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Where are We?

- Channel 1
- Domain Lectures
 - 1. National health information infrastructure
 - 2. Provision of health care by clinicians
 - 3. Personal/individual health and wellbeing
 - 4. Biomedical and other health-related research
 - 5. Public health

National Health Information Infrastructure and the "Learning Health System"

> Prof. Charles P. Friedman Introduction to Health Informatics (Fall 2013) University of Michigan September 4, 2013

Warm-up: What Does This Picture Say to You?



Questions to be Addressed

- 1. What do we mean by infrastructure?
- 2. What is a learning health system and why do we need it?
- 3. How does a learning health system work and how to envision it as infrastructure?
- 4. How can we achieve it?

An infrastructure is...

- Persistent: you can count on it being there
- Transparent: you know what it does
- Reliable: it does what it does almost all the time
- Routine: using it requires no special effort
- Versatile: it serves a wide range of needs
- Scalable: requires one connection
- Fertile: Capable of growth

Remember this Slide! Infrastructure and Scale



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Ν

connections

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Big Problem!

- The U.S. does not have a health information infrastructure
- The consummate health informatics challenge



We Can't Fix This Without an Infrastructure



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What Infrastructure Can Enable

- A needed virtuous cycle of study, learning and improvement
- This requires assembly of data, analysis, and feedback



The Challenge: Studying a Rare Disease



But Look What Might Be Possible



The Learning Health System

- The nation's health system is going digital 30% now → 80% by 2019
- If each care provider, patient, researcher, used his/her/its own data only for immediate needs, these efforts will undershoot their potential
- Sharing of data can enable a virtuous cycle of study, learning and improvement
- A learning health system is infrastructure that enables this to be done routinely and continuously.

Adoption of "Basic" Electronic Health Records Among Office-based Physicians



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Source: National Center for Health Statistics, Centers for Disease Control, NAMC (National Ambulatory Medical Care) Survey

Deployment of "Basic" EHRs in Non-Federal Acute Care Hospitals



Source: ONC Data Brief – March 2013 - Electronic Health Record Systems and Intent to Attest to Meaningful Use among Non-federal Acute Care Hospitals in the United States: 2008-2012



The NEW ENGLAND JOURNAL of MEDICINE

- Perspective: Jan 3, 2013
- "Code Red and Blue Safely Limiting Health Care's GDP Footprint"

Arnold Milstein, M.D., M.P.H.

...U.S. health care needs to adopt new work methods, outlined in the Institute of Medicine's vision for a learning health system... Such methods would enable clinicians and health care managers to more rapidly improve value by continuously examining current clinical workflows, management tools from other service industries, burgeoning databases, and advances in applied sciences (especially health psychology and information, communication, and materials technologies). They could then use the insights gained to design and test innovations for better fulfilling patients' health goals with less spending and rapidly scaling successful 18 innovations.

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A National-Scale Learning Health System



The LHS Must Work Bi-Directionally: Afferent and Efferent Arms



A Learning System Will Make These Things Possible

"17 years to 17 months, or maybe 17 weeks or even 17 hours..."

- Nationwide post-market surveillance of a new drug quickly reveals that personalized dosage algorithms require modification. A modified decision support rule is created and is implemented in EHR systems.
- During an epidemic, new cases reported directly from EHRs. As the disease spreads into new areas, clinicians are alerted.
- A patient faces a difficult medical decision. She bases that decision on the experiences of other patients like her.

The National LHS: *One Infrastructure* that Supports

Research

- Clinical
- Comparative effectiveness
- Translational
- Public Health
 - Surveillance
 - Situational Awareness

Quality Improvement

- Health process and outcom research
- Best practice dissemination

Consumer Engagement

Knowledge-driven decision making

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Interpret findings: Are the results credible? What advice should be given?

Analyze Data What practices associate with lower fall rates?

Efferent

Afferent

Assemble Data: How do we prevent falls? What is the fall rate? Change Current Practice: In whole or part...

Based on your current

practice, you might

want to consider...

Feedback:

Decision to study falls 24

The LHS Must Meet Infrastructure Requirements

- Persistent: you can count on it being there
- Transparent: you know what it does
- Reliable: it does what it does almost all the time
- Routine: using it requires no special effort
- Versatile: it serves a wide range of needs
- Scalable: requires one connection
- Fertile: Capable of growth

The National LHS as Currently Envisioned

- A federation of some type
 Not a centralized database
- Grounded in public trust and patient engagement
- Participatory governance
- A "Complex Adaptive System"
- An "Ultra Large Scale" System

- "Just enough" standardization

– Supports innovation around standards

Exhibit 1.2: Health Informatics: The Transforming Power of HIT



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The LHS as a Fractal

- At every level of scale, it looks pretty much the same
- Local, regional, national, global



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LHS: A Pillar of the 2011 Federal Health IT Strategic Plan *BUT the Government Can't Build It*



Institute of Medicine Reports

Digital Infrastructure for the Learning Health System: The Foundation for Continuous Improvement in Health and Health Care

> Best Care at Lower Cost: The Path to Continuously Learning Health Care in America

The LHS Summit: May 17-18, 2012

Engaging a critical mass of key stakeholders, to be, for the LHS, what the Dumbarton Oaks Conference was for the United Nations (see <u>http://LearningHealth.org</u>)

- ~ 70 organizations represented at the National Press Club
- Resulted in 10 consensus Core Values
- 52 organizations have formally endorsed
- Giving rise to national "Learning Health Community"



Learning Health System Core Values

- 1. Person-Focused
- 2. Privacy
- 3. Inclusiveness
- 4. Transparency
- 5. Accessibility
- 6. Adaptability
- 7. Governance
- 8. Cooperative and Participatory Leadership
- 9. Scientific Integrity

10. Value

A Growing National Movement

- Achieving multi-stakeholder endorsement of LHS *Core Values (54 endorsements received to date)*
- Building a self-organizing, multi-stakeholder "learning health community", to develop as a coalition of the willing
- National workshops
- Catalyzing, leading, and participating in initiatives
 - Standards
 - Governance,
 - Technology



Public Health LHS Workshop

• Workshop in Ann Arbor, March 12-13

PUBLIC HEALTH AND THE LEARNING HEALTH SYSTEM A National Invitational Meeting at the University of Michigan



Robert Wood Johnson Foundation

... state and local public health have been underrepresented at discussions of the Learning Health System, and there is general agreement that the voice of public health needs to be heard as this national movement rolls forward. Accordingly, this meeting is designed to lay the groundwork for a community of public health leaders who share an interest in learning about the LHS and enriching its current status...

Finale

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