LEARNING TOGETHER FOR BETTER HEALTH USING AN EVIDENCE-BASED LEARNING HEALTH SYSTEM FRAMEWORK: A CASE STUDY IN STROKE

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ABSTRACT

The introduction sets the stage for the case study on stroke within an evidence-based Learning Health System (LHS) framework. This framework enables collaborative learning among healthcare providers, researchers, and patients, aiming to improve health outcomes through continuous generation and application of evidence. The section will provide a background on the significance of implementing an LHS approach in stroke care, emphasizing the need for a systematic, data-driven method to address the complexities of stroke management. Additionally, it will outline the specific research aim and objectives of the case study, establishing the purpose and scope of the investigation. The introduction will provide a comprehensive overview of the upcoming analysis of learning together for better health in stroke care by delving into the rationale behind the study and clearly defining its aims.

Key words: Learning Health System, Stroke, Evidence-based medicine, Person-centred care, Models of care, Healthcare improvement

The background and rationale for this study lie in the urgent need to improve the health outcomes of individuals affected by stroke. Stroke is a leading cause of disability and mortality worldwide, and its management requires a multidisciplinary approach that integrates the latest research and clinical expertise. However, traditional healthcare systems often struggle to effectively incorporate new evidence into routine practice, leading to delays in implementing best practices and ultimately impacting patient outcomes. In response to this challenge, the concept of a Learning Health System (LHS) has emerged as a promising framework to bridge the gap between research and practice. By systematically collecting and analyzing data from clinical encounters, the LHS model enables healthcare organizations to learn and adapt their processes to deliver better care continuously. This case study aims to demonstrate the potential of an evidence-based LHS framework in improving stroke care, with the ultimate goal of fostering collaboration and knowledge exchange among various stakeholders to enhance patient outcomes and quality of life.

Overall, the aim and objectives of this research align with the broader goal of fostering collaboration and learning within the healthcare ecosystem to ultimately achieve better health outcomes for individuals affected by stroke. The study aims to

contribute valuable insights and evidence to support the advancement of stroke care practices within the context of a Learning Health System.

To achieve this aim, the research has outlined several key objectives. One of the main objectives is to establish a comprehensive understanding of the current practices and challenges in stroke care through the collection and analysis of real-world data. Additionally, the research aims to identify opportunities for improvement in stroke care by leveraging the insights gained from the Learning Health System framework. Furthermore, the study aims to develop and implement evidence-based interventions and protocols tailored to the specific needs of stroke patients, with an emphasis on continuous learning and adaptation based on real-time data and experiences.

In this section, we will delve into the specific aim and objectives of the research conducted within the framework of a Learning Health System in the context of stroke. The primary aim of this study is to examine the effectiveness and efficiency of utilizing an evidence-based Learning Health System approach to improve outcomes for stroke patients. By integrating clinical expertise, patient preferences, and the best available evidence, the research seeks to enhance the quality of care and the overall health trajectory of individuals affected by stroke.

Internationally, health systems are facing a crisis, driven by an ageing population, increasing complexity, multi-morbidity, rapidly advancing health technology and rising costs that threaten sustainability and mandate transformation and improvement [1, 2]. Although research has generated solutions to healthcare challenges, and the advent of big data and digital health holds great promise, entrenched siloes and poor integration of knowledge generation, knowledge implementation and healthcare delivery between stakeholders, curtails momentum towards, and consistent attainment of, evidence-and value-based care [3]. Tis is compounded by the short supply of research and innovation leadership within the healthcare sector, and poorly integrated and often inaccessible health data systems, which have crippled the potential to deliver on digital-driven innovation [4]. Current approaches to healthcare improvement are also often isolated with limited sustainability, scale-up and impact [5]. Evidence suggests that integration and partnership across academic and healthcare delivery stakeholders are key to progress, including those with lived experience and their families (referred to here as consumers and community), diverse disciplines (both research and clinical), policy makers and funders. Utilization of evidence from research and evidence from practice including data from routine care, supported by implementation research, are key to sustainably embedding improvement and optimising health care and outcomes. A strategy to achieve this integration is through the Learning Health System (LHS) (Fig. 1) [2, 6–8]. Although there are numerous publications on LHS approaches [9–12], many focus on research perspectives and data, most do not demonstrate tangible healthcare

