Medical Education in a Changing World of Health Care

H. Thomas Aretz, MD
When did/will you reform your curriculum

Polling of APMEC attendees, February 20, 2006
The input – outcomes model of medical education

Education Inputs
- Students
- Educators (individuals and institutions)
- Patients, materials, equipment
- Facilities

Education Interventions
- Financial intermediaries
- Regulatory authorities
- Management
- Programs

Education outputs and outcomes
- Competent health professionals
- State-of-the-art and appropriate care at reasonable cost
- Improved health status of the population
- Consumer satisfaction
- New products and knowledge
The changes in health care systems

<table>
<thead>
<tr>
<th>Changes in Health Care Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics and pattern of disease</td>
</tr>
<tr>
<td>New technologies</td>
</tr>
<tr>
<td>Trends in health care delivery</td>
</tr>
<tr>
<td>Consumerism</td>
</tr>
<tr>
<td>Effectiveness and efficiency</td>
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<td>Changing professional roles</td>
</tr>
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</table>

Education Inputs

Education Interventions

Education outputs and outcomes
Table of Contents

Demographics and Disease Patterns

New Technologies

Trends in Health Care Delivery

Consumerism

Effectiveness and Efficiency

Changing Professional Roles
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- Demographics and Disease Patterns
- New Technologies
- Trends in Health Care Delivery
- Consumerism
- Effectiveness and Efficiency
- Changing Professional Roles
Percentage of global population over age 60

Source: Population Division of the Economic and Social Affairs of the United Nations Secretariat
Age distribution trends in the world population

Less Developed Regions

More Developed Regions

Source: Population Division of the Economic and Social Affairs of the United Nations Secretariat
# Shift in frequency for the most common and debilitating diseases

<table>
<thead>
<tr>
<th>1990</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lower Respiratory Infections</td>
<td>1. Ischemic Heart Disease</td>
</tr>
<tr>
<td>2. Diarrheal Diseases</td>
<td>2. Unipolar Depression</td>
</tr>
<tr>
<td>3. Perinatal diseases</td>
<td>3. Road Traffic Accidents</td>
</tr>
<tr>
<td>4. Unipolar Depression</td>
<td>4. Cerebrovascular Disease</td>
</tr>
<tr>
<td>5. Ischemic Heart Disease</td>
<td>5. Chronic Lung Disease</td>
</tr>
<tr>
<td>7. Tuberculosis</td>
<td>7. Tuberculosis</td>
</tr>
<tr>
<td>8. Measles</td>
<td>8. War</td>
</tr>
<tr>
<td>10. Congenital anomalies</td>
<td>10. HIV</td>
</tr>
<tr>
<td>11. Malaria</td>
<td>11. Perinatal Diseases</td>
</tr>
<tr>
<td>12. Chronic Lung Disease</td>
<td>12. Violence</td>
</tr>
<tr>
<td>15. Protein energy malnutrition</td>
<td>15. Cancers of the respiratory tract</td>
</tr>
</tbody>
</table>

Source: Murray, Lopez. The Global Burden of Disease
## Shift in frequency for the most common and debilitating diseases

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Shift in frequency for the most common and debilitating diseases

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1. Lower Respiratory Infections
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3. Perinatal diseases
4. Unipolar Depression
5. Ischemic Heart Disease
6. Cerebrovascular Disease
7. Tuberculosis
8. Measles
9. Road Traffic Accidents
10. Congenital anomalies
11. Malaria
12. Chronic Lung Disease
13. Falls
14. Iron Deficiency Anemia
15. Protein energy malnutrition

2020
1. Ischemic Heart Disease
2. Unipolar Depression
3. Road Traffic Accidents
4. Cerebrovascular Disease
5. Chronic Lung Disease
6. Lower Respiratory Tract Infection
7. Tuberculosis
8. War
9. Diarrheal Diseases
10. HIV
11. Perinatal Diseases
12. Violence
13. Congenital Anomalies
14. Self-inflicted injuries
15. Cancers of the respiratory tract

Source: Murray, Lopez. The Global Burden of Disease
Projected trends in death by broad cause groups in developing regions

