

Health Care Systems Overview

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ESD.69

September 2010

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The Main Issues in US Health Care

■ Access, Cost, Quality

- Access: How many do not have reasonable access to health care providers due to lack of insurance?
- Cost: What is the cost of health care to an individual and the nation?
 - Current cost vs. Health Care Inflation
- Quality: How good are outcomes of health care delivery; how good is the overall health of the nation?

Access

- In 2009 about 15% or 45 million Americans had no health care insurance
 - This is the highest percentage of access limitation among major industrialized nations
- After the new Health Care Act (PPACA - Patient Protection and Affordable Care Act) goes into full effect, the number of uninsured is expected to go down to about 15 -25 million or 5-8% of the US population. Massachusetts is already there.

OECD Health Care Data for 2007

Country	Life expectancy	Infant mortality rate	Physicians per 1000 people	Nurses per 1000 people	Per capita expenditure on health (USD)	Healthcare costs as a percent of GDP	% of government revenue spent on health	% of health costs paid by government
Australia	81.4	4.2	2.8	9.7	3,137	8.7	17.7	67.7
Canada	80.7	5.0	2.2	9.0	3,895	10.1	16.7	69.8
France	81.0	4.0	3.4	7.7	3,601	11.0	14.2	79.0
Germany	79.8	3.8	3.5	9.9	3,588	10.4	17.6	76.9
Japan	82.6	2.6	2.1	9.4	2,581	8.1	16.8	81.3
Norway	80.0	3.0	3.8	16.2	5,910	9.0	17.9	83.6
Sweden	81.0	2.5	3.6	10.8	3,323	9.1	13.6	81.7
UK	79.1	4.8	2.5	10.0	2,992	8.4	15.8	81.7
USA	78.1	6.7	2.4	10.6	7,290	16.0	18.5	45.4

US spends the most on health care per capita, but life expectancy and infant mortality are not as good as in other OECD countries.