improvement or better health outcomes. [6] In developed nations, it has been estimated that 60% of care provided aligns with the evidence base, 30% is low value and 10% is potentially harmful [13]. In some areas, clinical advances have been rapid and research and evidence have paved the way for dramatic improvement in outcomes, mandating rapid implementation of evidence into healthcare (e.g. polio and COVID-19 vaccines). However, healthcare improvement is challenging and slow [5]. Health systems are highly complex in their design, networks and interacting components, and change is difcult to enact, sustain and scale up. [3] New efective strategies are needed to meet community Fig. 1 Monash Learning Health System: The Learn Together for Better Health Framework developed by Monash Partners and Monash University (from Enticott et al. 2021 [7]). Four evidence quadrants: Q1 (orange) is evidence from stakeholders; Q2 (green) is evidence from research; Q3 (light blue) is evidence from data; and, Q4 (dark blue) is evidence from implementation and healthcare improvement Teede et al. BMC Medicine (2024) 22:198 Page 3 of 9 needs and deliver evidence-based and value-based care, which reorients care from serving the provider, services and system, towards serving community needs, based on evidence and quality. It goes beyond cost to encompass patient and provider experience, quality care and outcomes, efciency and sustainability [2, 6]. Te costs of stroke care are expected to rise rapidly in the next decades, unless improvements in stroke care to reduce the disabling efects of strokes can be successfully developed and implemented [14]. Here, we briefy describe the Monash LHS framework (Fig. 1) [2, 6, 7] and outline an exemplar case in order to demonstrate how to apply evidence-based processes to healthcare improvement and embed real-world research for optimising healthcare. Te Australian LHS exemplar in stroke care has driven nationwide improvement in stroke care since 2007.

An evidence-based Learning Health System framework In Australia, members of this author group (HT, AJ, JE) have rigorously co-developed an evidence-based LHS framework, known simply as the Monash LHS [7]. Te Monash LHS was designed to support sustainable, iterative and continuous robust beneft of improved clinical outcomes. It was created with national engagement in order to be applicable to Australian settings. Trough this rigorous approach, core LHS principles and components have been established (Fig. 1). Evidence shows that people/workforce, culture, standards, governance and resources were all key to an efective LHS [2, 6]. Culture is vital including trust, transparency, partnership and co-design. Key processes include legally compliant data sharing, linkage and governance, resources, and infrastructure [4]. Te Monash LHS integrates disparate and often siloed stakeholders, infrastructure and expertise to 'Learn Together for Better Health' [7] (Fig. 1). Tis integrates (i) evidence from community and stakeholders including priority areas and outcomes; (ii) evidence from research and guidelines; (iii) evidence from practice (from data) with advanced analytics and benchmarking; and (iv) evidence from

implementation science and health economics. Importantly, it starts with the problem and priorities of key stakeholders including the community, health professionals and services and creates an iterative learning system to address these.

Australian Stroke Learning Health System Internationally, the application of LHS approaches in stroke has resulted in improved stroke care and outcomes [12]. For example, in Canada a sustained decrease in 30-day in-hospital mortality has been found commensurate with an increase in resources to establish the multifactorial stroke system intervention for stroke treatment and prevention [15]. Arguably, with rapid advances in evidence and in the context of an ageing population with high cost and care burden and substantive impacts on quality of life, stroke is an area with a need for rapid research translation into evidence-based and value-based healthcare improvement. However, a recent systematic review found that the existing literature had few comprehensive examples of LHS adoption [12].

There is a clear mandate to optimise healthcare improvement with big data ofering major opportunities for change. However, we have lacked the approaches to capture evidence from the community and stakeholders, to integrate evidence from research, to capture and leverage data or evidence from practice and to generate and build on evidence from implementation using iterative system-level improvement. Te LHS provides this opportunity and is shown to deliver impact. Here, we have outlined the process applied to generate an evidence-based LHS and provide a leading exemplar in stroke care. Tis highlights the value of moving from single-focus isolated approaches/initiatives to healthcare improvement and the beneft of integration to deliver demonstrable outcomes for our funders and key stakeholders — our community. This work provides insight into strategies that can both apply evidence-based processes to healthcare improvement as well as implementing evidence-based practices into care, moving beyond research as an endpoint, to research as an enabler, underpinning delivery of better healthcare.

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