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Industrial and Systems Engineering and Health Care: Critical Areas of Research Workshop

September 21 - 22, 2009 • Washington, DC

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



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Thank YOU for being here!
*Shaping the future of health
care requires an alliance
between systems engineers &
health care professionals!*



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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



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

BMJ. 1999 November 20; 319(7221): 1361–1363.

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

- LEEP-
 - Environmentally responsible
 - Globalization –
 - Economics –
 - Biotech –
 - Culture –
 - Patient Centered Care –
 - Accessibility
- *New therapeutics*
- *Patient-centered care*
- *Gene/environment*
- *Ubiquity*
- Financial disruptions
- Changing global markets
- Un- and under-employment
- Pervasive technology

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

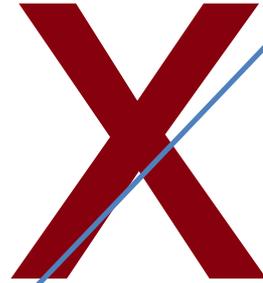
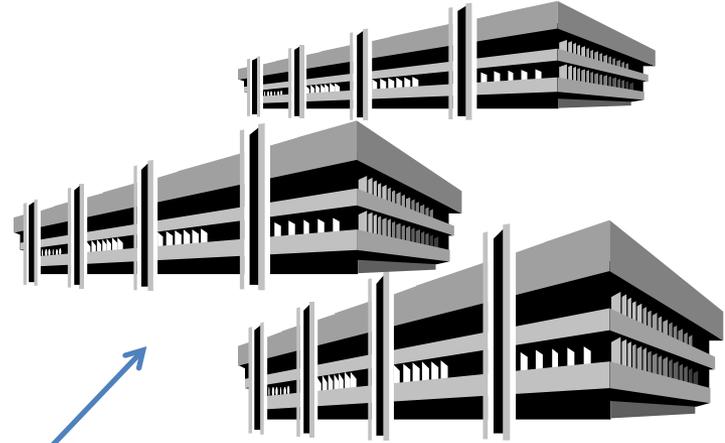
Building on our foundations

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*



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

	IT/Finance & Quantitative Decision Making	Systems Analysis, Change & Implementation	Materials Mgmt/ Production Processes	Human Factors/STS	Quality Engineering
Managing Acute Illness & Disease					
Effective models for Health promo & Disease Prevention					
Chronic Disease Management					
End of Life					
Public Health					
Discovery					