Bridging Technology and Healthcare Services: Implementing a Digital Innovation Hub in Critical Care for Quality Improvement

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Introduction

In Cambridge University Hospitals (CUH), where the directorate of Critical Care spans four floors and involves over 500 staff members, the complexity of clinical workflows presents challenges in maintaining process efficiency and communication. With multiple ongoing improvement efforts spread across the various units, the need for a centralised system to streamline these processes is paramount.

The creation of a **Quality Improvement (QI) Hub** aims to address this challenge by providing a cohesive platform to coordinate and manage QI initiatives in real time. Central to this QI project is the concept of Digital Innovation Hub (DIH). DIHs have been increasingly employed across Europe, especially in finance and manufacturing, where digital hubs have enhanced automation and process efficiency up to 40% in the first two years of implementation. Borrowing this DIH approach from other industries into healthcare represents a forward-thinking strategy in driving digital transformation and enhancing the quality of care. Through a QI Hub, improvement efforts are not only standardised, but also reduces duplications while aiming to enhance clinical outcomes.

Methodology
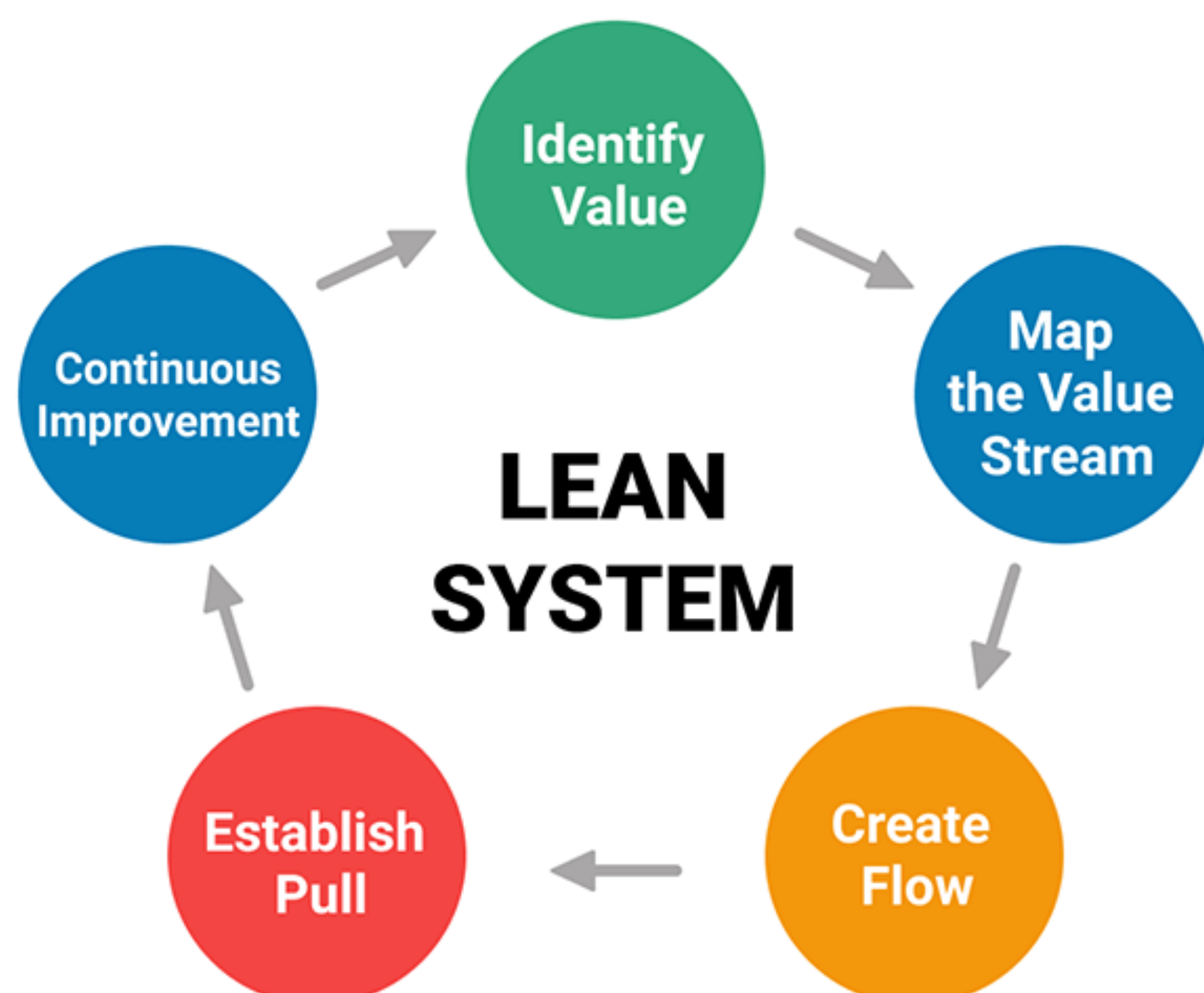
Rationale: Given the decentralised and fragmented nature of QI efforts in CUH Critical Care, with various teams working on different projects and no unified system to capture these QI initiatives, the **Lean Methodology** has been selected. Essentially, Lean principles focus on eliminating inefficiencies, making it an ideal approach for integrating the multiple improvement actions across all units in CUH Critical Care.

