgeon is the battlefield neurosurgeon. On the battlefields in Iraq and Afghanistan, the Acute Care Surgeon is already the expectation (Tables 2 and 3).

The caseload of several of these surgeons validates these comments. (Personal Communications: [1] Pryor, J. General Surgeon Procedures: February–May 2006; Abu-Ghraib, Iraq. [2] Fernandez, F. General Surgeon Procedures: June–September 2006; Abu-Ghraib, Iraq. [3] Guy, S. Summary of procedures; Afghanistan, All (from September 2006). Though a few civilian trauma centers serve as training centers for Army, Navy, and Air Force teams, maintaining a continuous stream of combat surgeons remains a giant question for the military; its timely answer is critical to the well being of any future force.^{69,80–90} The solution may lie with us: those responsible for the civilian trauma and critical care training programs.

My visit to Landstuhl this summer and the extensive association we have with young surgeons serving recently in Iraq and Afghanistan confirmed the military's accomplishments. The medical successes on today's battlefield give us a



BAS, Battalion aid station; FST, Forward Surgical Team; CSH, Combat Support Hospital

Fig. 6. Echelons of care and the management of wartime vascular injury: a report from the 332nd EMDG/Air Force Theater Hospital, Balad Air Base, Iraq. (Adapted from Rasmussen, TE, Clouse WD, Jenkins DH, et al., *Perspect Vasc Surg Endovasc Ther.* 2006;18:91–99.)

vision and blueprint of how to build the future regional emergency care system and medical disaster response system. The current system shows how to successfully adapt, position, and coordinate resources of care under extremely hazardous conditions for large numbers of critically wounded. It demonstrates how to clear mass casualties from highly dangerous and unstable environments using an integrated system in which each echelon provides the minimal acceptable care before transport back to larger and better-staffed centers. The system should be adapted to our regional trauma systems as the model for disaster response and preparedness by federal and state governments. As important, these younger combat surgeons have showed us that surgeons broadly trained in the

care of all injury can get spectacular results under the most extreme conditions. They and their records prove that Acute Care Surgery works and needs to flourish as a new specialty.

STEPPING STONES AND THE FUTURE

I think there are solutions to the crises I have discussed and, combined with the achievements on the battlefield, they give us the stepping-stones to the future.

Step One: Regionalizing Care

Our urban trauma centers and academic medical centers with busy emergency and surgery loads should become the

Table 2 Caseloads of Two General Surgeons at a Combat Support Hospital (TF Med 344, Abu Ghraib Iraq, CSH, Level III) in Iraq During Two Different Timeframes*

General Surgeon Procedures	First Surgeon	
	MAJ Fernandez, June–Sept 2005 (n [%])	MAJ Pryor, Feb–May 2006 (n [%])
Abdominal	40 (27)	31 (26)
Soft tissue	40 (27)	26 (22)
Hernia/uro	20 (15)	N/A†
Thoracic	10 (7)	10 (8)
Breast, soft tissue mass	10 (7)	5 (4)
Head and neck (nontrach)	9 (6)	13 (11)
Head and neck (trach)	5 (3)	3 (3)
Vascular	5 (3)	6 (5)
Vascular access	4 (3)	6 (5)
Colorectal	1 (1)	11 (9)
Burn	1 (1)	9 (7)
Total	145 (100)	120 (100)

TF, Task force; CSH, Combat support hospital.

* The CSH surgical compliment for trauma during these times was a general surgeon and an orthopedic surgeon.

† No elective hernia cases.

Table 3 Caseload of Three Surgeons at a Combat Support Hospital (CSH, Level III) in Afghanistan for Two 5-Month Tours*

Most Common Procedures	N	Notable Procedures	N
Incision and drainage	325	Craniotomy	11
ORIF or external fixation	82	Tracheostomy or Cricothyroidotomy	12
Hand procedures	77	Amputations	82
Exploratory lap	75	Neck exploration	7
Skin graft	52	Splenectomy	7
Wound closure	37	Liver resection or repair	4
Dressing change	35	Vascular repair or reconstruction	7
Below knee amputation	31	Liver resection or repair	4
Closed reduction	30	Pulmonary lobectomy	2
Wound exploration	27	Labor and delivery	1
Colon resection	25	Thyroidectomy	8
Small bowel resection	25	Esophagectomy	3
Hernia repair	24	Ovarian mass removal	1
Appendectomy	22	Breast	
Amputation revision	20	Splenectomy	
Burn debridement	20	Breast	
Fasciotomy	19		
Colostomy	17		
Urologic reconstruction	14		

