Information Technology & Quality of Life in Health Care

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24 March 2009 – CSMC 818G

UMD, College Park & Amrita University, Coimbatore
Health Care? Quality of Life?

...What CARE?
...What QUALITY?
Measuring Quality of Life...

Measuring the QALY of life
Professor Reinhardt argues that the key measure of health spending effectiveness is quality-adjusted life years (QALY). In this exhibit, he draws a line showing the trade-offs between the cost of treatments and their QALY payoff. As the curve steepens, that trade-off becomes less and less attractive.

“Decisions about medical treatments and the settings of health programs are not purely technical, but also involve issues of value such as the evaluation of trade-offs between quality of life (morbidity) and quantity of life (mortality). The most commonly used measure of outcome in such cases is the quality-adjusted life year (QALY)…. An alternative measure of outcome, the healthy-years equivalent (HYE), is described. This measure stems directly from the individual's utility function and thus fully reflects his/her preferences. It combines outcomes of both morbidity and mortality and thus can serve as common unit of measure for all programs, allowing comparisons across programs.”

**What is the acceptable Cost/QALY Threshold?**
(https://research.tufts-nemc.org/cear/related/faq.aspx)
...Yet now even Politicians and the Pentagon agree—the U.S. Health Care System is a LIABILITY:

- $2.4 tr spent in 2008, more than 2X per capita than other developed nations (18% GDP)
  - Nearly 50 m Americans lack health insurance
  - Life expectancy 78.1 yrs, compared to:
    - UK – 82.1 yrs & 8%
    - France – 80.3 yrs & 11.1%
    - Japan – 82.1 yrs & 8%
## Overall Views of the Health Care System in Eight Countries

**Base:** Adults with any chronic condition

<table>
<thead>
<tr>
<th>Percent</th>
<th>AUS</th>
<th>CAN</th>
<th>FR</th>
<th>GER</th>
<th>NETH</th>
<th>NZ</th>
<th>UK</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only minor changes needed</td>
<td>22</td>
<td>32</td>
<td>41</td>
<td>21</td>
<td>42</td>
<td>29</td>
<td>38</td>
<td>20</td>
</tr>
<tr>
<td>Fundamental changes needed</td>
<td>57</td>
<td>50</td>
<td>33</td>
<td>51</td>
<td>46</td>
<td>48</td>
<td>48</td>
<td>46</td>
</tr>
<tr>
<td>Rebuild completely</td>
<td>20</td>
<td>16</td>
<td>23</td>
<td>26</td>
<td>9</td>
<td>21</td>
<td>12</td>
<td>33</td>
</tr>
</tbody>
</table>

Data collection: Harris Interactive, Inc.
Source: 2008 Commonwealth Fund International Health Policy Survey of Sicker Adults.
International Comparison of Spending on Health, 1980–2005

Average spending on health per capita ($US PPP*)

- United States
- Germany
- Canada
- France
- Australia
- United Kingdom

Total expenditures on health as percent of GDP

* PPP=Purchasing Power Parity.


Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008
Over 2/3 of deaths and health costs in the US are attributable to chronic diseases —which are largely preventable—

Yet only half of recommended preventive services are provided to adults.

- The United States has fewer practicing physicians and nurses per 1k people than comparable countries.
- Obesity rate for adults of 30.6%, higher than any other developed nation, and 21% higher than Mexico (2nd).
- Obesity among young near epidemic levels, causing spikes in the incidence among children of high blood pressure, high cholesterol and painful joint conditions, and type 2 diabetes.
# Cost-Related Access Problems in Past Two Years

Base: Adults with any chronic condition

<table>
<thead>
<tr>
<th>Percent</th>
<th>AUS</th>
<th>CAN</th>
<th>FR</th>
<th>GER</th>
<th>NETH</th>
<th>NZ</th>
<th>UK</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not fill Rx or skipped doses</td>
<td>20</td>
<td>18</td>
<td>13</td>
<td>12</td>
<td>3</td>
<td>18</td>
<td>7</td>
<td>43</td>
</tr>
<tr>
<td>Did not visit a doctor when had a medical problem</td>
<td>21</td>
<td>9</td>
<td>11</td>
<td>15</td>
<td>3</td>
<td>22</td>
<td>4</td>
<td>36</td>
</tr>
<tr>
<td>Did not get recommended test, treatment, or follow-up</td>
<td>25</td>
<td>11</td>
<td>13</td>
<td>13</td>
<td>3</td>
<td>18</td>
<td>6</td>
<td>38</td>
</tr>
<tr>
<td>Any of the above access problems because of cost</td>
<td>36</td>
<td>25</td>
<td>23</td>
<td>26</td>
<td>7</td>
<td>31</td>
<td>13</td>
<td>54</td>
</tr>
</tbody>
</table>

