

AAHC President's Council on the Learning Health System

Key Resources

Overviews

Anderson JL, Mugavero MJ, Ivankova NV, et. al. Adapting an interdisciplinary learning health system framework for academic health centers: a scoping review. Academic Medicine. 2022 Sep 23;97(10):1564-72.

Full-text link:

https://journals.lww.com/academicmedicine/Fulltext/2022/10000/Adapting_an_Interdisciplinary_Learning_Health.35.aspx

8 pages

A scoping review of the literature to identify definitions, components and how academic health centers have conceptualized the LHS. The authors compiled their findings to put forth a seven component LHS framework. The framework includes the following components: organization and collaboration, performance, ethics, and security, scientific, data, information technology, and patient outcomes.

Collard HR, Grumbach K. A call to improve health by achieving the learning health care system. Academic Medicine. 2022 Dec 22;98(1):29-35.

Full-text link:

https://journals.lww.com/academicmedicine/Fulltext/2023/01000/A_Call_to_Improve_Health_by_Achieving_the_Learning.14.aspx

6 pages

A Scholarly Perspectives article which defines the LHS concept and describes its historical relationship to academic health systems. Specific to the AHC, the authors also explore factors that serve as barriers and facilitators to establishing and sustaining and LHS. The article concludes with proposed next steps at the local, regional, and national levels.

De Bruin J, Bos C, Struijs JN, Drewes HW, Baan CA. Conceptualizing learning health systems: A mapping review. Learning Health Systems. 2023 Jan;7(1):e10311.

Full-text link: <https://onlinelibrary.wiley.com/doi/full/10.1002/lrh2.10311>

10 pages

A mapping review that included 155 articles that were mapped in relation to the concept of the LHS across the literature. The authors identified that the studies included 25 interconnected aims of which the most prevalent were accelerating research, clinical decision making, and improving the quality of care. Nine design elements were also identified. Design elements were varied and ranged from stakeholder inclusion to financial incentives.

Easterling D, Perry A, Miller D. Implementing the learning health system paradigm within academic health centers. Learning Health Systems. 2023:e10367.

Full-text link: <https://onlinelibrary.wiley.com/doi/full/10.1002/lrh2.10367>

6 pages

Billed as an “experience report” this article is a narrative review, which describes how AHCs nationally have implemented the concept of the LHS. The authors also weave into the narrative their personal experience of promoting the adoption of the LHS concept at their own AHC (Atrium Health Wake Forest Baptist). Barriers to LHS adoption are identified and future recommendations are proposed to mitigate them.

Ellis LA, Sarkies M, Churrua K, et. al. The science of learning health systems: scoping review of empirical research. JMIR medical informatics. 2022 Feb 23;10(2):e34907.

Full-text link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8908194/>

17 pages

A scoping review of 76 studies that utilized an implementation science lens that aimed to map the empirical research on the LHS to identify limitations to implementations and propose future directions for the concept. The authors found that most studies focused on a particular context or patient population with only a minority considering whole hospitals or hospital systems. Key topics covered included ethics, policies and governance; stakeholder perspectives; and LHS-specific research strategies and tools.

Lindsell CJ, Gatto CL, Dear ML, et al. Learning from what we do, and doing what we learn: A learning health care system in action. Academic Medicine. 2021 Jun 8;96(9):1291-9.

Full-text link:

https://journals.lww.com/academicmedicine/Fulltext/2021/09000/Learning_From_What_We_Do,_and_Doing_What_We_Learn_.32.aspx

9 pages

This article provides a roadmap of the development and implementation of the LHS at Vanderbilt University Medical Center with a specific focus on describing its LHS platform and

the roadmap to its creation. The authors provide descriptions of what they found to be essential design elements of LHS projects; the resources required for the LHS platform to include regulatory guidance and research expertise; infrastructure costs; and recommendations for structures and governance.

McDonald PL, Van Der Wees P, Weaver GC, Harwood K, Phillips JR, Corcoran M. Learning health systems from an academic perspective: establishing a collaboratory within a school of medicine and health sciences. Medical Education Online. 2021 Jan 1;26(1):1917038.

