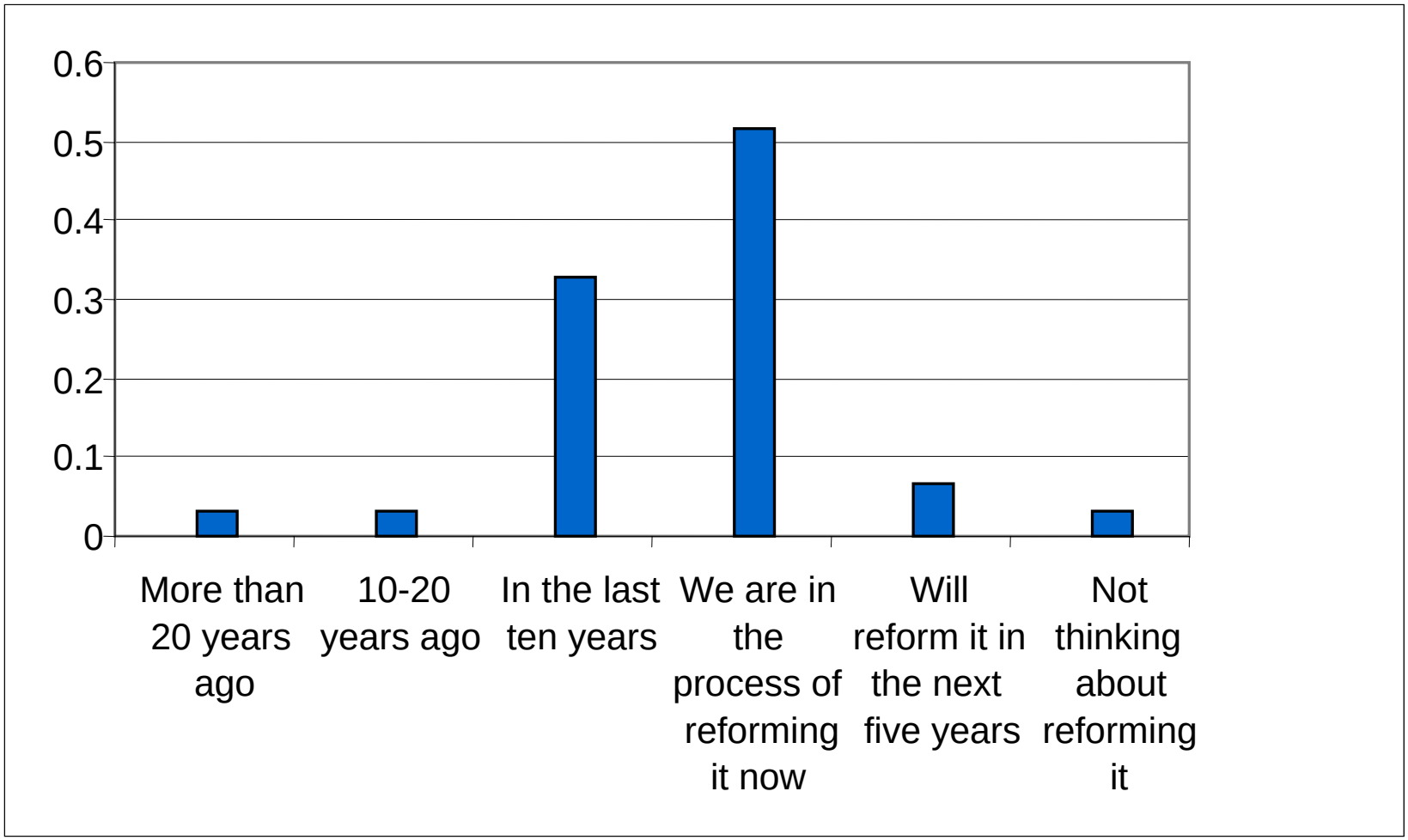
Medical Education in a Changing World of Health Care

H. Thomas Aretz, MD

HARVARD MEDICAL INTERNATIONAL

When did/will you reform your curriculum



Polling of APMEC attendees, February 20, 2006

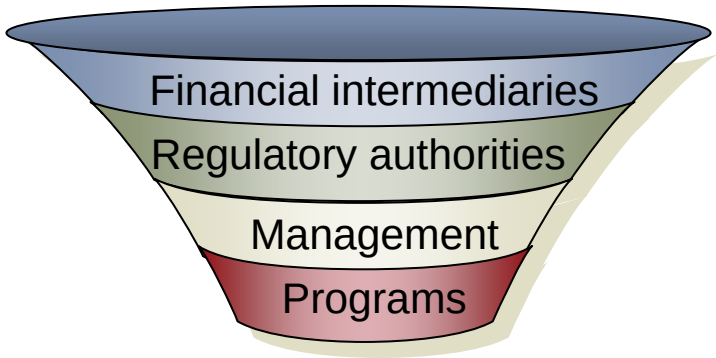
The input – outcomes model of medical education

Education Inputs

Education Interventions

Education outputs and outcomes

Resources/Capital
Students
Educators (individuals and institutions)
Patients, materials, equipment
Facilities

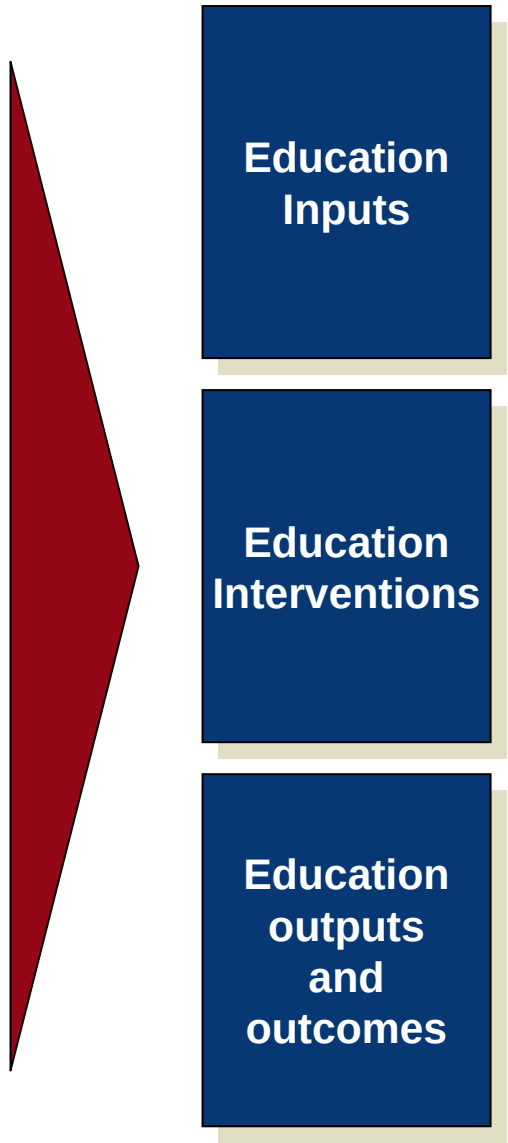


Competent health professionals

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

Changes in Health Care Systems
Demographics and pattern of disease
New technologies
Trends in health care delivery
Consumerism
Effectiveness and efficiency
Changing professional roles



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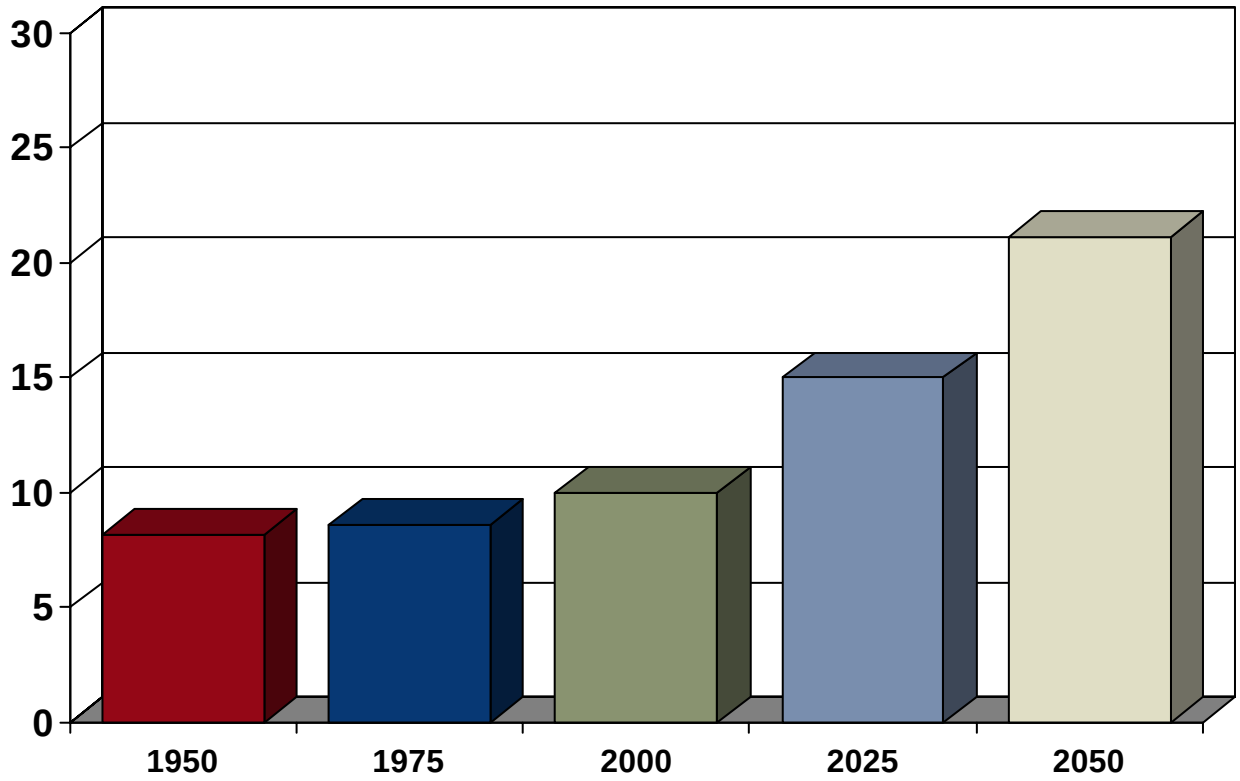
Percentage of global population over age 60



Source: Population Division of the Economic and Social Affairs of the United Nations Secretariat

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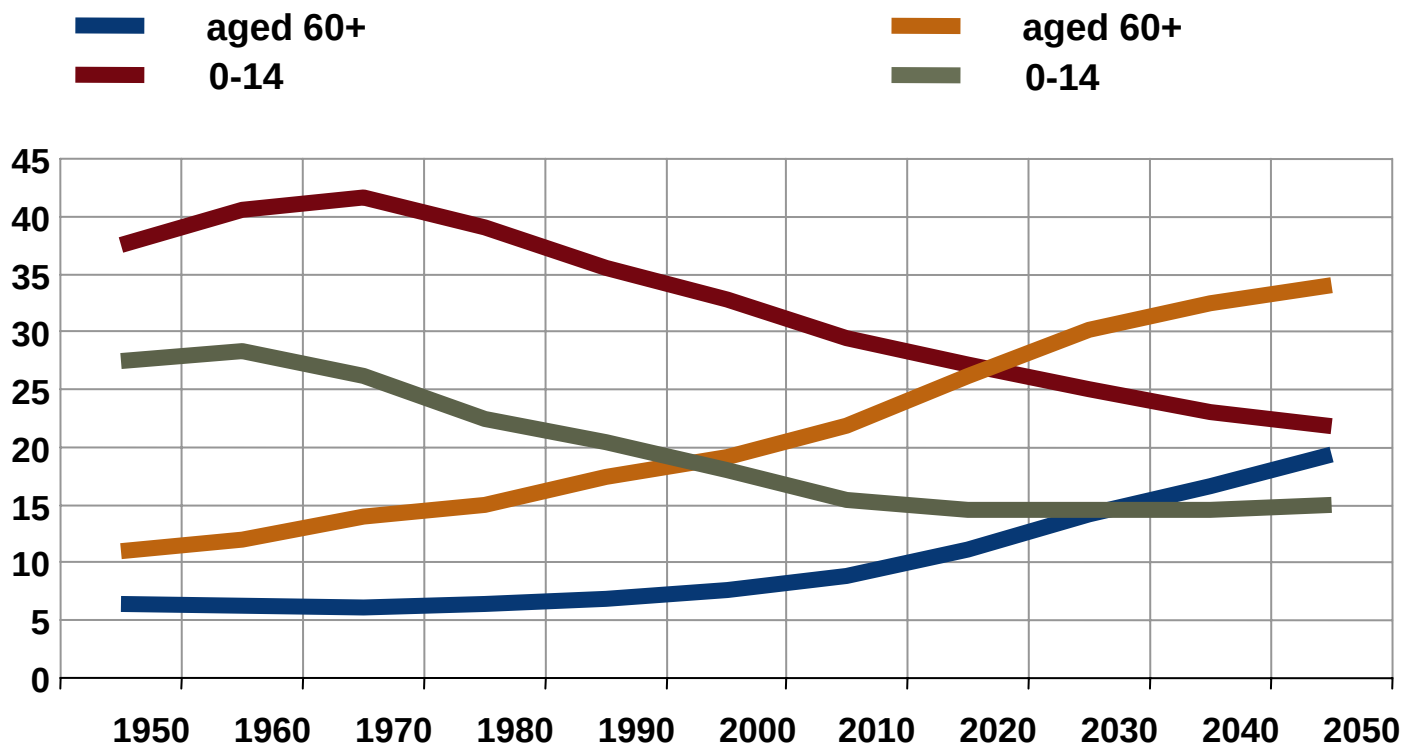
Age distribution trends in the world population

Less Developed Regions

More Developed Regions



Source: Population Division of the Economic and Social Affairs of the United Nations Secretariat

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Shift in frequency for the most common and debilitating diseases

1990	2020
1. Lower Respiratory Infections	1. Ischemic Heart Disease
2. Diarrheal Diseases	2. Unipolar Depression
3. Perinatal diseases	3. Road Traffic Accidents
4. Unipolar Depression	4. Cerebrovascular Disease
5. Ischemic Heart Disease	5. Chronic Lung Disease
6. Cerebrovascular Disease	6. Lower Respiratory Tract Infection
7. Tuberculosis	7. Tuberculosis
8. Measles	8. War
9. Road Traffic Accidents	9. Diarrheal Diseases
10. Congenital anomalies	10. HIV
11. Malaria	11. Perinatal Diseases
12. Chronic Lung Disease	12. Violence
13. Falls	13. Congenital Anomalies
14. Iron Deficiency Anemia	14. Self-inflicted injuries
15. Protein energy malnutrition	15. Cancers of the respiratory tract