Data collection: Harris Interactive, Inc.
Source: 2008 Commonwealth Fund International Health Policy Survey of Sicker Adults.
# Length of Time with Regular Doctor or Place

Base: Adults with any chronic condition

<table>
<thead>
<tr>
<th>Percent</th>
<th>AUS</th>
<th>CAN</th>
<th>FR</th>
<th>GER</th>
<th>NETH</th>
<th>NZ</th>
<th>UK</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has regular doctor or place of care</td>
<td>96</td>
<td>97</td>
<td>99</td>
<td>99</td>
<td>100</td>
<td>98</td>
<td>99</td>
<td>91</td>
</tr>
<tr>
<td>With regular doctor or place for five years or more*</td>
<td>58</td>
<td>64</td>
<td>75</td>
<td>79</td>
<td>79</td>
<td>61</td>
<td>73</td>
<td>49</td>
</tr>
</tbody>
</table>

* Base includes those with and without a regular doctor or place of care.

Data collection: Harris Interactive, Inc.
Source: 2008 Commonwealth Fund International Health Policy Survey of Sicker Adults.
Access to Doctor When Sick or Needed Care

Base: Adults with any chronic condition

Percent

Same-day appointment

6+ days wait or never able to get appointment

Data collection: Harris Interactive, Inc.
Source: 2008 Commonwealth Fund International Health Policy Survey of Sicker Adults.
Difficulty Getting Care After Hours Without Going to the Emergency Room

Base: Adults with any chronic condition who needed after-hours care
Percent reported *very/somewhat difficult* getting care on nights, weekends, or holidays without going to ER

Data collection: Harris Interactive, Inc.
Source: 2008 Commonwealth Fund International Health Policy Survey of Sicker Adults.
Access Problems Because of Costs

Percent of adults who had any of three access problems* in past year because of costs

- Did not get medical care because of cost of doctor's visit, skipped medical test, treatment, or follow-up because of cost, or did not fill Rx or skipped doses because of cost.

AUS=Australia; CAN=Canada; GER=Germany; NETH=Netherlands; NZ=New Zealand; UK=United Kingdom.


Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008
* Did not get medical care because of cost of doctor's visit, skipped medical test, treatment, or follow-up because of cost, or did not fill Rx or skipped doses because of cost.

AUS=Australia; CAN=Canada; GER=Germany; NETH=Netherlands; NZ=New Zealand; UK=United Kingdom; US=United States.

Data: 2007 Commonwealth Fund International Health Policy Survey.

Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008
Medical Bill Problems or Medical Debt

Percent of adults (ages 19–64) with any medical bill problem or outstanding debt*

By Income and Insurance Status, 2007

- **Insured all year**
- **Uninsured during year**

<table>
<thead>
<tr>
<th>Income Status</th>
<th>2005</th>
<th>2007</th>
<th>Total</th>
<th>Under 200% of poverty</th>
<th>200% of poverty or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>34</td>
<td>41</td>
<td>61</td>
<td>68</td>
<td>56</td>
</tr>
<tr>
<td>Under 200% of poverty</td>
<td>33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200% of poverty or more</td>
<td></td>
<td></td>
<td>45</td>
<td></td>
<td>29</td>
</tr>
</tbody>
</table>

* Problems paying or unable to pay medical bills, contacted by a collection agency for medical bills, had to change way of life to pay bills, or has medical debt being paid off over time.


Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008
Percent of Adults Ages 18–64 Uninsured by State

1999–2000

2005–2006

Percent of Children Ages 0–17 Uninsured by State

1999–2000

2005–2006


Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008
Uninsured and Underinsured Adults, 2007 Compared with 2003

Percent of adults (ages 19–64) who are uninsured or underinsured

* Underinsured defined as insured all year but experienced one of the following: medical expenses equaled 10% or more of income, or 5% or more of income if low-income (<200% of poverty); or deductibles equaled 5% or more of income.


Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008
Infant Mortality Rate

Infant deaths per 1,000 live births

National Average and State Distribution

- U.S. average
- Bottom 10% states
- Top 10% states

International Comparison, 2004

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>2.8</td>
<td>2.8</td>
<td>3.1</td>
<td>3.2</td>
<td>3.3</td>
<td>4.4</td>
<td>5.3</td>
</tr>
<tr>
<td>Iceland</td>
<td>2.8</td>
<td>2.8</td>
<td>3.1</td>
<td>3.2</td>
<td>3.3</td>
<td>4.4</td>
<td>5.3</td>
</tr>
<tr>
<td>Sweden</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>Norway</td>
<td>3.2</td>
<td>3.2</td>
<td>3.2</td>
<td>3.2</td>
<td>3.2</td>
<td>3.2</td>
<td>3.2</td>
</tr>
<tr>
<td>Finland</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Denmark</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Canada</td>
<td>5.3</td>
<td>5.3</td>
<td>5.3</td>
<td>5.3</td>
<td>5.3</td>
<td>5.3</td>
<td>6.8</td>
</tr>
<tr>
<td>U.S.</td>
<td>6.8</td>
<td>6.8</td>
<td>6.8</td>
<td>6.8</td>
<td>6.8</td>
<td>6.8</td>
<td>6.8</td>
</tr>
</tbody>
</table>

^ Denotes baseline year.


Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008
Immunizations for Young Children

Percent of children (ages 19–35 months) who received all recommended doses of five key vaccines*

National Average and State Distribution

By Family Income, Insurance Status**, and Race/Ethnicity, 2006

* Recommended vaccines include: 4 doses of diphtheria-tetanus-pertussis (DTP), 3+ doses of polio, 1+ dose of measles-mumps-rubella, 3+doses of Haemophilus influenzae type B, and 3+ doses of hepatitis B vaccine. **Data by insurance was from 2003.


Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008
Receipt of Recommended Preventive Care for Older Adults, by Race/Ethnicity, Family Income, and Insurance Status, 2005

Percent of older adults who received all recommended screening and preventive care within a specific time frame given their age and sex*

*Recommended care includes seven key screening and preventive services: blood pressure, cholesterol, Pap, mammogram, fecal occult blood test or sigmoidoscopy/colonoscopy, and flu shot. See report Appendix B for complete description.

Data: B. Mahato, Columbia University analysis of Medical Expenditure Panel Survey.

Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008
For a Change, Some Solutions
What is Evidence-Based Medicine?

“What evidence-based medicine is the integration of best research evidence with clinical expertise and patient values”

- Sackett & Straus
“Just in Time” learning:

• An EBM Approach to Education

Dave Sackett
“Just in Time” learning

- Evidence cart on ward rounds - 1995
- Looked up 2-3 questions per patient
- Took 15-90 seconds to find
- Change about 1/3 decisions
- Rounds took longer!
US Lags Other Countries in Adoption of e-Health Records

- NEJM Report (2007 & 2008 surveys) – 4% of physicians had extensive & fully functional e-records, 13% less so
- 8 – 10% of hospitals – even a basic e-health records system
  - Nearly 50 m Americans lack health insurance
  - Life expectancy 78.1 yrs, compared to:
    - UK – 82.1 yrs & 8%
    - France – 80.3 yrs & 11.1%
    - Japan – 82.1 yrs & 8%
- Infant mortality - 6.9 deaths/1,000 live births, 2X Japan or Sweden
Percentage of National Health Expenditures Spent on Insurance Administration, 2005

Net costs of health insurance administration as percent of national health expenditures

- Finland: 1.9%
- Japan: 2.3%
- Australia: 2.8%
- United Kingdom: 3.3%
- Austria: 3.9%
- Canada: 4.2%
- Netherlands: 4.3%
- Switzerland: 4.8%
- Germany: 5.6%
- France: 6.9%
- United States: 7.5%

Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008

* Includes claims administration, underwriting, marketing, profits, and other administrative costs; based on premiums minus claims expenses for private insurance.

Physicians’ Use of Electronic Medical Records

Percent of primary care physicians using electronic medical records

International Comparison

United States  NETH  NZ  UK  AUS  GER  CAN

2001  17  28  98  92  89  79  42  23
2006

AUS=Australia; CAN=Canada; GER=Germany; NETH=Netherlands; NZ=New Zealand; UK=United Kingdom.
Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008
Only 28% of U.S. Primary Care Physicians Have Electronic Medical Records; Only 19% Have Advanced IT Capacity

Percent reporting EMR

Percent reporting 7 or more out of 14 functions*

*Count of 14: EMR; EMR access other doctors, outside office, patients; routine use electronic ordering tests, prescriptions; access test results, hospital records; computer for reminders, Rx alerts; prompt tests results; and easy to list diagnosis, medications, patients due for care.

Source: 2006 Commonwealth Fund International Health Policy Survey of Primary Care Physicians.
Hospitals with Automated Clinical Decision Support Generate Savings

Mean adjusted hospital savings*

- All patients: $538
- Patients with myocardial infarction: $225
- Patients with heart failure: $555
- Patients with coronary artery bypass surgery: $1,043
- Patients with pneumonia: $363

* Adjusted for patient complication risk; patient mortality risk; and hospital size, total margin, and ownership. Savings associated with a 10-point increase in Clinical Information Technology Assessment Tool subdomain score.

