TRAINING SURGICAL SPECIALISTS

THE FUTURE
PREDICTING THE FUTURE

It’s tough to make predictions, especially about the future.

_Yogi Berra_
FACTORS DRIVING CHANGE

DISCIPLINE RELATED

- Divergence of skill sets
- Expansion of the body of knowledge
- Diseased – based focus
- Volume – outcome relationships
- Hours restrictions require efficiency
FACTORS DRIVING CHANGE

INDIVIDUAL TRAINEE

- Economic
  - High debt
  - Adverse repayment schedules (too early, lengthy)
  - Decreased compensation

- The Time Factor
  - Entering training older
  - Lifestyle issues (Gen X, Y, Z, Next)
FACTORS DRIVING CHANGE

SOCIAL ISSUES
- Cost
- Quality
- Societal tolerance of care by trainees
FUTURE SURGICAL TRAINING

Proposed Schema for Restructured Surgical Residency Training

- Basic Surgery Core (2-3 yrs)
  - National Curriculum
  - Basic Surgical Skills
  - Professionalism, ethics, practice management

- Verification of Competence
  - (no certification)

- Research or Advanced Degree
  - (optional)

- Specialist in General Surgery* (3 yrs)
  - Urban Track
  - Rural Track

- Sub-specialist in Surgery* (3 yrs)
  - Cardiothoracic
  - Plastic
  - Vascular
  - Transplant
  - Trauma Surgery, Critical Care
  - Pediatric
  - Colo-rectal
  - Surgical Oncology

- Additional Fellowship Modules: HPB, Foregut, MIT/Laparoscopy, Bariatrics, Breast, Endocrine, Hand, Congenital Heart, etc. (optional)

- Research or Advanced Degree (optional)
  - Junior Faculty Appointment

*Leads to Board Certification

Pellegrini et al, Surgery, 2004
REQUIREMENTS

- General surgery
  - core knowledge—a new definition of a general surgeon
  - technical skills
  - general surgeon certificate
  - cannot claim to be specialists

- Speciality surgery definition
  - core knowledge
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  - Specialist surgeon certificate
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“The most difficult issue is to provide and alter the current curriculum of medical school and residency....”

“The challenge is to retain sufficient breadth of experience in residency to allow building on that experience in.....practice.....”

“A new concept of generalism is needed......It is unrealistic to expect a single physician to be knowledgeable of the expanse of medical information.”

Sheldon, Am Surg, 2007
CURRENT OPERATIVE TRAINING

Table 1  ACGME national case log data for overall number of cases (average per graduating resident) and breakdown in key major open case categories

<table>
<thead>
<tr>
<th>Variable</th>
<th>1999</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cases</td>
<td>966 ± 204</td>
<td>914 ± 164</td>
</tr>
<tr>
<td>Chief resident cases</td>
<td>251 ± 67</td>
<td>238 ± 64</td>
</tr>
<tr>
<td>Operative trauma</td>
<td>41 ± 22</td>
<td>40 ± 24</td>
</tr>
<tr>
<td>Liver</td>
<td>7.6 ± 5</td>
<td>4.7 ± 4*</td>
</tr>
<tr>
<td>Open abdominal aortic aneurysm</td>
<td>9.3 ± 5</td>
<td>3.5 ± 4*</td>
</tr>
<tr>
<td>Open colon</td>
<td>67</td>
<td>44†</td>
</tr>
<tr>
<td>Open inguinal hernia</td>
<td>51 ± 22</td>
<td>45 ± 19*</td>
</tr>
</tbody>
</table>

Data are expressed as mean ± SD.

*P < .05.
†SD not available.

Table 2  ACGME national case log data for overall number of cases (average per graduating resident) and breakdown in key laparoscopic and minimally invasive case categories

<table>
<thead>
<tr>
<th>Procedure</th>
<th>1999 (n = 985)</th>
<th>2008 (n = 1,020)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laparoscopic inguinal hernia</td>
<td>8 ± 9</td>
<td>15 ± 11*</td>
</tr>
<tr>
<td>Laparoscopic colon</td>
<td>2 ± 3</td>
<td>13 ± 10*</td>
</tr>
<tr>
<td>Laparoscopic appendectomy</td>
<td>8 ± 8</td>
<td>32 ± 18*</td>
</tr>
<tr>
<td>Diagnostic laparoscopy</td>
<td>4 ± 4</td>
<td>7 ± 5*</td>
</tr>
<tr>
<td>Endovascular abdominal aneurysm repair</td>
<td>0</td>
<td>4†</td>
</tr>
</tbody>
</table>

Data are expressed as mean ± SD.

*P < .05.
†SD not available.

1 procedure performed ≥ 50 times
83 procedures performed ≤ 5 times
47 procedures performed < 2
31 procedures performed < 1
CURRENT OPERATIVE TRAINING

Bell, Surg, 2009

Mode < mean in 119 of 121
Mode = 0 in 63 of 121
CURRENT OPERATIVE TRAINING

QE applicants 2009: number of primary cases (mean #)
CURRENT TECHNICAL SKILLS TRAINING

- Insufficient time spent operating
- Perform fewer procedures
- Spectrum of procedures much narrower
- Fewer open procedures
One related challenge that academic surgeons will meet in the coming decade is one that is neither necessarily intuitively apparent….nor one which incremental change will likely solve. It too will require innovative approaches….Surgeons still must perform open procedures….How do clinical faculty teach surgical trainees to perform a rare, complex open procedure in a competent fashion, if the trainee completes only 5….during his or her entire residency training period?

Smythe, Acad Med, 2010
SOLUTIONS

- SIMULATION
- OPEN SURGERY FELLOWSHIPS
- PROCEDURAL MINI-FELLOWSHIPS
SIMULATION

- A 3-wk course of vascular anastomosis (1 hr/wk) improved junior trainees to senior level of performance.
- Carotid CEA & patch model (pulsatile flow) improved performance after 3 days of training (6 hours/day).
- SFA angioplasty model significantly improved performance level.
- Patient-specific procedure rehearsal more effective in improving performance than a generic “warm-up.”
- Carotid CEA with and without crisis accurately mimics OR stress.
- Carotid stenting VR simulator accurately simulated the specific procedure in 67% of cases (equipment used, imaging angles).
SIMULATION

- Endovascular
  - Easily simulated
  - Costly
- Open
  - Not easily simulated
  - Costly
  - Need much better technology
SOLUTIONS

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SOLUTIONS

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FUTURE SURGICAL TRAINING

- Medical school will be 3.5 years
- Pre-surgery 6 months
  - Procedural training
  - Team training
  - Mentored on-call
  - Milestones
- 3 years of core surgery training
  - Simulation each year
- 3 years of specialty surgery training
  - Simulation each year
- Research between year 3 and year 4 (optional)
FUTURE SURGICAL TRAINING

- Complex open surgery fellowships
  - standing
  - 12 months
  - Discipline driven
  - Disease based
  - Performed at any time

- Emerging technology mini-fellowships
  - Ad hoc
  - 3 to 6 months
  - Specific skill driven
  - Performed at any time

- The 5 + 2 and 0 + 5 training pathways will disappear
PREDICTING THE FUTURE

This telephone has too many shortcomings to be seriously considered as a means of communication. The device is inherently of no value to us.

*Western Union, Internal memo, 1876*

Who the hell wants to hear actors talk?

*Henry M. Warner, Warner Bros, 1927*

I think there is a world market for maybe five computers.

*Thomas Watson, Chairman IBM, 1943*
We must beware of needless innovation, especially when guided by logic.

Winston Churchill