Source: Murray, Lopez. The Global Burden of Disease

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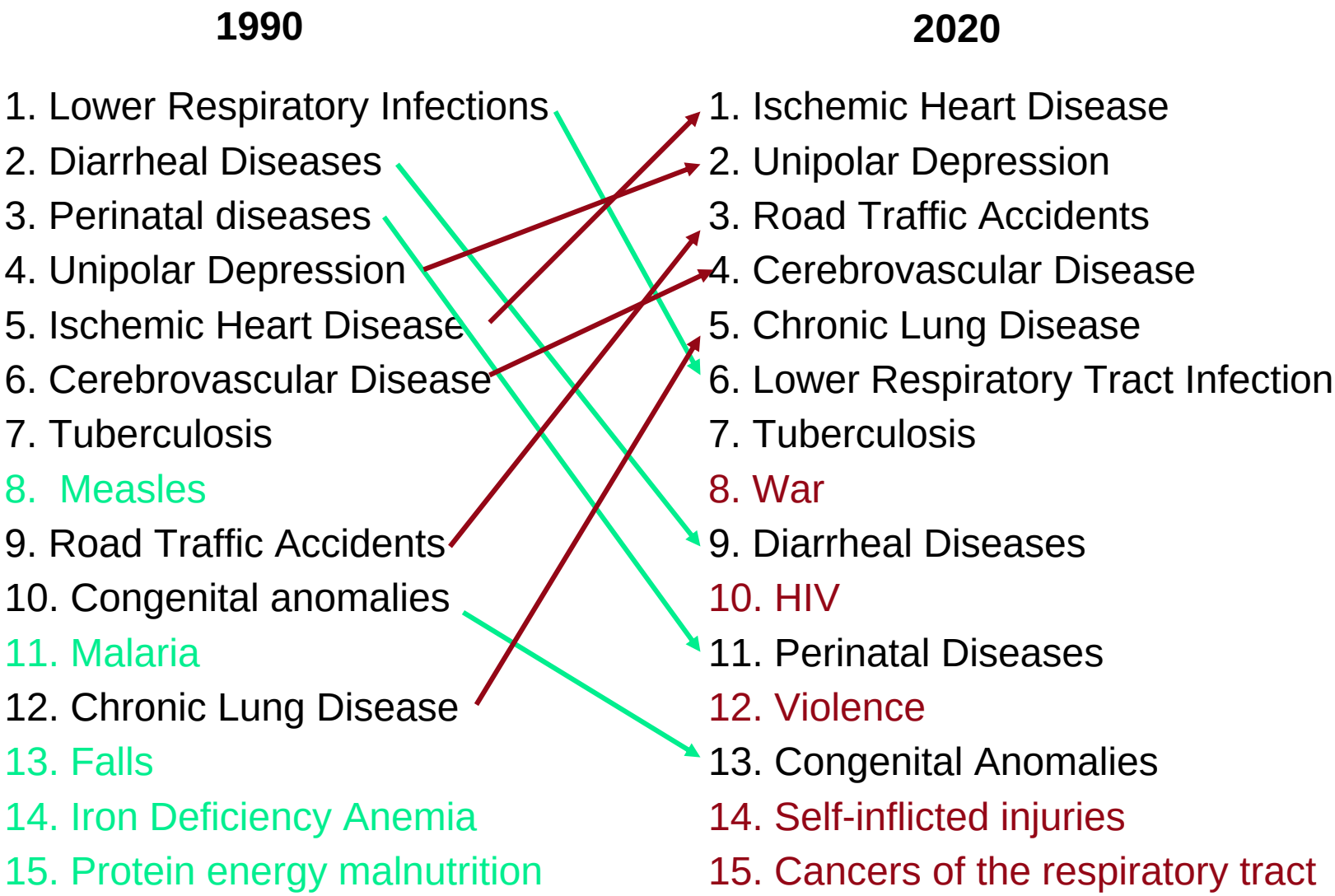
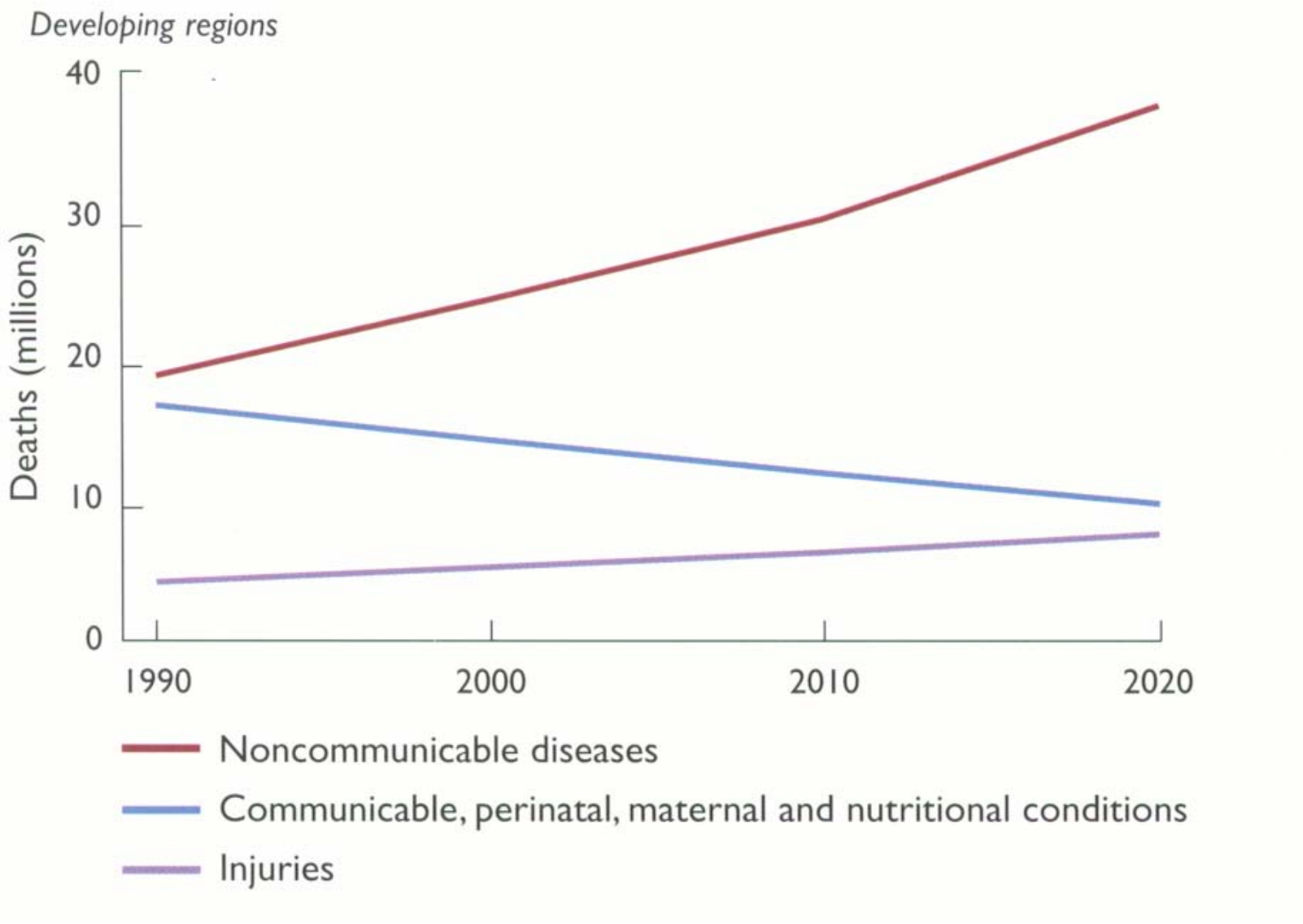
Shift in frequency for the most common and debilitating diseases

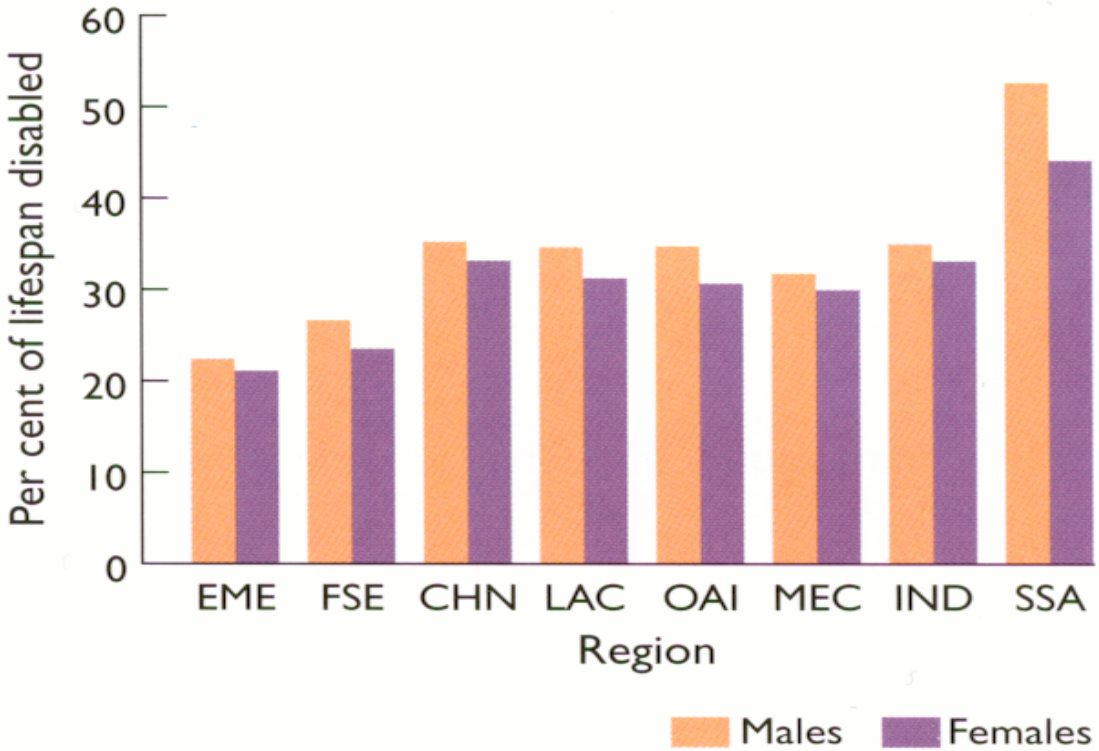


Source: Murray, Lopez. The Global Burden of Disease

Projected trends in death by broad cause groups in developing regions



Disability distribution in various regions



EME	**Established market economies**
FSE	**Formerly socialist economies of Europe**
CHN	**China**
LAC	**Latin America and the Caribbean**
OAI	**Other Asia and Islands**
MEC	**Middle Eastern Crescent**
IND	**India**
SSA	**Sub-Saharan Africa**

Source: Murray, Lopez. The Global Burden of Disease

Impact of demographics and disease patterns on medical education

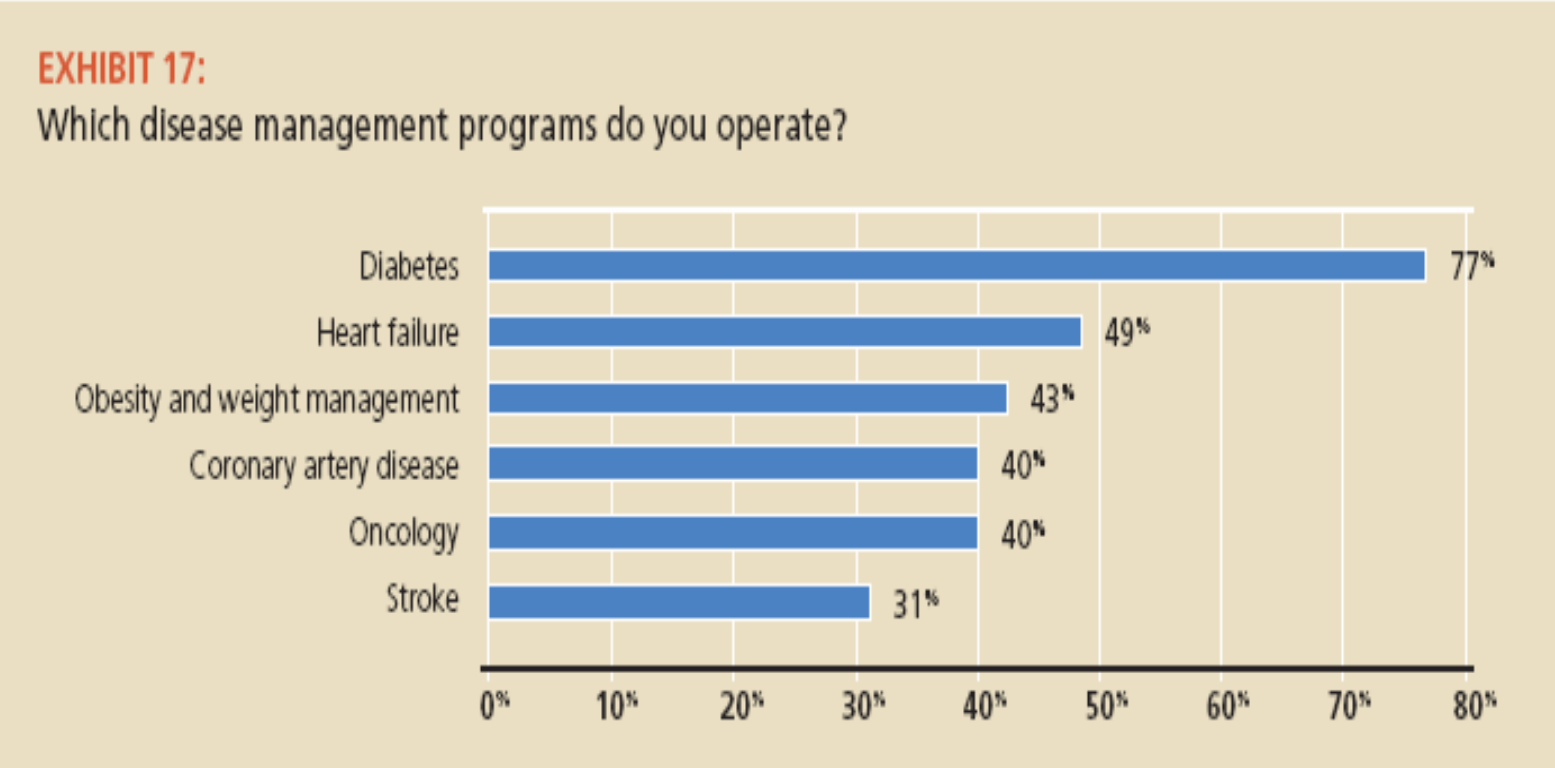
Education Inputs

Education Interventions

Education outputs and outcomes

Inputs	*Desired Outcomes*	*Educational Strategies*
▪Patient shift from acute illness to chronic management	▪Physicians trained in chronic care	▪Education in chronic care facilities and geriatrics
▪Multidisciplinary care	▪Physicians able to work in teams	▪Education in effective team processes
▪Care in the ambulatory and home setting	▪Physicians trained in ambulatory setting	▪Education in ambulatory setting
▪Disease management and protocol driven care	▪Physicians willing to submit to protocols or work with healthcare professionals who do	▪Exposure to EBM and collaborative education

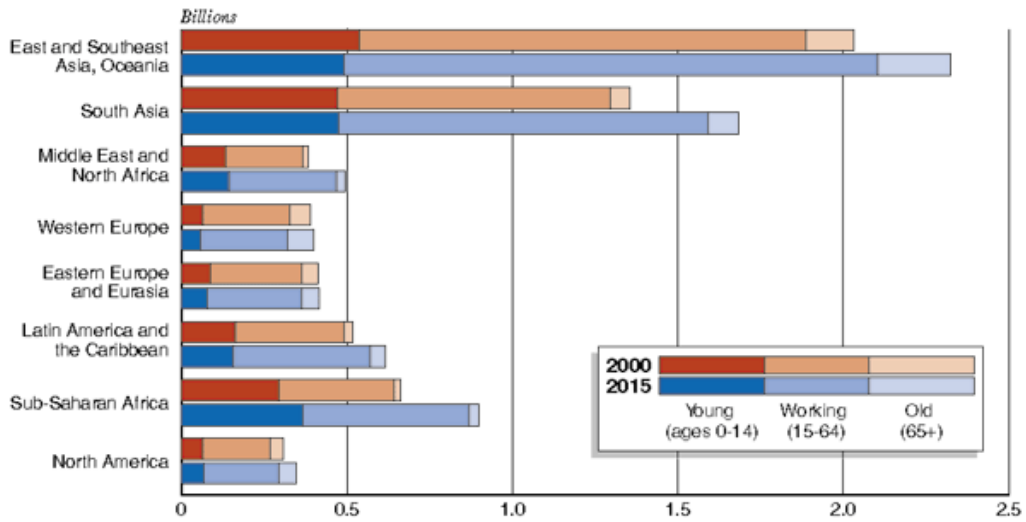
Present situation for disease management



http://www.deloitte.com/dtt/article/0,1002,sid%253D34239%2526cid%253D95977,00.html