![Graph showing trends in deaths](image)
Disability distribution in various regions

<table>
<thead>
<tr>
<th>Region</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EME</td>
<td>Established market economies</td>
</tr>
<tr>
<td>FSE</td>
<td>Formerly socialist economies of Europe</td>
</tr>
<tr>
<td>CHN</td>
<td>China</td>
</tr>
<tr>
<td>LAC</td>
<td>Latin America and the Caribbean</td>
</tr>
<tr>
<td>OAI</td>
<td>Other Asia and Islands</td>
</tr>
<tr>
<td>MEC</td>
<td>Middle Eastern Crescent</td>
</tr>
<tr>
<td>IND</td>
<td>India</td>
</tr>
<tr>
<td>SSA</td>
<td>Sub-Saharan Africa</td>
</tr>
</tbody>
</table>

Source: Murray, Lopez. The Global Burden of Disease
# Impact of demographics and disease patterns on medical education

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Desired Outcomes</th>
<th>Educational Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient shift from acute illness to chronic management</td>
<td>Physicians trained in chronic care</td>
<td>Education in chronic care facilities and geriatrics</td>
</tr>
<tr>
<td>Multidisciplinary care</td>
<td>Physicians able to work in teams</td>
<td>Education in effective team processes</td>
</tr>
<tr>
<td>Care in the ambulatory and home setting</td>
<td>Physicians trained in ambulatory setting</td>
<td>Education in ambulatory setting</td>
</tr>
<tr>
<td>Disease management and protocol driven care</td>
<td>Physicians willing to submit to protocols or work with healthcare professionals who do</td>
<td>Exposure to EBM and collaborative education</td>
</tr>
</tbody>
</table>
Present situation for disease management

EXHIBIT 17:
Which disease management programs do you operate?

- Diabetes: 77%
- Heart failure: 49%
- Obesity and weight management: 43%
- Coronary artery disease: 40%
- Oncology: 40%
- Stroke: 31%
Future trends: Example: Assisted Living

- Lifestyle options
- Affiliated on-site medical services
- Wellness programs
- Concierge services
- Dine in / dine out
- Estate settings
- Transportation
- Hotel amenities
- Leisure facilities

Impact

Increasing “non-traditional” chronic care environments with medicine being a necessary adjunct and service to the enterprise.
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- Demographics and Disease Patterns
- New Technologies
- Trends in Health Care Delivery
- Consumerism
- Effectiveness and Efficiency
- Changing Professional Roles
Types of new technologies in healthcare

- Diagnostic and screening
- Monitoring
- Interventions (minimally invasive, robotics)
- Replacements, artificial organs and cellular technologies
- Drugs and drug delivery
- Information technology
  - Process-related
  - Educational
  - Telemedicine
  - Telecommunications
  - Expert systems
  - Public information
Minimally invasive procedures continue to rise
Use of technology is increasing, but at different rates

Medical equipment in Thailand from 1976-99

www.searo.who.int/LinkFiles/Thailand_Part_13-Medical_Technologies.pdf
Capital needs in US hospitals: four of the top five are equipment and IT

EXHIBIT 22:
Over the next 5 years, what are your major capital needs?

- Purchase medical equipment – replacement: 86%
- Purchase medical equipment – new: 72%
- Purchase information systems: 68%
- Renovate inpatient facility: 48%
- Purchase CPOE: 41%
- Expand emergency rooms: 35%
- Implement new joint ventures: 35%
- Renovate outpatient facility: 33%
- Build new outpatient facility: 28%
- Expand operating rooms: 28%
- Build new inpatient facility: 24%
### Impact of technology on medical education

