Summer Internship Program

Day 1 Orientation

James C. Benneyan, PhD, Director
Healthcare Systems Engineering Institute
CMS Innovation Healthcare Systems Engineering Center
NSF Center for Health Organization Transformation
AHRQ Patient Safety Learning Laboratory Center
Northeastern University, Boston MA

www.HSyE.org
Welcome!

(we’re glad you’re here)
Today

1. About **us**
   - Me, you, internship

2. About **healthcare**
   - Problems (Wed: Healthcare industry, Dr H)

3. About **ISyE in healthcare**
   - Overview

4. Logistics, trouble shooting
Morning

1. Welcome!
2. Who we are and why
3. Summer internship program
4. Logistics
5. Next steps, Calendar
6. Q & A
About us

HSyE, you, internship program
Mission: Broad measureable impact on healthcare, nationally, thru integration of research, education, and application of industrial and systems engineering
NSF Industry-University Collaborative Center

National Science Foundation IUCRC
Industry-University Center Model

- One or more university research groups
- Test beds
- Common problems
- Multiple companies (healthcare systems)
- Research results
- Response proposals
- Project selection
- Member steering committee

NEU’s Center for Health Organization Transformation (CHOT) IUCRC

- Members = Advisory board, Project selection
- Active members = Vibrant center, Useful research
Education platform

For Engineers

- Formal coursework
  - Curricula, classes
- Experiential education
  - Coop, intern programs

For Healthcare

- Seminars, workshops
  - Build awareness, skill
- Clinicians-in-residence
  - Medical, MHA students

Experiential Learning

- Undergraduate Co-op Program
  - Assist with 5+ projects in health systems
  - Sophomores through seniors eligible
  - 6 month duration

- Graduate Research Internships
  - Work 3-6 months in healthcare system
  - Combined applied project(s) and in-system work on thesis research or topic discovery
  - Continued work in following semester

- Summer Fellowships Program
  - Experience on applied and research problems in our centers and health system partners
  - Supervised by academic & healthcare mentors
  - 8-12 week duration, undergraduate and graduate students eligible

Formal Education

- Undergraduate healthcare IE minor
- Graduate health systems engineering MS and PhD concentrations within IE
- Engineering leadership program in health systems engineering MS & PhD
- Short courses and webinar series (practitioner focused)

In Development

- Professional MS, healthcare improvement science
- HSyE MS engineering degree

Seminar Series

Healthcare Systems Engineering Institute

- Healthcare transformation
- Use of computer simulation and online tools to develop a better understanding of the current healthcare system
- Use of computer simulation and online tools to develop a better understanding of the current healthcare system
- Use of computer simulation and online tools to develop a better understanding of the current healthcare system

Time

- Winter-Spring
- Summer
- Fall-Spring

Cohort Research Experience

- Recruiting & Application
- Onboarding
- Cohort
- Research
- Reflection
- Report
- Post REU Year
Us - snapshot

- Core staff
  - Dr. Benneyan, Director, NU-IE faculty; IHI fellow/faculty
  - 5 Faculty, 5 staff/engineers/advisors, 2 MDs, 2 office staff, 2 technical writers,
  - 5 post-docs, 24 graduate students, 10 undergrads

- 2,600 square foot institute space

- Summer internship program
  - Intern coordinators (Elizabeth, Cory, Corey)
  - Jamie Hackney; office admin (hiring, paperwork, etc)
  - Graduate student and 2015 intern mentors
HSyE values

• Measurable improvement on healthcare systems, at scale and at pace

• Processes

• Continuous and co-learning

• Abhorrence of MUDA, waste, mediocre

• Joy and satisfaction in work

• Personal and professional growth
My hopes for you – summer interns

• Contribute to our healthcare IE projects & our overall mission, team, internal operations.
• Learn about healthcare systems engineering
• Develop useful career experience and insight
• Grow personally and professionally

“It’s time for the science of health care to embrace systems engineering” (JAMA, 2012)
Your turn : )