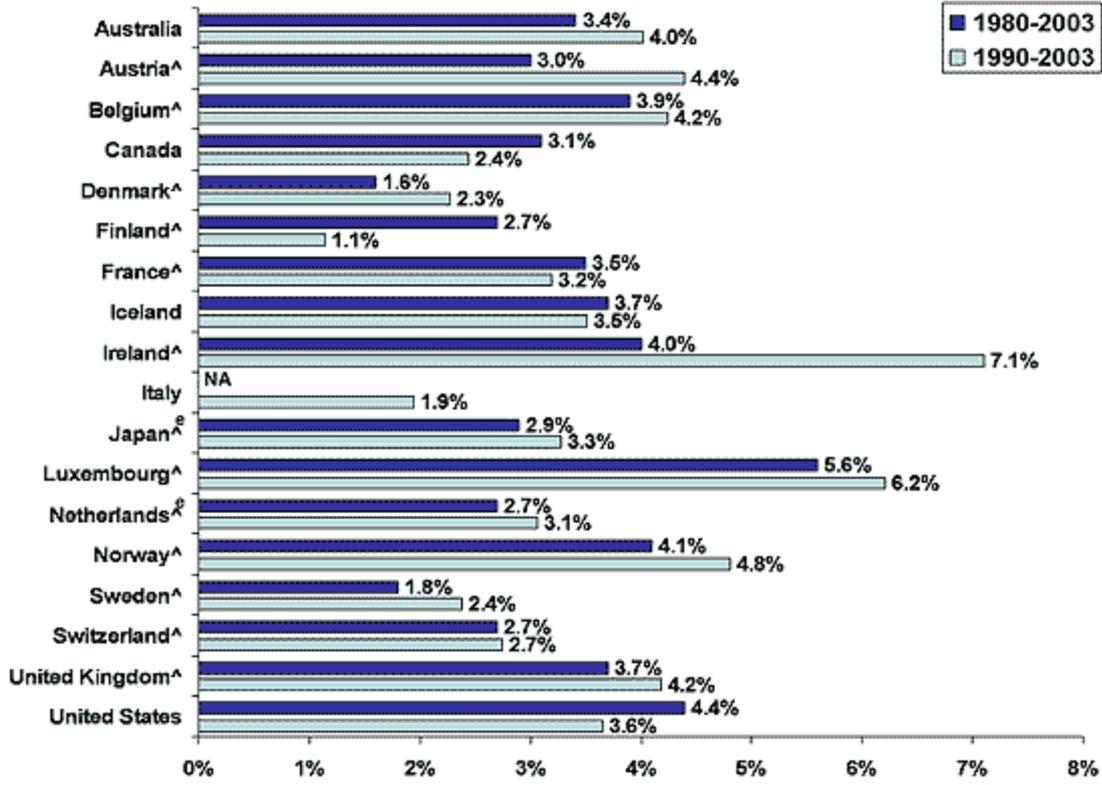
US Health Care Cost

- US GDP in 2007 was about \$14 trillion
- US spent about 16% of GDP on health care
- Next highest were France and Switzerland at 11% of their GDP
- The difference of 5% is \$700 Billion/year !!!
 - One TARP each year
- We also could not claim that our very high level of health care expenditure per capita clearly led to better overall outcomes for the nation

US Health Care Cost

- The US has tried to lower overall costs, but except for a few years in the 1990's (the HMO effect) we have been unsuccessful in doing so
- So a major issue now is the level of inflation of health care cost. That is, many health care economists assume that the overall or base cost is not likely to be decreased anytime soon
- “Bending the Curve” is the term used by the administration to describe reduction of the inflationary increase in health care costs

**Average Annual Growth Rates in Total Health Expenditures Per Capita,
U.S. and Selected Countries, 1980 to 2003; 1990 to 2003**



Level of Inflation in Health Care

- Assume that overall US inflation is 3%/year in an average year
- Health Care inflation in recent years appears to be about 5-6%/year (ca. \$140 B/yr), about 2-3 points higher than the overall economy's inflation
- The rule of 72
 - 2.5% inflation doubles cost in about 30 years
 - Hence, if nothing changes, US expenditure on health care could rise to about 30% of GDP by 2040
 - At some point there is a limit to how much the US can afford to spend on health care and remain economically competitive with other nations
 - Granted, other major economies are also noting an inflation rate in health care that is higher than the rest of the economy

Major Reasons Proposed for the Inflation in Health Care Inflation Above Overall Inflation

- Rise in US population – ignored in 'per capita' analysis
- Rise in percentage of elderly
- Increase in salaries of physicians and nurses above those of other professions
- Increased number of tests and procedures due to defensive medicine
- Increasing cost of HC administration
- Innovation in Health Care Delivery
 - Innovation is related to increase in usage of new technology, procedures, organization, etc.

2008 CBO Analysis (Orszag) of Factors Influencing 'Real' Health Care Inflation Per Capita

<u>Factor</u>	<u>Estimated Impact (3 different studies)</u>
Aging ratio	2%
Payment Change	10-13%
Growth in US Personal Income	5-20%
HC Price Growth	11-22%
Admin Costs	3-13%
Defensive Medicine Growth	0
Innovation and Technology Related Changes in Medical Practice (Residual in each study)	38-65 %

Some Possible Steps to Reducing Health Care Inflation/Cost and Maintaining/Increasing Quality – largely by CMS

- Accountable Care Organizations –shared savings, partial capitation
- Health Home for patients with chronic diseases, such as diabetes
- Transition of providers from Fee For Service to salary
- Evidence-based medicine
- Tele-health in underserved areas using non-medical staff
- Tele-health from low-cost countries

HC Inflation and Innovation

- In manufacturing new technology usually reduces cost – not so far in medicine
- Can we develop technologies or organizational structures that will reduce cost?
 - Stan Finkelstein’s proposed low-cost MRI machine
 - Might reduce cost even if widely used in ambulances
 - Greater reliance on nurse-practitioner-based community centers

Systems Thinking

Systems Thinking - 1

In complex systems, such as health care, small local changes can lead to larger, more global ones.

Outbreak of MRSA infection in a hospital

- 90% reduction in MRSA infections has been reported in some hospital wards through careful hand washing, but sustainability and spread of handwashing to whole hospitals or larger health care systems has not yet happened very much (Steve Spear)
- A few exceptions to hand washing can greatly reduce the positive impact (e.g., Typhoid Mary)
- We sometimes need constant pressure to do the right thing
- Medicare/Medicaid wants to not pay for patients that have MRSA, but hospitals resist that effort

Systems Thinking - 2

Central lines (e.g., for cancer patients)

- Approx. 10% of all central lines have gotten infected
- 10-20% of infected patients have died in some hospitals
- Very careful protocols for inserting central lines have been developed that have reduced infection rates greatly - order of magnitude reduction in, for example, Pittsburgh area hospitals (Steve Spear et al, The Pittsburgh Way)

Standards for medical procedures and for information flow can make the health care system perform better

Denis Cortese (former CEO of Mayo Clinic) – “ The US Health care system – what system?”