<table>
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<tr>
<th>Inputs</th>
<th>Desired Outcomes</th>
<th>Educational Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Increasing number of technologies and techniques and use of IT</td>
<td>- Physicians trained in use of IT and technology assessment</td>
<td>- Education in utilizing IT, virtual settings, diagnostic techniques.</td>
</tr>
<tr>
<td>- Increased specialization</td>
<td>- Highly specialized physicians</td>
<td>- Areas of concentration and expertise</td>
</tr>
<tr>
<td>- Multidisciplinary care</td>
<td>- Physicians able to work in teams</td>
<td>- Education in multi-departmental care teams</td>
</tr>
<tr>
<td>- Care in the ambulatory and home setting</td>
<td>- Physicians trained in ambulatory setting</td>
<td>- Education in ambulatory setting</td>
</tr>
<tr>
<td>- Increased health care costs</td>
<td>- Physicians trained in cost-benefit analysis and health economics</td>
<td>- Exposure to health economics and financial management</td>
</tr>
</tbody>
</table>
IT in medical education
Future trends in IT technology

**EXHIBIT 23:**
The organization’s current status and future plans as they relate to the following information technologies

<table>
<thead>
<tr>
<th>Information Technology</th>
<th>Currently in place</th>
<th>Upgrade or implement in next 2 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Information Systems (CIS)</td>
<td>33%</td>
<td>63%</td>
</tr>
<tr>
<td>Information security applications</td>
<td>69%</td>
<td>26%</td>
</tr>
<tr>
<td>Pharmacy systems</td>
<td>52%</td>
<td>39%</td>
</tr>
<tr>
<td>Electronic Medical Records (EMR)</td>
<td>14%</td>
<td>74%</td>
</tr>
<tr>
<td>Privacy protection applications</td>
<td>62%</td>
<td>24%</td>
</tr>
<tr>
<td>Computerized Physician Order Entry (CPOE)</td>
<td>12%</td>
<td>70%</td>
</tr>
<tr>
<td>Voice and imaging systems</td>
<td>23%</td>
<td>53%</td>
</tr>
</tbody>
</table>
Perceived future impact of technology

**EXHIBIT 20:**
In what ways will technology advances in life sciences impact how care is delivered?

- Average length of stay:
  - Increasing: 5%
  - Decreasing: 65%
  - Remaining the same/Unsure: 30%

- Case mix index:
  - Increasing: 51%
  - Decreasing: 12%
  - Remaining the same/Unsure: 37%

- Hospital admissions:
  - Increasing: 29%
  - Decreasing: 54%
  - Remaining the same/Unsure: 26%

- Hospital outpatient services:
  - Increasing: 93%
  - Decreasing: 3%
  - Remaining the same/Unsure: 4%

- Services in physician offices:
  - Increasing: 83%
  - Decreasing: 2%
  - Remaining the same/Unsure: 15%

- Services in other outpatient settings:
  - Increasing: 89%
  - Decreasing: 2%
  - Remaining the same/Unsure: 9%

**EXHIBIT 21:**
In what ways will technology advances in life sciences impact consumer demand for how care is delivered?

- Brand-name products:
  - Increasing: 47%
  - Decreasing: 22%
  - Remaining the same/Unsure: 31%

- Products & technologies for self diagnosis:
  - Increasing: 94%
  - Decreasing: 5%
  - Remaining the same/Unsure: 1%

- Specialty/High-end services:
  - Increasing: 73%
  - Decreasing: 5%
  - Remaining the same/Unsure: 22%

- Specific service location:
  - Increasing: 49%
  - Decreasing: 6%
  - Remaining the same/Unsure: 45%
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Some trends in healthcare delivery

- Shift to outpatient care
- Increasing shift to private funding, for-profit and not-for-profit
- Globalization and outsourcing
- Super-specialty institutions
- “Shopping mall and department store care”
Increasing focus on outpatient care: dropping Average Length Of Stay (ALOS)

Reasons
- Payor based pressures
- New technologies
- Patient preference

Results
- Fewer Patients in the hospitals
- Hospital patients sicker than before (Increased case mix index)
- Cost pressures to be productive

Source: "Hospital Reports" for Japan. "OECD Health Data 98" for other nations.
Levels of Care in Healthcare Systems

3rd Care

2nd Care
Outpatient specialist
Focused facilities

1st Care
Wellness
Prevention

Intake

Step-down
Rehabilitation
Chronic care
Home care
Maintenance

Outflow

Complexity
Costs
Numbers
Medical trainees spend most of their time where the fewest patients are.
Residents spend increasing time in outpatient settings