• Name, year, major (minor if any)
• Something interesting about yourself
• Something fun about yourself
• Favorite (and least favorite) subject so far
• Past work, coop, or healthcare experience, if any
Summer internship program

• 12 week internship
• Students from across U.S.
• Applied, research projects
• Reflection activities, presentation skills
• Weekly in-services
• Mentoring
• Post-summer activities
Summer Internship Program
Healthcare Systems Engineering Institute – Northeastern University

Recruiting & Application
- Hiring
- Reading
- Mentoring
- 2 Research Projects

Onboarding
- Preflection exercise
- Onboarding

Cohort Research Experience
- Formal Report

Testing + Evaluation
- Reflection exercise
- Paper Preparation

Post REU Year

Time
- Winter-Spring
- Summer
- Fall-Spring
## Calendar

### Spring
- March 28 – Orientation call 1
- April (date) – Orient. call 2
- Background reading assign
- Pre-onboarding, paperwork
- “Pre-flection” exercise (what you want to gain from this)

### Fall
- Quarterly conference call
- Post-reflection
- Short writing assignment

### Summer
- Week 1: May 27 2014
  - General orientation, onboarding
  - Project finalization
- June – Aug 14
  - Team projects, HSyE activities
  - Learn, grow, teach, contribute
- Weekly
  - Team meetings
  - Guest lectures, IHI Open school
  - Weekly meetings: mentor, me
- Aug 10 week
  - Reflection, report, presentation
Typical summer responsibilities

1. Two (ish) applied IE projects
   - Team structure (following slide)
   - Fluid over time, load balancing, help others as needed

2. One (ish) research IE projects

3. One internal project team
   - Fill in ebb + flow of other projects. Ad hoc help as needed

4. Learning and growth
   - Guest lectures, summer course sit-ins, IHI Open School
   - Weekly mentor meeting. Reflection exercises (August)
   - Self-motivated
Expectations

• Contribute to projects and unanticipated needs
• Conduct oneself and represent Center professionally
• Attend all team and staff meetings and project reviews (schedule to follow)
• Self-manage team projects on daily/weekly basis
• Keep senior manager and me updated on progress, results, and barriers
• Co-learn
• Ask for help, information, and direction when needed or uncertain
## Typical projects

<table>
<thead>
<tr>
<th>Delivery System Logistics</th>
<th>Patient Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Inventory</td>
<td>• Workflow smoothing</td>
</tr>
<tr>
<td>• Supply chain and reusable equipment optimization</td>
<td>• Patient flow simulation models</td>
</tr>
<tr>
<td>• Regional network design</td>
<td>• Operating room logistics</td>
</tr>
<tr>
<td>• Real time location systems and RFID</td>
<td>• Emergency department flow</td>
</tr>
<tr>
<td></td>
<td>• Diagnostic test scheduling</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Workforce Planning</th>
<th>Quality &amp; Patient Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Capacity planning</td>
<td>• Reliable and consistent care</td>
</tr>
<tr>
<td>• Staff scheduling</td>
<td>• Harm and error reduction</td>
</tr>
<tr>
<td>• Demand management</td>
<td>• Readmission reduction</td>
</tr>
<tr>
<td>• Operating room scheduling and turn-around</td>
<td>• Nurse knowledge exchange &amp; hand-off practices</td>
</tr>
<tr>
<td>• Academic workforce logistics</td>
<td>• Treatment optimization</td>
</tr>
</tbody>
</table>
## Project Status, June 2013

