Acute Care Surgery: Quo Vadis?

Erik Hasenboehler MD
Acute Care Surgery UK
Acute Care Surgery

- ACS Swiss Model
- ACS Model in Other countries
- What is ACS?
- The journey to ACS
  - Changes
  - Generations
- Current Status of ACS
- Training Model
Old vs New GS Swiss Model

- 5-7 year residency >> now ?yrs. residency (45hrs week)
- Residency training at 2 or more hospitals, with minimum of 2 years at a University Hospital
- Graduation upon completion of 1250 cases (minimum)
  Now 550 cases (minimum)
- Written board and oral board exam
Additional Training

- Subspecialty after GS residency
  (VS, Abdominal Surgery (CRS, HBS, MIS), HS, GSTS)
- Additional 2-4 years, or more
- Completion of additional surgical cases (800-1500 cases)
- 1500 cases for GSTS subspecialty including 650 ortho trauma cases
- Graduation with oral and practical (2 surgical cases) examination and grand rounds presentation
Swiss Trend

- Less Swiss interested in GS residency >>>>> same for other European countries

- More foreigners interested in Swiss GS residency >>>>> **same** work load for **more** money (average PG1 salary $85,000/year)

- Swiss GSTS (AKA German Traumatologist) disappearing

- CCS “lost for a better cause” >>>>>>>>> Anesthesia and PCC

- Interest to integrate the subspecialties into residency

- Orthopaedic Trauma drifting towards Orthopaedic Surgeon

- GSTS attempt to survive with training redesign and new name >>>> From Swiss Society for General Surgery and Trauma Surgery to Swiss Society for General Surgery and Traumatology (aka ACS)

- You can decide which direction: If you pick Traumatology >>>> 2 more years of Ortho residency to obtain OBC is **SUGGESTED**
The Finnish Model

- 6 yr. residency in general surgery with training in orthopedic surgery
- If desired an additional two-year fellowship in gastroenterological surgery, urology, plastic surgery, orthopedic surgery
- 1999 change with reduction of subspecialties into main specialties reducing the duration of all training programs
The Finnish Model

- Common core program of 3 years to familiarize the resident with basic surgical techniques

- After the common core period 3-years in a university hospital in one specialty: GES, CTS, VS, US, OS, TS, HS, PLS, PDS and GS.

- Current trend: interest to form ACS subspecialty because lack of emergency surgeons
  (Trauma currently led by Ortho Trauma and subspecialties)

SIMILAR MODEL AND TRENDS IN NORWAY, SWEDEN, HOLLAND, BELGIUM, GERMANY
The Brazilian Model

A6-ICU

Air Ambulance

What is Acute Care Surgery?

A response to a need
“……. The term used to designate the operative and medical management of acutely ill surgical patients coming to the hospital with unscheduled insults from a variety of mechanism including trauma, burns an acute condition on the abdomen or necrotizing soft tissue infection.”
William S. Halsted (1852–1922)

"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".

To paraphrase "the key to good [emergency] patient care, is to actually care for the [critically ill] patient".
RECRUITMENT OF SURGICAL residents into surgical critical care (SCC) and trauma fellowships has become increasingly difficult, leading to staffing concerns.

Reasons: lack of performing operations, poor reimbursement, too much night work, and absence of prestige.
What is Acute Care Surgery?

A RESPONSE TO A NEED?

- 360° Comprehensive Care
- 24/7 Coverage
- Broad-based surgical and critical care skills
David Lingle is one of two surgeons at Shore Memorial Hospital in Nassawadox, Va., which had seven a decade ago. The lack of surgeons has hit rural hospitals hard.
### Numbers of General Surgeons and General Surgeon to Population Ratios by Location Category, 1981-2005