Figure 6
Percentage of Time Spent in Non-Inpatient Care Settings by Resident Physicians in Postgraduate Year 2 or Higher Positions, by Type of ACGME Accredited Programs, 2000

Residents still consider traditional training sites as superior

Figure 7
Residents’ Ratings of Quality of Instruction by Site, 1998

<table>
<thead>
<tr>
<th>Site</th>
<th>Rating (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Care Inpatient</td>
<td>84%</td>
</tr>
<tr>
<td>Operating Room</td>
<td>81%</td>
</tr>
<tr>
<td>Community Hospital</td>
<td>76%</td>
</tr>
<tr>
<td>Attending Rounds</td>
<td>78%</td>
</tr>
<tr>
<td>MD Office</td>
<td>65%</td>
</tr>
<tr>
<td>Outpatient Clinic</td>
<td>70%</td>
</tr>
<tr>
<td>Long-Term Care</td>
<td>39%</td>
</tr>
<tr>
<td>Managed Care</td>
<td>34%</td>
</tr>
</tbody>
</table>

Source: 1996 Commonwealth Fund Survey of Residents. Analysis by M. Gokhale at H.P. Regression adjusted percentages controlling for differences due to gender, specialty, IMG status, market stage, and US News rank. Percentages differ significantly at p<0.05.
And feel adequately prepared for traditional practice situations

Figure 8
Residents’ Rating of Their Preparedness to Care for Different Types of Patients, 1998

- Inpatients: 99%
- Ambulatory Patients: 95%
- Nursing Home Patients: 66%

Source: 1996 Commonwealth Fund Survey of Residents. Analysis by H. Go khale at IHPI. Regression adjusted percentages controlling for differences due to gender, specialty, IME status, market stage, and US News rank. Percentages differ significantly at p<.05.
### Falling public sector funding, increased private investments

<table>
<thead>
<tr>
<th>Public Sector Funding</th>
<th>1980</th>
<th>2000</th>
<th>Drop</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>89.4</td>
<td>80.9</td>
<td>-8.5</td>
</tr>
<tr>
<td>Ireland</td>
<td>82.2</td>
<td>73.3</td>
<td>-8.9</td>
</tr>
<tr>
<td>New Zealand</td>
<td>83.6</td>
<td>78.0</td>
<td>-5.6</td>
</tr>
<tr>
<td>Greece</td>
<td>82.2</td>
<td>56.1</td>
<td>-16.1</td>
</tr>
<tr>
<td>Switzerland</td>
<td>67.5</td>
<td>55.0</td>
<td>-11.9</td>
</tr>
</tbody>
</table>

- Most governments are reducing their healthcare spending
- Private investments growing in healthcare delivery
- Much deregulations occurring in certain countries like the NHS in the UK

**Source:** AMA / Team analysis

**Impact**

Education will have to take place increasingly in the private setting and demonstrate an economic benefit
Academic medical centers provide care at a higher cost due to their academic missions.

Figure 1
Distribution of Costs Due to Mission-Related Activities by Type of Institution, 1998

Outsourcing and 24/7

- Outsourcing of medical image interpretation, monitoring of ICU physiological data and remote manipulation of robotic instruments are already a reality, driven by finances and convenience (time zones).
- The practice has raised profound questions about licensure, medical legal issues and quality control.

Wachter. NEJM 2006;354:661
International patients 2004

- India: 150,000
- Singapore: 200,000
- Thailand: 600,000

Estimate of India’s medical tourism volume by 2012: $2.3 Billion
Specialty clinics

'Factory clinics' to cut NHS lists

Critics alarmed at plans for fast-track US surgery

Gaby Hinsliff, chief political correspondent
Sunday July 27, 2003
The Observer

http://www.shouldice.com/
Medicine in the mall

Is "Wal-Mart" medicine in the future?