Future trends:
Example: Assisted Living

Regional Population by Age Group: 2000 and 2015



Source: US Bureau of the Census

- **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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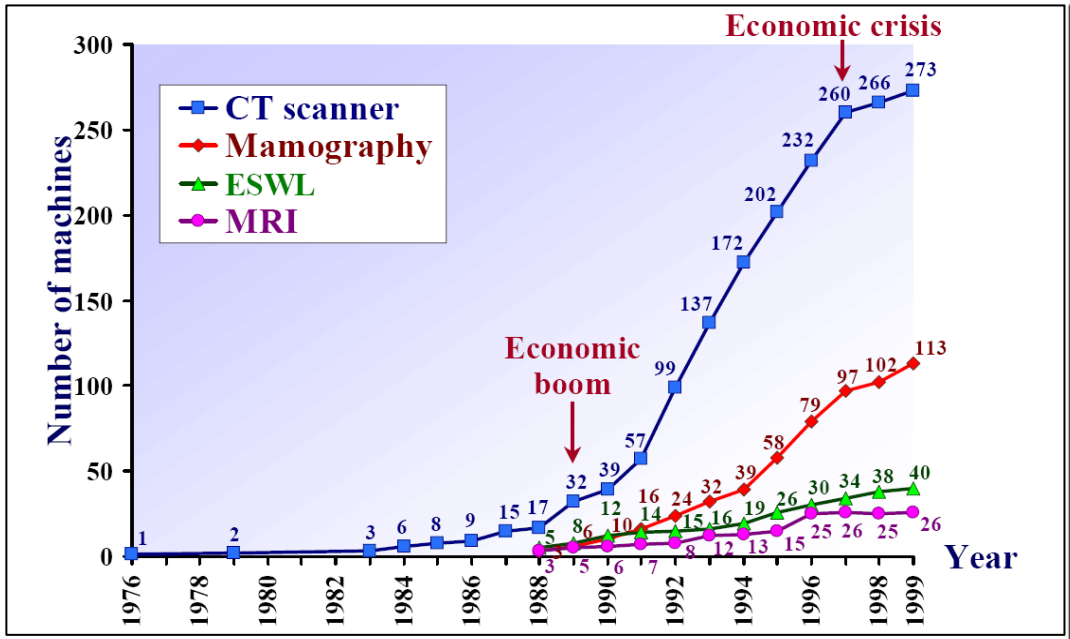
Types of new technologies in healthcare

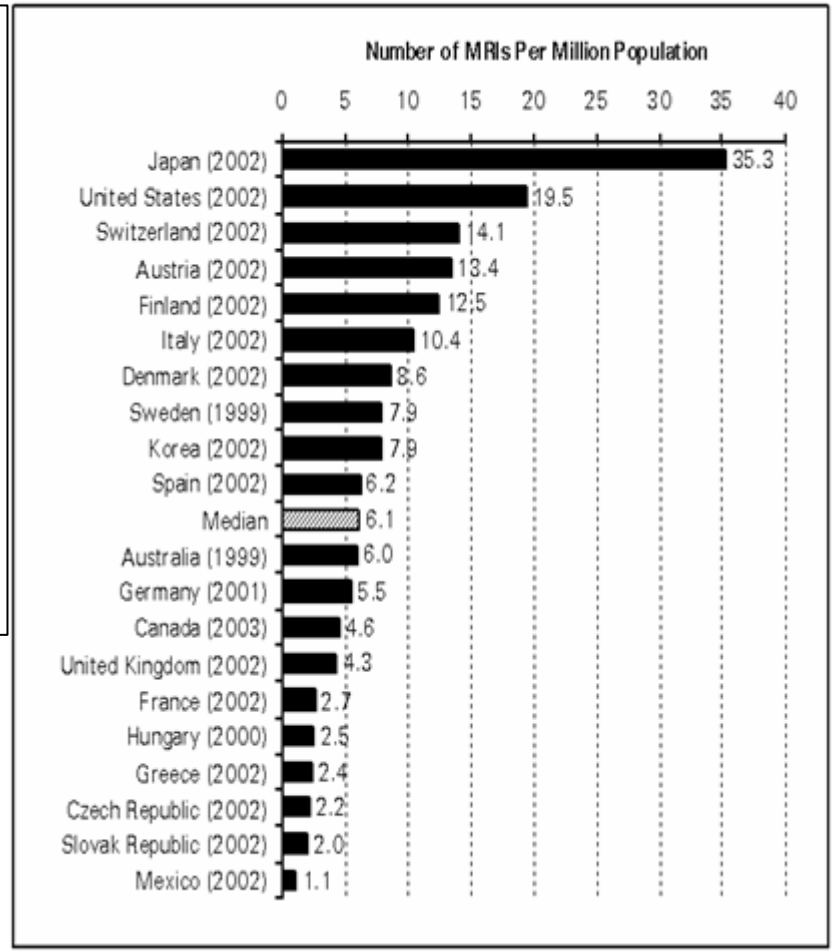
- Diagnostic and screening
- Monitoring
- Interventions (minimally invasive, robotics)
- Replacements, artificial organs and cellular technologies
- Drugs and drug delivery
- Information technology
  - Process-related
  - Educational
  - Telemedicine
  - Telecommunications
  - Expert systems
  - Public information

Minimally invasive procedures continue to rise

Use of technology is increasing, but at different rates



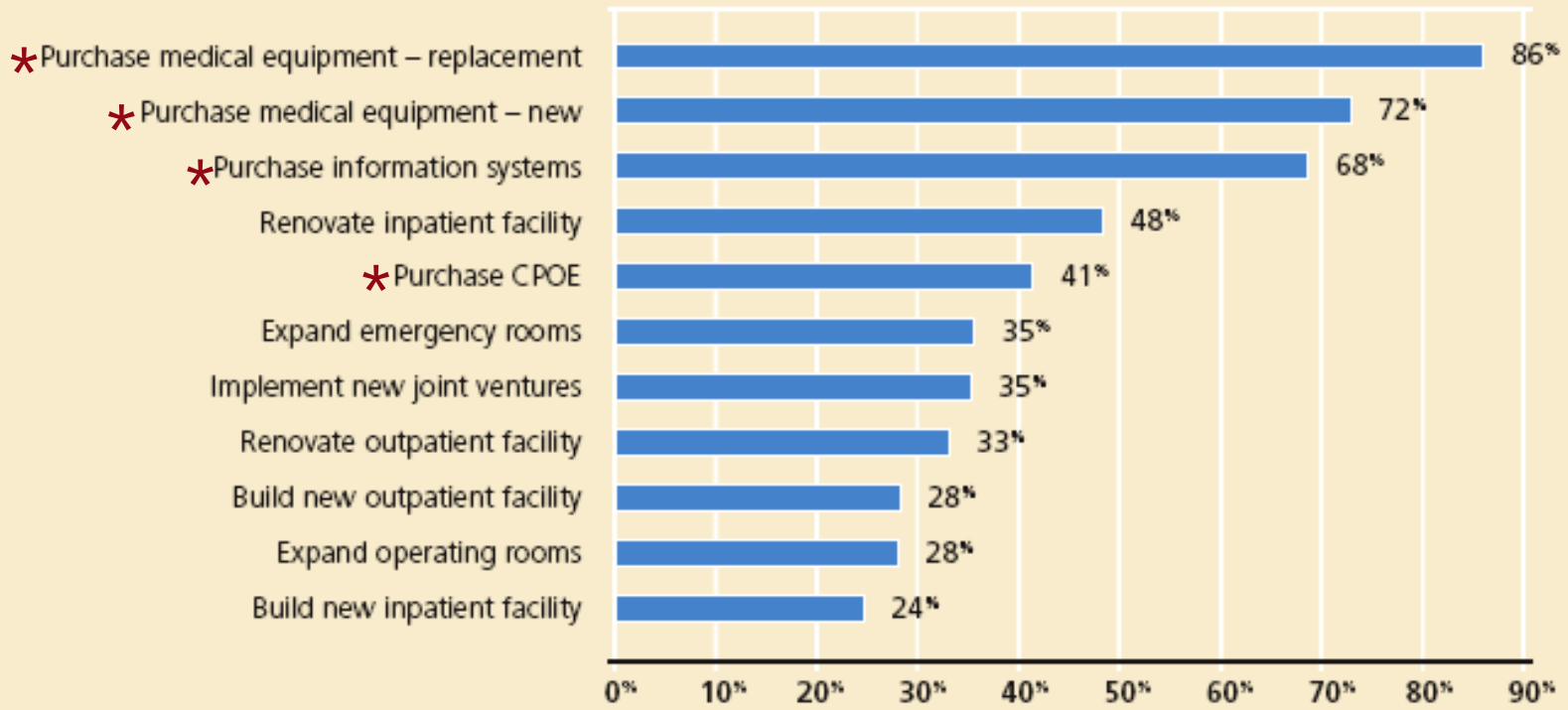
Medical equipment in Thailand from 1976-99



www.searo.who.int/LinkFiles/**Thailand**_Part_13-Medical_Technologies.pdf
http://www.cihi.ca/cihiweb/dispPage.jsp?cw_page=media_13jan2005_e

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?



http://www.deloitte.com/dtt/article/0,1002,sid%253D34239%2526cid%253D95977,00.html

Impact of technology on medical education

Education Inputs

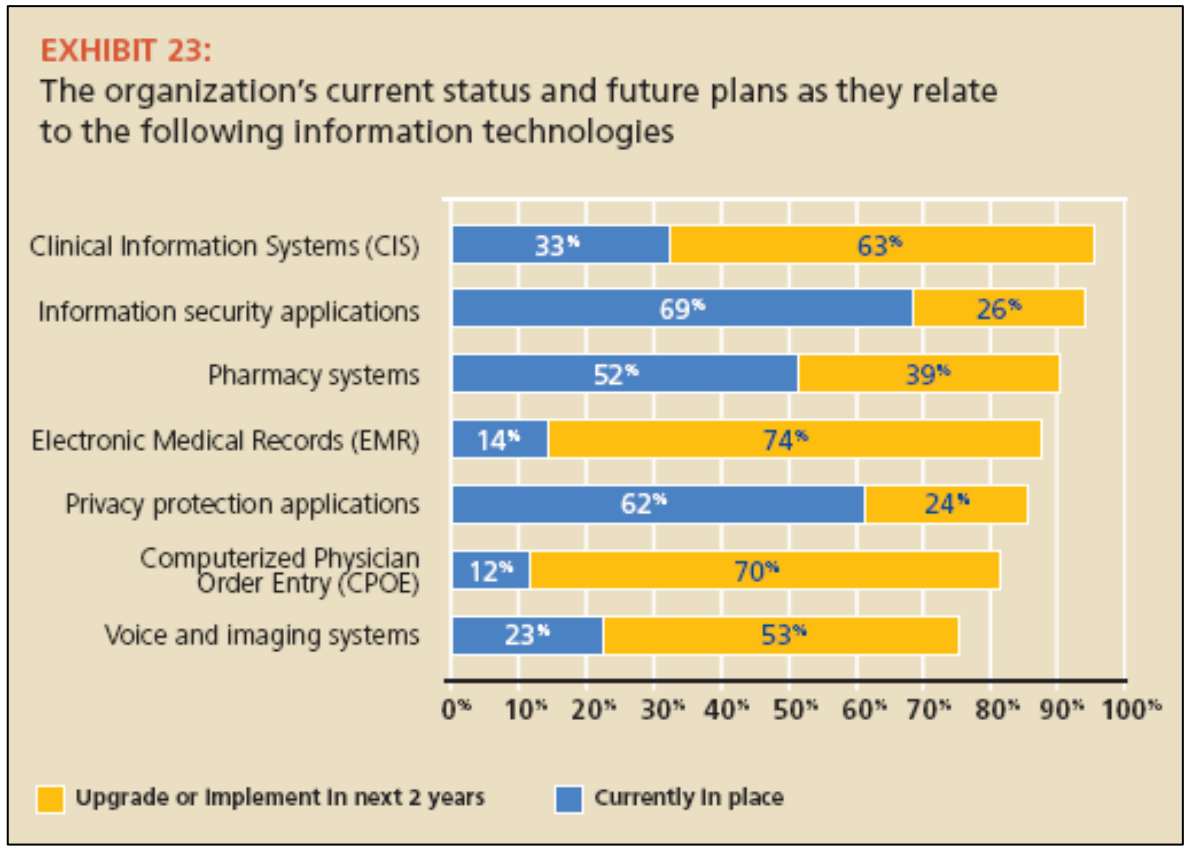
Education Interventions

Education outputs and outcomes

Inputs	*Desired Outcomes*	*Educational Strategies*
▪Increasing number of technologies and techniques and use of IT ▪Increased specialization ▪Multidisciplinary care ▪Care in the ambulatory and home setting ▪Increased health care costs	▪Physicians trained in use of IT and technology assessment ▪Highly specialized physicians ▪Physicians able to work in teams ▪Physicians trained in ambulatory setting ▪Physicians trained in cost-benefit analysis and health economics	▪Education in utilizing IT, virtual settings, diagnostic techniques. ▪Areas of concentration and expertise ▪Education in multi-departmental care teams ▪Education in ambulatory setting ▪Exposure to health economics and financial management

IT in medical education

Future trends in IT technology



http://www.deloitte.com/dtt/article/0,1002,sid%253D34239%2526cid%253D95977,00.html

Perceived future impact of technology

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

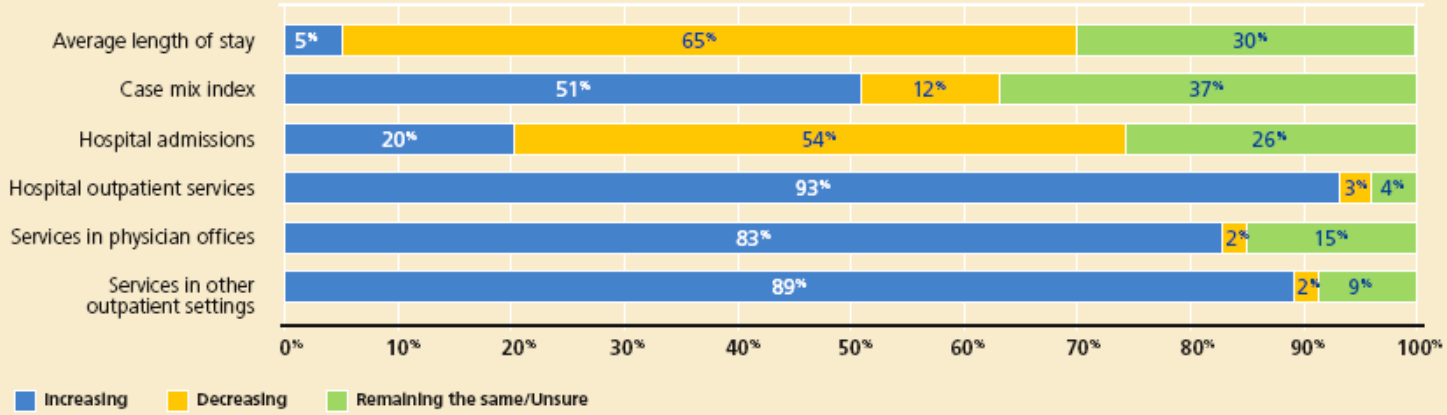
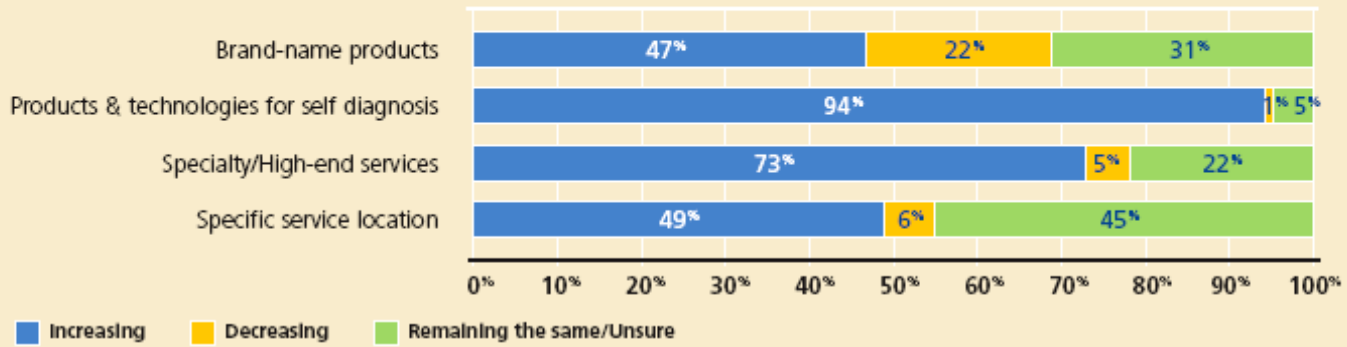


EXHIBIT 21:
In what ways will technology advances in life sciences impact consumer demand for how care is delivered?



http://www.deloitte.com/dtt/article/0,1002,sid%253D34239%2526cid%253D95977,00.html