Full-text link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8079055/>

8 pages

A descriptive article that described the George Washington University School of Medicine and Health Sciences Health Research and Education Collaboratory. The GW Collaboratory was established to study mechanisms supporting continuous quality improvement and learning in health systems within an academic medical center. The authors describe the overall structure of the Collaboratory, the competencies that it supports and implemented projects, including its integration with doctoral education.

Platt JE, Raj M, Wienroth M. An analysis of the learning health system in its first decade in practice: scoping review. Journal of medical Internet research. 2020 Mar 19;22(3):e17026.

Full-text link: <https://www.jmir.org/2020/3/e17026/>

16 pages

This scoping review describes 85 articles on the LHS between 2008-2018. Articles were primarily concerned with: theory related to the LHS, the implementation of an LHS, advocacy for an LHS and the role of policy. The authors identified the following broad themes: culture, innovations, data structure, and ethical considerations. The authors also examined the use of LHS definitions finding that the Institute of Medicine/National Academy for Medicine's definition was most frequently used by authors.

Rosenthal GE, McClain DA, High KP, et. al. The academic learning health system: A framework for integrating the multiple missions of academic medical centers. Academic Medicine. 2023 Apr 25:10-97.

Full-text link:

https://journals.lww.com/academicmedicine/Abstract/9900/The_Academic_Learning_Health_System_A_Framework.434.aspx

12 pages

In this article, the authors raise the importance of considering the nuances of an LHS in the context of an AHC. They identify six features that differentiate an academic LHS from a general LHS, which include embedded academic expertise in health systems science; engagement with the full spectrum of translational investigation; access to current and future experts in LHS sciences and clinicians with fluency in practicing in an LHS; application of core LHS principles to the development of training across the continuum of medical education; broad dissemination of knowledge; and the ability to address social determinants of health.

Zurynski Y, Smith CL, Vedovi A, et al. Mapping the learning health system: A scoping review of current evidence. Australian Institute of Health Innovation, Sydney, Australia. 2020.

Full-text link: https://research-management.mq.edu.au/ws/portalfiles/portal/134364432/Publisher_version_open_access.pdf

63 pages, however, the report opens with an approximately 10-page overview summary

This scoping review of 272 information resources, published between 2016-2020, attempted to describe the current understanding of the LHS based on LHS definitions, schematic frameworks, barriers and enablers. The authors also analyzed relevant LHS case study examples with 42 based in the US and seven that were multi-national. While a lengthy report, this does introduce a more global slant that draws widely from a variety of information types. The report also identified 63 frameworks that illustrate the functioning of an LHS with the IOM's framework most used. The report also identifies barriers and enablers across five dimensions and highlights eight characteristics.

LHS Frameworks / Models

Friedman CP, Rubin JC, Sullivan KJ. Toward an information infrastructure for global health improvement. Yearbook of medical informatics. 2017 Aug;26(01):16-23.

Full-text link: <https://www.thieme-connect.de/products/ejournals/html/10.15265/IY-2017-004>

7 pages

This is a literature-informed essay that provides background on the LHS and attempts to describe the mechanisms that will enable the creation of a fully functional LHS. The authors describe the necessary learning cycle and the necessary infrastructure to support to enable this learning. The authors draw upon global examples and the worldwide desire for the outcomes of an LHS to position the challenge of creating an LHS as a major priority.

Lessard L, Michalowski W, Fung-Kee-Fung M, Jones L, Grudniewicz A. Architectural frameworks: Defining the structures for implementing learning health systems. Implement Sci. 2017;12(1):78.

Full-text link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5481948/>

11 pages

The authors propose an architectural framework for the development of an LHS that includes descriptions of the necessary structures and their interrelationships to design and implement an LHS at large scale and at the organizational level. Based on the literature, the framework includes five dimensions (goals, scientific, social, technical and ethical) that are integrated into six decision layers, which represents this article's unique contribution.