Getting your health care at Wal-Mart
Wednesday, October 05, 2005
By Jane Spencer, The Wall Street Journal

http://www.minuteclinic.com/
http://www.quickhealth.com/index.htm
Impact of trends in health care delivery on medical education

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| • Increasing outpatient care and greater emphasis on primary care  
  • Increased complexity of inpatient care  
  • Financial pressures and new business models  
  • Possible further “fragmentation” of clinical sites  
  • Further alliances and mergers  
  • Global workforce and market place | • Physicians trained in ambulatory and primary care  
  • New specialists (“hospitalists, ruralists”)  
  • Physicians able to work in cost-effective manner  
  • Physicians competent in health care systems and highly skilled in specific areas  
  • Physicians capable of working across institutions and in larger health care organizations  
  • Physicians with “global” competencies and cultural awareness | • Education in outpatient and office settings  
  • Tiered and tailored clinical experiences  
  • Exposure to health economics and financial management  
  • Exposure to systems dynamics and in-depth experiences  
  • Education in organizational behaviors and communications  
  • Education in cultural diversity and according to international standards |
2005 survey of graduating US medical students

Percent graduates who felt that their education was *inadequate* in the following areas:

- Health care systems: 46.2
- Medical economics: 64.0
- Managed care: 56.0
- Culturally appropriate care: 23.4
- Culturally-related health behaviors: 24.9

Percent graduates who *strongly disagreed* or *disagreed* with the following statements about electives:

- Elective time should be decreased: 77
- More required courses should be added: 71.5

Source: AAMC 2005 Medical School Graduation Questionnaire
Florida State University-School of Medicine
department structure

- Clinical Sciences
- Family Medicine and Rural Health
- Geriatrics
  - Basic Medical Sciences
  - Medical Humanities and Social Sciences
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Some aspects of consumerism

- Increased availability of medical information
- Increased ability to receive care at home
- Increased desire to be informed and be part of decision making
- Increased costs drive consumer behavior - “shopping for values” including on a global scale and outside of traditional medicine
- Increased demand for transparency of outcomes data
## Quality ratings among persons hospitalized or needing elective surgery in 2001

<table>
<thead>
<tr>
<th>Country</th>
<th>Excellent or Very Good</th>
<th>Waited less than 1 month</th>
<th>Waited 1 to less than 4 months</th>
<th>Waited 4 months or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>55%</td>
<td>51%</td>
<td>26%</td>
<td>23%</td>
</tr>
<tr>
<td>Canada</td>
<td>54%</td>
<td>37%</td>
<td>36%</td>
<td>27%</td>
</tr>
<tr>
<td>New-Zealand</td>
<td>58%</td>
<td>43%</td>
<td>31%</td>
<td>26%</td>
</tr>
<tr>
<td>UK</td>
<td>48%</td>
<td>38%</td>
<td>24%</td>
<td>38%</td>
</tr>
<tr>
<td>USA</td>
<td>50%</td>
<td>63%</td>
<td>32%</td>
<td>5%</td>
</tr>
</tbody>
</table>

**Source:** Robert Blendon et al (HSPH), Health Affairs May/June 2002
Citizens’ views on their health care system and general access problems 2001

<table>
<thead>
<tr>
<th></th>
<th>Canada</th>
<th>UK</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Below average income</td>
<td>Above average income</td>
<td>Below average income</td>
</tr>
<tr>
<td>There is so much wrong with the system that it should be completely rebuilt</td>
<td>23%</td>
<td>13%</td>
<td>19%</td>
</tr>
<tr>
<td>Very or extremely difficult to see a specialist</td>
<td>20%</td>
<td>14%</td>
<td>18%</td>
</tr>
<tr>
<td>Often or sometimes unable to get care because it is not available where you live</td>
<td>23%</td>
<td>17%</td>
<td>14%</td>
</tr>
</tbody>
</table>

Source: Robert Blendon et al (HSPH), Health Affairs May/June 2002
Example – Consumer-driven health care (CDHC)

Early experience in the US with giving consumers control to purchase health insurance

• 20,000 consumers joined new system compared to 25,000 in legacy system

• Results for first year:
  ▪ 33% increase in registration on health information sites
  ▪ 15% increase in call center volume
  ▪ 85% of enrollees carried money forward into next year
  ▪ 13% reduction of outpatient and radiology visits
  ▪ 15% decrease in specialist visits
  ▪ 9% decrease in primary care visits
  ▪ 15% decrease in laboratory services
  ▪ 8% increase in preventative services