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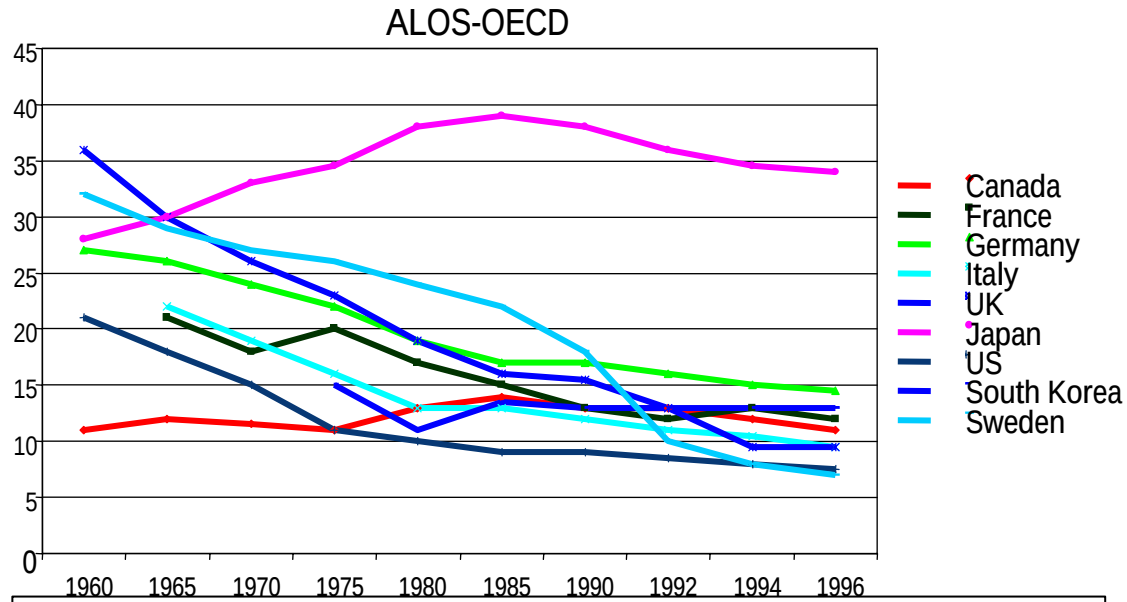
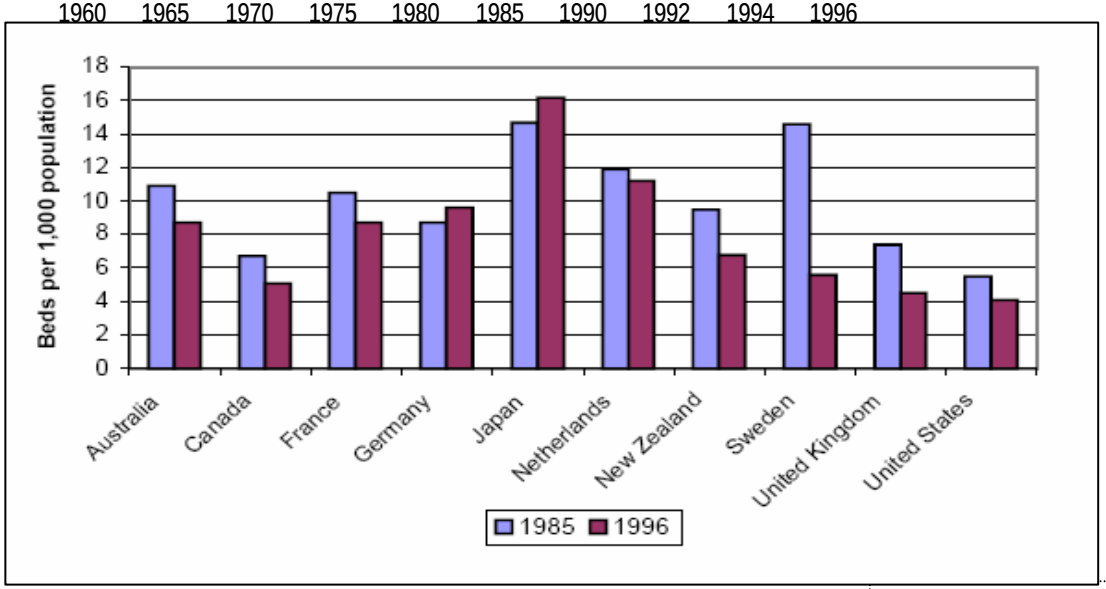
Some trends in healthcare delivery

- 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

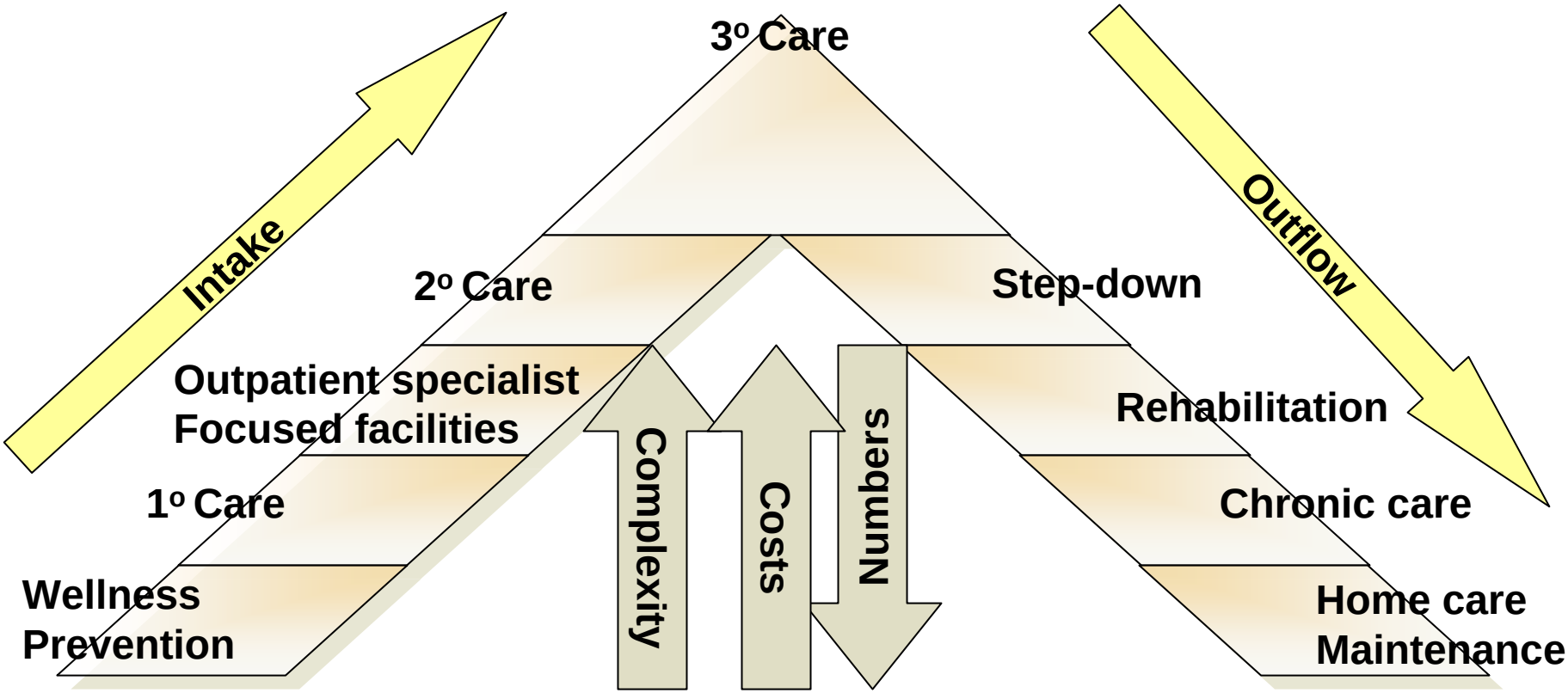
- **Payor based pressures**
- **New technologies**
- **Patient preference**

Results

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

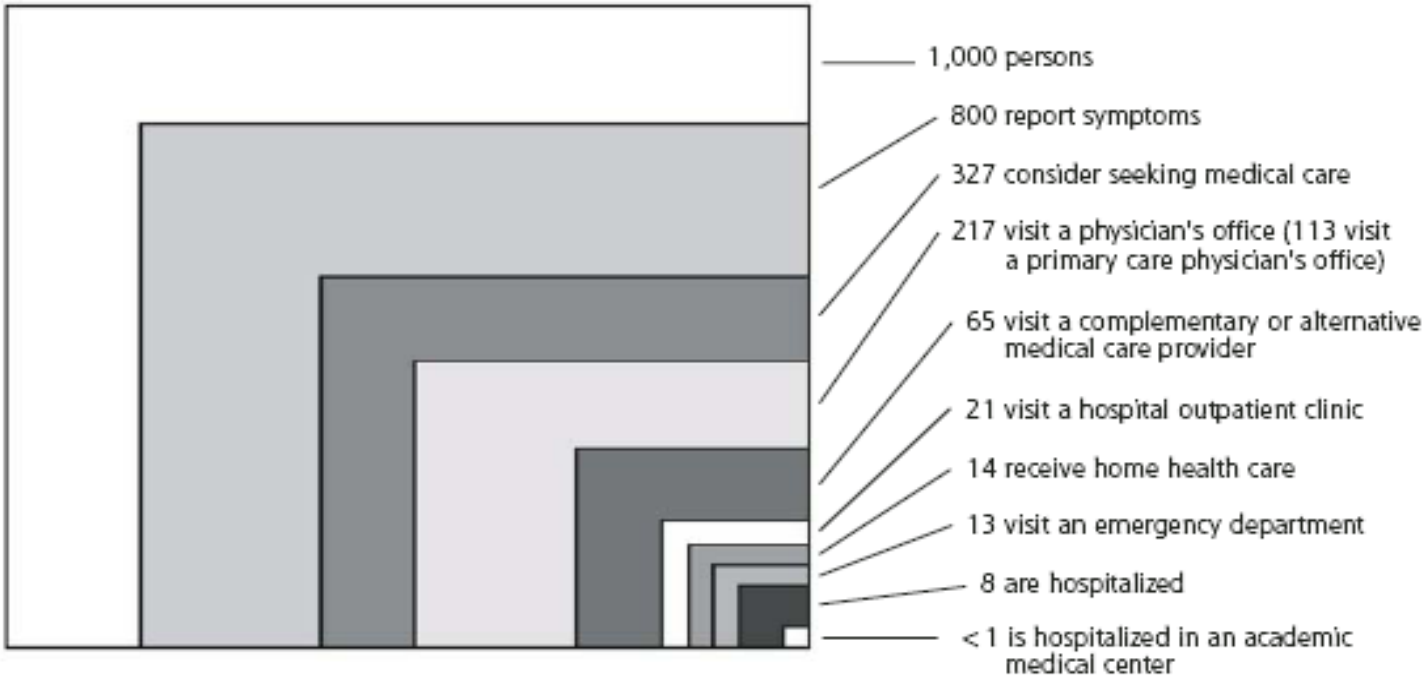
Source: "Hospital Reports" for Japan. "OEDC Health Data 98" for other nations.

Levels of Care in Healthcare Systems



Medical trainees spend most of their time where the fewest patients are

Figure 4. The ecology of medical care revisited.

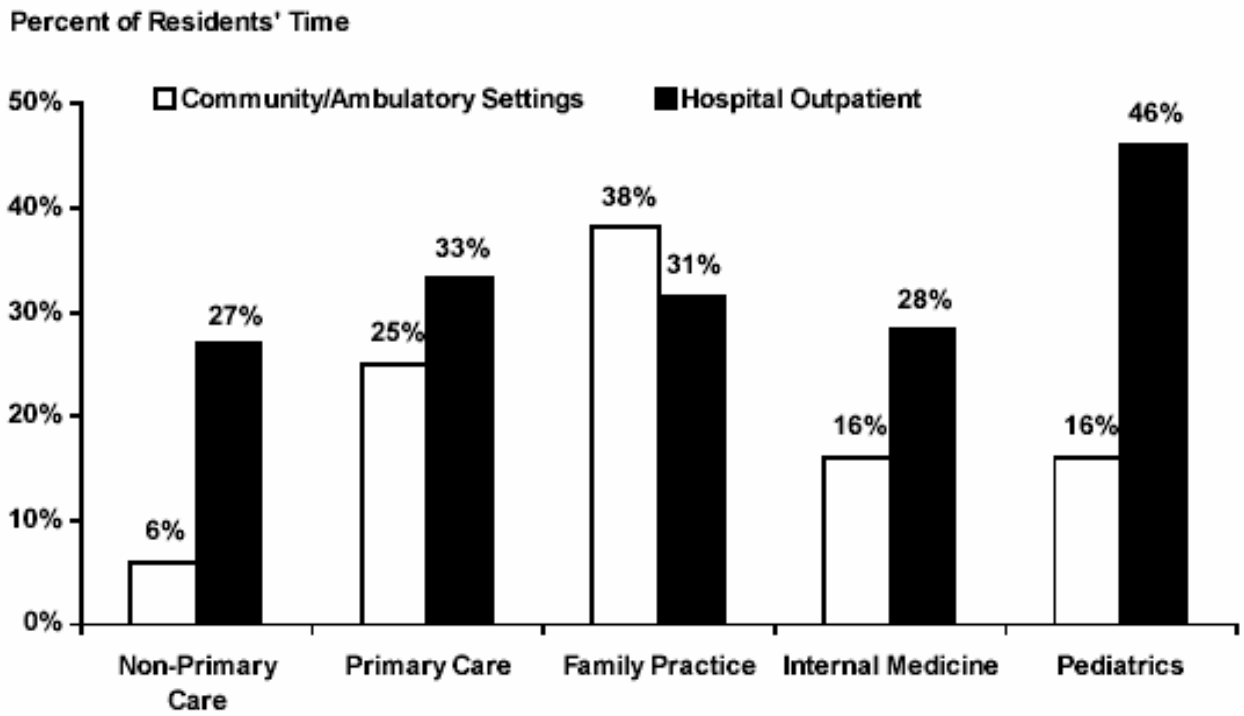


Note: All numbers refer to discrete individual persons and whether or not they received care in each setting in a typical month.

From: Green LA, Fryer GE Jr, Yawn BP, Lanier D, Dovey SM. The ecology of medical care revisited. *N Engl J* Med. 2001;344:2021-2025. Reprinted with permission from the Massachusetts Medical Society.

Residents spend increasing time in outpatient settings

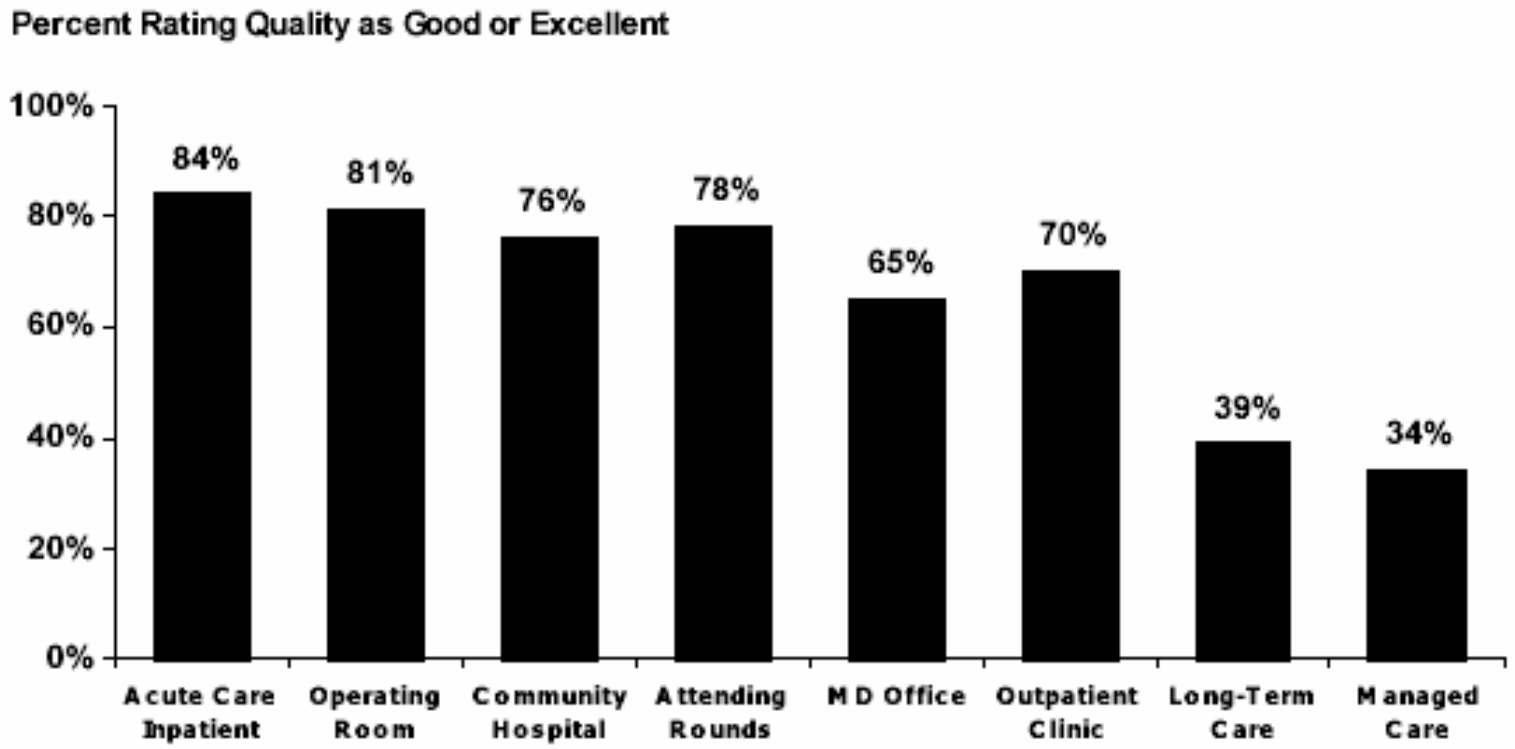
Figure 6
Percentage of Time Spent in Non-Inpatient Care Settings by Resident Physicians in Postgraduate Year 2 or Higher Positions, by Type of ACGME Accredited Programs, 2000



Source: AMA Annual Survey of GME Programs, JAMA Medical Education Issue, 2000.