* The CSH surgical compliment for trauma varied but usually included one general surgeon, a cardio/thoracic surgeon and an orthopedic surgeon.

pivotal and key institutions in any model for emergency, disaster, and military training. The center of the IOM plan calls for regionalizing emergency and trauma care. Therefore, most of the serious emergency cases will be concentrated at these centers. The ability to integrate and adequately train large numbers of doctors, nurses, and allied health professionals at these regional centers seems apparent. These hospitals would gladly welcome the support, and many need the extra revenue that *might* be available from Defense and Homeland Security. These regional resource centers could provide curriculum for relearning, refreshing, and maintaining trauma and emergency skills. Reservists, National Guard, and rural emergency and trauma care providers could benefit greatly from periodic, concentrated “reserve weekends” at one of these hospitals. The curriculum could be developed to assure didactic and psychomotor skill proficiency; newer simulators for mass casualty could be included to optimize the experience, similar to that which has gone on in Sweden for a decade. In parallel, each state could house its disaster administration and training centers there and link with the key medical professionals in emergency medical services and emergency and trauma care. Programs that train trainers could provide courses for their local trainers, who would keep local communities proficient. If this model was designed on a corporate model with nationally created standards, measured outcomes, and the results disseminated to the public, most Americans would support this just to assure themselves of a true “safety net” in their own communities.

As a first step, supported by recent reports from Drs. Eiseman and Chandler, is to reactivate a civilian-military think tank and begin to address enhancing civilian-military partnerships.^{82,83} A key goal would be to establish quickly the value of the existing civilian-military training programs and to find ways to further partner our busiest and best civilian centers with the needs of the military for medical education, training, and skill maintenance at all levels. Using this partnership, I would hope to compel the disaster planners to the table and begin discussions as to how we can effect the necessary plans to incorporate hospital-based services and state and regional trauma systems.

Step Two: Increasing the Workforce

America must have a supply of emergency surgeons. The IOM’s future vision falls apart without a robust and constant surgical workforce. Without this, emergency centers and trauma centers will be further clogged and more ambulances on divert. Disaster response will be chaotic and care superficial without an adequate number of surgeons who are trained, willing, and able to respond. Creation of the training programs for the acute care surgeon is the next operational step for the AAST. More important is the establishment of this new specialty as a key and important specialty in medicine and surgery. To create this new discipline and assure its growth, we must take on the academic, scholastic, organizational, and operational leadership, as well as the training

aspects. There are few better to develop the research agenda, teach the next generations, run the systems, and respond and demand the changes that will be needed than those in this association.

Years ago, I thought that the recognition of only surgical critical care with a special certificate and no inclusion of trauma surgery was a mistake. We remain undervalued by our colleagues and our youth see so little good from what we do, in part because we lack a banner of legitimacy. We lack even the merit badge of achievement. Acute Care Surgery, like emergency medicine 30 years ago, will be a paradigm shift in medicine and will benefit many. Creating the specialty and giving it recognition, value, and stature, as we have for colon and rectal, vascular, pediatric, transplant, and others, is vital; we the AAST must make it a non-negotiable next step or award a special certificate ourselves.

We must create the home for emergency surgeons, the surgical hospitalists, and acute care surgeons in all environments and from all backgrounds. Rural, urban, community, military, or academic surgeons, trauma, general, and specialty surgeons committed to emergency surgical care must be represented by this society and together we must begin to re-engineer the AAST. We should not lose our traditions or the direction of our founding fathers. At the heart of it, we are all trauma surgeons and we should remain proud about that unique distinction and our character. However, a new AAST must emerge that embraces partnerships with those who do what we do, and who struggle as we do.