Herzlinger, Parsa-Parsi. JAMA 2004;292
Example – CDHC in Switzerland

Sources of payments for health care

<table>
<thead>
<tr>
<th>Source</th>
<th>Switzerland</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumers</td>
<td>68.2%</td>
<td>23.3%</td>
</tr>
<tr>
<td>Government</td>
<td>25.4%</td>
<td>44.5%</td>
</tr>
<tr>
<td>Employer or other</td>
<td>6.4%</td>
<td>32.2%</td>
</tr>
</tbody>
</table>
Increased transparency to consumers

http://www.myhealthfinder.com
AQHC New York State Inpatient Quality Indicators 2005

http://www.mediguide.com/
Dashboards to benchmark performance

**Efficiency Indices**

- **Total Expenditures (Actual/Predicted)**
  - 10th: 72, 25th: 89, Median: 102, 75th: 1.1, 90th: 1.3

- **Total Inpatient Expenditures (Actual/Predicted)**
  - 10th: 55, 25th: 67, Median: 89, 75th: 1.2, 90th: 1.35

- **Total Outpatient Expenditures (Actual/Predicted)**
  - 10th: 88, 25th: 95, Median: 99, 75th: 1.19, 90th: 1.38

- **Total Pharmacy Expenditures (Actual/Predicted)**
  - 10th: 53, 25th: 8, Median: 1.01, 75th: 1.17, 90th: 1.27

- **PCP Visit Expenditures (Actual/Predicted)**
  - 10th: 60, 25th: 74, Median: 84, 75th: 1.17, 90th: 1.21

- **SCP Visit Expenditures (Actual/Predicted)**
  - 10th: 77, 25th: 0, Median: 1.02, 75th: 1.18, 90th: 1.26
### Impact of consumerism on medical education

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Desired Outcomes</th>
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</tr>
</thead>
</table>
| Sophisticated consumers with heightened expectations  
More care at home with remote monitoring  
More medical tourism  
More demand for non-traditional services  
Increased demand for preventative care  
Consumer information | Physicians trained in access to latest information, including costs  
Physicians trained in remote IT and use of intelligent systems  
Physicians with “global” competencies and cultural awareness  
Physicians knowledgeable in alternative medicine  
Physicians knowledgeable in nutrition and prevention  
Physicians as health advocates and partners in decision making | Education in efficient retrieval of information and patient education  
Education in non-hospital IT and in community-based settings  
Education in cultural diversity and according to international standards  
Knowledge of alternative medicine  
Education in nutrition and prevention  
Education in evidence, quality and cost based care and patient education |
Supranational accrediting bodies, examples and other “watchdogs”

- International/regional bodies
  - http://www.caam-hp.org/
  - http://www.iime.org/
  - http://www.sund.ku.dk/wfme/
  - The Accreditation Commission on Colleges of Medicine (ACCM)

- Governmental lists of comparison
  - http://www.ed.gov/about/bdscomm/list/ncfmea.html#decisions

- Non-governmental lists
  - http://www.ecfmg.org/faimer/orgs.html
  - www.quackwatch.org
Some aspects of effectiveness and efficiency

Effectiveness “doing the right thing”
- The influence of EBM
- Managed care across the system

Efficiency “doing things right”
- The quality and patient safety movement
- Increased pressures to increase cost-efficiency

Increase of choice based on information and “value”

\[ \text{Value} = \frac{\text{Quality}}{\text{Price}} \]
What are we missing in our curricula? Should we revise our focus?

- 1.14 million “patient-safety incidents” occurred from 2000 - 2002
- 1 in 4 patients experiencing an “incident” died
- 263,864 deaths attributable to incidents
- CDC list of leading causes of hospital deaths, list medical errors #6, ahead of:
  - Diabetes
  - Pneumonia
  - Alzheimer’s
  - Renal Disease
Disclosure – the patient-doctor gap

- 98% of patients desire to be informed of even a minor error, the greater the error the more patients and families want to know.