<table>
<thead>
<tr>
<th>System</th>
<th>Project</th>
<th>Year</th>
<th>Active</th>
<th>Type</th>
<th>Status</th>
<th>Needs</th>
<th>Estimated Annual Impact</th>
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<tbody>
<tr>
<td>BWH</td>
<td>Non-OR anesthesia utilization</td>
<td>'13</td>
<td>●</td>
<td>TA</td>
<td></td>
<td>$Other/Category</td>
<td>44k +10% utilization</td>
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<tr>
<td>CHA</td>
<td>Primary care continuity</td>
<td>'13</td>
<td>●</td>
<td>SF/JB</td>
<td></td>
<td>Implementation</td>
<td>+20% continuity</td>
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<tr>
<td>HVMA</td>
<td>Obstetrics admissions optimization</td>
<td>'13</td>
<td>●</td>
<td>SG</td>
<td></td>
<td>Implementation</td>
<td>3m</td>
</tr>
<tr>
<td>HVMA</td>
<td>OB/GYN ultrasound capacity optimization</td>
<td>'13</td>
<td>○</td>
<td>JB</td>
<td></td>
<td>Implementation</td>
<td>340k</td>
</tr>
<tr>
<td>Lahey</td>
<td>CHF post-discharge scheduling</td>
<td>'13</td>
<td>●</td>
<td>SG</td>
<td></td>
<td>Measurement</td>
<td>360k -3% readmissions</td>
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<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Atrius</td>
<td>Homecare population optimization</td>
<td></td>
<td>●</td>
<td>JB</td>
<td></td>
<td>health, cost</td>
<td></td>
</tr>
<tr>
<td>Atrius</td>
<td>Homecare networks/resource design</td>
<td></td>
<td>●</td>
<td>JB</td>
<td></td>
<td>cost</td>
<td></td>
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<tr>
<td>BIDMC</td>
<td>Surgery call center</td>
<td></td>
<td>●</td>
<td>JB</td>
<td></td>
<td>access</td>
<td></td>
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<tr>
<td>BMC</td>
<td>Specialty appointment access</td>
<td></td>
<td>●</td>
<td>VS</td>
<td></td>
<td>access</td>
<td></td>
</tr>
<tr>
<td>BWH</td>
<td>System-wide appointment access</td>
<td></td>
<td>●</td>
<td>TA</td>
<td></td>
<td>access</td>
<td></td>
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<tr>
<td>CCA</td>
<td>SNF care incentive design</td>
<td></td>
<td>●</td>
<td>JB</td>
<td></td>
<td>health, cost</td>
<td></td>
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<tr>
<td>CHA</td>
<td>Peri-op supplies - inventory science</td>
<td></td>
<td>●</td>
<td>VS</td>
<td></td>
<td>cost</td>
<td></td>
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<tr>
<td>CHA</td>
<td>Peri-op supplies - process flow</td>
<td></td>
<td>●</td>
<td>VS</td>
<td></td>
<td>cost</td>
<td></td>
</tr>
<tr>
<td>CHA</td>
<td>Peri-op supplies - master list standardization</td>
<td></td>
<td>●</td>
<td>VS</td>
<td></td>
<td>cost</td>
<td></td>
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<tr>
<td>DFCI</td>
<td>Project 1</td>
<td></td>
<td>●</td>
<td>JB</td>
<td></td>
<td>access, delays</td>
<td></td>
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<tr>
<td>DFCI</td>
<td>Project 2</td>
<td></td>
<td>●</td>
<td>JB</td>
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<td>access, delays</td>
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<tr>
<td>DFCI</td>
<td>Project 3</td>
<td></td>
<td>●</td>
<td>JB</td>
<td></td>
<td>access, delays</td>
<td></td>
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<tr>
<td>Hallmark</td>
<td>Breast clinic access + delays</td>
<td></td>
<td>●</td>
<td>JB</td>
<td></td>
<td>Aim, measurement</td>
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<tr>
<td>HCH</td>
<td>Project 1 TBD</td>
<td></td>
<td>●</td>
<td>JB</td>
<td></td>
<td>access, delays</td>
<td>$500 -5% readmissions</td>
</tr>
<tr>
<td>HCH</td>
<td>Project 2 TBD</td>
<td></td>
<td>●</td>
<td>JB</td>
<td></td>
<td>access, delays</td>
<td></td>
</tr>
<tr>
<td>Lahey</td>
<td>OU appropriate patient ID + standardization</td>
<td></td>
<td>●</td>
<td>JB</td>
<td></td>
<td>cost</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lahey</td>
<td>OU capacity + staffing optimization</td>
<td></td>
<td>●</td>
<td>JB</td>
<td></td>
<td>cost</td>
<td></td>
</tr>
<tr>
<td>MGH</td>
<td>CLABSI reliability engineering science</td>
<td></td>
<td>●</td>
<td>VS</td>
<td></td>
<td>$AEs, LOS, $</td>
<td></td>
</tr>
<tr>
<td>MGH</td>
<td>Interventional radiology</td>
<td></td>
<td>●</td>
<td>JB</td>
<td></td>
<td>access</td>
<td></td>
</tr>
<tr>
<td>MGH</td>
<td>Neurosurgery (access/flow?)</td>
<td></td>
<td>●</td>
<td>TA</td>
<td></td>
<td>access</td>
<td></td>
</tr>
</tbody>
</table>
Methods we use

