• About the Adult and Child Consortium for Health Outcomes Research and Delivery Science (ACCORDS) at CU Anschutz Medical Campus:
  ▪ Health services, outcomes, and implementation research
  ▪ Methodological cores and programs focused on service including consultation, training, and grant development

• Today: Learning Health Systems 2021: Where We’ve Been and Where We Need To Go
  ▪ Presented by: Katy Trinkley, PharmD, PhD and Heather Gilmartin, PhD, NP
## ACCORDS Upcoming Events

**Workshops and Seminars for 2021-2022:**

<table>
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<tr>
<th>Date(s)</th>
<th>Event</th>
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<tr>
<td>Sep 22, 12:00-1:00 PM MT</td>
<td>▪ CCTSI/ACCORDS Community Engagement Forum</td>
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<tr>
<td>Oct 11, 12:00-1:00 PM MT</td>
<td>▪ Learning Health Systems Seminar Series 2021-2022</td>
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<td>▪ Marc Williams, MD from Geisinger</td>
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<td>Nov 11, 12, 17, &amp; 19, 8:30-1:00PM MT</td>
<td>▪ Qualitative and Mixed Methods Research Workshop</td>
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<tr>
<td>May 23, 24, &amp; 25, 8:30-1:00PM MT</td>
<td>▪ COPRH Con 2022</td>
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Previously recorded seminars can be found on our ACCORDS Education website.
Learning Health Systems in 2021: Where We’ve Been & Where We Need To Go

Katy Trinkley, PharmD, PhD
Heather Gilmartin, PhD, NP

ACCORDS 2021-2022 Seminar Series
September 13, 2021
Learning Objectives

- Describe the facts and fiction regarding learning health systems
- Explain the historical context and aspirational goals of learning health systems
- Illustrate persistent implementation challenges of learning health systems
- Discuss a framework to achieve the aspirational goals of a fully mature learning health system
There is one definition for a Learning Health System

Fact or Fiction
FACT

A system in which,

“science, informatics, incentives, and culture are aligned for continuous improvement and innovation, with best practices seamlessly embedded in the delivery process and new knowledge captured as an integral by-product of the delivery experience”.

IOM 2015
A learning health system, per the Institute of Medicine...

“harnesses data and analytics to learn from every patient and feed the knowledge to clinicians to implement with high-reliability (i.e., error free)”
Learning Health Systems are a new idea

Fact or Fiction
Lean & Six Sigma
Systems Science
Community-based Participatory Research
Continuous Quality Improvement
Informatics
Value-based Care
Pragmatic Trials/Mixed-Methods
Dissemination & Implementation Science
Behavior Change
Improvement Science
Team Science
Decision Support
FICTION
Improvement Science
Learning Health Systems researchers are a real thing
Fact or Fiction
FACT

Learning Health Systems Researcher

"An individual who is embedded within a health system and collaborates with its stakeholders to produce novel insights and evidence that can be rapidly implemented to improve the outcomes of individuals and populations and health systems performance."

Agency for Health Research and Quality, 2017
There are model Learning Health Systems

Fact or Fiction
FACT

Accelerating implementation of research in Learning Health Systems: Lessons learned from VA Health Services Research and NCATS Clinical Science Translation Award programs

Amy M. Kilbourne1,2, Patricia L. Jones3 and David Atkins1

1Health Services Research and Development, Veterans Health Administration, U.S. Department of Veterans Affairs, Washington, DC, USA; 2Department of Learning Health Sciences, University of Michigan Medical School, Ann Arbor, MI, USA and 3Division of Clinical Innovation, National Center for Advancing Translational Sciences, National Institutes of Health, Bethesda, MD, USA

Quality Enhancement Research Initiative Implementation Roadmap
Toward Sustainability of Evidence-based Practices in a Learning Health System

Amy M. Kilbourne, PhD, MPH,*† David E. Goodrich, EdD,* Isomi Miao-Lye, PhD,*§ Melissa Z. Braganza, MPH,* and Nicholas W. Bowersox, PhD, ABPP‡

Moving From Discovery to System-Wide Change: The Role of Research in a Learning Health Care System: Experience from Three Decades of Health Systems Research in the Veterans Health Administration*

David Atkins,† Amy M. Kilbourne,1,2 and David Shulkin1

Accelerating learning healthcare system development through embedded research: Career trajectories, training needs, and strategies for managing and supporting embedded researchers*

Elizabeth M. Yano, PhD, MSPH a,b,‡†, Adam Resnick, MPH a,b, Michael Gluck, PhD d, Harry Kwon, PhD, MPH, MCHS a, Kamila B. Mistry, PhD, MPH e

a VA HSR&D Center for the Study of Healthcare Innovation, Implementation and Policy, VA Greater Los Angeles Healthcare System, 11311 Science Street, Sepulveda, CA 91343 USA
b Department of Health Policy and Management, UCLA Fielding School of Public Health, Los Angeles, CA, 90095, USA
c Department of Medicine, UCLA Geffen School of Medicine, Los Angeles, CA, 90095, USA
d AcademyHealth, 1100 17th NW, Suite 1100, Washington, DC, 20006, USA
e Agency for Healthcare Research and Quality, 2000 M Street, N.W., Washington, DC 20006, USA
There is one standard model for Learning Health Systems

Fact or Fiction
FIGURE S-3 Schematic of the continuously learning health care system.
Figure. The 6 phases of the rapid-learning health care system, from scanning to dissemination.