<table>
<thead>
<tr>
<th>Category^a</th>
<th>1981 (N=17394)</th>
<th>1991 (N=17757)</th>
<th>2001 (N=17922)</th>
<th>2005 (N=16662)</th>
<th>Change, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall US</td>
<td>17394 7.68 (7.44-7.91)</td>
<td>17757 7.04 (6.79-7.29)</td>
<td>17922 6.29 (6.05-6.57)</td>
<td>16662 5.69 (5.46-5.93)</td>
<td>-25.91</td>
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<tr>
<td>Urban^c</td>
<td>14220 8.04 (7.76-8.33)</td>
<td>14667 7.31 (7.01-7.62)</td>
<td>14749 6.46 (6.16-6.79)</td>
<td>13792 5.85 (5.58-6.13)</td>
<td>-27.24</td>
</tr>
<tr>
<td>Rural^c</td>
<td>3135 6.36 (6.12-6.60)</td>
<td>3054 5.99 (5.78-6.20)</td>
<td>3173 5.62 (5.39-5.86)</td>
<td>2870 5.02 (4.79-5.23)</td>
<td>-21.07</td>
</tr>
<tr>
<td>Adjacent rural</td>
<td>1603 5.97 (5.69-6.25)</td>
<td>1523 5.38 (5.12-5.65)</td>
<td>1571 4.95 (4.67-5.25)</td>
<td>1428 4.43 (4.13-4.73)</td>
<td>-25.80</td>
</tr>
<tr>
<td>Small nonadjacent</td>
<td>671 5.15 (4.75-5.55)</td>
<td>700 5.45 (5.06-5.82)</td>
<td>699 5.01 (4.60-5.43)</td>
<td>604 4.31 (3.94-4.69)</td>
<td>-16.31</td>
</tr>
</tbody>
</table>

Abbreviation: CI, confidence interval.

^a See the “Location Classification” subsection in the “Methods” section for definitions of the categories.

^b Number of general surgeons per 100,000 population.

^c Alaska is not included in the overall US rural and urban counts and ratios, 1981 and 1991.
Shortage of General Surgeons

- 2020: Shortage of 86,000 US physicians (>30%)
- Population increases 30Mill / 20 yr
- 1981: 7.68 surgeons / 100,000
- 2005: 5.69 surgeons / 100,000
- PA, RN can partially compensate this
- Shortage of 1,300 GS by 2010

- ACGME Physician Workforce Policy Guidelines for the United States 2000-2020
- Population Analysis predicts a future critical shortage of general surgeons SURGERY 2008
People live longer creating a rising demand for ES!!!
Since 2000, dramatic increase in specialty training applications and programs

70-80% of “General Surgeons” go on for specialty training
Total number of residents enrolled in Critical Care fellowship training programs in the US by year.
Number of positions filled in critical care fellowship training programs in each specialty by year over the last decade. From: http://www.acgme.org/adspublic/
Match results for Surgical Critical Care Fellowship

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Applicants</th>
<th>Number Matched</th>
<th>Number of Positions</th>
<th>Number of Programs</th>
<th>Unfilled Programs</th>
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<tbody>
<tr>
<td>2004</td>
<td>61</td>
<td>58</td>
<td>117</td>
<td>68</td>
<td>41</td>
</tr>
<tr>
<td>2005</td>
<td>66</td>
<td>58</td>
<td>122</td>
<td>65</td>
<td>40</td>
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<tr>
<td>2006</td>
<td>77</td>
<td>70</td>
<td>136</td>
<td>72</td>
<td>39</td>
</tr>
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<td>2007</td>
<td>75</td>
<td>66</td>
<td>138</td>
<td>74</td>
<td>52</td>
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<tr>
<td>2008</td>
<td></td>
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</tr>
</tbody>
</table>

*Began participation in the SMS for appointment year 2005.*
More and more surgeons are narrowing their practice

More general surgery residents pursue subspecialty training

Surgical specialists may no longer feel qualified or confident to perform general surgical procedures needed in the ED

Specialists may refuse to take emergency call

Specialists may take much longer to perform surgical procedures that they no longer routinely perform.

Patient safety is a real concern
Surgical Training Time

- College +4yrs
- Medical School +4yrs
- General Surgery Residency + 5 yrs
- Post-graduate fellowship (90%) +1-4yrs

General Surgeon = 13yrs minimum
Core Gen Surgery Specialist = 14-18yrs

Surgeons begin their careers: Age 32 to 40
Will Future Surgeons Be Interested in Trauma Care?
Results of a Resident Survey

J. DAVID RICHARDSON, MD, AND FRANK B. MILLER, MD

- Level of interest in the field of trauma
- 1795 senior GSR surveyed
- 49% response
<table>
<thead>
<tr>
<th>Positive Factors</th>
<th>Negative Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exciting/challenging</td>
<td>Lots of work with few cases</td>
</tr>
<tr>
<td>Enjoy trauma surgery</td>
<td>Lots of night work</td>
</tr>
<tr>
<td>Provides cases as practice grows</td>
<td>Not much elective cases</td>
</tr>
<tr>
<td>Challenging science</td>
<td>Poor Reimbursement</td>
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</table>