Menear M, Blanchette MA, Demers-Payette O, Roy D. A framework for value-creating learning health systems. Health research policy and systems. 2019 Dec;17(1):1-3.

Full-text link: <https://health-policy-systems.biomedcentral.com/articles/10.1186/s12961-019-0477-3>

3 pages

Based on a scoping review of the literature and set in the Canadian context, this article describes a conceptual framework to support the implementation of LHSs. The framework proposes core elements that characterize an LHS and the pillars and accelerators that the authors believe will enable success. The article was written by the Institut national d'excellence en sante et en service sociaux.

Psek WA, Stametz RA, Bailey-Davis LD, Davis D, Darer J, Faucett WA, et al. Operationalizing the learning health care system in an integrated delivery system. EGEMS. 2015;3(1):1122.

Full-text link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4434917/>

14 pages

Based at Geisinger Health System, this article describes their framework which includes nine elements including: data and analytics, people and partnerships, patient and family engagement, ethics and oversight, evaluation and methodology, funding, organization, prioritization and deliverables. Highlights the importance of leadership support to facilitate success.

Leadership Focus

Enticott J, Braaf S, Johnson A, Jones A, Teede HJ. Leaders' perspectives on learning health systems: a qualitative study. BMC Health Serv Res. 2020 Nov 26;20(1):1087.

Full-text link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7689994/>

13 pages

The authors interviewed 26 healthcare leaders primarily based in Australia with two participants from the UK and Canada. Five themes were identified, culture; continuous learning; data systems; resourcing and workforce that were felt to be critical to a sustainable LHS. The authors include their interview guide.

Morain SR, Kass NE, Grossmann C. What allows a health care system to become a learning health care system: Results from interviews with health system leaders. Learn Health Syst. 2016 Oct 21;1(1):e10015.

Full-text link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6516720/>

8 pages

An analysis of interviews with leaders of 25 healthcare organizations in the US, which includes a handful of AHCs (Duke, Vanderbilt, Penn State, Baylor). Five themes were identified including those related to their implementation: visionary leadership, adaptation to a changing health care landscape, external funding, regulatory influence, and mergers and expansion. They also identify challenges and strategies to overcome them.

Psek W, Davis FD, Gerrity G, et. al. Leadership perspectives on operationalizing the learning health care system in an integrated delivery system. eGEMS. 2016;4(3).

Full-text link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5019321/>

10 pages

The authors interviewed 41 healthcare leaders specifically at Geisinger Health. Ten themes were identified. While focused on a single entity, the authors consider how the findings can be applied broadly.

Websites

Learning Health Systems journal

<https://onlinelibrary.wiley.com/journal/23796146>

Learning Health Systems (LHS) is an international, open access, peer-reviewed journal published in collaboration with the University of Michigan. With a goal of advancing the interdisciplinary area of learning health systems, the journal promotes research, scholarship, and dialogue focused on theory, complex issues, conceptual syntheses, education models and more. *LHS* seeks to achieve continuous rapid improvement in health and healthcare and to transform organizational practice. The journal includes computable knowledge publications, research reports, experience reports, technical reports, policy analyses, briefs and commentaries. This journal has been publishing since 2017. Chuck Friedman is the editor-in-chief.

National Academy of Medicine: The Learning Health System series

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

Most likely the first volume in the series, *The Learning Healthcare System*, which provides an overview or Leadership Commitments to Improve Value in Healthcare, would be of most relevance to the President's Council. Of note, each of these resources is quite long (300+ pages), however, they all open with a somewhat shorter summary chapter. It is possible to freely download these as the complete text or by chapter.

AHRQ

<https://www.ahrq.gov/learning-health-systems/about.html>

This website provides an overview of the LHS and a variety of resources. Most notably, the site presents a series of brief case studies "Learning From the Field", including from Baylor Health and the University of Utah Health.

The Learning Healthcare Project

<https://learninghealthcareproject.org/>

Based out of Newcastle University in the UK this website serves as an aggregator of curated content on the LHS including case studies, journal articles, reports, links to related websites. The site is navigable by an image that includes the multiple components of an LHS.