Blue Side: Technical advances

Red Side: Interdisciplinary – behavioral psychology, communication science, implementation science, behavioral economics, policy science, organizational theory.

Figure 2. The Learning Health System Cycle. Reproduced from [43]
Learning Health Systems

“Practice generating research”
Research informs practice $\leftrightarrow$ Practice informs research

- It’s hard
  - Complex, dynamic systems
Where We’ve Been: Well-Known Challenges

• System- and policy level support
  • Financial support, training programs

• Resource availability
  • Methodologic and analytic expertise
  • Accessibility of actionable and inclusive data

• Engagement of stakeholders
  • Patients, community members

• Shared mission across research and clinical enterprises
Many Existing LHS

- Diverse models
  - **Centralized** governance within a health system
  - Consultancy-like
  - **Decentralized** data network
Spectrum of LHS Maturity

• It’s NOT all or nothing
Where We Need to Go

A Fully Mature Learning Health System

• Aspirational
  • Innovations in data, technology and best practices

• Commitment to excellence
  • Quality, value, efficiency, equity

Davis FD et al. Learn Health Sys. 2021;5:e10221
An Aspirational Framework for a Mature LHS
An Aspirational Framework for a Mature LHS

Learning cycles
- Iterative
- Rapid
An Aspirational Framework for a Mature LHS

Greenne’s classic LHS model
An Aspirational Framework for a Mature LHS

‘PDSA’ concept from quality improvement (KP Washington)
An Aspirational Framework for a Mature LHS

Systems Thinking Approach to Complex Problems

HEALTH INSTITUTION UNIT LEVEL
(Individual department / specialty)

ORGANIZATIONAL LEVEL
(Individual health institution)

COMMUNITY LEVEL
(Relationships among health institutions / organizations)

PUBLIC POLICY LEVEL
(National, state and local)

Davis FD et al. Learn Health Sys. 2021;5:e10221
Boes S et al. Learn Health Sys. 2018;2:e10059
An Aspirational Framework for a Mature LHS

Engagement/support across all levels of stakeholders

Builds on the socio-ecologic model
An Aspirational Framework for a Mature LHS

ORGANIZATIONAL LEVEL
(Individual health institution)

- Shared vision: Evidence-based practice and practice-based evidence
- Equity-focused, transdisciplinary stakeholder-engaged team science
- Prioritization of resources and data availability
An Aspirational Framework for a Mature LHS

COMMUNITY LEVEL
(Relationships among health institutions / organizations)

- Multi-sectoral collaborations
- Shared goals and priorities
- Data sharing and standards
An Aspirational Framework for a Mature LHS

**PUBLIC POLICY LEVEL**
*(National, state and local)*

- Guidance/regulations/quality standards
- Reimbursement models (e.g., grant funding, clinical revenue)
- Financial support for training/education programs
- Few examples of LHS at this level
An Aspirational Framework for a Mature LHS

LHS can occur at any of these levels

Swiss model PCORnet

ADAPT

Geisinger, Vanderbilt, University of Michigan, VA, Kaiser

Systems Thinking Approach to Complex Problems

Health Institution Unit Level (Individual department / specialty)

Organizational Level (Individual health institution)

Community Level (Relationships among health institutions / organizations)

Public Policy Level (National, state and local)

Narrow

Breadth of population impact

Fast

Rapidity of enacting change

Slow

An Aspirational Framework for a Mature LHS

Informatics
- Data, software, technology
- Analytic tools, expertise
- Standards and ontologies
An Aspirational Framework for a Mature LHS

Precision health
- Inclusive data
- Individualized care

An Aspirational Framework for a Mature LHS

Stakeholder engagement
- Representative
- Ongoing, iterative

KEY COMPONENTS
- D&I Science
- Informatics
- Precision Health
- Stakeholder Engagement
- Quality Improvement
- Pragmatic Research

Krapohl GL et al. Learn Health Syst 2020;4:e10215
An Aspirational Framework for a Mature LHS

Quality improvement
- Iterative methods
- Culture of improvement
- Contextually relevant

KEY COMPONENTS
- D&I Science
- Informatics
- Precision Health
- Stakeholder Engagement
- Quality Improvement
- Pragmatic Research

Berwick DM. JAMA. 2008;299:1182
An Aspirational Framework for a Mature LHS

Pragmatic research methods/outcomes
- Relevance to stakeholders
- Rapidity and recursiveness of findings
- Replicability by others
- Rigor in real-world
- Resources required

An Aspirational Framework for a Mature LHS

Dissemination & Implementation (D&I) Science
- Translating evidence to practice
- Sustainability, scalability
- Dissemination

KEY COMPONENTS
- D&I Science
- Informatics
- Precision Health
- Stakeholder Engagement
- Quality Improvement
- Pragmatic Research

Harden SM et al. Prev Chronic Dis. 2021;18:E32
Glasgow RE. Health Educ Behav. 2013;40:257
The Aspirational Mature LHS Framework

• Integrates others’ work/ideas

• D&I science

• Prioritizes under-recognized challenges
  • Sustainability and generalizability

• Emphasizes methods to maximize equity
  • Inclusive precision health
  • Representativeness of stakeholders
LHS Summary

• An aspirational goal

• Many examples along the maturity spectrum

• Challenges present opportunities
  • Cultural and policy level changes
  • Transdisciplinary engagement
  • Integration of many methods/concepts/perspectives

• Tune in to future seminars to learn more!
Thank You!