- Systems Thinking
- Human Factors Analysis
- Facility Design Layout
- Human Factors Analysis Classification

- Optimization
- Mathematical Programming
- Data Mining
- Decision Analysis
- Discrete Event Simulation
- System Dynamics
- Network Analysis
- Statistical Analysis

- Heuristics
- Queuing
- Forecasting
- Operations Research
- Scheduling

- Constraint Based Scheduling
- Network Analysis
- Inventory Modeling

- Ethnography
- Evidenced Based Medicine
- Fault Tree Analysis
- Decision Trees
- Evidence Based Medicine
- Six Sigma
- Failure Mode Effect Analysis
- Statistical Process Control

- Quality Function Deployment
- Lean
- Patient Safety
- Plan-Do-Study-Act
- QI Leadership
- Basic Quality Tools
- Clinical Variation

- Root Cause Analysis
- Process Mapping
- Decision Making
- Clinical Variation
- Project Management
- Time/Motion Study

Created by: Office of Performance Improvement, UT MD Anderson Cancer Center, with idea from the Standards and Practice Department, Mayo Clinic, 2010.
We do a LOT of this…

6σ, Lean, CQI, PDSA, …

More this afternoon
...and we do a lot of this

Max $Z = \sum_k \sum_t \sum_r \sum_s w_{kt} \cdot p_{ktrs}$

$\sum_t A_{mts} \leq 1 \quad \forall i, s \text{ and } \forall m, n \in G_i$

$\sum_s A_{mts} = R_{mt} \quad \forall i, t \text{ and } \forall m, n \in G_i$

$A_{mts} = 1 \quad \forall (m, t, s) \in \mathcal{O}$

$A_{mts} \leq 1 \quad \forall i, t, s \text{ and } \forall m \in G_i, \forall n \in U_{imt}$

$A_{mts} \geq \alpha \quad \forall i, t, s \text{ and } \forall m \in G_i, \forall n \in U_{imt}$

$\sum_m A_{mts} \geq C_{it} \quad \forall i, t, s \text{ where } m \in G_i$

$\sum_m A_{mts} \geq k \cdot \sum_t p_{ktrs} \quad \forall t, r, s \text{ where } m \in Q^t_r$

$\sum_r p_{ktrs} \geq Goal_t \quad \forall t, s$

$A_{mts} \in \{0,1\} \quad \forall m, t, s$

$p_{ktrs} \in \{0,1\} \quad \forall k, t, r, s$
Project team structure
## Example – old (revise!)