Heart surgery in Great Britain

W. Andrew Owens  
The James Cook University Hospital

About W. Andrew Owens  
Specialties  
- Adult cardiac surgery  
- Adult thoracic surgery  

Qualifications  
- Queen's University, Belfast, 1990

Education  
- Royal Victoria Hospital, Belfast, 1994–1995  
- Papworth Hospital Cambridge, 1995–1996  
- Freeman Hospital, Newcastle upon Tyne, 1996–1997  
- St. Vincent's Hospital, Sydney, Australia, 1999–2001  
- James Cook University Hospital, Middlesbrough, 2001–2002  
- Freeman Hospital, Newcastle upon Tyne, 2002

Telephone:  
- 030 7 389 390

Email:  
- owens@JCUH.com

Webpage

Practice profile for the 3 years ending March 2005

<table>
<thead>
<tr>
<th>Total number of operations performed</th>
<th>Isolated coronary bypass operations performed</th>
<th>Isolated valve operations performed</th>
<th>Combined and other operations performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>140</td>
<td>200</td>
<td>150</td>
<td>50</td>
</tr>
</tbody>
</table>

### British Surgeon Survival and Complication Rates Available on Internet

#### Survival rates after selected types of heart operation

**How you can use this information**
Patients who are going to have certain heart surgery may find it useful to look up survival rates for surgeons or units they are considering and discuss this information with their GP or their surgeon.

**What it can't tell you**
Your own chances of surviving a heart operation

##### Coronary artery bypass graft operations

Operations over 3 years ending March 2005

<table>
<thead>
<tr>
<th>Survival rate: 99.1% (better than expected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected survival rate taking into account the health of patients treated</td>
</tr>
<tr>
<td>120 operations performed</td>
</tr>
<tr>
<td>Statistics calculated from all first-time patients</td>
</tr>
</tbody>
</table>

##### Survival rates for all kinds of surgery

Operations over 3 years ending March 2005

<table>
<thead>
<tr>
<th>Survival rate: 98.3% (better than expected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected survival rate taking into account the health of patients treated</td>
</tr>
</tbody>
</table>

Opportunities and Progress
Using Telehealth* to Improve Quality and Safety: Findings from the AHRQ Health IT Portfolio

*The use of telecommunications technologies to deliver health-related services and information that support patient care, administrative activities, and health education.

• Improving access to care where -
  • ... physician-to-patient ratios are inadequate, or
  • ...there are not enough medical specialists available to meet the population’s needs

• Reducing costs of transportation


PDF at: healthit.ahrq.gov/portal/server.pt/gateway/PTARGS_0_1248_837129_0_0_18/Telehealth_Issue_Paper_Final.pdf
Innovations – Far and Wide

• China: sep 08, Web-based infectious disease reporting using XML forms – Int J Health Informatics

• WebEast: An Epilepsy Self-Mgmt web site (8/4/08, Health Education Research 2009 Vol 24 No 2)

• World’s first Bluetooth(R)-Enabled, Wireless Fingertip Pulse Oximeter
  – allowing vital signs to be easily monitored and sent wirelessly through communication devices (cell phones, PDAs, PCs, etc.). Patients can also take readings outside of the home and transmit the time-stamped data after their return using the device’s Store and Forward facility.

• Japanese Researchers introduce Micro Medical Robot
  – Unlike previous minirobots that were swallowed and could only capture images, this robot is capable of perform treatments inside the body.

• Satori Labs - Breakthrough Digital Pen Technology
  – digital pen-based forms automation software, FusionForm™. FusionForm allows oncologists and radiologists to use a familiar pen-and-paper format to produce standard cancer staging forms that instantly convert to electronic medical records (EMRs). These records are integrated into any existing EMR system.

• Aquilion ONE - The World's First Dynamic Volume Computed Tomography System by Toshiba
  – a new computed tomography (CT) system scanner that creates detailed 3-D movies of entire organs in real time.
Interactive Human Patient Simulators Used by Air Force Medical Center

Queen's University (UK) introduces innovative antennas:

...a new type of antenna that is up to 50 times better and efficient than the existing designs. The new design is capable of utilizing 'wireless body area network' (WBAN) technology to full potential. A WBAN is a network of biosensors attached to different parts of a patient's body.
Reading for the Interested:
Computational Technology for Effective Health Care: Immediate Steps and Strategic Directions
William W. Stead and Herbert S. Lin, editors; Committee on Engaging the Computer Science Research Community in Health Care Informatics; National Research Council