Will future surgeons be interested in trauma care? Results of a resident survey. Richardson JD, J Trauma 1992
<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is trauma an attractive career?</td>
<td>63</td>
<td>37</td>
</tr>
<tr>
<td>Are you interested in trauma care?</td>
<td>81</td>
<td>19</td>
</tr>
<tr>
<td>Are you interested in trauma as part of your surgical practice?</td>
<td>18</td>
<td>82</td>
</tr>
<tr>
<td>Willing to take IN-HOUSE call as attending?</td>
<td>22</td>
<td>78</td>
</tr>
<tr>
<td>Are you interested in a Trauma Fellowship</td>
<td>8</td>
<td>92</td>
</tr>
</tbody>
</table>

Will future surgeons be interested in trauma care? Results of a resident survey. Richardson JD, J Trauma 1992
General surgery model

Abdominal | Vascular | Cardiac-thoracic | Endocrine & Breast | Urology | Surgical oncology | Plastic & Reconstructive | Orthopedic | Minimal invasive

Subspecialty surgery model

Trauma and the acute care surgery model – should it embrace or replace general surgery? Soreide 2009 SJTREM
- 52-item questionnaire to members of AAST, EAST, WEST
- To investigate issues related to current and future trauma practice
- The average time in practice is 15 years and >80hrs/week
- Response rate 60%
<table>
<thead>
<tr>
<th>DISINCENTIVE</th>
<th>AGREEMENT (%)</th>
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</thead>
<tbody>
<tr>
<td>Poor reimbursement</td>
<td>75</td>
</tr>
<tr>
<td>Irregular hours</td>
<td>73</td>
</tr>
<tr>
<td>Inadequate operative practice</td>
<td>70</td>
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<tr>
<td>Lack of access to cases other than trauma and CC</td>
<td>60</td>
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</tbody>
</table>

Esposito T et al. J. Trauma 2006
<table>
<thead>
<tr>
<th>IMPEDIMENT TO TRAUMA CAREER</th>
<th>RANKING</th>
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<tbody>
<tr>
<td>Personal lifestyle issues</td>
<td>1</td>
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<tr>
<td>Length of training</td>
<td>2</td>
</tr>
<tr>
<td>Scope of practice</td>
<td>3</td>
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<tr>
<td>Income</td>
<td>4</td>
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<tr>
<td>Medico legal risk</td>
<td>5</td>
</tr>
<tr>
<td>Malpractice premium cost</td>
<td>6</td>
</tr>
<tr>
<td>Professional respect</td>
<td>7</td>
</tr>
<tr>
<td>Disruptive nature of trauma care</td>
<td>8</td>
</tr>
</tbody>
</table>

Esposito T et al. J. Trauma 2006
# Ideal Practice Characteristics

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>RANKING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guaranteed appropriate salary</td>
<td>1</td>
</tr>
<tr>
<td>Guaranteed time away from work</td>
<td>2</td>
</tr>
<tr>
<td>Subsided ancillary benefits</td>
<td>3</td>
</tr>
<tr>
<td>More general surgery</td>
<td>4</td>
</tr>
<tr>
<td>Less night call</td>
<td>5</td>
</tr>
</tbody>
</table>

Esposito T et al. J. Trauma 2006
Conclusions:

1. Trauma surgeons felt that the discipline must change to remain viable

2. Change should entail broader training to allow more procedures in trauma/ES/CCS and EGS

3. Predictable lifestyle and guaranteed salary commensurate

4. In house call viewed favorable

5. Inclusion of selected emergency orthopedic and neurosurgical procedures are viewed favorably

6. Increase public perception and value of trauma surgery’s to society
Operative experience of residents on trauma services over 2 years

82 trauma centers included

The included centers represent over 247,000 trauma admissions

The majority of trauma centers (65.9%) had > 80% blunt injury.
24.2% performed no U/S, and 47.0% performed fewer than two U/S / month

3.8% performed no DPL and 66.7% performed fewer than two per month
Conclusion

1. Assuming 1 night in 4 on call, the average surgical resident training at a trauma center with > 80% blunt trauma has the potential to participate in only 15 trauma laparotomies, 6 diagnostic peritoneal lavages, and 45 ultrasound examinations per year.