QI Design and Approach

WHAT WE ARE AIMING TO ACCOMPLISH

In September 2024, this QI project has been approved by the CUH Critical Care Matrons and supported by the Trust's Divisional Head of Nursing. The aim in the next 12 months is to establish an integrated QI Hub within CUH Critical Care. This includes capturing and tracking of individual and team-led projects, promoting cross-unit collaboration, and sharing of best practices to enhance the provision of services in CUH Critical Care.

WHAT ARE WE MEASURING TO UNDERSTAND IF OUR CHANGE WILL BE AN IMPROVEMENT

Structure Measure: The target of this project is to establish a QI Hub using available digital infrastructures within the Trust, with full compliance to data protection standards set by CUH. An IT audit will be conducted at the 12-month mark to assess functionality and usage.

Process Measure: Staff surveys will be completed quarterly to evaluate the experiences of members within CUH Critical Care using the QI Hub. Being key stakeholders, staff engagement is critical for this project. Their active participation influences overall effectiveness of the system, and necessary adjustments to the QI Hub can be made based on their feedback.

Outcome Measure: Key performance indicators (KPIs) will be monitored throughout the duration of the project to assess the impact of the QI Hub on patient care and clinical outcomes. These KPIs will focus on critical metrics such as improvements in length of stay, decreases in clinical errors, and reductions in mortality rates.

WHAT CHANGES WE ARE MAKING

At present, the framework and toolkits for the QI Hub are being developed in collaboration with the Trust's Quality and Transformation Team. This ensures that the project aligns with clinical governance standards, whilst adhering to the broader organisational goals aimed at standardising improvement methodologies across CUH.

Impact and Next Steps

Creating Long-Term Value: After the review process has been completed and recommendations are incorporated into the QI Hub's framework, the next critical step is raising awareness. This will include communication campaigns, staff briefings, and showcasing the benefits of using the QI Hub. Once the system is officially launched, ongoing support will be in place to ensure long-term value of the project. Furthermore, digital platforms like the QI Hub not only help facilitate decision-making that is data-driven, but also support a culture of continuous improvement, which is a key determinant in sustained quality in healthcare delivery.

GLOBAL RELEVANCE OF QUALITY IMPROVEMENT

Quality Improvement (QI) initiatives are integral to improving healthcare outcomes worldwide. According to a 2020 report by the World Health Organization (WHO), healthcare systems globally face challenges such as inefficiencies, high error rates, and uneven care quality, particularly in complex environments like critical care. This QI project, by focusing on streamlining care through a digital hub, provides a model that can be adapted to different healthcare systems globally, addressing these systemic issues.

PATIENT SAFETY AND CARE QUALITY

Data-driven Healthcare: Patient safety and care quality are at the forefront of global health priorities. Research from the Institute for Healthcare Improvement (IHI, 2020) emphasises that system-level interventions such as real-time data access and decision support tools can reduce clinical errors and improve care quality. This QI project's use of a DIH is designed to integrate real-time patient data in clinical decision-making. In addition, this project can also contribute to advancing data-driven healthcare globally. Future outcomes of this project, can help serve as a blueprint for digital health transformation, where adoption of such systems is crucial in improving healthcare efficiency particularly in critical care settings worldwide.