Systems Thinking - 3

- Slowness in a particular part of the hospital can lead to slowness in many other parts
 - Careful analysis of various hospital operations and their interrelationships can lead to smoother flow and after that to a somewhat faster flow
- Pressure to speed up some part of the hospital operation (e.g., 4 hour 'guaranteed' maximum ER stays in Britain) can lead to reduced safety, reduced efficiency and long waits elsewhere. Some consultants have pressed for such deadlines in order to improve patient satisfaction in one part of the hospital (e.g., ER), without realizing the full impact on the rest of the hospital, and on outcomes
- Careful analysis of various hospital processes can lead to smoother flow (lower variance), greater safety, lower cost and greater satisfaction by staff

The LEAN Approach

Some Lean Production Principles

Smooth flow (of patients and materiel)

- Low or zero inventories (hence 'lean') or reduced waiting time for patients – reduces cost in case of materiel, reduces frustration of waiting patients, less pressure on staff, lower space utilization
- Flow of materiel is now a field of study – supply chains (a generalization of 'just-in-time')
- Careful (possibly fewer) hand-offs (based on standards, good information flow (good use of IT systems)) – improves safety, reduces errors (Michael Hammer)
- Once smooth flow is established, one might be able to speed it up somewhat without increasing pressure too much on the staff or increasing risk to patients' safety

Smooth Flow of Patients

- Surgeons in some hospital wanted to have all elective surgeries at 7am so that they can go back to their offices for the rest of the day (Litvak–BU, Pittsburgh)
- This placed great pressure on nurses and others in ORs, recovery rooms and wards
- It was difficult to convince the surgeons to spread out the elective surgeries, but the long term outcome of a spread was to improve nurses' lives and those of patients too (but the patients did not know this). Eventually surgeons saw the advantages of this change
- Surgery groups are often given blocks of OR time. This can lead to inefficiency (low utilization) or frustrated elective surgery patients who need to be bumped for emergencies. Change to a system with largely unscheduled operating rooms leads to greater efficiency and less stress. This approach involves a cultural change for the surgeons

Catching errors early

- If you catch errors early you can avoid crises and more expensive treatment later
- Staff at all levels should be trained to notice classes of unusual or simply poor situations and report them asap so that they can be 'fixed'
- One approach to fixing problems is based on 'Five Whys'
 - Keep asking why something occurred, and eventually you could get to the root cause
- Respect for all levels of staff (e.g., cleaning staff) is needed for this aspect to operate well

Continuous Improvement (Modern Lean)

- By using statistics or 'five whys,' for example, one can determine situations where improvement is needed, figure out the improvement and embed it into the 'learning' system
- Suggestions for improvement should be accepted from all stakeholders
- Many small changes can lead to much improvement over time
- Steve Spear ("Chasing the Rabbit") thinks that continuous improvement is the DNA of the Toyota approach. We did not understand this between 1985 and 1999 because the Japanese did not explain the importance of this aspect of their problem solving. Continuous improvement, done well, can lead to increased knowledge and a learning organization

Data, Data, Data

- One needs data in order to use statistics to figure out possible improvements – it is important to keep as much data as possible in computerized form
- The tendency in medicine (due to lawyers, in part) has been to hide errors from the patients and the public. There is also the assumption that errors are a normal part of the health care system
- Instead it is wise to announce errors so that competition will tend to reduce them in the future (e.g., Paul Levy at the Beth Israel Deaconess – “Running a Hospital” blog)

Stakeholder Analysis

- There are many stakeholders in the health care system
 - Patients, their immediate families, doctors, nurses, other staff, pharmaceutical firms, insurance companies, lawyers, employers, governments, society, ...
- The system should attempt to make each stakeholder relatively satisfied, even happy
- Ask them for opinions on how to improve the overall service
- Given the large number of stakeholders, many of them quite powerful and entrenched, resistance to change will be a key issue in improving US health care

Local Optimization (Lean point of view)

- It is natural to locally optimize. Some economists believe that if everyone is looking for their own good, this will result in the good of the whole, but there are significant exceptions in complex systems
- Nurses that hoard equipment because they are afraid that it will not be available to them when they desperately need it, add to the overall cost of the hospital since too much equipment is bought. Buy enough equipment so that the nurses can feel comfortable relying on others to keep them available when they need it
- Developing trust in others is a key lean principle