Residents still consider traditional training sites as superior

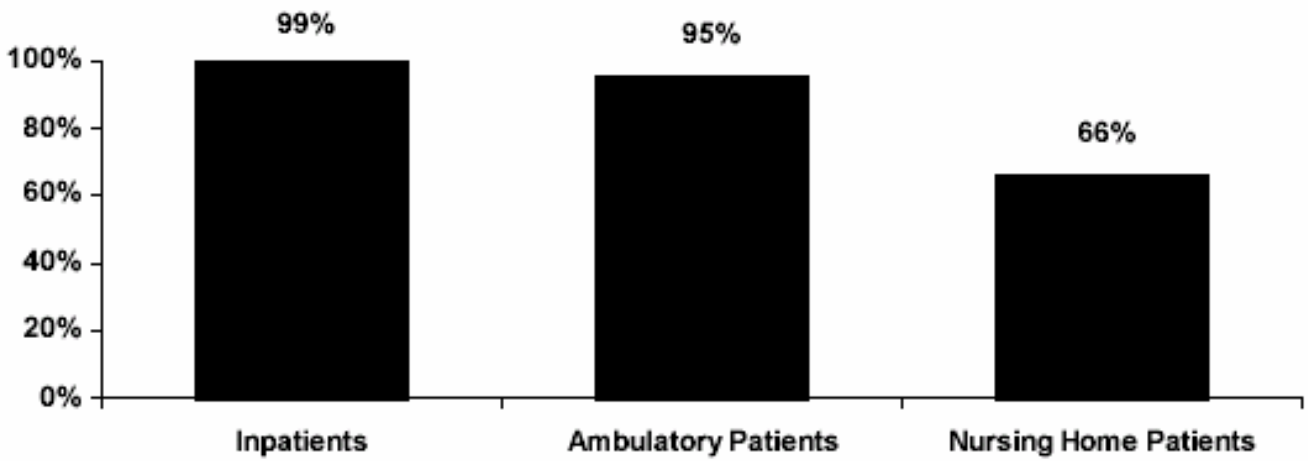
Figure 7
Residents' Ratings of Quality of Instruction by Site, 1998



Source: 1996 Commonwealth Fund Survey of Residents. Analysis by M. Gokhale at IHP. Regression adjusted percentages controlling for differences due to gender, specialty, IMG status, market stage, and US News rank. Percentages differ significantly at p<.05.

And feel adequately prepared for traditional practice situations

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



Source: 1996 Commonwealth Fund Survey of Residents. Analysis by M. Gokhale at IHP. Regression adjusted percentages controlling for differences due to gender, specialty, IMG status, market stage, and US News rank. Percentages differ significantly at $p<.05$.

Falling public sector funding, increased private investments

Public Sector Funding

	1980	2000	Drop
UK	89.4	80.9	-8.5
Ireland	82.2	73.3	-8.9
New Zealand	83.6	78.0	-5.6
Greece	82.2	56.1	-16.1
Switzer-land	67.5	55.0	-11.9

Source: AMA / Team analysis

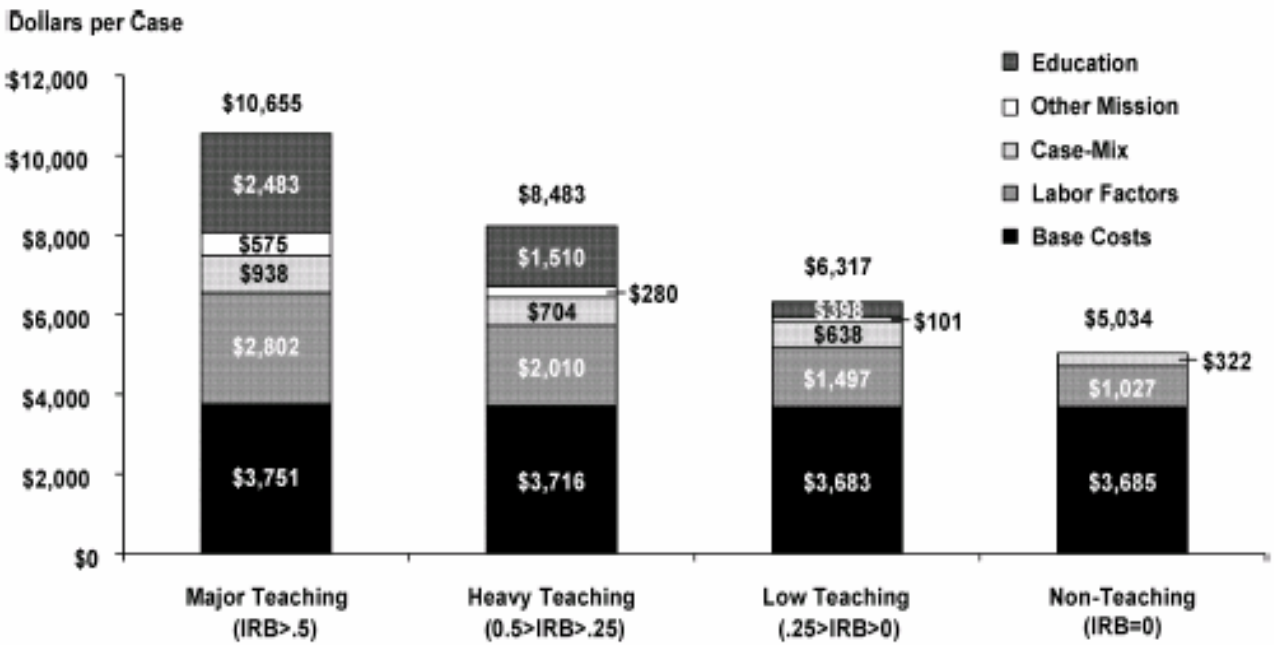
- Most governments are reducing their healthcare spending
- Private investments growing in healthcare delivery
- Much deregulations occurring in certain countries like the NHS in the UK

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

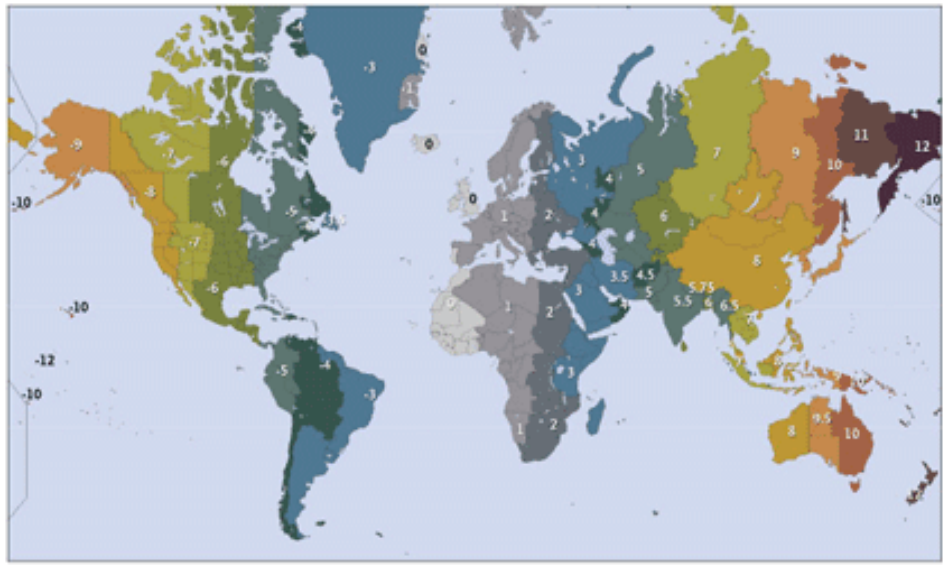
Figure 1
Distribution of Costs Due to Mission-Related Activities by Type of Institution, 1998



Source: Georgetown University analysis of data in Coleman et al., Estimating Provider Training, Standby Capacity, and Clinical Research Costs Using Regression Analysis. Lewin Associates, 1999.

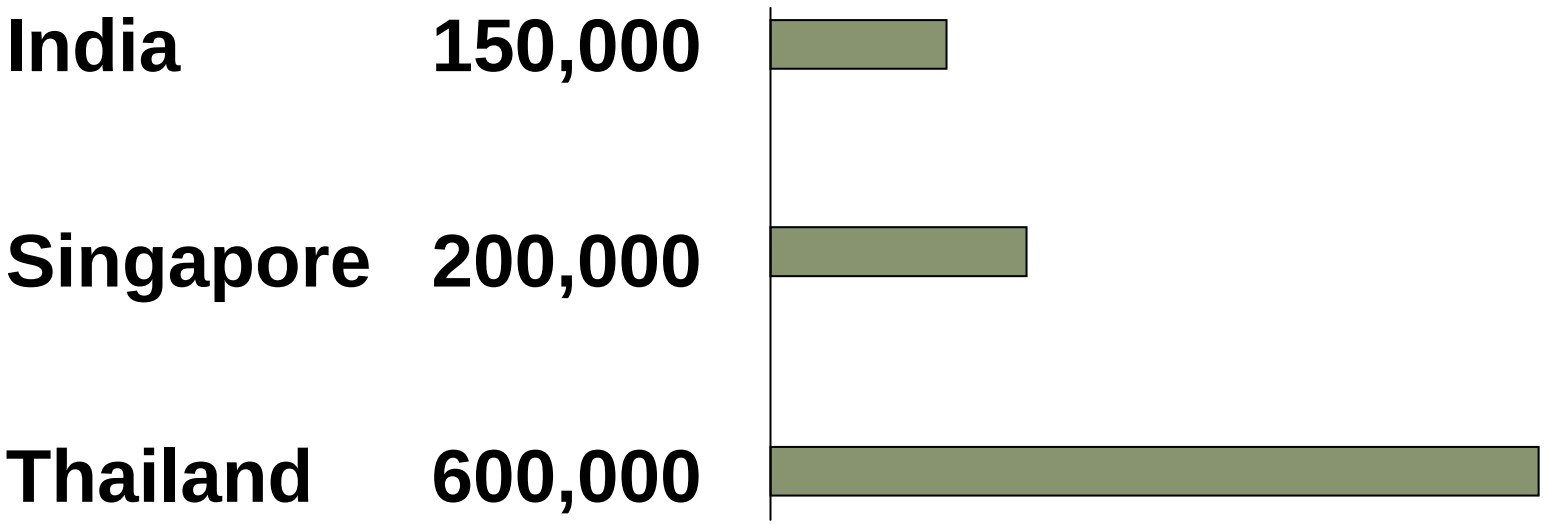
Outsourcing and 24/7

- 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.



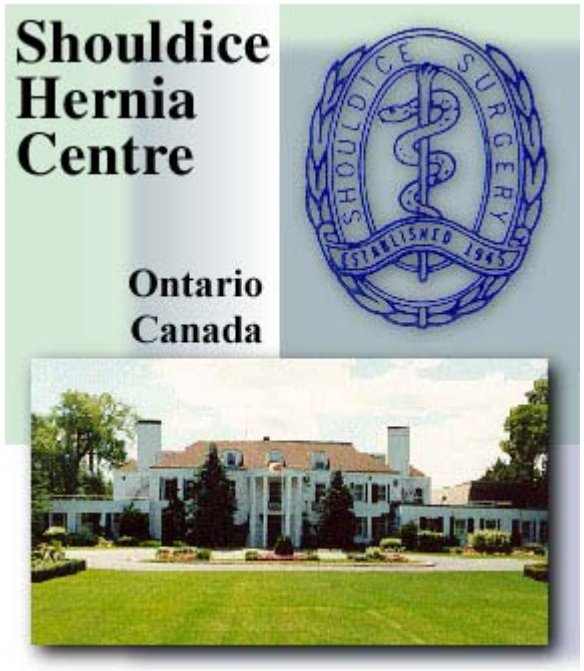
Wachter. NEJM 2006;354:661

International patients 2004



Estimate of India's medical tourism volume by 2012: $2.3 Billion

Specialty clinics



http://www.shouldice.com/

'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

Medicine in the mall

Is "Wal-Mart" medicine in the future?

Pa Med. 1996 Oct;99(10):12.

Getting your health care at Wal-Mart

Wednesday, October 05, 2005
By Jane Spencer, The Wall Street Journal

http://www.minuteclinic.com/

Quick+Health™

http://www.quickhealth.com/index.htm

Impact of trends in health care delivery on medical education

Education Inputs

Education Interventions

Education outputs and outcomes

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

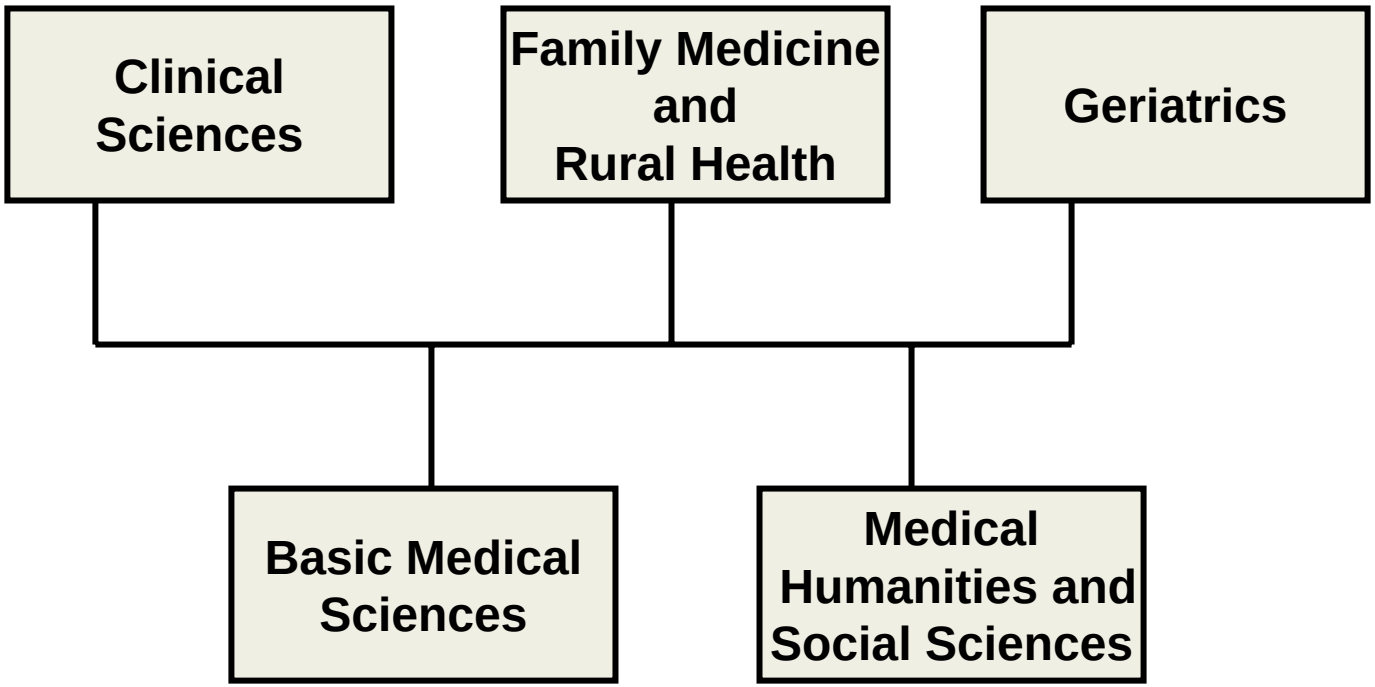
Health care systems	46.2
Medical economics	64.0
Managed care	56.0
Culturally appropriate care	23.4
Culturally-related health behaviors	24.9

