Road-mapping Health Care Systems and Services

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Agenda

- Trends in Health Care
- Health Care Services and Innovation
- Smarter Platforms for Health Care
- New Bases of Competition and Innovation
- Opportunities for the future

(all in some sort of order)
Disclosures

- BOD of Lumetra Health Solutions
- Chief Strategist, 360Fresh, Inc.
  - semantic mining of medical records
  - predict risk non-adherence, readmission, clinical deterioration, adverse care trajectory...
- Co-founder of CalRHIO
  - health exchange
- UC Berkeley/CITRIS
- BOA California Telehealth Network
  - Broadband Telehealth Network (CTN)
Trend: A Demand Challenge

Age Distribution of the US Population

Source: 2000 US Census

Population shifts will increase care burden. Age groups where care burden is greatest. Current workforce shortages pose difficulty with care burden at this level.

B. Lowensohn, Kaiser Research
Trend: A Workforce Challenge

Total Medical School Matriculations -- 1994 to 2005

Sources: NCHS & AAMC
Trend: Worldwide age wave

Percentage of Population over 60 years old
Global Average = 10%

SOURCE: United Nations • “Population Aging • 2002”
Healthcare challenges: Aging

Denmark
Population pyramids
1950
2000
2050

Sweden
Population pyramids
1950
2000
2050

China
Population pyramids
1950
2000
2050

USA
Population pyramids
1950
2000
2050
Trends: Bell’s Law –
New computer class every 10 years

- Enabled by technological opportunities & advances
- Smaller, more numerous and more intimately connected
- Ultimately used in many ways not previously imagined
- Ushers in a new kinds of applications, capabilities, and services
Services are Co-produced, ...
Services are also...
Engineering Smarter Health Services

*Health care is a *service* ...*

- Heavily knowledge and information dependent
- Highly customized, co-produced delivery

... *and full of services challenges*

- Labor force productivity
- Service supply chains
- Appropriate automation, outsourcing / out-tasking
- Coordination of services
- Service levels, measurement, & quality provision
- Service engineering & platforms
- Service innovation and scaling services
- Decision-making and architectures
- Demand Management

... *for which science, computation & engineering offer many approaches and potential solutions*

**Technology Innovation AND Services Innovation**

- New *tools* to care for patients *and*
- New *ways* to increase capacity & improve patient experience *in the health care system*

NAE + IOM: “Building a Better Delivery System” – calls for science and engineering to help the *service* of healthcare
Many Inventions, Few Innovations

- Innovation = Invention + Value
  - Not just a new way of doing something
  - Need to show Value too !!
- **DOING** something of value (**Services**) is key
Implications for Service Engineering

- **Co-Produced or Co-created Value**
  - Interaction between service provider and recipient, *patient & clinician*
  - Collaboration as to needs, skills, tasks, data, and desired outcomes
  - Coordination of expectations, needs, handoffs, terms, metrics, etc.

- **Intangibility**
  - Conveying/marketing of something you can’t touch or show easily
  - Valuation of care, outcomes, contracting, modifications, etc.

- **Perishability / no inventories**
  - Scaling highly interactive, intangible work that you can’t store requires new methods of dissemination to reach a broad audience
  - Labor dependent
Services & the Business of Health Care

- Measurement (QI)
- Publicity (QR) → Brand
- Value-based payment → CMS
- New Business Relationships
  - Retail, plan, IT provider,
- New Business Models
  - Warranties, Telecare, R&D, Retail Clinics
- New Basis of Competition

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**Geisinger Medical Center: Where a Warranty on Coronary Artery Bypass Surgery Signals a Commitment to Excellence**

This story originally appeared in IHI's 2008 Annual Progress Report.

John Podgursky, 62, did not know there was a warranty on the bypass surgery he had in the summer of 2007 at Geisinger Medical Center in Danville, Pennsylvania. But even if he had, he would not have needed it. His surgery and recovery went just fine.

It all started when he was mowing his lawn in Elysburg, Pennsylvania, a quiet community about an hour southwest of Scranton, in the heart of the anthracite coal region. Semi-retired from a lifelong career in the Bureau of Mines, Podgursky says he felt some tightness in his chest. He felt it off and on for the next few days.

A series of examinations and tests revealed that Podgursky needed triple bypass surgery. “One artery was 100 percent blocked, and two others were pretty blocked up as well,” he recalls. The surgery was booked for the very next day.

