Envisioning the Learning Health System

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March 2, 2021
Disclosure

I serve on the Board of Directors of the Learning Health Community, a non-profit corporation promoting Learning Health Systems.
Main Menu

• What are Learning Health Systems (LHS)?

• What makes the LHS approach to health improvement different from other approaches?
  – Embraced uncertainty requiring discovery
  – Multi-stakeholder learning communities enabling continuity
  – Infrastructure: shared services enabling scalability
Learning Health Systems

Health systems--at any level of scale--become learning systems when they can, continuously and routinely, improve health through discovery and implementation.

https://nam.edu/programs/value-science-driven-health-care/learning-health-system-series/

lhsjournal.com
Learning Health Systems

Not

Learning HealthCare Systems

Sheikh A. From learning healthcare systems to learning health systems. Learning Health Systems, 2020. DOI: 10.1002/lrh2.10216
LHS “Anthems”
(Reward Offered for Putting these to Music)

• Bring us the tough problems!

• A system problem needs a system solution!

• 17 years to 17 months!
  – to 17 weeks to 17 days (to 17 hours)!
The Goal: A System That Can Improve Health Through Discovery & Implementation

✓ Characteristics, events, and context are captured as data to learn from (Data to Knowledge)

✓ Trusted knowledge is rapidly available to support decisions (Knowledge to Performance)

✓ Improvement is continuous and enduring through ongoing cyclic activity

✓ An infrastructure enables this to happen routinely and with economy of scale

✓ All of this is part of the culture
Pulling Out the Keywords: Gestalt of the LHS

- Persons/People
- Learn
- Data
- Knowledge
- Rapidly Available
- Performance
- Continuous and Enduring
- Cyclic Activity
- Infrastructure
- Culture
Learning Systems Can Exist at Any Level of Scale

- Single Organization
- Network of Organizations
- States/Provinces/Regions
- Nation
- Planet
The Fundamental Activity: Community-Directed Cycles of Study and Change

1. Assemble Data
2. Analyze Data
3. Interpret Results
4. Design Intervention
5. Take Action

External Evidence

Formation of Learning Community
An Example...

Preventing Falls in Nursing Homes

- **Take Action**: Change current Practice: In whole or part...
- **Integrate External Evidence**
- **Analyze Data**: What practices associate with lower fall rates?
- **Design Intervention**: Who receives intervention? How will it be implemented? Do an experiment?
- **Capture Practice as Data**: What happens now? (System has changed!) What is the fall rate and severity? (Has it improved?)
- **Assemble Data**: Gather data from all participating nursing homes
- **Interpret Results**: What have we learned? What interventions are indicated?

**Steps in the Cycle**

1. **D2K**: Data to Knowledge
2. **K2P**: Knowledge to Performance
3. **P2D**: Performance to Data

Better Health Requires This

Health Problem of Interest

D2K: Data to Knowledge

K2P: Knowledge to Performance

P2D: Performance to Data
Not Just This

Health Problem of Interest

D2K: Data to Knowledge

K2P: Knowledge to Performance

P2D: Performance to Data

Journals
Or This

**D2K:** Data to Knowledge

**K2P:** Knowledge to Performance

**P2D:** Performance to Data

Health Problem of Interest
LHS Initiatives at all Scales!

**Single Organizations**
- Intermountain
- Geisinger
- Mayo
- Many through CTSIs

**Learning Networks**
- PCORI Networks (Improve Care Now et al.)
- PEDSNet
- CancerLINQ
- Epinet (NIH)
- AHRQ Initiatives

**States/Provinces/Regions**
- Quebec & BC
- Michigan & Indiana

**Nations**
- Switzerland
- UK: Scotland, England
- Saudi Arabia
- U.S. (VHA)

**Planet**
- Someday
The Better Care Partnership will commence on 1 May 2020 and will be funded for an initial period of three years. It will develop solutions and methodologies to scale Better Care loops across multiple health and care settings and to transfer Better Care innovations across multiple health and care decisions. It is expected that the Partnership will become a key activity for HDR UK and will be an

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**Figure 1- Better Care Loop**

We are drawing on the conceptual framework of Learning Health and Care Systems and have developed a 'Better Care loop' to demonstrate continuous improvement for achieving better care for patients through data-driven health and care decisions.

https://www.hdruk.ac.uk/research/better-care/
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Embraced Uncertainty

• System problems are complex problems
• At the outset, the community is unsure of what it is going to do
• There are open questions at each stage of the learning cycle:
  – P2D: What’s happening now?
  – D2K: How should we change?
  – K2P: How should these changes be implemented?
Where the Cycle Starts

• The learning cycle should start at 5 o’clock and not 12 o’clock.

