Towards an Optimal Health Care System by 2016:
The contribution of Industrial & Systems Engineering Knowledge, Methods and Tools

Patricia Flatley Brennan, RN, PhD, FAAN
Professor and Chair, Industrial & Systems Engineering
Moehlman Bascom Professor, School of Nursing
University of Wisconsin-Madison
Thank YOU for being here!

Shaping the future of health care requires an alliance between systems engineers & health care professionals!
INTRODUCTIONS

Name...

Organization...

How will you be contributing to the health care system of the future?
What will health care look like in 2016?
Goals of the Workshop

1. Describe a future vision of health care that meets the needs of society (Maulik Joshi, Aneesh Chopra, Everyone!)

2. Enumerate the knowledge needed for that future (content, methods, use)

3. Envision research findings in five key area of engineering that are likely to benefit health care:
   1. Information technology/Finance and quantitative decision making
   2. Systems analysis, change and implementation theories
   3. Materials management and production processes
   4. Human factors/Sociotechnical systems
   5. Quality Engineering

4. Specify a research portfolio (financing, mechanisms, instruments, etc)
The patient of the future is already here and they look nothing like us!

1. There has always been a computer in the White House
2. They google rather than use the card catalog
3. The “Green Giant” is Shrek, not a product symbol
4. Brett Favre has ALWAYS been an NFL Quarterback
5. TXT has always been hyper and mostly on phones!
6. Jack Nicholson starred in Batman (not to be confused with that cuckoo’s nest or the Ride)
7. Most phone calls have not been private
8. Food packaging has always included nutritional labeling
9. The Hubble Space Telescope has always been eavesdropping on the heavens.
10. 98.6 F or otherwise has always been confirmed in the ear
11. Evening news is redundant

Source: Beloit College Mindset
and for that matter, the staff is too!
Maybe we are OK?

Scott Atlas, M.D., senior fellow, Hoover Institution and professor at the Stanford University Medical Center.

Fact No. 1: Americans have better **survival rates** than Europeans for common cancers.

Fact No. 2: Americans have **lower cancer mortality** rates than Canadians.

Fact No. 3: Americans have better **access to treatment for chronic diseases** than patients in other developed countries.

Fact No. 4: Americans have **better access to preventive cancer screening** than Canadians.

Fact No. 5: Lower income Americans are **in better health** than comparable Canadians.

Fact No. 6: Americans spend **less time** waiting for care than patients in Canada and the U.K.

Fact No. 7: People in countries with more government control of health care are highly **dissatisfied** and believe reform is needed.

Fact No. 8: Americans are **more satisfied** with the care they receive than Canadians.

Fact No. 9: Americans have much better access to important **new technologies** like medical imaging than patients in Canada or the U.K.

Fact No. 10: Americans are responsible for the vast majority of all health care **innovations**.
The wisdom of planning...

- Hospital planning is done on the basis of limited research
- There is little evaluation of completed plans
- Many of the assumptions used are not stated clearly and are often based on limited or poor evidence—this applies to many of the arguments for increased centralization
- The paradox of increasing admissions and falling bed numbers has contributed to the problems of responding to emergency care
- Planning needs to take into account the limited state of knowledge

What kind of knowledge is needed?

*The kind we’ve always needed!*

- Understanding likely future *demand*
- Improved forecasting of length of stay and other aspects of *system performance*
- The *benefits of subspecialization* and methods to reduce the impact of this on access to services
- How hospitals can be *staffed in new and imaginative ways*
- The development of *flexible approaches to planning hospitals*
- How to *manage change* effectively

Pick your perspective: What will shape care in the future?

- LEEP - Environmentally responsible
- Globalization –
- Economics –
- Biotech –
- Culture –
- Patient Centered Care –
- Accessibility

Financial disruptions
Changing global markets
Un- and under-employment
Pervasive technology

• New therapeutics
• Patient-centered care
• Gene/environment
• Ubiquity
Futurescan (AHA 2009)

• The globalization of healthcare
• The impact of an aging population
• The challenges and opportunities of America’s foreign-born population
• Competition from new healthcare delivery vehicles
• The importance of reengaging physicians
• An employer perspective on healthcare reform
• How the push for transparency will affect quality and patient safety
• The impact of mandatory public reporting
Building on our foundations

Strong positive regard and acceptance for engineering-health care partnerships

Vibrant junior faculty and ISyE professionals moving into health care

Strong evidence that application of known industrial and systems engineering methods and tools to health care problems has positive outcomes
ISyE Knowledge and Methods

X

ISyE Knowledge and Methods
Why not?

Improving today’s healthcare system won’t get us to where we need to be tomorrow

– Global
– Multi-cultural
– Preventative
– Integrative

Applying today’s ISyE models and methods won’t accelerate progress towards tomorrow’s health care system

– Multipoint supply chain
– Perverse partnerships
– Unanticipated stakeholders
– Uncertainties
Our work is clear!

Prepare the systems engineering road map for the future
Purpose

Propose a research agenda jointly to AHRQ & NSF to develop the Industrial and Systems Engineering knowledge, methodologies and skills needed to achieve an optimal health care system 5-7 years in the future.
Work Plan: balancing small group with large group work

**Large Group Work**
1. Maulik Joshi
2. Vision statements – where is ISyE going?
3. Exchange
4. Aneesh Chopra
5. Policy perspectives
6. Research Agenda
7. Open group summary

**Small group work**
- ISyE theme groups
  - Scope
    - a) New and emerging areas
    - b) Existing methods applied to new problems
  
  *Share!*

  - Research approaches to developing that knowledge
    
    *Share!*

  - Revise

**Cross cutting groups**
- How can your specialty contribute to a health care system that achieves...
Breakout Group Structure

• ISyE Topical Areas (Monday Afternoon, Tuesday Morning)
  1. Information technology/Finance and quantitative decision making
  2. Systems analysis, change and implementation theories
  3. Materials management and production processes
  4. Human factors/Sociotechnical Systems
  5. Quality Engineering

• Cross-Cutting Groups (Monday Afternoon)
  1. Managing acute illness and disease
  2. Creating effective models of health promotion & disease prevention
  3. Insuring chronic disease management
  4. Enhancing the end-of-life experience
  5. Facilitating public health
  6. Accelerating discovery
Creating a research agenda

<table>
<thead>
<tr>
<th>IT/Finance &amp; Quantitative Decision Making</th>
<th>Systems Analysis, Change &amp; Implementation</th>
<th>Materials Mgmt/Production Processes</th>
<th>Human Factors/STS</th>
<th>Quality Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing Acute Illness &amp; Disease</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effective models for Health promo &amp; Disease Prevention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic Disease Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End of Life</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Health</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discovery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>