Podgursky was twice lucky. First, to get on the surgical schedule so quickly, and second to be at Geisinger, where the warranty itself is far less important than what it symbolizes.

the terms of the warranty, which Geisinger calls ProvenCareSM, Geisinger charges insurers a flat fee for a bypass that includes 90 days of routine follow-up care. If a patient suffers complications, Geisinger pays for the treatment at its facilities.
Innovation Topics to Follow for Road-mapping

- Alliances, Relationships, Financial Arrangements
- Analytics and Algorithms
- Arbitrage – xTourism
- Business organization
  - R&D, alliances, relationships
- Care Settings
- Devices – especially consumer-facing devices
- Gaming
- Metrics of competition
  - Used to be cost and market share
  - Service level, outcomes, experience, affordability, quality/safety, cost, among others
- Self Care (self service)
- Telecare
- Who has the data?
ICT Innovation central to Health Care

Care Delivery

Self Care

Care Coordination & Collaboration
Service Engineering for Health Care

- **Optimization of OR and ED utilization**
  - Research: 2 OR cases/day $\rightarrow$ ~8 cases/day (ORF project, MassGen)
  - Challenge: capacity increase, but moving bottlenecks result
  - Lessons: build in **flexibility**; optimize and augment with **sensing**; engineer **ecosystem**.

- **Social tools and methods for Chronic Care**
  - Use marketing and knowledge mobilization tools and methods to improve health literacy, **self-efficacy**, prevention.
  - **Advertising techniques** for patient safety, quality of care, adverse events, infection control, etc.
    - Maibach et al *Prev Chronic Dis* 2006 Jul
    - No Nielsen or Gallup for Health care
  - Role of **Serious Gaming** in adoption, literacy, and behavior change
If your livelihood depended on altering patient behavior, who should be your partner?

July 13, 2008

Warning: Habits May Be Good for You

By CHARLES DUHIGG

A FEW years ago, a self-described “militant liberal” named Val Curtis decided that it was time to save millions of children from death and disease. So Dr. Curtis, an anthropologist then living in the African nation of Burkina Faso, contacted some of the largest multinational corporations and asked them, in effect, to teach her how to manipulate consumer habits worldwide.

Dr. Curtis, now the director of the Hygiene Center at the London School of Hygiene & Tropical Medicine, had spent years trying to persuade people in the developing world to wash their hands habitually with soap. Diseases and disorders caused by dirty hands—like diarrhea—kill a child somewhere in the world about every 15 seconds, and about half those deaths could be prevented with the regular use of soap, studies indicate.

But getting people into a soap habit, it turns out, is surprisingly hard.

To overcome this hurdle, Dr. Curtis called on three top consumer goods companies to find out how to sell hand-washing the same way they sell Speed Stick deodorant and Pringles potato chips.

She knew that over the past decade, many companies had perfected the art of creating automatic behaviors—habits—among consumers. These habits have helped companies earn billions of dollars when customers eat snacks, apply lotions and wipe counters almost without thinking, often in response to a carefully designed set of daily cues.

“There are fundamental public health problems, like hand washing with soap, that remain killers only because we can’t figure out how to change people’s habits,” Dr. Curtis said. “We wanted to learn from private industry how to create new behaviors that happen automatically.”

The companies that Dr. Curtis turned to—Procter & Gamble, Colgate-Palmolive and Unilever—had invested hundreds of millions of dollars finding the subtle cues in consumers’ lives that corporations could use to introduce new routines.
Serious Games for Health Quality and Safety

- Gaming & Simulation can effectively teach & bring people together
- Peer pressure can be a strong motivator for behavior & change
- Games can scale to societal levels
- Games can be combined with real life, devices, and knowledge.
- Games can raise self efficacy
Services Platforms: Remote Care Today...

- Remote, but tethered
- Extension of sight & sound
- All care at the device
- Challenging workflow
- Limited “presence”
- Low knowledge mobilization
- No analytics
- No context sensitivity
- Poor scale
Services Platforms: Cell-phone Microscopy

**Services:** distributed work, sensing, remote collaboration, feedback, decoupling dx / tx
“Programmable Rehab”

Services: distributed work, embedded intelligence, collaboration, feedback

Courtesy: Filippo Tempia, Telecom Italia
Wireless Health Sensors

- Accelerometry, ECG, Pulse oximetry, Myography, Galvanic Skin Response, chest sounds
- Bluetooth connectivity to cell phone or PC upload
- worn as chest strap, upload via BT to PC.

Courtesy: Dr. John Canny & Reza Naimi

HealthPia GlucoPhone™

1. Check blood glucose
2. Get results
3. Send results to database
4. Text message sent to caregiver via database (optional)
5. Access your database online

Cuff-less, Continuous BP monitor
Dr. Harry Asada, MIT
Aging & Telecare - Taiwan
NextGen Telecare: Cloud Computing
Trends: Healthcare, Role of IT & Services

Shift the point of care (POC)
- POC can be ANY location
- Capturing data, identification, location
- Telemedicine

New Devices
- New data streams, real-time sensing
- Security issues
- Interfaces, data exchange, analytics

Info explosion & liquidity
- New data presentation mechanisms
- Context-sensitive information
- Security & Safety issues
- Personal health records
- New Market Dynamics

New Approaches to care
- Image / ICT dependent
- Data fusion & Processing, Cloud computing
- Telecare, Self Care, Care Tourism
- Role of Serious Gaming

New Care Models
- Patient safety & quality
- Warranties, Risk management
- Matching labor cost to care cost
- Service Level competition

Workforce & Retention
- Efficiency and Productivity
- Patient Experience
- Privacy and Trust Retention
THANK YOU

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