- 92% of patients believe that they should always be told, but only 60% of MD’s think that patients should always be told.

- 81% of patients believe that they should be advised of the potential adverse outcomes, while only 33% of MD’s believe that the patients should be told about possible adverse outcomes.
JCAHO – Causes Of Sentinel Events

Root Causes of Sentinel Events
(All categories; 1995-2005)

- Communication
- Orientation/training
- Patient assessment
- Staffing
- Availability of info
- Competency/credentialing
- Procedural compliance
- Environ. safety / security
- Leadership
- Continuum of care
- Care planning
- Organization culture

Percent of 3548 events
External quality benchmarks are increasing

### JCI Accredited Hospitals

<table>
<thead>
<tr>
<th>Region</th>
<th>2000</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Asia</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Europe</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>Middle East</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>South America</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3</strong></td>
<td><strong>71</strong></td>
</tr>
</tbody>
</table>

### Growth in Europe across all Accrediting Agencies

Source: JCI
The drive to international standards
Impact of effectiveness and efficiency on medical education

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Desired Outcomes</th>
<th>Educational Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Greater emphasis on EBM and protocols where applicable</td>
<td>- Physicians trained in EBM and access to information</td>
<td>- Education in EBM and use of databases</td>
</tr>
<tr>
<td>- Greater pressure on quality processes, process management and knowledge management</td>
<td>- Physicians trained in “production” processes and quality and knowledge management</td>
<td>- Education in quality management, process management and team and institutional learning</td>
</tr>
<tr>
<td>- Greater transparency of price and outcomes</td>
<td>- Physicians trained in access to latest information, including costs</td>
<td>- Education in health systems metrics</td>
</tr>
<tr>
<td>- Greater financial pressures</td>
<td>- Physicians with greater understanding of health economics</td>
<td>- Education in health economics</td>
</tr>
<tr>
<td>- Increased stakeholder involvement</td>
<td>- Physicians able to work with patients and payers</td>
<td>- Education in health systems dynamics</td>
</tr>
</tbody>
</table>
A recent snapshot about whether some related subjects are taught

Polling of APMEC attendees, February 20, 2006
Percent graduates who felt that their education was *inadequate* in the following areas:

- Clinical epidemiology: 20.2%
- Risk assessment and counseling: 21.0%
- Cost-effective medical practice: 49.0%
- Quality assurance in medicine: 38.9%
- Practice management: 57.9%
- Medical record keeping: 43.8%

Source: AAMC 2005 Medical School Graduation Questionnaire
Individual learning is not enough

Inputs

Knowledge (of the disease)
Resources
Patient (with the disease)

Learning

Systems level
Institutional level
Team level

Diagnosis
Treatment selection
Treatment implementation
Information gathering and testing

Outputs

Health outcomes
Cost outcomes

Decision-making and problem-solving process

Clinical Method

adapted from Bohmer, R. HBS 2003
Managing learning

Learning about the patient

Processes and systems for problem solving

Processes and systems for knowledge use
  • What to do
  • Who will do it

Processes and systems for knowledge capture

Learning about the disease

adapted from Bohmer, R. HBS 2003
Some aspects of changing professional roles

- The nature of specialties is changing (e.g. hospitalists, intensivists, emergency physicians, etc.)
- The number of multidisciplinary clinics and approaches to medical care is increasing (e.g. cardiac care, women’s health, oncology, etc.)
- The roles and responsibilities of non-physician health care professionals is changing and increasing (nurse practitioners, physician assistants, pharmacists, nurse anesthetists, case managers, etc.)
Physician supply grows more slowly than growth in the numbers of non-physician clinicians.
NP and PA growth is faster than FP/GP

Number of Nurse Practitioners in the US has risen from 30,000 in 1990 to 115,000 today
Impact of change in professional roles on medical education