<table>
<thead>
<tr>
<th>Project</th>
<th>Owner</th>
<th>Project Team</th>
<th>Advice / Oversight Responsibility</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Grad/Lead</td>
<td>Coop/Support</td>
<td>Technical Area</td>
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<tr>
<td><strong>Wave 1 – Ongoing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>BWH-1 anesthesia</td>
<td>Tom</td>
<td>Nick</td>
<td>Colin</td>
<td></td>
</tr>
<tr>
<td>BMC-1 urology appointment access</td>
<td>Vin</td>
<td>Sam</td>
<td>Jillian (Mitchel)</td>
<td></td>
</tr>
<tr>
<td>Atrius-1 regionalization</td>
<td>Jim</td>
<td>Onur</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lahey-1 inventory supply chain</td>
<td>Suzy</td>
<td>Selen (Rana)</td>
<td>Bader Saad</td>
<td></td>
</tr>
<tr>
<td><strong>Wave 2 - Scoping</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHA-1 Primary care resident scheduling</td>
<td>Suzy</td>
<td>Rachel</td>
<td>Ahmed (LP)</td>
<td></td>
</tr>
<tr>
<td>MGH-1 critical care – CLABSI</td>
<td>Jim</td>
<td>Dayna</td>
<td>Jillian (stats)</td>
<td>Robert (QC)</td>
</tr>
<tr>
<td>Lahey-2 observation unit</td>
<td>Vin (Jim)</td>
<td>Laura</td>
<td>Saad Bader</td>
<td></td>
</tr>
<tr>
<td>Atrius-2 hospital in home</td>
<td>Vin</td>
<td>Brendan</td>
<td>Ahmed (Mitchel)</td>
<td></td>
</tr>
<tr>
<td>BWH-2 specialty patient flow, access</td>
<td>Tom</td>
<td>Sara</td>
<td>Ryan Colin</td>
<td></td>
</tr>
<tr>
<td>MGH-2 neuro surgery ED flow</td>
<td>Tom</td>
<td>Dayna</td>
<td>Robert Ryan</td>
<td></td>
</tr>
<tr>
<td><strong>Wave 3 – Identifying</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHA-2 project yet to be scoped</td>
<td>(Laura)</td>
<td>(rana)</td>
<td>(flex)</td>
<td></td>
</tr>
<tr>
<td>BMC-2 project yet to be scoped – OR?</td>
<td>(Laura)</td>
<td>Serpil</td>
<td></td>
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<tr>
<td>Lahey-3 Perfect discharge</td>
<td>Suzy</td>
<td>Luke (Brendan)</td>
<td></td>
<td></td>
</tr>
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</table>
How we do the work

1. Project lifecycle mgmt

2. Project vetting and selection process

3. Project management and formal design reviews

4. Implementation & impact measurement

More later this week
Writing assignment (1)

• “Pre-flection” exercise (what you want to gain from this)
Why healthcare
Why healthcare?

- National crisis
- CWF and WHO studies
- $3$ trillion/year (18%)
- $1/3 = $ pure waste
- Unsafe, unreliable
- Poor health, outcomes
- High variability
- Poor access, equity
Why systems engineering

Significant interest (IOM, NAE, AHRQ, NSF, NIH, PCAST, etc)

‘Time for science of health care to embrace science of systems engineering... but examples of... impact... are rare’ (JAMA, 2012)

‘Greater use of (IE) principles... widely used in manufacturing and aviation... small number health care organizations... not widespread in U.S. health care’
Why us?

• Significant experience with healthcare IE (application, education, research)

• Unique team, strong healthcare collaborators, 3 past centers, >75 years combined experience

• Will, vision, passion

“Never doubt that a small group of thoughtful, committed citizens can change the world; indeed it is the only thing that ever does.”

Margaret Mead
What matters  What IEs do

Safe
Effective
Patient centered
Timely
Efficient
Equitable

Common Applications of Systems Engineering

• Flow, waits, delays
• Logistics, capacity
• Quality, lean, six sigma
• Safety, reliability
• Treatment, medical decision making
• Policy
“Triple Aim”

- Better care
- Better health
- Lower costs

Pervasive

CMS, AHRQ, IHI
The Triple Aim: Care, Health, And Cost

The remaining barriers to integrated care are not technical; they are political.