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



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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

	Australia	Canada	New-Zealand	UK	USA
Rated care as excellent or very good	55%	54%	58%	48%	50%
Waited less than 1 month	51%	37%	43%	38%	63%
Waited 1 to less than 4 months	26%	36%	31%	24%	32%
Waited 4 months or more	23%	27%	26%	38%	5%

Source: Robert Blendon et al (HSPH), Health Affairs May/June 2002

Citizens' views on their health care system and general access problems 2001

	Canada		UK		USA	
	Below average income	*Above average income*	Below average income	*Above average income*	Below average income	*Above average income*
There is so much wrong with the system that it should be completely rebuilt	23%	*13%*	19%	*17%*	35%	*22%*
Very or extremely difficult to see a specialist	20%	*14%*	18%	*9%*	30%	*8%*
Often or sometimes unable to get care because it is not available where you live	23%	*17%*	14%	*11%*	28%	*15%*

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

	Switzerland	*US*
Consumers	68.2%	23.3%
Government	25.4%	44.5%
Employer or other	6.4%	32.2%

Herzlinger, Parsa-Parsi. JAMA 2004;292

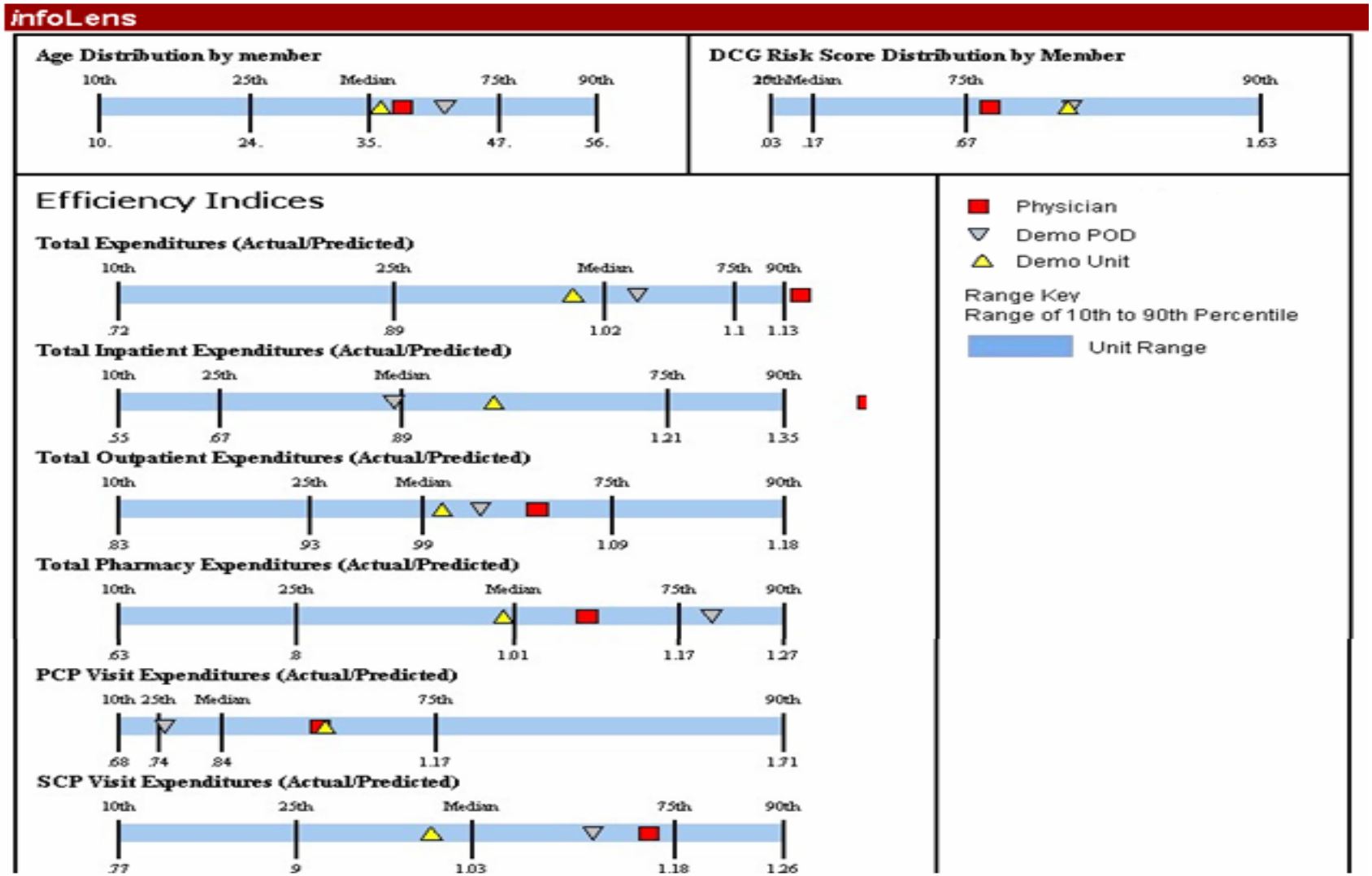
Increased transparency to consumers

http://www.myhealthfinder.com

AQHC New York State Inpatient Quality Indicators 2005

http://www.mediguide.com/

Dashboards to benchmark performance



Impact of consumerism on medical education

Education Inputs

Education Interventions

Education outputs and outcomes

Inputs	*Desired Outcomes*	*Educational Strategies*
▪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

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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”

Value = Quality/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

Health Grades Inc. Report, July 2004

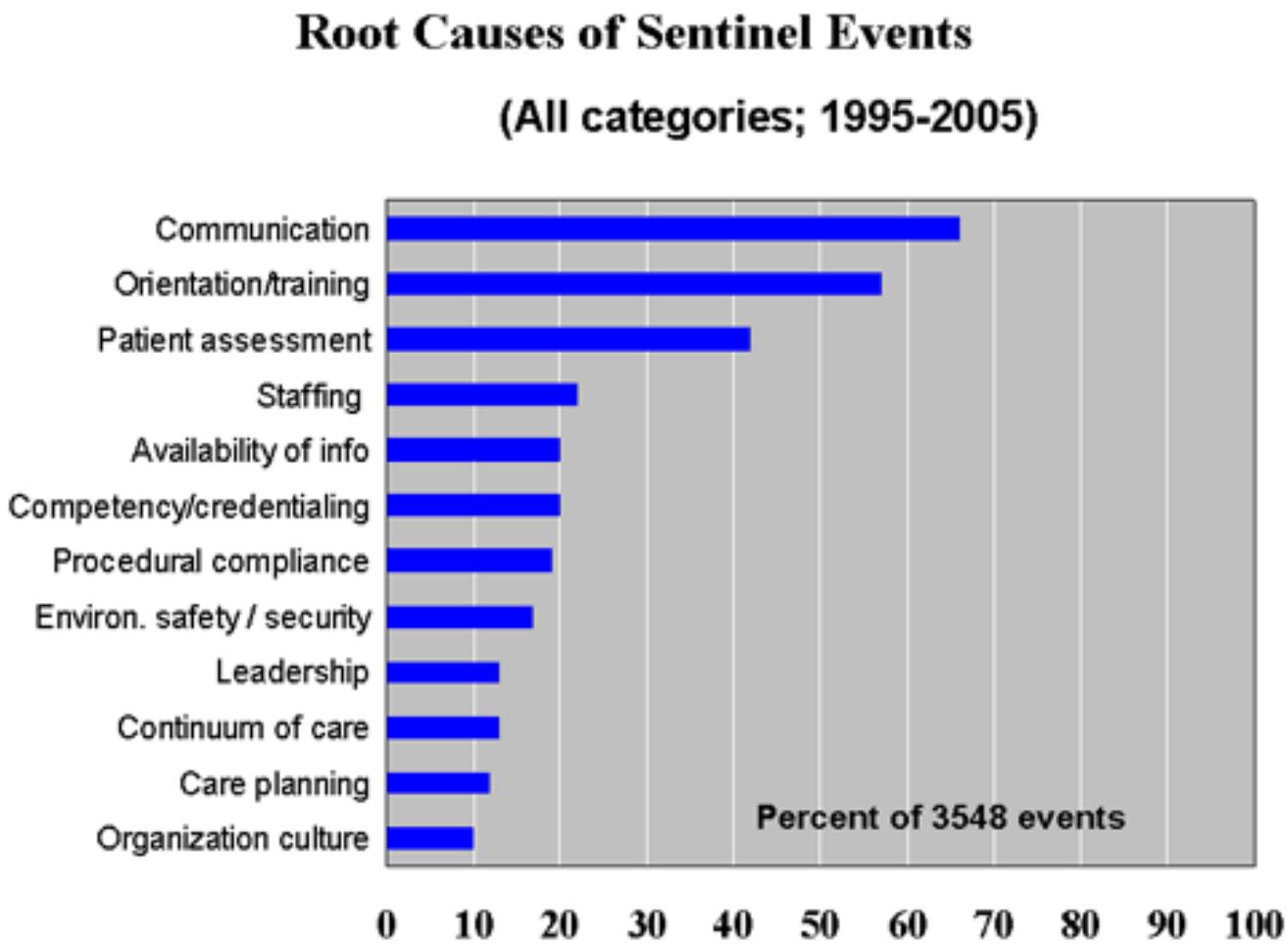
Disclosure – the patient-doctor gap

- 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

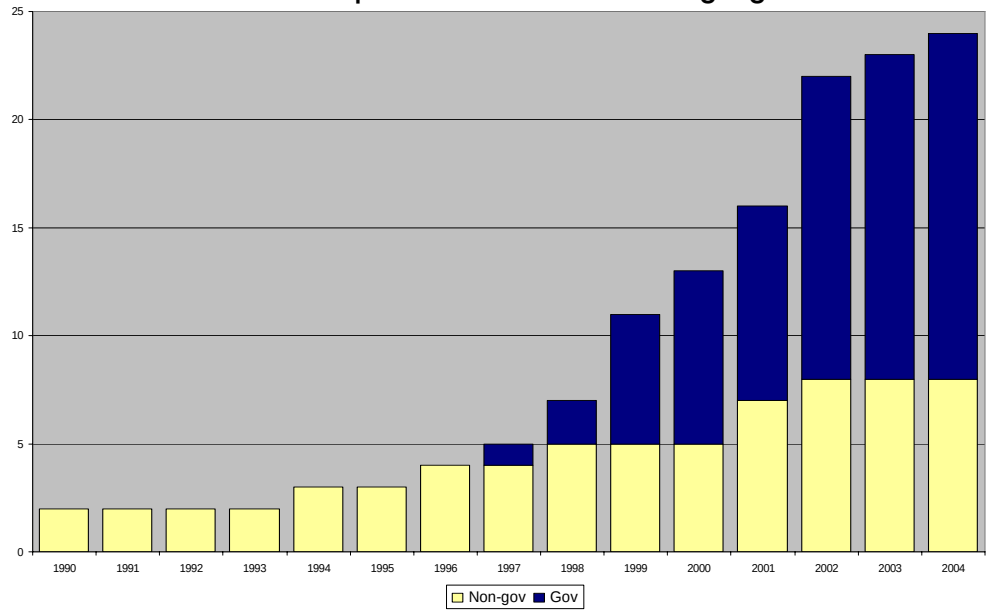


External quality benchmarks are increasing

JCI Accredited Hospitals

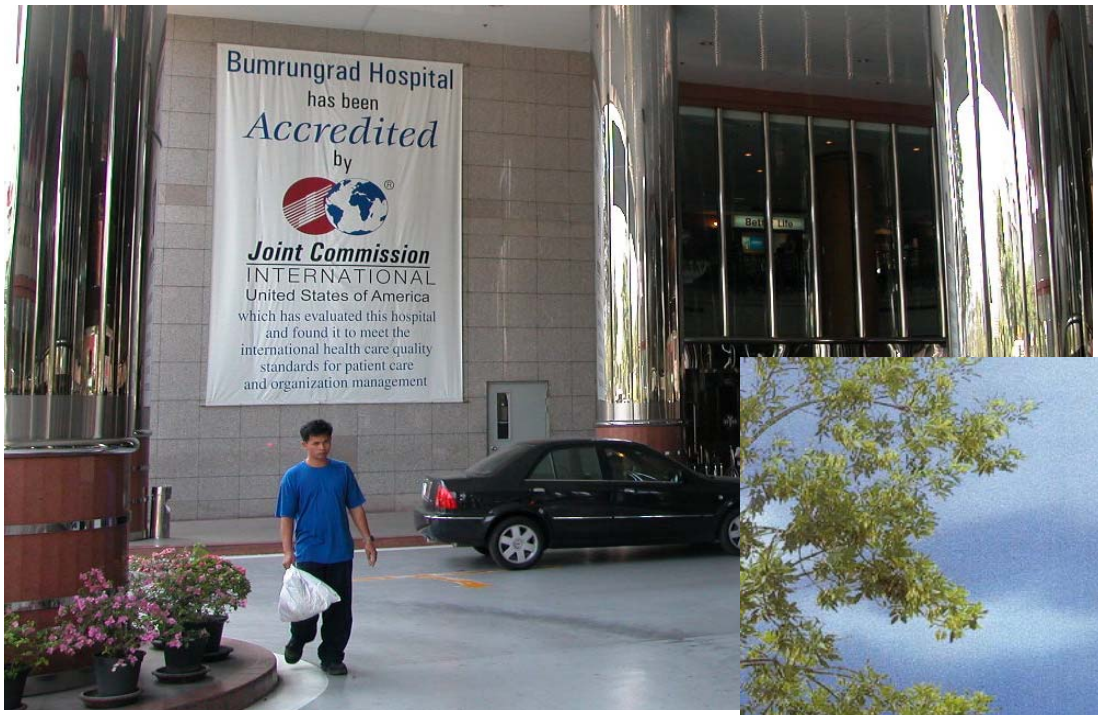
	2000	2006
Africa	0	1
Asia	0	19
Europe	2	40
Middle East	1	7
South America	0	4
Total	3	71