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Desired Outcomes</th>
<th>Educational Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>- New specialty mix in hospitals</td>
<td>- Physicians trained in new specialties</td>
<td>- Education in location-specific care</td>
</tr>
<tr>
<td>- Increasing number of clinical centers</td>
<td>- Physicians trained in “multidisciplinary care and processes”</td>
<td>- Education in disease management and team care</td>
</tr>
<tr>
<td>- Increasing number of Allied Health professionals</td>
<td>- Physicians trained to work in teams with AHPs</td>
<td>- Education in health teams</td>
</tr>
<tr>
<td>- Greater role and independence of AHP</td>
<td>- Physicians trained to supervise care not administer</td>
<td>- Education in management and team leadership</td>
</tr>
</tbody>
</table>

This table summarizes the impact of changes in professional roles on medical education inputs, desired outcomes, and educational strategies.
Characteristics of medical care based on evidence and its resultant modes of delivery

![Diagram showing the relationship between degree of agreement and degree of certainty in medical care modes.]

Source: Plsek PE, Greenhalgh T. BMJ 2001;323:625-28
So what has happened so far in medical education?
The development of global competencies

<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>Canada</th>
<th>Germany</th>
<th>Japan</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Patient care</td>
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<tr>
<td>Medical knowledge</td>
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<tr>
<td>Practice-based learning and improvement</td>
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<tr>
<td>Interpersonal and communication skills</td>
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<tr>
<td>Professionalism</td>
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<td>System-based practice</td>
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<tr>
<td>Patient-centered care</td>
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<tr>
<td>Communication skills</td>
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<tr>
<td>Sound ethics</td>
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<tr>
<td>Clinical skills</td>
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<tr>
<td>Problem solving skills</td>
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<td></td>
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<tr>
<td>Life-long learning skills</td>
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<tr>
<td>Leadership skills</td>
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<tr>
<td>Public health and health care systems skills</td>
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</tr>
</tbody>
</table>

Common “global” competencies:

- Expert in medical science, clinical care and their interrelationship through evidence
- Skilled in communications, caring and interpersonal relationships
- Professional, including being a member of a team
- Life-long learner, improving based on practice and quality improvement principles
- Knowledgeable in the system, including its economics
Spectrum of proposed international standards

Outcomes based
IIME

Process based
WFME
Who should do the accreditation?

- 33% National governments
- 28% National non-governmental organizations
- 9% Regional bodies
- 2% International bodies
- 2% Nobody
- 3% Does not matter who

Polling of APMEC attendees, February 20, 2006
Some recent trends of medical education

- Horizontal and vertical integration
- Problem-, practice- and community-based education
- Teamwork, small group instruction and learning communities
- Independent projects and “areas of concentration”
- Integration of EBM and management skills
- Skills labs, standardized patients and simulation
- Outcomes-based education
- New assessment methods
- Doctor-patient and doctor-society courses and emphasis on holistic approach
- Life-long learning skills
- Educational theory and instructional technologies
- Intensive faculty development
- New facilities design
“Nobody is able to master medicine as a whole”

Philostratus, 3rd century
A Brief (and Incomplete) History of Cancer

- Evidence of cancer in prehistoric man
- Fossilized bone tumors in Egyptian mummies
- First written reference to cancer and Rx in papyri
- Hippocrates coins the word “cancer”
- John Hill warns against tobacco use
- Virchow describes origin of cancer cells
- Beatson treats breast cancer with oophorectomy
- Bilroth, Handley and Halsted: cancer surgery
- Huggins uses hormone Rx for prostate cancer
- Effect of mustard gas on bone marrow observed
- First continuous cancer cell line established
- Watson and Crick publish DNA structure
- Roentgen discovers X-rays
- Paget develops metastasis theory
- Rous sarcoma virus discovered
- Hunter suggests criteria for cancer surgery
- Pott describes scrotal cancer in chimney sweeps
- Ramazzini describes cancer incidence in nuns
- Autopsies done by Morgagni in Padua
- Roentgen discovers X-rays
- Rous sarcoma virus discovered
- Cancer induced with tars in lab animals
- Philadelphia chromosome described
- Sequence of last human chromosome published

Source: www.cancer.org
Constant redefinition of the “core”
"In time of profound change, the learners inherit the earth, while the learned find themselves beautifully equipped to deal with a world that no longer exists."

Al Rogers