by Donald M. Berwick, Thomas W. Nolan, and John Whittington

ABSTRACT: Improving the U.S. health care system requires simultaneous pursuit of three aims: improving the experience of care, improving the health of populations, and reducing per capita costs of health care. Preconditions for this include the enrollment of an identified population, a commitment to universality for its members, and the existence of an organization (an “integrator”) that accepts responsibility for all three aims for that population. The integrator’s role includes at least five components: partnership with individuals and families, redesign of primary care, population health management, financial management, and macro system integration. [Health Affairs 27, no. 3 (2008): 759–769; 10.1377/hhaff.27.3.759]

Congestive heart failure (CHF) is the most common reason for admission of Medicare patients to a hospital.1 Sadly, 40 percent of Medicare patients discharged after admission for CHF are readmitted within ninety days, even though well-designed demonstration projects have shown that that rate can be reduced by more than 80 percent with proper management of patients.2 Patients experience this reactive system as one providing poor service and lacking memory. Caregivers experience frustration, despite their best efforts.

U.S. health system scorecard. CHF care is not an isolated case. It is a prime example of what goes wrong when a health care system lacks the capacity to integrate its work over time and across sites of care. The recent “Scorecard” from the Commonwealth Fund Commission on a High Performance Health System gives the U.S. health care system an overall score of 66 percent, with 100 percent referring to the top decile of known performance.3 The commission notes that even though U.S. health care expenditure rates are far higher than those of other developed countries, our results are no better. Despite spending on health care being nearly double that of the next most costly nation, the United States ranks thirty-first among nations on life expectancy; thirty-sixth on infant mortality; twenty-eighth on male healthy life expectancy; and twenty-ninth on female healthy life expectancy.4 As a side effect of the

Paper: Overview of IE in healthcare
Where is the Waste?
Redundancy, rework, non-value-add, unnecessary work

1. Misuse, overuse, re-use, underuse – critical/costly resources
2. Unnecessary readmissions \(\approx \$19 - 25\) billion/yr
3. Noncompliant medication use \(\$290\) billion
4. Inventory \(\approx 15 - 30\)% hospital costs
5. Routine NVA \(\approx 80 - 95\)% lean studies
6. 20\% lab/x-ray tests and 14\% admissions because original tests or medical records from previous visits unavailable (VA)
7. 81\% cases have missing data (Palo Alto Medical Foundation)
8. Average 6.4 providers/year seen by Medicare patients
9. 75\% cost is for chronic illness (significant % readmitted)

Process inefficiencies

A 36-Hospital Time and Motion Study: How Do Medical-Surgical Nurses Spend Their Time?

Table 2. Categories and subcategories of nursing time for protocol B

<table>
<thead>
<tr>
<th>Nursing activity category</th>
<th>Nursing activity subcategory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste</td>
<td>Waiting</td>
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<tr>
<td></td>
<td>Looking/retrieving</td>
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<tr>
<td></td>
<td>Delivering</td>
</tr>
<tr>
<td>Unit-related functions</td>
<td>Unit-related functions</td>
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<tr>
<td>Nursing practice</td>
<td>Patient care activities</td>
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<td></td>
<td>Care coordination</td>
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<td></td>
<td>Medication administration</td>
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<td></td>
<td>Documentation</td>
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<td></td>
<td>Assessment/reading vital signs</td>
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<tr>
<td>Nonclinical</td>
<td>Personal time</td>
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<td>Patient/family care</td>
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<tr>
<td></td>
<td>Administration/teaching</td>
</tr>
</tbody>
</table>

IHI TCAB Study

~50% NVA!