Growth in Europe across all Accrediting Agencies



Source: JCI

The drive to international standards



Impact of effectiveness and efficiency on medical education

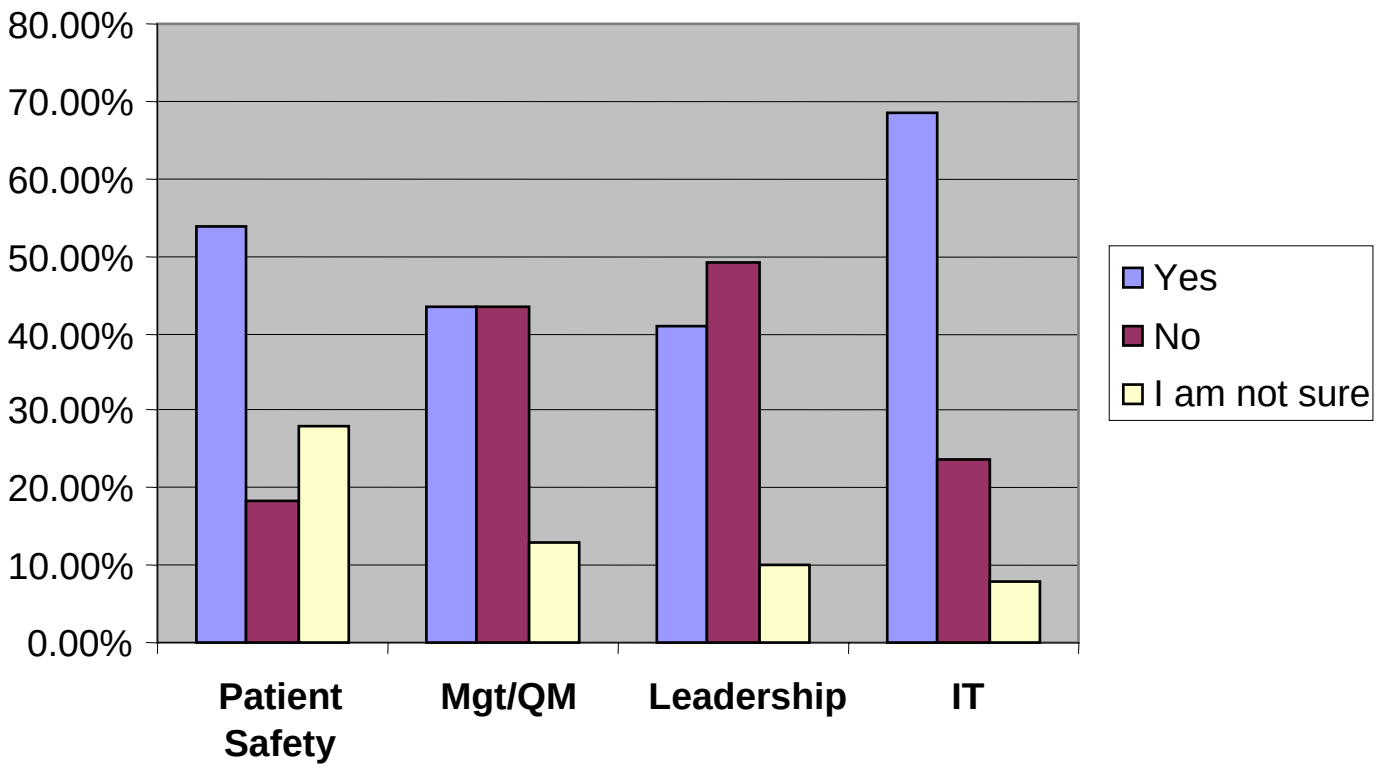
Education Inputs

Education Interventions

Education outputs and outcomes

Inputs	*Desired Outcomes*	*Educational Strategies*
▪Greater emphasis on EBM and protocols where applicable	▪Physicians trained in EBM and access to information	▪Education in EBM and use of databases
▪Greater pressure on quality processes, process management and knowledge management	▪Physicians trained in “production” processes and quality and knowledge management	▪Education in quality management, process management and team and institutional learning
▪Greater transparency of price and outcomes	▪Physicians trained in access to latest information, including costs	▪Education in health systems metrics
▪Greater financial pressures	▪Physicians with greater understanding of health economics	▪Education in health economics
▪Increased stakeholder involvement	▪Physicians able to work with patients and payers	▪Education in health systems dynamics

A recent snapshot about whether some related subjects are taught



Polling of APMEC attendees, February 20, 2006

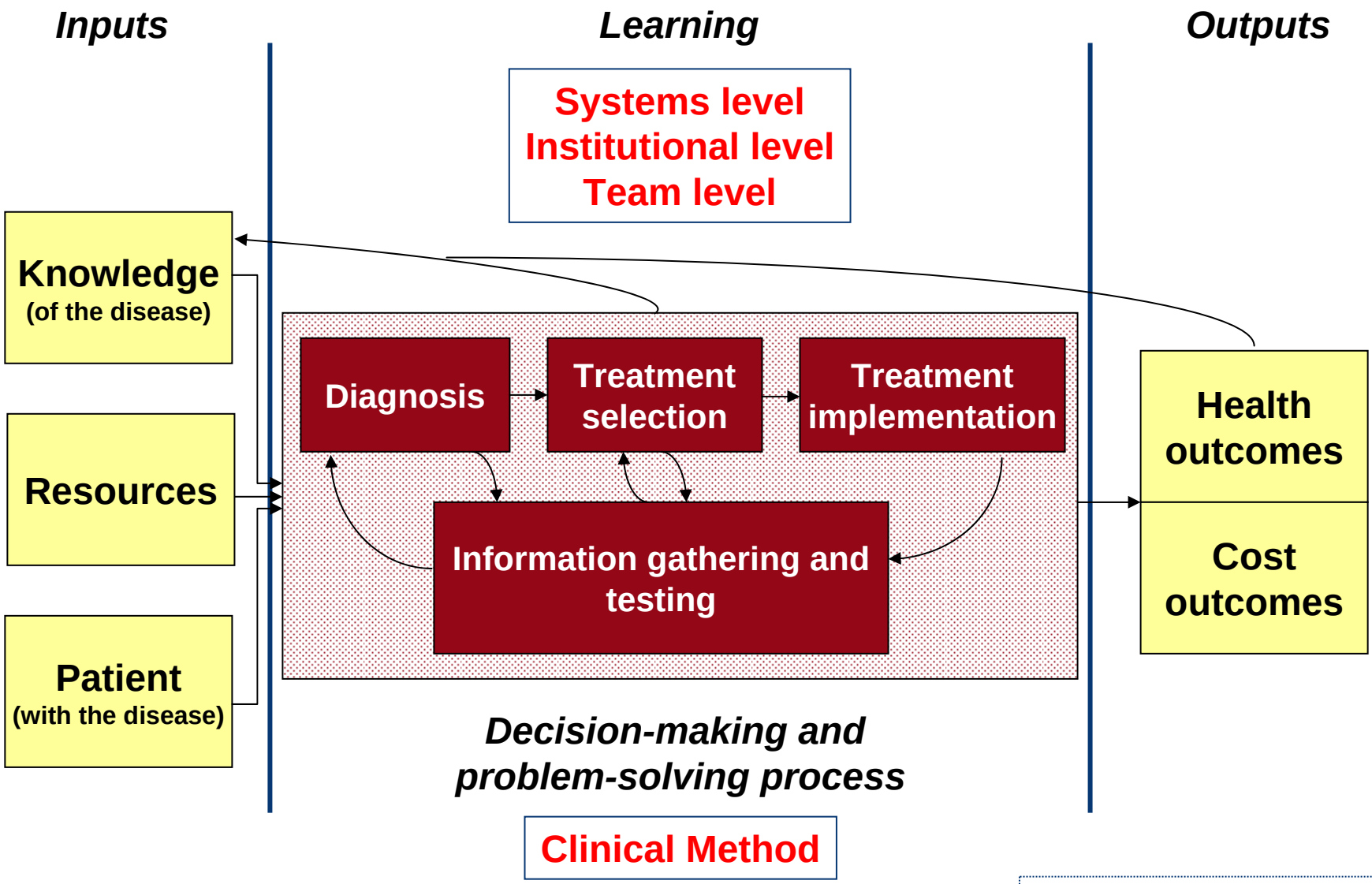
2005 survey of graduating US medical students

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

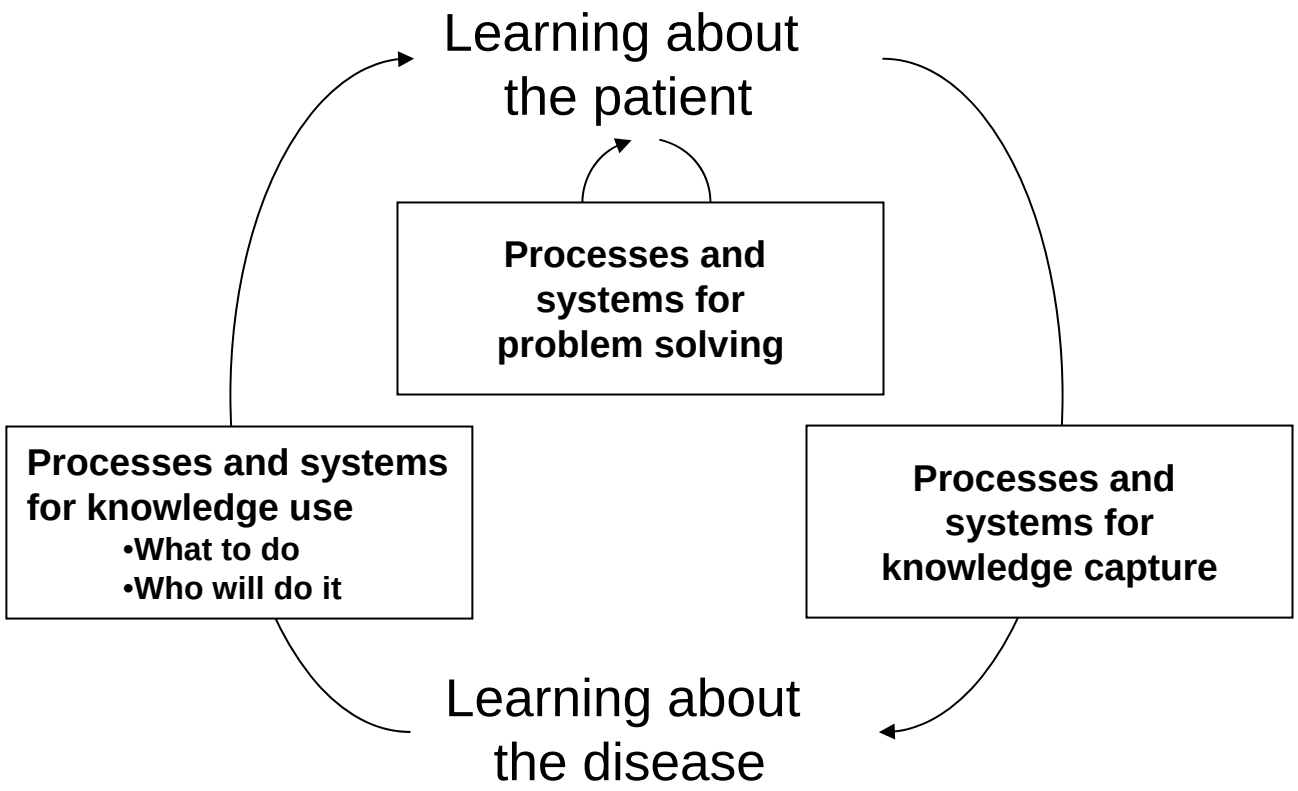
Source: AAMC 2005 Medical School Graduation Questionnaire

Individual learning is not enough



adapted from Bohmer, R. HBS 2003

Managing learning



adapted from Bohmer, R. HBS 2003

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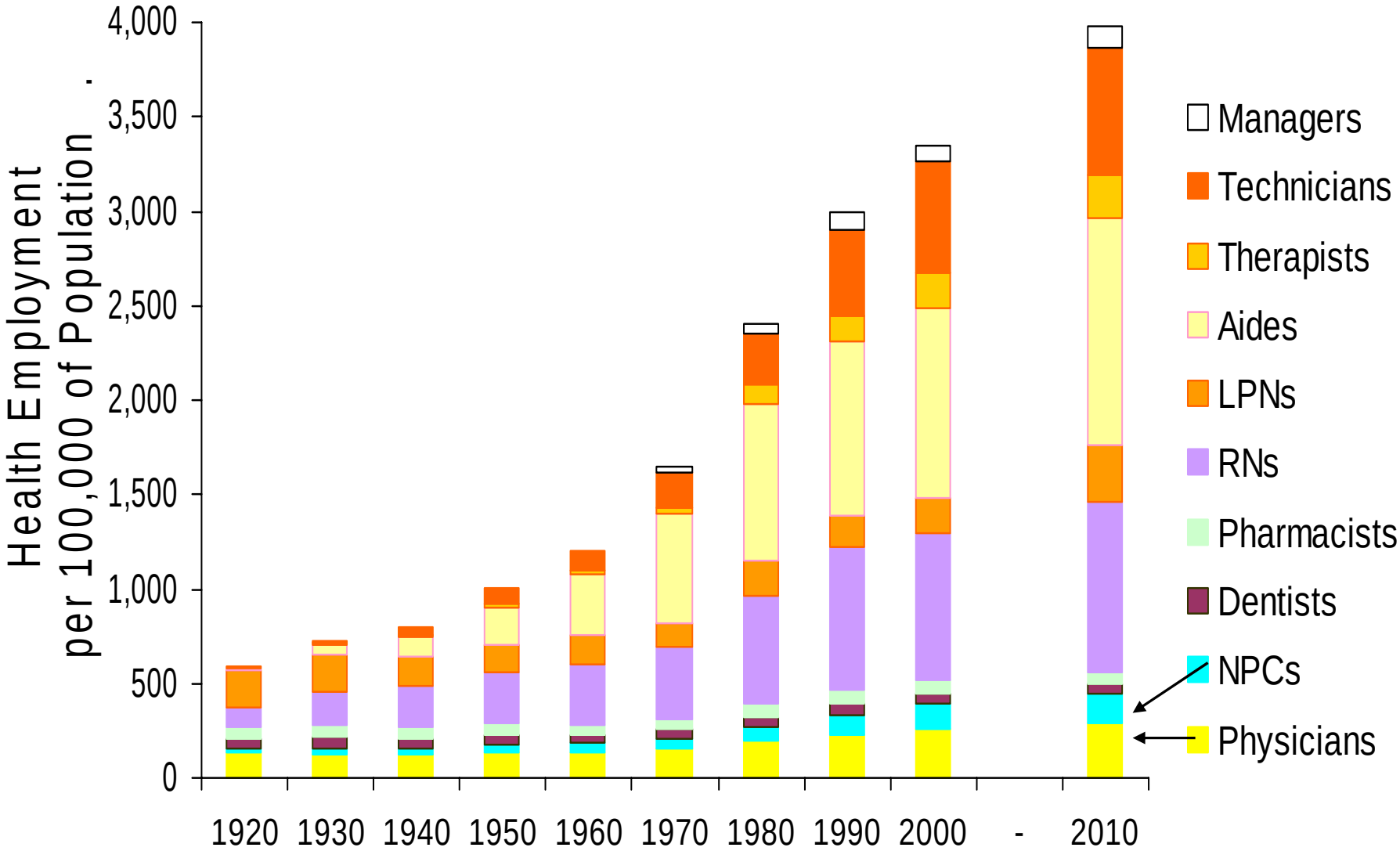
Some aspects of changing professional roles

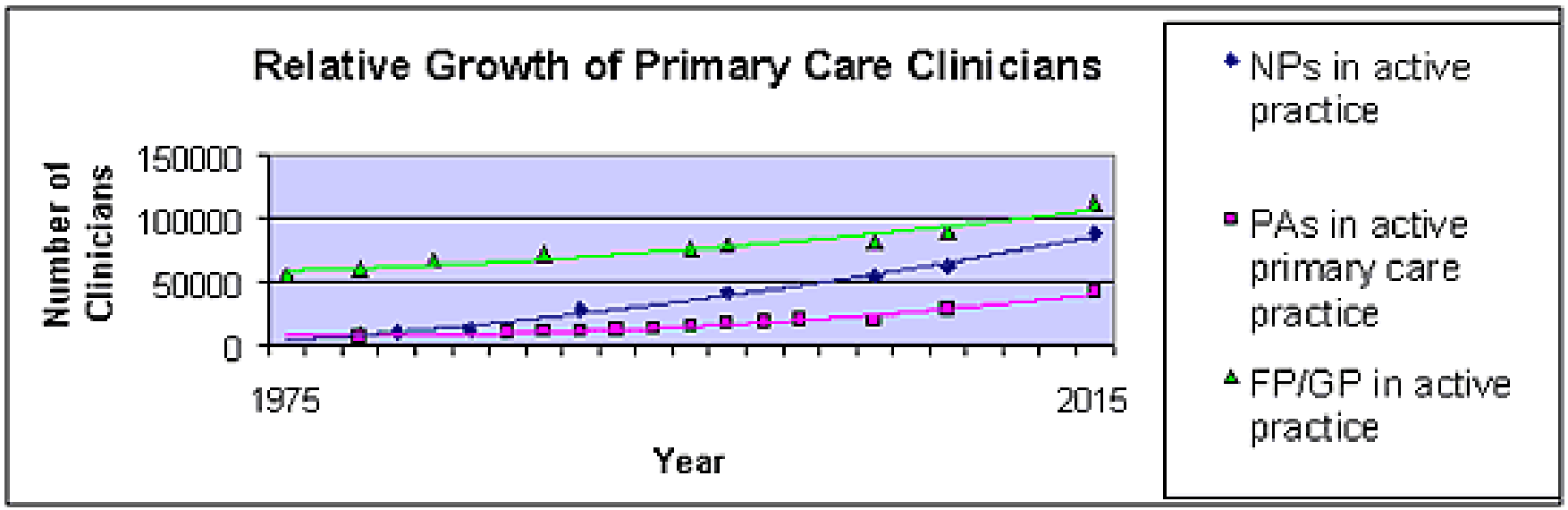
- The nature of specialties is changing (e.g. hospitalists, intensivists, emergency physicians, etc.)
- The number of multidisciplinary clinics and approaches to medical care is increasing (e.g. cardiac care, women's health, oncology, etc.)
- The roles and responsibilities of non-physician health care 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