Step Three: Expanding Globally

I believe the AAST has a pivotal role and we have a unique opportunity and favored position to become a lead organization for global partnerships. We must extend our riches beyond these shores and begin to look at the needs of those less fortunate. Therefore, I think the AAST, through its foundation, should begin a dialogue with organizations interested in global health. Not only could our busy trauma and emergency centers be used as institutions for civilian, disaster, and military training, but these resources could be used to provide experience for qualified doctors and nurses from developing countries. Surgeons could compete for our trauma and surgical critical care fellowships, and at least currently there is plenty of capacity.⁹¹ As a first step, pilot projects should be created and we should work in earnest to seek funding and establish a model for others to use. Several of our members have already established these types of exchanges on a smaller scale. These should be analyzed and best practices applied to a model to promote widespread applications. Larger funding and international positioning would need to be realized, but the return on this investment and effort seems enormous for our global neighbors. I have asked Don Trunkey, as the President of our foundation, to begin this important dialogue with several international foundations and surgical leaders from other countries.

Step Four: Working Together Toward Solutions

Last, I strongly believe that the rhetoric dividing us should cease. Orthopedics is in a similar dilemma, and re-energizing the emergency orthopedist for the needs of our emergency, disaster, and military care systems is as necessary as re-engineering general, trauma, and critical care surgery. Neurosurgery does have an important place in trauma care and I appreciate the continual dedication and commitment of our neurosurgeons at Penn. Many of them, like us, continually respond at all hours of the night and day to a myriad of emergencies and provide excellent care; but there are just not enough of them to cover all the trauma and nontrauma emergencies. Most emergencies do not need the immediate presence of a neurosurgeon. More importantly, telemedicine, digital imaging, and miniaturization technology should allow the neurosurgeon “into” our trauma bays and operating rooms regardless of location. However, these colleagues need to embrace the need to better prepare all emergency surgeons for managing severe central nervous system injury, especially those in the military and those practicing remotely. We as a profession need to work together for solutions that benefit the patient, with an improvement in our standing coming second. The dilemmas we face are large and demand epic and new solutions. Together we are a powerful voice and can precipitate change. Separated and misaligned we seem as self-serving and out of touch with the needs of those in emergent need.

Can We Succeed?

These problems individually are complex and difficult. Collectively, they create a puzzle that appears unsolvable, with little hope for substantive change on the horizon. However, confidence and strength needs to come from our past and the success we have had in facing similar dilemmas. History confirms that we are complex problem solvers and capable of producing solutions. In 1966, when the Committee on Trauma and Committee on Shock of the National Research Council published *Accidental Death and Disability*, its humble language and recommendations precipitated a paradigm shift in emergency and injury care.⁹² It changed us from ambulance drivers to paramedics; first aid to advanced life support; funeral cars for transport to high-tech mobile intensive care units and helicopters; emergency rooms and interns to emergency departments and emergency medicine specialists; and accident wards to trauma centers and trauma surgeons. Looking back, this report embarrassed us, stimulated us, and brought out the best in us. The AAST and its leaders responded to the need of the emergency patient and in doing so bettered the world.^{93–95} *Accidental Death and Disability* was a call for change. *Accidental Death and Disability* and surgeons hardened on, changed by and confident from the battlefields of other time were the instruments of change. They included Farrington, Tommy Thompson, Davis, Freeark, Shafton, Cleveland, Wolferth, Pruitt, Rich, Shel-

don, Collincot, Trunkey, Carrico, Flint, and many more. They changed emergency and trauma care and they created us.

The work of caring for the emergent and injured patient will never cease; to be injured will always be high on the list of man's afflictions. This 2006 report of the IOM, like *Accidental Death and Disability*, is a call for change, and it needs our response. The "fix" rests firmly on our shoulders. Within our control are the trauma systems of this country: effective, proven, and now embraced as the model of the future to deliver all emergency care. Within our sight is the birth of a new specialty, a first of many steps that will lead to the next chapter of how we lower the toll of death and disability here and throughout the world. Within our grasp is the power to change disaster readiness and response. And within our membership is a new generation of surgeons who, returning from battle, will insist on improving the care, the centers, and the systems dedicated to the trauma and emergency patient, just as our teachers did 40 years ago.

I hope that history will record that the challenges and crises of today did not go unanswered. Rather, they propelled each and every one of us to respond with clear thought and bright solutions. The world awaits a response, but the making of history awaits our actions.

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