- Documentation: 35%
- Non-nursing practice: 25%
- Foraging, Travel time, Patient escorting
Eliminating Waste in US Health Care

Berwick D, Hackbarth A, JAMA 2012;307(14):1513-1516
Over / under use

- Massive over use, over treat
- Some under use
- **Example 1**: Imaging in ED
- **Example 2**: 60-80% of all specialty referrals
- Unnecessary, wrong sub-specialty, or could have been via phone consult
Safety report card

Estimates (IOM 1999, etc)

Medical errors & iatrogenic injury:
- 98,000 deaths/year
- 770,000 - 2 million patient injuries
- $17 - $29 billion annually

Adverse drug events (ADE):
- 770,000 to 2 million per year
- $4.2 billion annually

Hospital-acquired infections (NSI):
- 2 - 5 million NSI/year, $2,000 - $3,000/case
- 8.7 million hospital days
- 20,000 deaths/year
- 2006 study: 195,000 deaths, $6 billion/year

More US deaths/year than traffic accidents, breast cancer, & AIDS.

Endemic AE’s

Hospital patients suffer ≥ 1 adverse events

- Drug events (ADE)
- Surgical site infections (SSI)
- Needlesticks
- Wrong side/site surgery
- Device-associated infections
- Ventilator-associated pneumonia
- Central line infections

Average costs:
- ADE: $4,000 - $5,000
- NSI: $2,000 - $3,000
- VAP: 13 additional days & 30 - 50% attributable mortality
- SSI: Can exceed $14,000

Endemic AE’s

More US deaths/year than traffic accidents, breast cancer, & AIDS.

2006 study: 195,000 deaths, $6 billion/year
Human Process errors

Doctor took out woman’s kidney instead of gallbladder

Milford Regional supports surgeon, but he may face discipline

By Andrew Lightman DAILY NEWS STAFF

MILFORD — A surgeon at Milford Regional Medical Center mistakenly removed a patient’s kidney, according to hospital officials and a state investigation. Hospital officials would not hospital employees and reviewing related hospital records, the Department of Public Health concluded that the hospital has taken all necessary corrective action.

DPH spokesman Ed Kiely said the state remains “very confi-nurse present during the surgery said the surgeon “was working in the exact location you would expect... (the gall-bladder) to be located,” according to the DPH’s investigation report.

However, the patient had a lot

Rare events not so rare....
**Variation & one-sigma quality**

**Recommended Care Received ≈ ½**

- 64.7% Hypertension
- 63.9% Congestive Heart Failure
- 53.9% Colorectal cancer
- 53.5% Asthma
- 45.4% Diabetes
- 39.0% Pneumonia
- 22.8% Hip Fracture

**Hand washing compliance rate**

- 75%
- 70%
- 65%
- 60%
- 55%
- 50%
- 45%
- 40%
- 35%
- 30%

**Map 6.5. Breast Sparing Surgery**

- Percentage of Inpatient Breast Cancer Surgery in Medicare

---

Lots of Activity (10-20 years)

- National campaigns
- P4P, demonstration projects
- Numerous such workshops
- Search for penicillin (EMRs, bundles, new QI/PI models, latest HBR idea, ...)
- ‘Innovation’ centers

IOM reports

> 3,200 U.S. hospitals (90% acute care beds)
And now the bad news...!
Not much is improving

Per capita cost (US) = trend unaffected

\[ y = 1025.3e^{0.64t} \]

\[ R^2 = 0.9939 \]

Increasing: 4 times earnings
5 times inflation

$5.3 trillion U.S. by 2020

PROFESSION
Hospitals make almost no headway in cutting readmissions
About 1 in 6 Medicare patients was rehospitalized within 30 days in 2008 -- a rate that must improve by October 2012 to avoid penalties.

PROFESSION
No benefit from telemonitoring heart patients
A study finds no improvement for those who call in to update their health status compared with those who don’t call.

After Hospitalization:
A Dartmouth Atlas Report on Post-Acute Care for Medicare Beneficiaries

THE DARTMOUTH INSTITUTE FOR HEALTH POLICY & CLINICAL PRACTICE
Where Knowledge Informs Change

BACKGROUND

In the 10 years since publication of the Institute of Medicine’s report To Err Is Human, extensive efforts have been undertaken to improve patient safety. The success of these efforts remains unclear.