Adapted from Kendix and Getzen and the Bureau of Labor Statistics

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

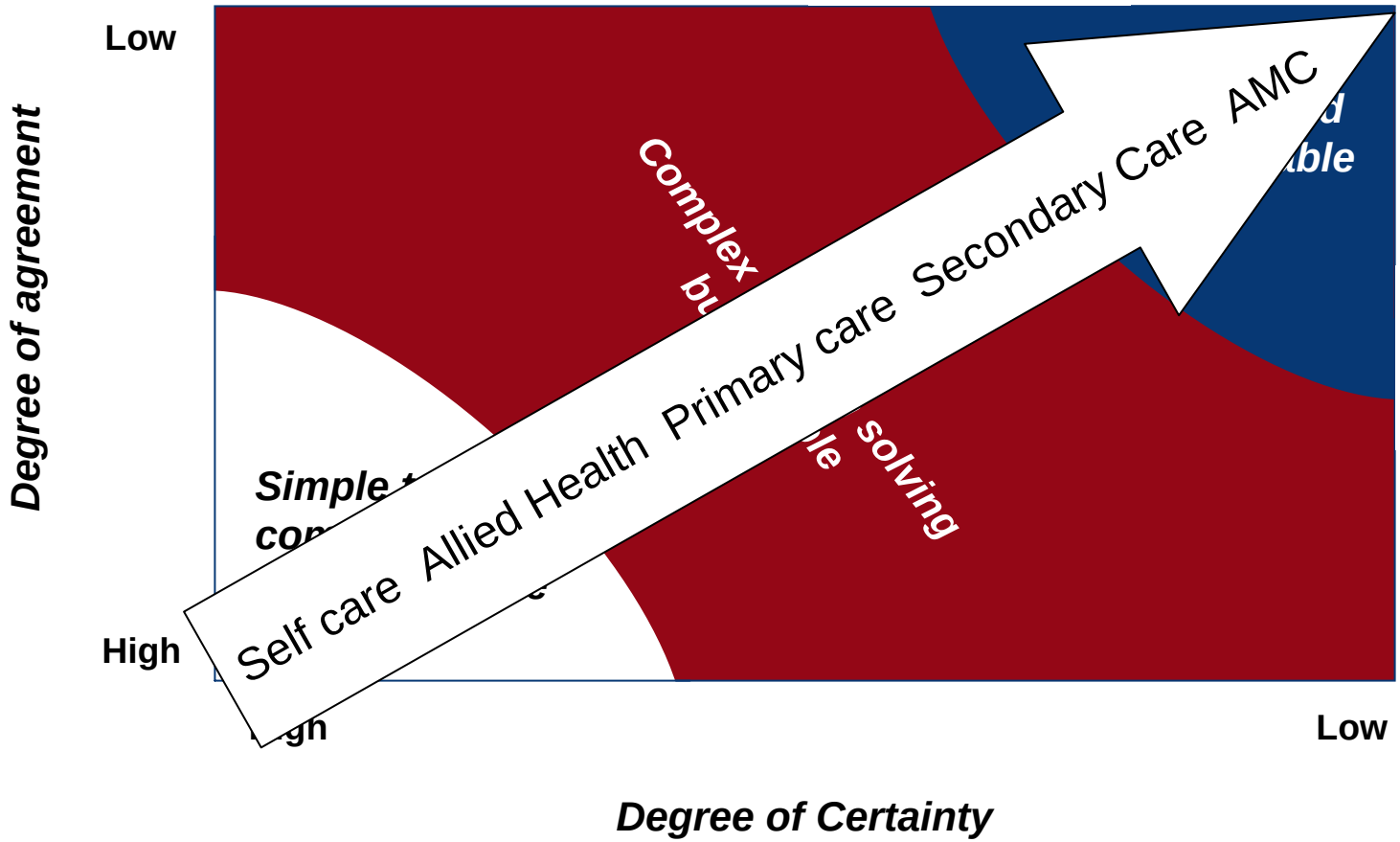
Education Inputs

Education Interventions

Education outputs and outcomes

Inputs	*Desired Outcomes*	*Educational Strategies*
▪New specialty mix in hospitals ▪Increasing number of clinical centers ▪Increasing number of Allied Health professionals ▪Greater role and independence of AHP	▪Physicians trained in new specialties ▪Physicians trained in "multidisciplinary care and processes" ▪Physicians trained to work in teams with AHPs ▪Physicians trained to supervise care not administer	▪Education in location-specific care ▪Education in disease management and team care ▪Education in health teams ▪Education in management and team leadership

Characteristics of medical care based on evidence and its resultant modes of delivery



Source: Plsek PE, Greenhalgh T. BMJ 2001;323:625-28

So what has happened so far in medical education?

The development of global competencies

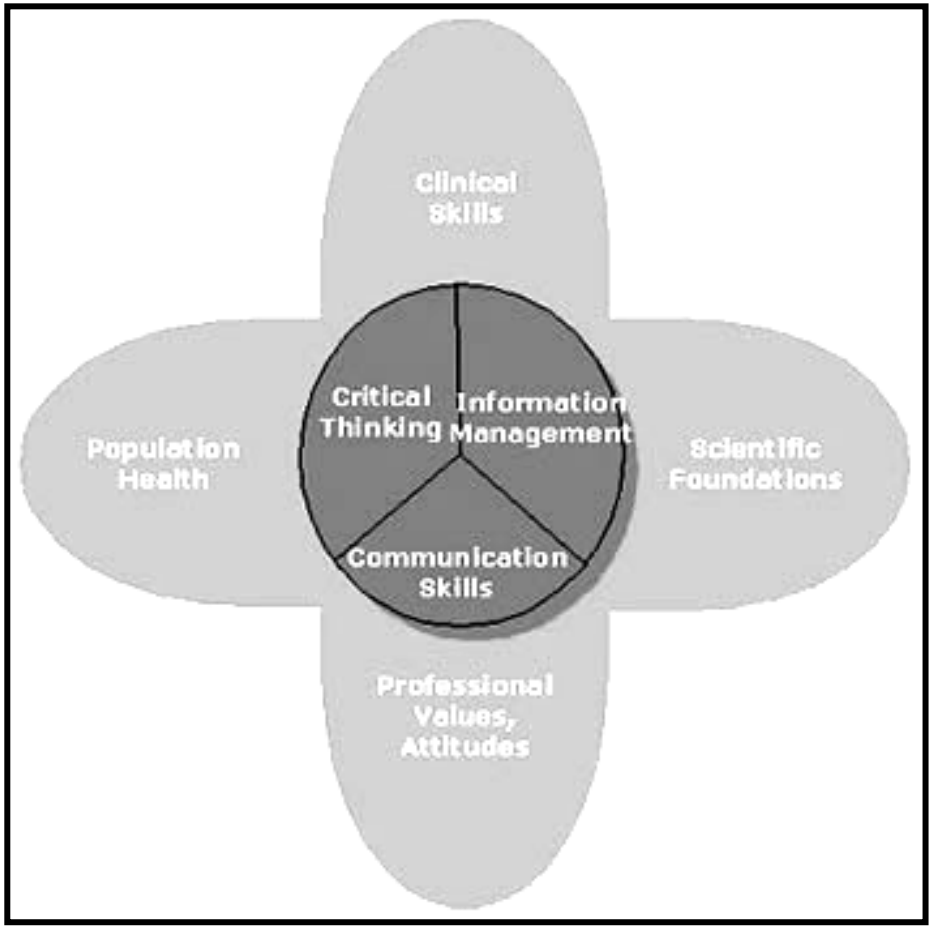
USA	Canada	Germany	Japan
AC			

Patient c… ed care
Medical … on
Practice-… learn… impr…
Interpers… com… skill…
Professio… ning
System-b… prac… lls and e kills

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

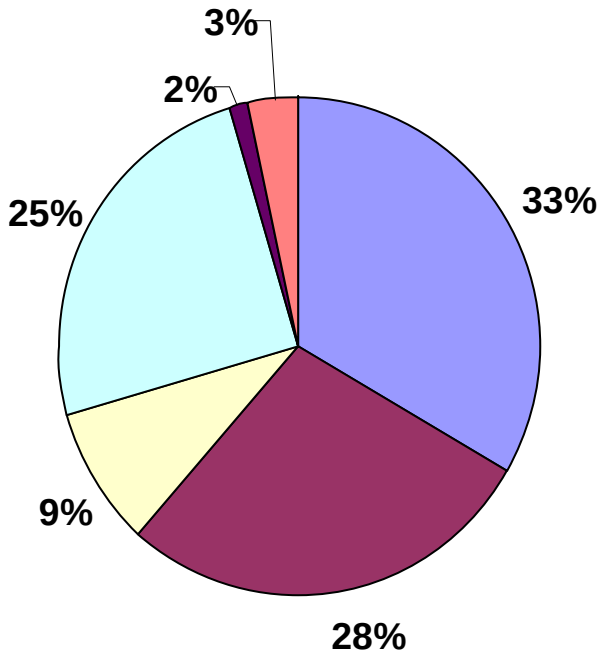
Spectrum of proposed international standards



Outcomes based
IIME

Process based
WFME

Who should do the accreditation?



Polling of APMEC attendees, February 20, 2006

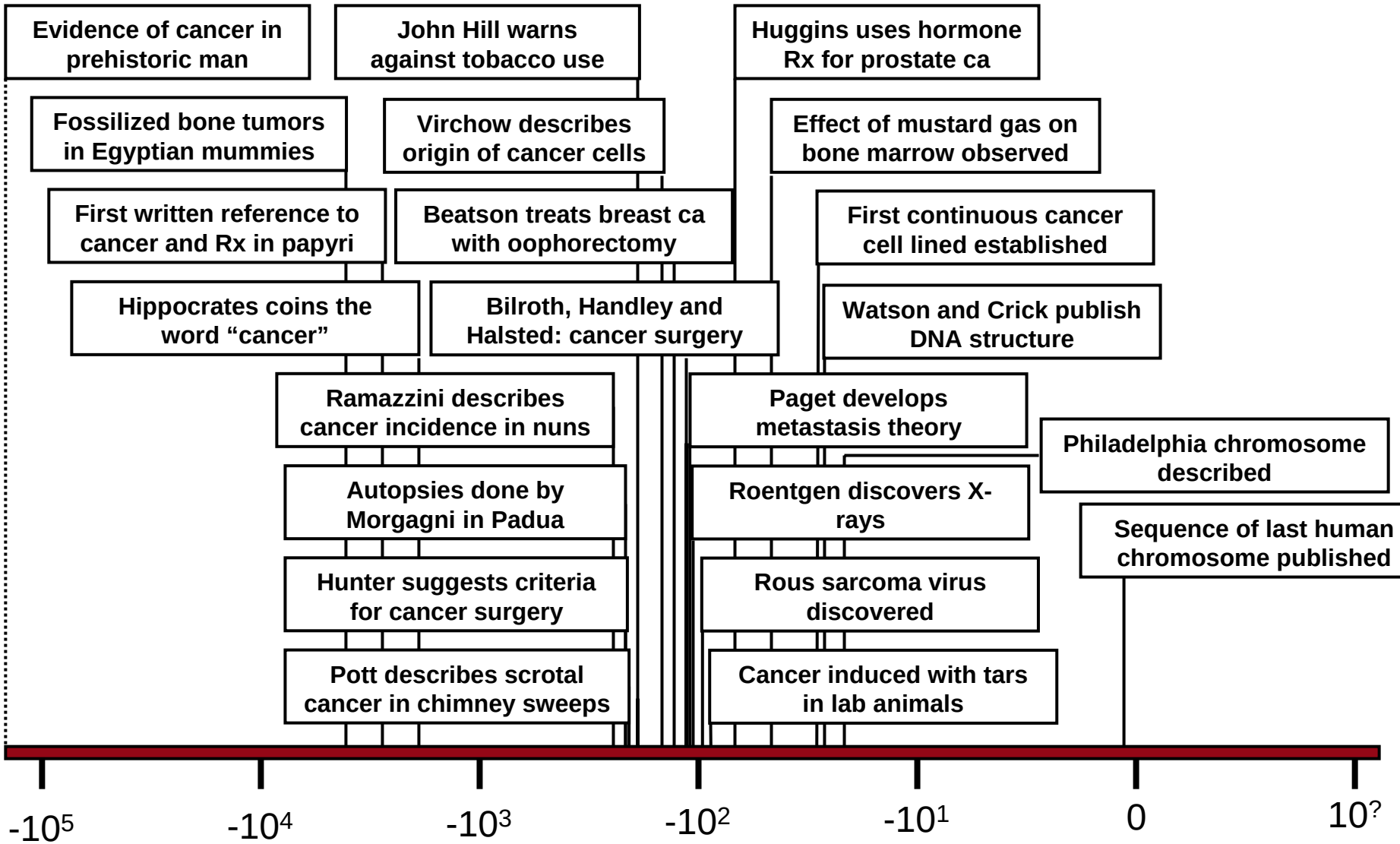
Some recent trends of medical education

- 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”

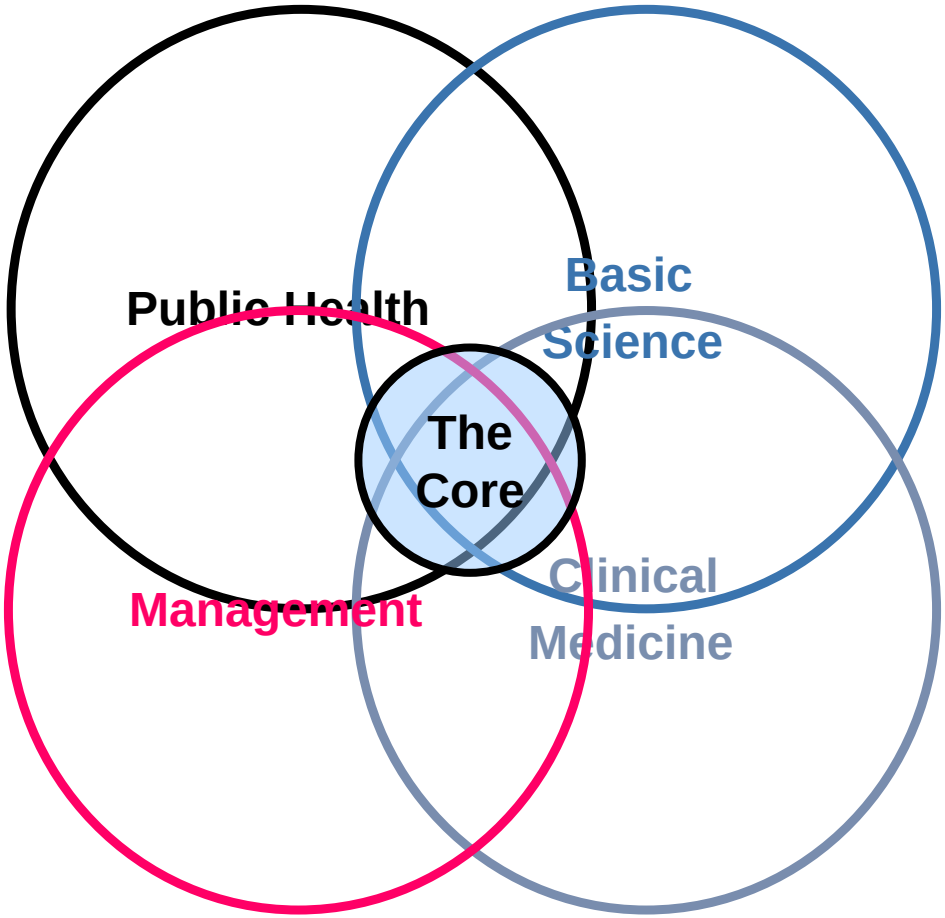
Philostratus, 3rd century

A Brief (and Incomplete) History of Cancer



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