2. Surgical resident experience on most trauma services is heavily weighted to non operative management.

3. These data have serious implications for resident training and recruitment into the specialty.
What can we conclude here?

- More operations are needed for future “trauma surgeons”
- The practice models need to be better defined
- Better role models
Operative vs non-operative management

- Trauma
  - <5% (Intensive care monitoring, Interventional radiology)

- Emergency conditions
  - ~30% (ICU or intermediate care, drains & tubes, antibiotics)

- Non-emergent (elective) conditions
  - ~65% (unfit surgical candidates)

Trauma and the acute care surgery model – should it embrace or replace general surgery? Soreide 2009 SJTREM
Trauma and the acute care surgery model – should it embrace or replace general surgery? Soreide 2009 SJTREM
More operations ...

- Wrong goal
- More important to address unmet patient needs – lack of surgeons
- A clear development of the Acute Care Surgery concept
- Most obvious population is the emergency general surgery patient
Operations for trauma decreased in 2002 compared with 1999, despite a higher number of penetrating injuries and total trauma contacts.

Non trauma general surgery operations performed by trauma faculty increased in proportion to coverage provided by the trauma service.

In 2002, 57% of all cases performed by trauma surgeons were emergency general surgery, which accounted for 32% to 74% of an individual surgeon’s caseload.
**Figure 1.** Total operations by trauma surgeons per year. EGS, emergency general surgery. Black bars, EGS; gray bars, trauma.
Figure 2. Emergency general surgery operations, 1999–2002.
All admissions 7/1/2000 – 6/30/2003

N = 9405 admissions

July 2002 EGS separate service

A decrease in trauma operations was offset by an increased EGS operative volume

EGS patients were often sicker with more than 50% requiring ICU admission
FIG 2. Operations over the three study periods. ■ - trauma, ◆; - general surgery, ○ - EGS. This shows that both GS and EGS operations increase whereas trauma operations decrease over time.
Results: Ten thousand six hundred fifty-four cases were analyzed for 14 graduates. Mean cases per resident was 432 ± 57 in PGY-4, 330 ± 40 in PGY-5, and 761 ± 67 for both years combined. Mean case volume on ACS for both years was 273 ± 44, which represented 35.8% (273 of 761) of the total experience and exceeded all other services. Residents averaged 8.9 cases per week on the ACS service, which exceeded all other services except private general surgery, gastrointestinal/minimally invasive surgery, and pediatric surgery rotations. Disproportionately more head/neck, small and large intestine, gastric, spleen, laparotomy, and hernia cases occurred on ACS than on other services.

Conclusions: Residents gain a large operative experience on ACS. An ACS model is viable in training, provides valuable operative experience, and should not be considered a drain on resident effort. Valuable ACS rotation experiences as a resident may encourage graduates to pursue ACS as a career.
Surgical Resident Perceptions of Trauma Surgery as a Specialty

Lejla Hadzikadic, MD, MSc; Peter A. Burke, MD; Thomas J. Esposito, MD, MPH; Suresh Agarwal, MD

- 6006 residents identified through ACS database
- Academic, urban and Level 1 TC Residency
- 21 questions E-Mailed survey
- 20.1% response rate
- Midlevel resident most respondents
Most undecided on career >>>> planning GS practice

- 6% interested in Trauma Surgery
- 3.4% interested in SCC
- 1.2% interested in academic GS
Two Surveys e-mailed to SCC program director

First survey:
- First section about faculty at the institution
- Second section regarding the general SICU
- Third section to separate TICU

Second survey to elicit opinions from surgical intensivist about the ACS model
• Response from 57 of 87 programs
• 54 SCC programs at Level 1
• 2 were level II, and 1 was a non level center.
• 95% of trauma surgeons covered SCC: 10 wks/yr
• Mean (SD) of 6 (3) call nights per month >> 72% IHC
• 89% covered EGS when not on call
• 82% covered EGS when on trauma call.
• 70% SICU surgeons and 30% nonsurgeons (AN, PM, EM)
155 of 1100 members of the Surgery Section of the SCCM responded