- Largest study since IOM
- “No significant change in overall rate of harm”
Higher costs ≠ Better outcomes

### U.S. System versus Benchmarks
Commonwealth Fund (2006)

<table>
<thead>
<tr>
<th>Measure (U.S.)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>70%</td>
</tr>
<tr>
<td>Infant mortality</td>
<td>39%</td>
</tr>
<tr>
<td>Healthy life expectancy at 60</td>
<td>87%</td>
</tr>
<tr>
<td>Overuse / waste</td>
<td>46%</td>
</tr>
<tr>
<td>Unnecessary ER visits</td>
<td>23%</td>
</tr>
<tr>
<td>Same/next day access</td>
<td>58%</td>
</tr>
<tr>
<td>After hours access</td>
<td>53%</td>
</tr>
<tr>
<td>Adult preventative care</td>
<td>61%</td>
</tr>
<tr>
<td>Childhood absenteeism</td>
<td>74%</td>
</tr>
<tr>
<td>Chronic disease under control</td>
<td>61%</td>
</tr>
<tr>
<td>Administration cost</td>
<td>28%</td>
</tr>
<tr>
<td>Use of electronic records</td>
<td>21%</td>
</tr>
</tbody>
</table>

Benchmarks typically top 3-6 countries

### Life Expectancy 2003

<table>
<thead>
<tr>
<th>Country</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
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<tr>
<td>Switzerland</td>
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<td>New Zealand</td>
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<td>United Kingdom</td>
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<td>Netherlands</td>
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<td>France</td>
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<tr>
<td>Germany</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
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</tbody>
</table>

### Infant Mortality per 1,000 live births 2003

<table>
<thead>
<tr>
<th>Country</th>
<th></th>
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<tbody>
<tr>
<td>United States</td>
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<td>New Zealand</td>
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<td>Canada</td>
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<tr>
<td>Sweden</td>
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<tr>
<td>Japan</td>
<td></td>
</tr>
</tbody>
</table>
BCBSMA’s medical cost trend is growing **four** times faster than workers' earnings, and nearly **five** times the rate of inflation.

**Source:** Vin Sahney, BCBSMA, Bureau of Labor Statistics
More than healthcare crisis

Employer Health Costs In a Global Economy
A Competitive Disadvantage For U.S. Firms

By Len Nichols, Sarah Axeen, New America Foundation  May 2008

- U.S. manufacturing firms $2.38 per hour
- Foreign average $0.96 per hour. (2005, 2.4 times)

Example
- Chrysler: $1,000 per vehicle more Japanese-based manufacturers
- GM: $1,525 per vehicle (2005)

Figure 1. Greatest Cost Pressure on U.S. Businesses

Employment logistics

(Suzy, Jillian)
Orientation packet

• New employee check list...

• Complete all items

• (check each when completed)

• Sign and return to Jamie Hackney

• Due within first week of start
NU – New employee hires

**All**
- NU personal information form
- I-9 employment eligibility form
- W-4 federal tax withholding form
- Direct deposit form

**Full Time Hires**
- Confidential race and gender declaration (optional)
- Benefits enrollment

**Coop students**
- Coop hire sheet

**International students**
- Read international student FAQ
COE and HSyE

**COE**
- Sponsored computer account
- 253 RI and 254 RI key access request form
- 
- 

**HSyE**
- Contact information sheet
- Interest areas form (internal/external projects)
- HSyE (“QPL”) listserve
- Sharepoint access
- Space, desk, and computer assignment
- 

HSyE.org
## General orientation

### HSyE website
- □ Mission statement
- □ CHOT center
- □ Tools and resources
- □ Project scoping document templates

### Sharepoint website
- □ Regular meeting schedule
- □ Time reporting
- □ Expense reimbursement
- □ Templates and forms

### Reading, browsing
- □ Triple aim paper
- □ PDSA paper
- □ Healthcare IE chapter
- □ others as distributed

### Sharepoint website
- □ Escape fire video or paper
- □ Measuring triple aim
- □ IHI open school modules
- □ others as distributed
Wrap up
Questions

www.hsye.org

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