Impact of Lean

- Lean helped US and other auto makers improve their car quality and reduced the cost of production in the past 15-20 years
- Why is Toyota, which invented the system, usually still #1 in quality?
 - Lean principles became a 'religion' in the US
- This (religion) appears to be happening in health care through various consultants. But the customers also want a simple set of principles/commandments
- Toyota has, on the other hand, violated their own rules when they thought this was necessary
- Continuous improvement trumps other commandments

Silo Mentality

- Specialization has its advantages in science, but some flexibility and cooperation also has advantages
- High degree of specialization lends itself to a structure that emphasizes silos, each silo composed of a particular set of specialists. Historically, teaching hospitals were the first academic institutions (ca. 1810 in Berlin) to create departments that combined teaching and research, departments that eventually behaved like silos
- Members of silos tend to respect their silo colleagues more than members of other silos (this is certainly not limited to medicine)
- Diagnosticians will tend to recommend procedures to be performed by members of the silo of the diagnostician
- Collaboration of members of several specialties (teamwork) suffers

Incentives in US Health Care System

- The US medical insurance system has emphasized fee for service performed in recent decades
- Thus there is a built-in incentive to have too many procedures
- A 'star' system has developed based on ability to attract reimbursement for a large number of procedures
- Atul Gawande (New Yorker article) points out that in a town in Texas the doctors own MRI installations, for example, to which they can send their patients and make lots of money

Incentives affect structure and processes - changes in incentives may require a cultural change, which is not easy, although necessary

Future US Health Care System

Possible Pyramidal Structure of Future Health Care System

- US health care system, in contrast to most European countries, relies on two layers: GPs and specialists/hospitals
- Most European countries have a lower layer of clinics operated by nurse practitioners usually overseen by physicians
- 80-20 rule (Pareto)
 - Ideally, up to 80% of the visits should be handled by nurse practitioners in clinics under the supervision of a physician
 - Up to 80% of the remaining visits should be handled by a GP
 - Far fewer visits should require specialists or hospital admissions
- We can argue about the numbers, but the effect of adding a lower layer can be to greatly reduce cost (possibly 10-15%) and even improve overall outcomes
- Clay Christensen calls such a change disruptive. Adding a lower layer of clinics can be disruptive when the number and type of cases handled safely and efficiently by the clinics grows markedly over time

Pyramidal Structure - 2

Clinics relying on nurse practitioners should be able to handle most visits

- Nurses should also be able to make house calls to individuals with chronic illnesses (some top reasons for hospital admissions: diabetes, heart-related, asthma), thus reducing demand on hospital admissions and nursing homes
- Reduced demand for GPs is consistent with current interests of medical students
- Reduced demand on ERs and other hospital wards even if total number of visits to and from the health care system are increased
- There are currently about 1,000 such clinics in the US – can we increase the number by 1-2 orders?

Medicine as a Craft - Procedures

- To the extent that significant medical procedures can be standardized or nearly automated, they should be (e.g., specialized hospitals or parts of hospitals that perform just one procedure, such as hernias)
- Some cases require real time flexibility and creativity, true of other crafts (e.g., law)
- Thus a pyramid of craftsmen (masters, mid-level journeymen, apprentices/associates) makes sense in such cases

Medicine as a Craft - 2

- Our insurance system largely emphasizes payment for procedures, not diagnoses, and not even improved health. This must change
- Diagnoses should also be handled by a craft-like pyramid
- Master diagnosticians should be properly compensated (by the hour) because good diagnoses in complex cases can improve outcomes and reduce cost (Clay Christensen et al – *The Innovator's Prescription*)
- Most procedures should be standardized. Special hospitals or subhospitals (e.g., cancer, heart disease, diabetes, children) should be paid a fixed price for a procedure, regardless of complications that might result (Christensen). We must, however, avoid cream-skimming by specialty hospitals. Thus put them as a layer inside teaching hospitals

Hospital da Luz in Portugal

- New hospital in Lisbon, owned by a bank and run by an engineer
- Has master diagnosticians
- Has subhospitals (e.g., heart, cancer, children)
- Physicians are told they have to work in teams before they are hired. Most are salaried by the hospital
- Has latest equipment and paperless IT systems