<table>
<thead>
<tr>
<th>Questions</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<tbody>
<tr>
<td>The acute care surgery model compromises (would compromise) the care of</td>
<td>27.5%</td>
<td>32.5%</td>
<td>12.5%</td>
<td>22.5%</td>
<td>5%</td>
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<td>the ICU patients at my hospital because it has introduced (would introduce)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>new, time-consuming responsibilities.”</td>
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<tr>
<td>“The acute care surgery model takes (would take) time away from the</td>
<td>28%</td>
<td>32%</td>
<td>12%</td>
<td>22%</td>
<td>6%</td>
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<td>37%</td>
<td>10%</td>
<td>10%</td>
<td>9%</td>
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<td>35%</td>
<td>13%</td>
<td>20%</td>
<td>5%</td>
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<tr>
<td>trauma surgeon’s educational responsibilities.”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>“The acute care surgery model allows trauma/critical care surgeons the</td>
<td>3%</td>
<td>8%</td>
<td>7%</td>
<td>40%</td>
<td>42%</td>
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<td>opportunity to maintain surgical skills.”</td>
<td></td>
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<td>“The acute care surgery model is important financially for the trauma/</td>
<td>6%</td>
<td>14%</td>
<td>27%</td>
<td>31%</td>
<td>22%</td>
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<tr>
<td>critical care field.”</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>“The establishment of the acute care surgery model is important to the</td>
<td>8%</td>
<td>14%</td>
<td>14%</td>
<td>37%</td>
<td>27%</td>
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<tr>
<td>future of the trauma/critical care surgeon.”</td>
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### Questions

<table>
<thead>
<tr>
<th>Questions</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>“More residents will pursue careers in trauma and critical care with the addition of emergency general surgery (ie, with the implementation of the acute care surgery model).”</td>
<td>15%</td>
<td>13%</td>
<td>24%</td>
<td>33%</td>
<td>15%</td>
</tr>
<tr>
<td>“Implementation of the acute care surgery model will improve patient care.”</td>
<td>10%</td>
<td>10%</td>
<td>27%</td>
<td>35%</td>
<td>18%</td>
</tr>
</tbody>
</table>
Trauma Surgery Response

- American Association for the Surgery of Trauma (AAST)
- Committee on Trauma of the ACS, EAST, WTA
- Strategic planning meeting, August, 2002
- AAST to take the lead: ad hoc committee on the Future of Trauma Specialization
Goals

Develop a specialty that would:

- Best serve the needs of patients
- Offer an attractive, viable and sustainable career and lifestyle
- Be recognized by the public and profession as a valuable specialty
- Better define the “trauma surgeon”
- Provide a solid foundation of operative experience
Fellowship Training

- 2 years in length
- Follows certification in General Surgery
- Includes 9 months for RRC-approved Surgical Critical Care
- 15 months: advanced skills clinical training in operative skills in a competency based curriculum
- At least 12 months “Trauma-Emergency Call”
Model Fellowship Design

- 9 months Surgical Critical Care
  
  6 months trauma; 3 months other, e.g. burns

- 6-9 months advanced general surgery
  - 2-3 months vascular
  - 2-3 months thoracic
  - 2-3 months hepatobiliary/transplant/GI

- 2-4 months specialty surgery
  - Orthopedic trauma
  - Neurosurgery

- 2-5 months Trauma Service or electives
Accomplishments to date

1. AAST has the lead in developing this fellowship
2. A competency-based curriculum has been written
3. Advisory Council status has been obtained from the American Board of Surgery
4. Identified 25+ programs interested in providing fellowship training
5. Established match program (Surgical Critical Care)
6. Program requirements established
7. Program application forms available
8. Site visit committee established
9. Eight sites approved
10. Examination written, MOC sessions
Interested/Approved Sites

- U. Nevada - 1st
- U Colorado-Denver
- U. Pittsburg
- U. California Fresno
- UT Houston-Methodist
- Harvard/ MGH
- U. Connecticut
- Maryland Shock-T
- U. Florida
- U. Michigan
- UC-San Diego
- Emory
- Cook County/Rush
- UT Southwestern
- Michigan State
- Loyola
- USC
- UC-Irvine
- U. Pennsylvania
- U. Washington
- Vanderbilt
- Ohio State
- Miami Valley/Wright St
Acute Care Surgery

- A training program in trauma, critical care, and emergency surgery
- A focused practice and part of general surgery
- What general surgery used to be
- The need exists
- Fine tuning is necessary