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JMIR Publications recently published "[The Science of Learning Health Systems: Scoping Review of Empirical Research](#)" in [JMIR Medical Informatics](#) which reported that the development and adoption of a Learning Health System (LHS) has been proposed as a means to address key challenges facing current and future health care systems. Learning Health Systems (LHS) is a concept that seeks to connect a myriad of data and knowledge with clinicians, families, and the patient themselves in a highly sophisticated way that fully supports informed decision making, and forms a continuous cycle of improvement.

Prof. [Jeffrey Braithwaite](#) and Dr Louise Ellis from the Australian Institute of Health Innovation, [Macquarie University](#), have recently published a review of published papers that have an explicit empirical focus on LHS.



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With the growth in empirical contributions in the LHS field, it was timely to examine the published empirical research and to determine the status of the field, five years on from the first LHS review of Budrionis and Bellika (2016). The review was also designed to leverage recent developments from the field of implementation science, which aligns closely with a core goal of LHSs, to get more evidence into practice, and to satisfy requirements for continuous quality improvement.

Study information was extracted relevant to the review objective, including:

1. Primary concern or focus;
2. Context;
3. Design;
4. Data type;
5. Implementation framework, model, or theory used;
6. Implementation determinants or outcomes examined.

Since the 2016 review by Budrionis and Bellika, which found only 13 LHS empirical studies from 2007 to 2015, the Braithwaite research team identified a further 76, showing the growth of empirical applications within the LHS field over the past 5 years. Over two-thirds of the identified studies were concerned with implementing a particular program, system, or platform designed to contribute to achieving an LHS. Most of these studies focused on a particular clinical context or patient population, with far fewer studies focusing on whole hospital systems or on other broad health care systems encompassing multiple facilities.

In particular, the routine use of implementation determinant and outcome frameworks will improve the assessment and reporting of barriers, enablers, and implementation outcomes in this field and will enable comparison and identification of trends across studies.

Prof. [Jeffrey Braithwaite](#) from [Macquarie University](#) said, "*Contemporary health care systems are not always fit for purpose or evidence-based.*" To overcome ongoing challenges in health care systems, there is growing awareness of the need for health care systems predicated on knowledge harvesting and exploitation, and continuing improvement through leveraging big data and incorporating patients' perspectives and choices into decisions.

Although this vision has remained largely aspirational to date, rapid innovations in big data, machine learning, and artificial intelligence are creating the opportunity, and expectation, that health care systems can make real the promise of an LHS.

Research interest in LHS concepts and ideas has been increasing, as evidenced by the growing number of publications on LHS since it was first discussed in 2007 and the emergence of the influential journal [Learning Health Systems](#).

The Braithwaite research team concluded in their [JMIR Publications Research Output](#) that studies empirically investigating and implementing LHS models have been increasing in recent years. In particular, they are seeing research concerned with implementing a variety of programs, systems, or platforms designed to contribute to achieving an LHS.

Running parallel with this work, a new LHS Toolkit has recently been released: <https://lhstoolkit.learninghealthcareproject.co.uk/> and is in beta testing. It aims to provide up to date tools, frameworks and guidance for any group interested in developing capacities centred on LHS concepts and principles.

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Full-text – <https://medinform.jmir.org/2022/2/e34907>

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**Keywords** – learning health systems, learning health care systems, implementation science, evaluation, health system, health care system, empirical research, medical informatics, review

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