  – Starting at 12 o’clock (no!): the community has been told what to do or has made an “evidence-free” decision
  – Starting at 5 o’clock (yes!): the community collaboratively discovers what to do
Nursing Home Example

• Starting at 12 o’clock (anti-LHS)
  “Leadership has decided to hire Miracle Consultants and their program will be implemented to reduce falls: ...”

• Starting at 5 o’clock (LHS)
  “Everyone is concerned about the rate of falls. Based on our own studies and the literature, we will develop and implement a plan...”
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Continuity: The Community that Discovers is also the Community that Implements
You Can’t Skip this Step
(And Once Established, Learning Communities Are Active Across the Entire Cycle)
Learning Communities are Collaboratives

- Multi-stakeholder
- Pursuing a shared goal
- Fueled by “passion” to achieve the goal
- Strategies are “co-produced”
- Leader as facilitator
- No group dominates
Example: Improve Care Now

Improvers wanted.
Together, we're collectively restoring the wellbeing of all kids with Crohn's disease and ulcerative colitis — changing the way medicine is practiced.

IMPROVE CARE NOW™

WATCH OUR VIDEO
JOIN OUR CIRCLE
“Improve Care Now” IBD Remission Findings

Michigan Example: Out of Hospital Cardiac Arrest (OHCA)

Michigan’s goal to double OHCA survival

Red Line: Washtenaw-Livingston County Medical Control Authority (WLC-MCA)
Source: Cardiac Registry to Enhance Survival (CARES)
OHCA Learning Community

• Initial Scale: Two counties forming a medical control district
• Stakeholders across the whole chain of survival:

• Now funded by the American Heart Association
A Learning Community:
Pictures Worth a Thousand Words
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Infrastructure!

Cycles enable improvement but do not create a Learning System

• If you want to get 350,000 people per day across a river, does everyone build his/her own rowboat?

• No, you build a:
A Learning Health *System* is a Collection of Learning Cycles Supported by a Common Infrastructure
Why an Infrastructure?

• Without an infrastructural “platform”:
  – Every cycle requires its own agreements, technology, staffing, analytics, dissemination mechanisms
  – No economy of scale
  Cost of 10 cycles = 10 x (Cost of one)

• With a “platform”:
  – All cycles are supported by the infrastructure
  – Big economy of scale
  Cost of 10 cycles << 10 x (Cost of one)
Emphasis on Infrastructure is a Differentiator

Differentiates the LHS from:

- Lean
- PDSA, PDCA cycles
- Proprietary approaches

Crudely:

LHS = (Community-Driven Cycles) + (Infrastructure)

*Open* infrastructure that can be shared allows LHSs to “scale up”
We Can “Look Down” to See What the Infrastructure Consists Of
Infrastructure as Interconnected *Socio-Technical Services*

1. Organize, Start, Maintain, and Support Learning Communities

2. Capture, Identify, and Measure Performance and Performance Changes

3. Represent Health Information as Computable Data

4. Provide and Govern Access to and Use of Data

5. Share and Analyze Data Into New Knowledge

6. Make Knowledge Computable and Sharable

7. Generate & Deliver Knowledge-Derived Advice to Applicable Users

8. Enable and Promote Performance Changes
Many Open Infrastructure Components Already Exist: We Need More

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OHDSI, TRANSFoRM, Knowledge Grid, i2b2, PopMedNet, SMART IRB, pcor.net, emorse
In Closing...

• What are Learning Health Systems?
  LHSs improve health by marrying discovery to implementation, which drives further discovery

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Toward an Information Infrastructure for Global Health Improvement

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PERSPECTIVE
Mind the Gap: Putting Evidence into Practice in the Era of Learning Health Systems

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https://link.springer.com/content/pdf/10.1007%2Fs11606-018-4633-1.pdf

And everything in:

Learning Health Systems

lhsjournal.com
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