The Promise of Modern Biology

- New drugs resulting from advances in molecular biology have been promised for some time, and some have indeed occurred (e.g., Gleevec)
- Likely many more will occur in the coming years that will improve people's lives greatly, especially when the drugs are tailored to an individual's genes (personalized medicine)
- New drugs have tended to be expensive in their early years, especially in the US
- Stan Finkelstein and Peter Temin suggest a public-funded approach to drug discovery, with private manufacturing and marketing – this should reduce overall drug costs markedly

The Role of IT

- In manufacturing and service industries (e.g., insurance companies), the big payoff of IT occurred when the processes using it are changed to permit IT to have a greater role than simply automating paper and pencil operations - this has largely not yet happened in health care in the US.
- France has a health care card for each individual that contains their entire health care record and that avoids paper files altogether. Not clear that this protects privacy, however.
- The Obama administration is pushing IT for the usual reasons (fewer medication errors, for example), but mainly, I believe, because it will help in evidence-based medicine

The Dartmouth Approach

- The Wennbergs and others at Dartmouth have created an atlas of the US that indicates the level of use of various procedures (e.g., back surgery) in different parts of the country
- The atlas shows that there sometimes is a factor of 2 or more difference in number of procedures per capita in different regions without significant improvement in outcome
- Using evidence-based analyses (from the data provided by the IT systems) it ought to be possible to greatly reduce the number of “wasteful” tests and procedures nationally
- This relies on committees of experts that decide what is best practice based on the evidence
- Many (e.g., Orszag at White House, former Senator Daschle) seem to believe that evidence-based medicine is a silver bullet for reducing the overall US health care cost, possibly by 30%
- I am not a believer in the existence of a single silver bullet for the US health care system at this time

Cultural Changes – Not Easy to Implement

- Patients should go to local nurse-practitioners-based clinics most of the time rather than physician's office - trust in clinics must be increased
- Increased reliance on standards in medical procedures and information flow, less reliance on stars in procedures or on special purpose information systems
- Increased use of pyramidal structures for diagnoses and procedures
- Evidence-based 'rules' for avoiding waste in procedures and diagnostics
- Payments to health care providers for improving health, not just treating sickness
- Behavioral changes leading to a healthy society

Toward a Healthy Society

- Other societies have a healthier diet and exercise more
- Changes in diet and exercise regimens are not easy to implement, but could greatly reduce the number of chronic illnesses (e.g., diabetes), and thus reduce overall health care cost
- If this leads to longer average life expectancy, it is not clear whether long term national health care costs are reduced significantly, although we all might enjoy a healthier life

Health Care Rationing?

- A significant percentage of lifetime health care cost per individual occurs in the last year of life - possibly 30%
- If one could carefully ration care at such a time, it would save a great deal and may make the patient's life better in the last few months
- Could one make reliable estimates of such a period in one's life?
- Would the culture permit (ought it to permit) such rationing? NICE in Britain effectively does that

Summary

Summary - 1

- Goal: better outcomes, far lower cost in the coming years
 - Increased quality of care reduces cost
 - Restructuring can reduce cost and improve quality a great deal even while increasing number of visits by nurse practitioners
 - Multi-layered teams reduce overall cost in difficult cases and improve outcomes
 - Evidence-based decisions on tests and procedures may reduce costs a great deal
 - Increased competition may reduce costs

Summary-2

- Better insurance schemes reduce overhead cost
- New drugs and technologies will improve health and might reduce costs in the long run
- Limits on legal suits can reduce costs and defensive medicine
- Improving general health of the nation will reduce cost in the medium run
- Some rationing reduces cost

There is no single silver bullet, I believe. There will be resistance to most silver bullet ideas. One man's savings is another's income. Complex systems need a complex response in most cases. A bunch of lead bullets could do the trick, but we need to be careful about their interactions

Summary -3

- Cost reduction goals – over the next decade
 - Pay for universal access \$100B/yr
 - Reduce health care inflation (3 points/yr) \$75B/yr/yr
 - Get cost down closer to that of major competitors \$500B/yr
 - This would still permit major US expenditures on innovation in procedures, pharmaceuticals, etc.
- Possible approaches to savings (the lead bullets)
 - Quality improvement
 - Evidence-based waste reduction
 - Restructuring delivery
 - Increasing competition
 - Lowering insurance costs
 - Lowering legal costs
 - Lowering drug costs
 - Better health and wellness
 - ...

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ESD.69 / HST.926J Seminar on Health Care Systems Innovation
Fall 2010

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